FM 10-416
HEADQUARTERS
DEPARTMENT OF THE ARMY

PETROLEUM PIPELINE AND TERMINAL OPERATING UNITS

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FIELD MANUAL
No. 10-416
HEADQUARTERS

DEPARTMENT OF THE ARMY
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PETROLEUM PIPELINE AND TERMINAL OPERATING UNITS

Table of Contents

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PREFACE

The mission of the United States Army is to protect and defend the Constitution of the United States of America. The Army does this by deterring war and, when and/or if deterrence fails, by achieving quick, decisive victory anywhere in the world and under virtually any conditions as part of a joint or combined team. Military leaders, at all levels, have the inherent responsibility to know and fully understand their role in supporting and fulfilling the Army's mission

Purpose and Scope

The Army's doctrine lies at the heart of its professional competence. It is the official guide to how Army forces fight wars and conduct SASO. This manual, FM 10-416, provides military leaders the basic doctrine for the petroleum pipeline and terminal operating units in a theater of operations (developed and/or undeveloped). FM 10-416 further provides insight, general data and operational information for the commander, key leadership, and personnel assigned to the petroleum pipeline and terminal operating units (TOEs 10416 and 10417L0). Information in this FM will assist in the supervision and conduct of training and operations in peacetime as well as during hostilities. Important environmental information is in Chapter 2 about individual and collective duties and responsibilities. Commanders and their leaders are encouraged to use their own judgments, experiences, initiatives, and imaginations along with the information in this FM to assist in the smooth and effective operation of their units.

User Information

The proponent of this FM is HQ TRADOC. Send comments and recommendations on DA Form 2028 directly to:

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Fort Lee, VA 23801-1713

*Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

**All equipment listings are based on OTOEs at time of publication. Consult the using unit MTOE for current equipment authorizations.

INTRODUCTION

Current petroleum doctrine, as this edition of FM 10-416 will reflect, is based on the Army's IPDS; its concept of employment and its interface with the U.S. Navy's OPDS as it pertains to either an "undeveloped" or "developed" theater of operations. FM 10-416 will serve as a key source of information for the leadership of the petroleum pipeline and terminal operating company's leadership. It will also serve as a vital source document in the current structuring of the unit's TOE.

OPDS Overview

The mission of the OPDS is to deliver fuel to a BTU on the beachhead (near the shoreline). The OPDS consists of a fleet of specialized waterborne vessels (modified petroleum tanker cargo ships). Each ship carries a cargo of fuel, a single anchor leg mooring system (mooring buoy, anchor chain and mooring base) and 4 miles of heavy-duty flexible conduit (hose) stored on reels. In operation, the ship can anchor a maximum of 4 miles offshore and pump fuel through the mooring system and conduit to the BTU. At that location, the fuel is transferred into the IPDS through the beach interface assembly for movement inland.

IPDS Overview and Concept of Employment

The IPDS consists of commercially available and military standard petroleum equipment that can be assembled by trained U.S. soldiers into an integrated petroleum distribution system. The system provides the Army with the unique capability required to support an operational force with bulk fuels in either an undeveloped and/or developed theater of operations. Bulk petroleum (fuel) can be supplied from either local sources or over-the-shore by the OPDS. The fuel is then moved inland via a pipeline system and pump stations to TPT or fuel storage facilities. Each TPT consists of three fuel units (bulk fuel receipt, storage and distribution facilities) and PLCAs. Each fuel unit consists of three tank farm assemblies. Fuel units may be used in combination with PLCA, and receive fuel from the pipeline or they can be used as independent units and receive fuel only from petroleum tank trucks/vehicles. In either case, the fuel unit can distribute fuel from bulk storage to tanker trucks for operational use.

Theater OPLANs identify fuel storage and distribution requirements from which pipeline traces (routes), pump stations locations and quantities and temporary storage sites are predetermined. If a requirement for OPDS exists, planning for location and installation is accomplished concurrently. In operation, the IPDS is designed to be transported to the theater of operations via the most expeditious and feasible way available, pending the CINC's priority of requirements. Engineer support units have the primary responsibility to install the pipeline, construct the pump stations, and assist with storage site preparation. Designated/selected Quartermaster units install the storage system and operate the total system when it is completed. Quartermaster units may also assist with the installation of pipelines when required. When not in use, the IPDS is stored in predetermined configurations and containers for deployment.

CHAPTER 1

ORGANIZATION OF THE THEATER

Section I. Theater Organization and Structure

The petroleum pipeline and terminal operating battalion is part of the CSS function of the theater of operations. The unit is assigned or attached within the theater as the operational situation permits. This chapter describes the theater organization and structure and the role of petroleum logistics in the theater.

THEATER ORGANIZATION

A theater is a large geographical area outside the continental United States that has one overall commander. The theater concept requires an organization that can be tailored for any size operation. The organization must be flexible enough for a diversified mission. The UCP establishes criteria for a unified theater based on national security strategy, national military strategy, geography, and history. Unity of effort requires that one responsible commander focus resources toward obtaining defined goals.

Chain of Command

The chain of command is prescribed by the Goldwater-Nichols Reorganization Act of 1986. The NCA exercises authority and control of the armed forces through a chain of command with two branches. The first branch flows from the President to the Secretary of Defense to the combatant commanders for missions and forces assigned to their commands. The second flows from the NCA to the secretaries of military departments to the chiefs of the service forces for execution of service functions. Commanders of the NCA are responsible to the NCA for the preparedness of their commands and execution of assigned missions. ASCC, assigned to the COCOMs, are responsible for preparing, maintaining, training, equipping, administering, and supporting Army forces assigned to the unified and specified commands. The Chairman JSC is placed within the chain of command to communicate the NCA's direction. Figure 1-1, page 1-2 displays the chain of command.

Command Authorities

Commanders in the chain of command exercise authority as prescribed by law or a superior commander. Commanders of US military forces use various levels of authority, which are described as command relationships and various other authorities. There are four command relationships: COCOM, OPCON, TACON, and support. The other levels of authority are coordinating authority, ADCON, and DIRLAUTH.

THEATER STRUCTURE

A theater is a geographical area OCONUS for which a commander of a unified command has been assigned military responsibility. It may be viewed from the strategic context as the level of international military cooperation required or the degree of necessary dedicated US military resources. These perspectives may influence how the Army conducts operations in each theater. Though theaters may involve unilateral US operations, US forces may also act with other nations in multinational operations, as in Operations Desert Shield and Desert Storm.

Types of Theaters

Theaters are often described as maritime, continental, or littoral based on their dominant geographic and strategic characteristics. This description influences the predominant type of military forces used, the strategic missions assigned, and the strategic and operational objectives pursued in the theater. Continental theaters primarily involve control of land and associated airspace. Maritime theaters focus on ensuring control of the sea and associated airspace. A littoral theater is set up on a shore or coastal region where major actions between land, air, and sea operations are combined and must be synchronized.

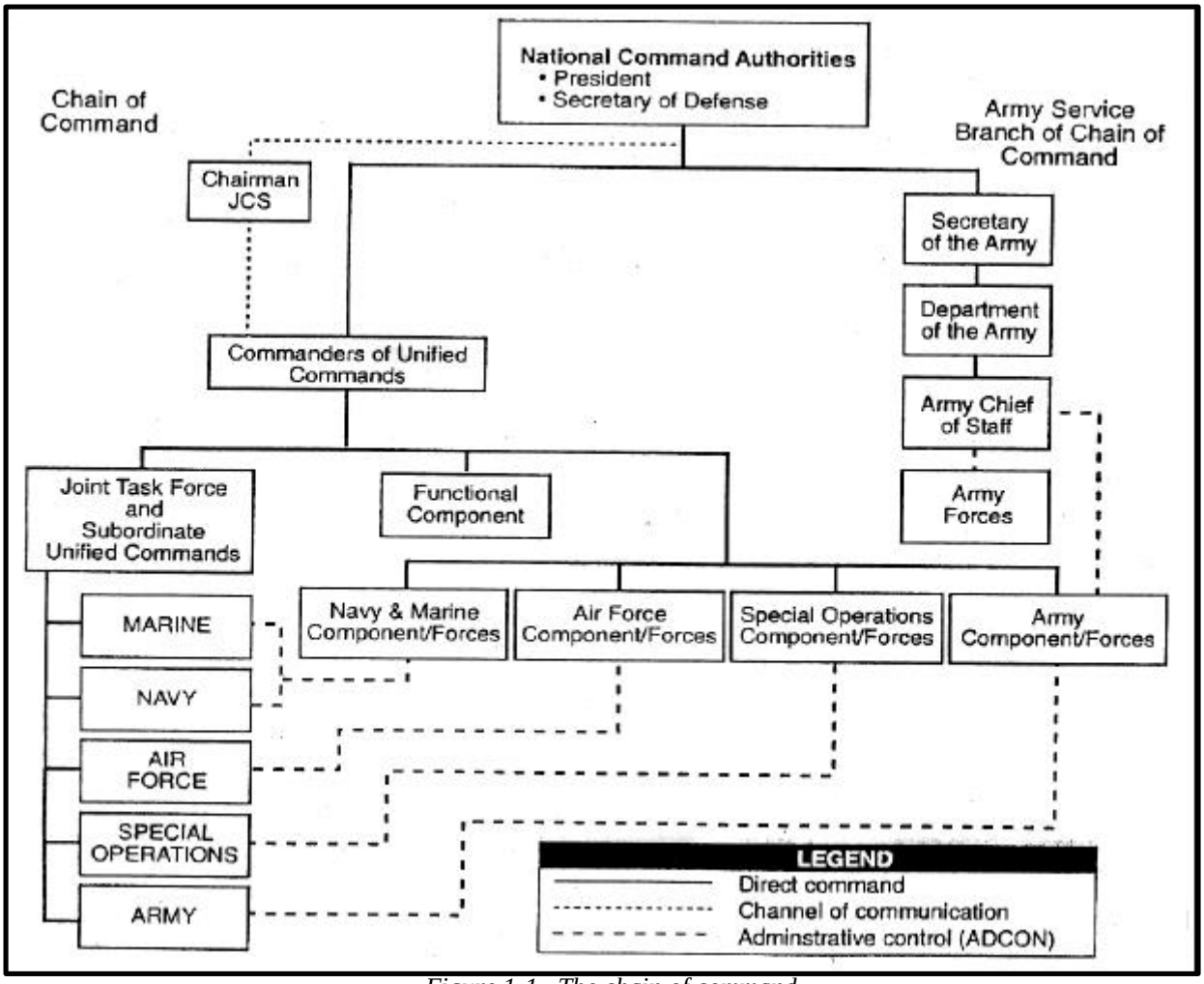


Figure 1-1. The chain of command

Internal Theater Organization

Theater combatant commanders develop strategy and organize the theater. The Army, besides operating as part of a joint force, must be prepared to conduct multinational operations with land, air, and naval forces of other nations as well as interagency operations. While unity of command may not be possible in multinational operations, unity of effort is essential. Each CINC may assign associated areas within his theater to subordinate commanders. CINCs may designate joint areas or zones during war and SASO, while theaters of war and operations are designated only in time of war. CZs and COMMZs may be set up as needed (Figure 1-2). The CINC organizes his theater to enable him to synchronize his unified operations or integrate single-service, joint, special, and supporting operations with allied and intragency activities, nongovernmental organizations, and private volunteer organizations.

- CSS in the COMMZ. The COMMZ extends from the rear of the combat zone in the theater of operations to the CONUS base. Its size may vary depending on the size of the theater of operations. The COMMZ contains lines of communications and those theater organizations and other agencies required to support forces in the field. Within the COMMZ the CINC will normally set up a theater base, which encompasses a theater logistics base. The theater logistics base will normally be at the junction of the various intratheater and intertheater lines of communication. The logistics bases provide supply, maintenance, field services, transportation, health services, personnel support, and evacuation. It also contains logistics facilities to support the theater such as air and sea ports of debarkation, marshaling areas, logistics

stockage areas, movement control points, logistics headquarters and units, and the rear area of the intratheater combat zone.

- CSS in the CZ. The CZ is an area required by forces to conduct combat operations. The CZ begins at the FLOT, to include the deep battle area, and extends to the corps rear area. CSS in the CZ is provided by the corps support command located in the corps rear area and the division support command located in the division rear.

  •• Corps Support Command. The corps support command is a flexible organization structured to support corps forces. The corps support command provides CSS mainly through corps-wide service organizations and support groups.

  •• Division Support Command. This command provides direct CSS (except communications-security equipment and construction) to all assigned or attached elements of the division. It consists of a headquarters and assigned or attached CSS units.

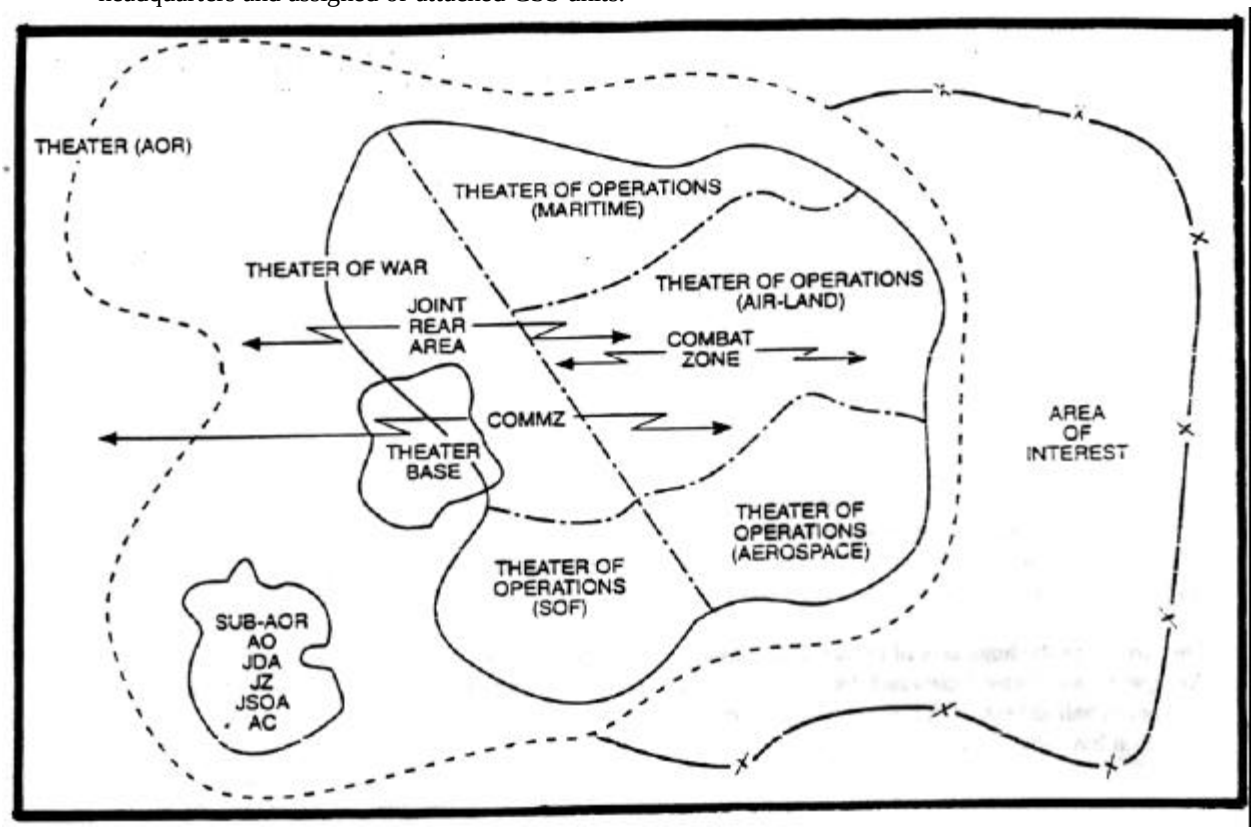


Figure 1-2. Theater area organization

Section II. Petroleum in the Theater

The ASCC must provide centralized distribution of bulk petroleum products for all US forces in theater. The ASCC sets up an operational-level army petroleum organization to receive petroleum products in theater and distribute them throughout the COMMZ and rear of the CZ. If the theater uses pipeline systems for bulk distribution, other transportation assets distribute the products from the pipeline terminal to the user. The operational-level petroleum organization interfaces with MMC for product distribution and coordinates with host nations for additional product and distribution support. FM 10-67 details the operational-level petroleum function.

BULK PETROLEUM SUPPLY MISSION

The responsive supply of Class III (bulk) is critical to battlefield success. The senior supporting MMC centrally manages, controls, and allocates it IAW the ASCC's priorities. The operational-level commander, IAW the senior CSS commander, provides bulk petroleum to US land forces. Support to multinational forces is based on established agreements.

Petroleum Operations

The availability of fuel depends on the location of the theater of operations. If operations are in an industrialized area, initial supplies may be obtained from host nation or contractor support. Tanker ships will bring in subsequent supplies through marine petroleum terminals. In an undeveloped area, Air Force aircraft may effect the initial resupply. In these "emergency" type situations, the ABFDS may be discharged into the operating unit's support vehicles. As soon as practical, the Navy's OPDS will provide bulk fuels in over-the-beach operations. The Navy is responsible for providing fuel to the high-water mark on the beach. The Army then assumes responsibility for the fuel through its tactical petroleum terminals.

Petroleum Organization

The senior petroleum unit commander , the primary petroleum distribution operator, is responsible for all aspects of theater-level petroleum operations. Distribution planning is the basis for the design, construction, and operation of the theater petroleum distribution system. The petroleum unit is also responsible for quality surveillance and liaison with the senior supporting MMC as well as with the supported multinational forces. It will distribute fuels based on ASCC established priorities and senior supporting MMC directives. Stockage policy is covered in AR 710-2. More information on petroleum operations and organizations is in FMs 10-1 and 10-67.

Distribution

Operational-level petroleum units (petroleum pipeline and terminal operating) will set up the petroleum support base for receiving, temporarily storing, and moving fuels to the GS petroleum supply units. These units, located at the operational and tactical levels, deliver fuels to the divisional and nondivisional SSAs. Movement may involve various modes of transportation. Pipelines, the most efficient mode, will be used to deliver the product as far forward as practical, usually to the corps rear area. Pipelines service air bases and tactical airfields when feasible. Pipeline distribution is supplemented primarily by tank vehicles, rail cars and barges when available. Figure 1-3, page 1-5, shows Class III (bulk) requirements and supply flow in the theater of operations.

JPO

A unified commander has a JPO to provide staff management of petroleum at the theater level. SAPOs may be set up at the subunified command level to provide in-country staff responsibilities for all services. More information on the JPO can be found in DOD 4140.25-M.

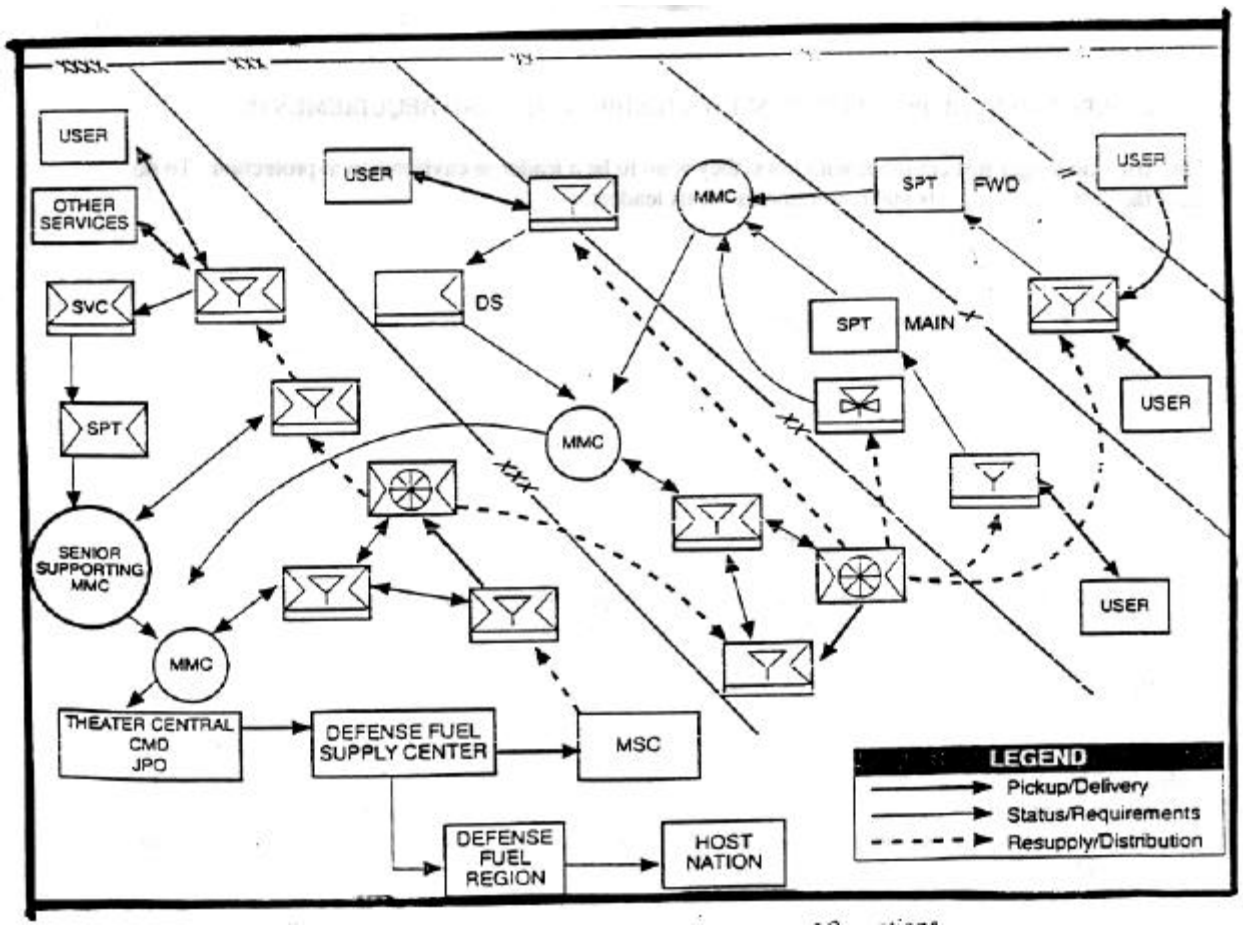


Figure 1-3. Bulk petroleum distribution in a theater of operations

CHAPTER 2

ENVIRONMENTAL RESPONSIBILITIES OF PETROLEUM UNITS

The Army environmental vision is to be a national leader in environmental and natural resource stewardship for present and future generations as an integral part of our mission.

SCOPE OF ENVIRONMENTAL RESPONSIBILITY

We must take care of the environment (that is, practice environmental stewardship). The definition of stewardship is taking care of property while also caring about the rights of others. We must plan our operations without harming the environment. Good environmental stewardship lets leaders take care of soldiers and their families. It also saves resources vital to combat readiness.

The Army has the huge task of reducing the environmental impact on its installations and units throughout the United States and the world. Within CONUS, the Army owns 20 million acres of land (an area about half the size of Virginia). This shows the vastness of this task. Each area of our daily operation has some effect on the environment.

The Army is renewing its emphasis on taking care of the environment. Pet roleum and water units by their nature have a huge impact on the environment. It is critical for the leaders and soldiers in these units to follow safe, legal environmental practices. By doing so, they protect their health and the health of those around them. They also prevent long-term environmental damage that can lead to fines and other legal actions.

ENVIRONMENTAL PROTECTION STEWARDSHIP GOALS AND REQUIREMENTS

The Army no longer just complies with laws, they want to be a leader in environmental protec tion. To do this, the Army has set goals and requirements for its leaders.

Goals

- Compliance--Ensure that all Army sites (CONUS, OCONUS) and operations attain and sustain 100 percent compliance with environmental laws and regulations in a climate of changing requirements. Do not be subject to a notice of violation or a fine for not following host nation, local, state, or federal environmental directives.

- Prevention--Adopt and implement integrated management approaches in all Army mission areas to reduce and minimize both the volume and toxicity of all categories (air, water, land) of environmental pollution.

- Conservation--Conserve, protect, and enhance the natural environmental and cultural resources entrusted under the Army's stewardship, for the enrichment of future generations, using all practical and available means which are consistent with the Army mission.

Requirements

- Assessment--Under NEPA, all Army actions require an assessment be done on potential environmental impacts of said action. If the assessment shows said action will cause a significant level of environmental impact, then an EIS document must be prepared and approved, before carrying out the action.

- Awareness--All key Army decision makers and planners are required to be aware of NEPA regulations pertaining to Army actions and their potential for significant environmental impact.

- Restoration--Ensure strict compliance with all spill and release reporting, timely resource requests and allocations, and clean up requirements to effect the clean up of all Army-contaminated sites as quickly as resources are made available, for the protection of human health and the environment.

- Environmental Consideration--Ensure that all practically available environmental and cultural resource data are incorporated early in the mission decision-making and planning process.

ROLE OF ENVIRONMENTAL STEWARDSHIP IN LEADERSHIP

A leader who cares for the environment also cares for his people. He does this by reducing or eliminating undue health risks. He saves resources (soldiers or money) vital to his mission. The leader keeps training areas in excellent condition for training far into the future. He preserves cultural artifacts for study by future generations. Also, he teaches the basic moral duty of soldiers to protect and preserve the United States of America and its allies.

ENVIRONMENTAL RESPONSIBILITIES OF PERSONNEL

Personnel at all levels must protect our environment. This includes soldiers, NCOs, officers, and commanders.

Soldiers

These duties include--

- Follow installation environmental policies, unit SOPs, ARs, and environmental laws and regulations.

- Make sound decisions in everyday activities.

- Advise the chain of command on techniques to ensure environmental regulations are followed.

- Identify the environmental risks in individual and team tasks.

- Support the Army recycling program.

- Report HM and HW spills immediately.

NCOs

These responsibilities include:

- Always consider the environment in day-to-day decisions.

- Make sure soldiers know the Army's environmental ethic.

- Train soldiers to be good environmental stewards.

- Be committed to environmental protection.

- Identify environmental risk associated with tasks.

- Plan and conduct environmentally sustainable actions and training.

- Protect the environment during training and other activities.

- Analyze the influence of the environment on your mission.
- Integrate environmental considerations into unit activities.
- Train peers and soldiers to identify the environmental effects of plans, actions, and missions.
- Counsel soldiers on the importance of protecting the environment and the results of not complying with environmental laws.
- Incorporate environmental considerations in AARs.
- Support the Army recycling program.
- Report HM and HW spills immediately.

Officers

These duties include--

- Build an environmental ethic in soldiers.
- Train and counsel subordinate leaders on stewardship.
- Lead by example.
- Enforce compliance with laws and regulations.
- Always consider the environment in making day-to-day decisions.
- Make sure subordinates know the Army's environmental ethic.
- Train subordinates to be good environmental stewards.
- Commit subordinate leaders to protect the environment.
- Analyze the influence of the environment on the mission.
- Integrate environmental considerations into unit activities, to include identifying the environmental risks associated with unit tasks.

Unit Commander

The commander must build an environmental ethic in his soldiers. The commander sets the tone for environmental compliance. He is totally responsible for complying with all applicable environmental laws in the unit. Commanders train their subordinates on stewardship and counsel them on doing what is right. They must lead by example and enforce compliance with laws. Commanders should--

- Consider the environment in making daily decisions.
- Know about the NEPA, HM, HW, HAZCOM efforts, and spill contingencies.
- Commit subordinates to environmental protection.

- Make sure officers and NCOs know the environmental ethic and train them to be good environmental stewards.

- Counsel officers and NCOs on the importance of protecting the environment and the results of violating laws.

- Ensure officers and NCOs comply with requirements when reporting hazardous substance spills.

- Ensure environmental concerns are addressed throughout the training.

- Identify and assess the environmental consequences of proposed programs and activities.

- Plan and conduct training that complies with environmental laws--including marking areas as "off-limits" during training exercises.

- Discuss environmental concerns during briefings, meeting, and AARs.

- Establish and sustain unit environmental awareness training.

- Appoint an environmental compliance officer and a HW coordinator (the same person can serve both positions). These appointments ensure environmental compliance occurs at the unit level.

- Ensure the unit SOP covers environmental considerations, conservation, natural resources, and spill procedures.

- Support the Army pollution prevention/recycling program.

- Report HM and waste spills immediately.

- Conduct environmental self-assessment or internal environmental compliance assessments.

- Meet with key installation environmental POCs.

Appointed Personnel

These personnel are appointed by the commander and should receive formal training. Their responsibilities include--

- Act as an advisor on environmental regulatory compliance during training, operations, and logistics functions.

- Serve as the commander's eyes and ears for environmental matters.

- Be the liaison between the unit and higher headquarters who are responsible for managing the environmental compliance programs and who can provide information on training requirements certifications that unit personnel need.

THE UNIT-LEVEL ENVIRONMENTAL TRAINING PROGRAM

An effective training program allows personnel to carry out their responsibilities. TC 5-400 is the basic manual for environmental stewardship. Commanders ensure all personnel are trained on environmental issues. He appoints an environmental compliance officer/HW coordinator. This person works with other environmental personnel. He also makes sure environmental laws are followed. The commander meets with the battalion S3 and S4 officers and

other environmental personnel. He finds what their requirements concerning environmental training and qualifications of unit personnel, ECAS inspections that may affect the unit, and common environmental problem areas and how to avoid them. The commander also makes sure the SOP details environmental issues and procedures the unit must follow. The training program should cover--

- HM management
- HW management
- HAZCOM
- Pollution prevention and HAZMIN
- Recycling program
- Spill prevention/response plan

CHAPTER 3

PETROLEUM PIPELINE AND TERMINAL OPERATING BATTALION

Section I. The Organization

MISSION AND ASSIGNMENT

The HHC (TOE 10416L0) provides command and control of units assigned or attached for the operation and maintenance of a military petroleum distribution system. The company is normally assigned to the HHC, Petroleum and Water Group, TOE 10602L0. Though pipelines may run through a CSG AO, they are not normally attached to a CSG. They are EAC units employed in the COMMZ. However, to support a contingency, they could be assigned to a COSCOM.

CAPABILITIES

The personnel strength levels and equipment authorization levels in its TOE determine the company's capabilities. This company--

- Plans, commands, controls, coordinates, and directs up to five pipeline and terminal operating companies or medium truck companies (petroleum). Supervises other assigned and attached units used to operate and maintain the petroleum supply and distribution system.
- Extends and develops existing and proposed distribution systems at the theater level.
- Directs the operation of fixed petroleum storage facilities capable of storing large quantities of bulk petroleum products.
- Plans and directs the operations of the IPDS, TPTs, FSSPs and hose line outfits.
- Operates a central dispatching and scheduling agency to schedule and direct the flow of bulk petroleum products through multiproduct military pipelines.
- Coordinates the movement of bulk products by means other than pipeline, such as a barge, rail, and truck.
- Maintains a prescribed reserve of petroleum products.
- Supervises a program for quality surveillance of petroleum products and operates a mobile petroleum laboratory.
- Transports 33 percent of its TOE equipment and supplies in a single lift using its authorized organic vehicles.
- Unit depends on a petroleum pipeline and terminal operating company for unit maintenance and food service support.
- Unit requires one truck tractor, 5-ton, LIN Z85341 to transport a mobile lab.

ORGANIZATION

Figure 3-1, page 3-2, shows the company organization. Sections II through VIII of this chapter detail individual sections in the unit.

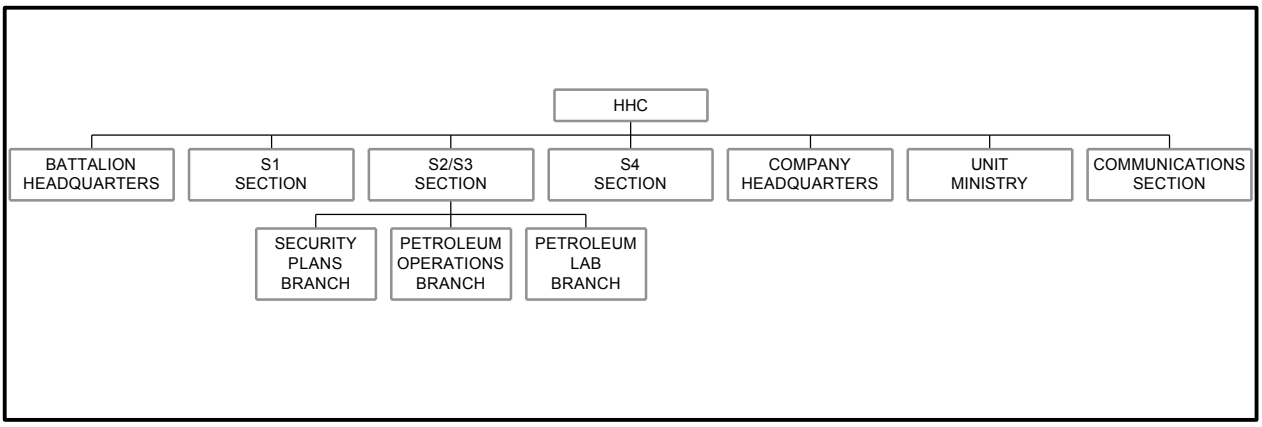


Figure 3-1. Company organization

Section II. Battalion Headquarters

MISSION AND RESPONSIBILITIES

The battalion headquarters mission is to supervise the battalion. It must also command and control all assigned and attached units.

PERSONNEL

Effective operation of the headquarters requires identifying key personnel and understanding their duties and responsibilities. Key personnel include--

Battalion Commander (Lieutenant colonel, 92F00). Provides leadership, welfare, and training for all assigned and attached soldiers. Prioritizes, plans, and coordinates present and future missions. Plans operations to comply with applicable federal, state, local, and host nation environmental laws to include ensuring all operations undergo a safety and environmental risk assessment. Ensures all personnel are trained in good environmental stewardship and that the environmental stewardship ethic is reinforced in day-to-day operations.

Command Sergeant Major (E9, 00Z50). Serves as the battalion commander's senior enlisted advisor.

Executive Officer (Major, 92F00). Assists the commander in accomplishing the overall mission. Coordinates and directs the activities of the staff. Acts as the commander in the absence of the battalion commander.

S1 Officer (Captain, 92F00). Directs the functions of the S1 section. Directs all technical administrative operations of the battalion and its assigned or attached units. Section III gives more on his responsibilities.

S2/S3 Officer (Major, 92F00). Directs the functions of the S2/S3 branch. Plans, controls, and supervises the operation of the battalion petroleum distributing system. This system may consist of as much as 450 miles of multiproduct pipelines and related terminal facilities. Section V gives more on his responsibilities.

S4 Officer (Captain, 92F00). Directs the functions of the S4 section. Plans, coordinates, and supervises all supply and maintenance activities and other related logistical matters required to support the battalion.

Chaplain (Captain, 56A00). Conducts religious activities for the battalion according to AR 165-1. Section IV gives more on his responsibilities.

Communications and Electronics Staff Officer (Captain, 25A00). Plans and determines requirements for signal communications support and for use of signal communications equipment. Coordinates with the area signal officer as required.

OPERATIONS

Some of the responsibilities in key functional areas of the battalion headquarters follow. Sections in this chapter detail these responsibilities.

- Plan and prepare for the deployment/redeployment of the battalion.
- Conduct all operations with minimal environmental damage as dictated by the operational situation.
- Guide and supervise subordinate units.
- Plan and set up air defense measures.
- Monitor the tactical and technical performance of subordinate units. Provide guidance and training programs to improve this performance.
- Provide logistical and administrative support for subordinate units.
- Plan and supervise religious activities.
- Plan and coordinate installation and use of a communications network.
- Advise higher headquarters of operating situations and requirements.
- Plan and implement appropriate environmental stewardship and safety programs in both tactical and garrison operations.
- Conduct operations with minimal damage to the environment as dictated by the operational situation.

EQUIPMENT

Table 3-1 lists equipment identified for the battalion headquarters by TOE 10416. CTAs may authorize other equipment. Use CTA 50-900 for clothing and individual equipment and CTA 50-909 for field and garrison furnishings and equipment. Expendable and durable supplies are listed in CTAs 8-100 and 50-970.

Table 3-1. Battalion headquarters TOE-prescribed equipment list for TOE 10416.

ITEM	QUANTITY
Cable telephone: WD-1/TT DR-8 1/2-km	2
Camouflage screen support system: woodland/desert	3
Camouflage screen system: woodland lt wt radar scat without support system	3
Installation kit: MK-2310/VRC for AN/VRC-87/88/90I in M1009	1
Installation kit vehicular electronic equipment: MK-2564/VRC-97	1
Radio set: AN/VRC-90A	1
Reeling machine cable hand: RL-39	2
Speech security equipment digital subscriber voice terminal: TSEC/KY-68	1
Telephone wire with reel: MX-10891/G	1
Terminal radio-telephone mobile subscriber: AN/VRC-97	1
Truck utility: cargo/troop carrier, 1 1/4-ton, 4x4, with equipment (HMMWV)	1
Telephone set: TA-312/PT	2

Data transfer device: AN/CYZ 10	1

Section III. S1 Section

MISSION

The S1 section supervises, plans, and coordinates all administrative and personnel activities in the battalion. The S1 section--

- Provides for a message center.
- Maintains office records.
- Publishes orders for the assignments of replacements within battalion headquarters and subordinate units.
- Provides for personnel management and classification. It also maintains liaison with the appropriate personnel services unit on personnel actions.
- Maintains liaison with the supporting finance direct support company on financial services.

RESPONSIBILITIES

The S1's overall responsibility is to make sure the section completes its assigned missions successfully. General areas of responsibility for the S1 are--

- Unit strength maintenance.
- Personnel management.
- Manpower management.
- Morale.
- Nonjudicial and administrative disciplinary actions.
- Health and safety.
- Staff coordination with higher headquarters personnel sections.

PERSONNEL

Effective operation of the section requires identifying key personnel and understanding their duties and key responsibilities. Key personnel in the S1 section include--

Personnel Sergeant (E7, 75H40). Assists the S1 officer in the operations of the section. This NCO also assists with the units assigned and attached to the battalion.

Legal Sergeant (E5, 71D20). Maintains and processes all legal paperwork in the battalion. Coordinates with the serving staff judge advocate on legal matters.

Administrative Sergeant (E5, 71L20). Supervises the administrative specialist. Supervises the preparation of military correspondence and orders. Maintains files and records. Compiles and submits administrative reports and coordinates publications.

Administrative Specialist (E4, 71L10). Performs all administrative functions to include setting up and operating MARKS, and prepares section correspondence.

Administrative Clerk (E3, 71L10). Performs all administrative functions to include setting up and operating MARKS, and prepares section correspondence.

OPERATIONS

The section provides administrative support, prepares SIDPERS, manages personnel, provides legal assistance, coordinates medical support, and operates a central record library. More specific operations include--

Administrative Support

The section authenticates orders and directives and maintains the filing system IAW MARKS. The section prepares, verifies and submits casualty feeder reports to the casualty section of the appropriate commander. The section takes prompt action on administrative instructions received from higher headquarters and requests from subordinate units. The section maintains accurate personnel records. It assigns replacements according to MOS and unit requirements. AR 672-5-1 gives standards on how to prepare, review, and process recommendations for awards and decorations. AR 600-200 has guidance on planning enlisted personnel management system procedures.

SIDPERS

Refer to DA Pamphlet 600-8-1 for unit-level procedures and DA Pamphlet 600-8-20, SIDPERS handbook for commanders.

Personnel Management

The section's personnel management responsibilities are--

- Personnel requirements. Subordinate units send the section their personnel status reports. Once section personnel know unit requirements, they coordinate soldier assignment priorities with the S2/S3 officer, unit commanders, and the battalion commander. It assigns personnel based on valid position numbers in the UMR. DA Pamphlet 600-8-1 gives more information. The section designates assignments for each person during the current SIDPERS cycle. Then it inputs the necessary information in the next SIDPERS cycle. FMs 12-1, 12-2, 12-3-2, 12-3-3 and 101-10-1 give information on planning the personnel management program.

- Casualties. Subordinate units will send the section their casualty reports. Within 1 hour after receipt, the section prepares a SIDPERS deceased transaction and a SIDPERS organization strength report change. DA Pamphlet 600-8-1 outlines procedures. Report strength figures are extracted from current unit totals.

- Equipment, documents, and EPWs. When subordinate units take EPWs, the S1 section provides processing guidance. They give instructions for EPW evacuation and interrogation. The section coordinates procedures with local military police. They also coordinate with the S4 section for captured materiel evacuation and with the S2/S3 for document evacuation. Procedures for EPW handling are in FM 19-40 and FM 30-15, Chapter 3. FM 101-10-1 gives general guidance.

- Personnel daily strength summary. Subordinate units report their maintenance and unit strength data each day. When reporting to higher headquarters, units show the section all organic and attached units separately. They identify them by line number. They do not show detached units. By 1800 on the date of the report, the section reports recorded data to higher headquarters by unit, attachment, and group. They report strength, losses, gains, number of PWs, number of days in the area of operations, and number of days in combat.

- Personnel data card. The section maintains DA Form 2475-2. This form provides strength accounting for personnel that are not members of the Active Army attached to the unit. The section posts the PDC according to DA Pamphlet 600-8-1. They record loss and casualty data. Next, they post the UMR and the zero balance report. They use data from the PDC to do this. After posting data, the section sends part 1 of the PDC to higher headquarters.

- Replacement personnel. The section in-processes replacements. They verify assignments based on vacancies with the unit and recommendations of the S2/S3 officer. They send assignment notice to the receiving unit. They also note this on the UMR. They ensure units submit SIDPERS transactions to the higher headquarters. DA Pamphlets 600-8 and 600-8-1 give more information. The section orients replacement personnel to the unit the day they arrive. The orientation includes information on unit mission, the chain of command, mail procedures, personnel policies, and personnel services as a minimum.

Personnel Services

The section manages personnel services program. It administers such matters as leaves, passes, and rotations. It also includes--

- Projected quotas for each unit for rest camps, recreation centers, and leave areas.

- Information on services provided by Army Emergency Relief and the chaplain and information on the Staff Judge Advocate, the Equal Opportunity Office, and special services.

- Actions taken on finance coordination with the supporting finance office. FM 14-6 gives guidance.

- Scheduling of personnel services for minimum interference with the unit's mission.

- Coordinates transportation requirements for movement to service areas.

Discipline, Law and Order

The S1 administers actions under the UCMJ. AR 27-10 gives more information. The S1 officer also recommends measures to the commander to improve discipline, law, and order.

Morale Support

Section personnel monitor subordinate units' morale by making unit visits. To evaluate unit morale and morale enhancement programs, they should follow the guidelines in FMs 22-101 and 101-5 and DA Pamphlet 1-2.

Labor Services

Subordinate units identify and report labor requirements to the section. The section then processes requests for civilian labor. The S1 ensures the requests meet approved guidelines and then coordinates civilian labor requirements with supporting labor service teams. The section coordinates the use of labor in functional areas with all other staff sections. FM 101-10-1, and FM 100-10, Chapter 13, gives guidance.

Legal Assistance

The section's legal sergeant provides legal administrative support and special courts-martial support to the soldiers and commander.

Medical Support

The S1 section coordinates with the local medical commander to determine the location of facilities and the services available. Section personnel coordinate procedures for routine and emergency evacuation. The S1 prepares a medical plan that ensures adequate coverage for all subordinate units. These plans should include dental support, instructions for treatment, and chain of medical evacuation. It should also include hospitalization and preventive medicine support beyond organic capabilities. FM 8-10 discusses the procedures for providing medical support. FM 101-10-1 also gives more information.

Command and Public Information

The section briefs the commander's staff and unit commanders on command information. The command briefing should include the following information as a minimum:

- Planning information activities.
- Publishing command information in newspapers and other media.
- Operating command information broadcast stations and networks.
- Reviewing information for security clearance before public release.

Library Services

The section operates a central records library for documents kept longer than 30 days. The section services the units or individuals requesting information or copies of documents from the library. AR 25-400-2 gives guidance on setting up an organized library file system.

Files and Records

Publications and files of supported units should be checked to ensure they are current. They should be maintained according to regulations. AR 340-2 gives guidance files and records maintenance. A list of current publications is in DA Pamphlets 310-1 and 310-35.

EQUIPMENT

TOE 10416 prescribes the equipment for the S1 section. See Table 3-2 for a list of this equipment.

Table 3-2. S1 section TOE-prescribed equipment list for TOE 10416

ITEM	QUANTITY
Cable telephone: WD-1/TT DR-8 1/2-km	1
Camouflage screen support system: woodland/desert	2
Camouflage screen system: woodland lt wt radar scat without support system	2
Generator set: diesel engine-driven, skid-mounted, 5-kw, 60-hz	1
Duplicating machine spirit process: table-mounted, elec/hand 9-15L in	1
Lightweight digital facsimile: AN/UXC-7	1
Reeling machine cable hand: RL-39	2
Telephone wire with reel: MX-10891/G	1
Telephone digital nonsecure voice: TA-1035U	1
Truck utility: cargo/troop carrier, 1 1/4-ton, 4x4, with equipment (HMMWV)	1
Telephone set: TA-312/PT	1
Computer digital: CP-2251 (P) (V) 1/TYQ	1
Computer digital: CP-2245 (P) (V) 9/TYQ	4

Section IV. Unit Ministry Team

MISSION

The UMT provides for religious ministry, pastoral care, and the moral and ethical well being of the unit. It advises the commander and staff on matters of religion, morals, and morale.

RESPONSIBILITIES

The UMT's overall responsibility is to successfully provide religious ministry for the command. Specific UMT responsibilities include--

- Coordinating, integrating, and supervising all chaplain activities, religious services, ministries, and observances and the use of facilities as approved by the commander.

- Setting up and maintaining liaison with staff chaplain of higher, equal, or subordinate headquarters, the other military services, government agencies, the armed forces of allied nations, and officials of civilian churches and other religious organizations.

- Deploys with the battalion to offer religious services, counseling, and morale support on all training or operational deployments.

- Facilitating the "free exercise" rights of all personnel, regardless of religious affiliation of either the chaplain or the soldier.

- Providing area chaplain services coverage within the geographical area or as specified in the area coverage plan.

- Providing denominational services where practical.

- Providing guidance to the battalion’s family support group.

- Providing chaplain coverage to EPWs and all others as outlined in AR 165-1.

PERSONNEL

The battalion chaplain is responsible for supervising the UMT. Key personnel on this team include the Chaplain Assistant (E4, 71M10) who performs or supervises the performance of religious support in the battlefield or in garrison. The chaplain assistant also provides personal protection and administrative support to the battalion chaplain.

EQUIPMENT.

TOE 10416 prescribes the equipment for the UMT. See Table 3-3 for a list of this equipment.

Table 3-3. UMT TOE-prescribed equipment list for TOE 10416

ITEM	QUANTITY
Cable telephone: WD-1/TT DR-8 1/2-km	1
Cable telephone: WF-16/U	1
Camouflage screen support system: woodland/desert	3
Camouflage screen system: woodland lt wt radar scat without support system	3
Digital nonsecure voice terminal (DNVT): TA-954/TT	1
Chest hymnbook: with handles	1
Truck utility: cargo/troop carrier, 1 1/4-ton, 4x4, with equipment (HMMWV)	1
Reeling machine cable hand: RL-39	2
Telephone wire with reel: MX-10891/G	2
Telephone set: TA-312/PT	1

Section V. S2/S3 Section

MISSION

This section is responsible for the intelligence, security, operations, and training necessary to support the battalion's critical wartime mission: to provide a petroleum distribution system to an assigned area. This section plans and supervises the security of the battalion's area. It coordinates with the RAOC and the HHC commander to implement a rear area security plan. The S2/S3 is responsible for the production of intelligence, and counterintelligence and intelligence training and security. It is responsible for communications, communications security, and relaying, on request, local weather observations. This section also directs activities pertaining to organization, operations, training, and deployment readiness for subordinate units, including, but not limited to, taskings, QTB, USR, and schools management. The three branches assigned to the section are a security and plans branch, petroleum operations branch, and petroleum laboratory branch.

RESPONSIBILITIES

The battalion S2/S3 officer is responsible for overall command and control of the three subordinate branches in the S2/S3 section. The officer--

- Exercises authority through each branch chief.
- Advises the battalion commander on matters relating to the security, plans, training, and operation of the battalion.
- Develops operational and training plans for the battalion.
- Implements environmental stewardship program in key areas of interest such as environmental training programs and land management. This includes ensuring all operations undergo environmental and safety risk assessments. See TC 5-400.

PERSONNEL

Effective operation of the section requires identifying key personnel and understanding their duties and responsibilities. Key personnel include--

Petroleum Operations Sergeant (E8, 77F50). Develops plans, and coordinates and controls petroleum support operations for the battalion. Monitors all operations to ensure they reduce damage to the environment within the scope of the tactical situation. Acts as the assistant S2/S3 when needed.

NBC Operations/Staff NBC NCO (E7, 54B40). Assists in planning and applying NBC defense measures for subordinate units and coordinates decontamination operations, when necessary. Plans, coordinates and evaluates the battalion's NBC training program.

Petroleum Surveillance Sergeant (E6, 77L30). Plans and supervises a program for quality surveillance of petroleum products.

Signal Support System Specialist (E3, 31U10). Installs and maintains the battalion telephone and wire system. Operates the battalion message center once systems are installed.

Administrative Specialist (E4, 71L10). Performs all administrative functions to include setting up and operating MARKS, and prepares section correspondence.

Petroleum Supply Specialist (E3, 77F10). Assists the petroleum operations sergeants and petroleum surveillance sergeant with the conduct of their assigned mission.

EQUIPMENT

TOE 10416 prescribes the equipment for the S2/S3 section. See Table 3-4 for a list of this equipment. Equipment for the branches within the S2/S3 section is listed separately.

Table 3-4. S2/S3 section TOE-prescribed equipment list for TOE 10416.

ITEM	QUANTITY
Cable telephone: WD-1/TT DR-8 1/2-km	1
Camouflage screen support system: woodland/desert	3
Camouflage screen system: woodland lt wt radar scat without support system	3
Facsimile set: AN/TXC-1	1
Installation kit: MK-2325/VRC for AN/VRC-87/88/90 in HMMWV	1
Installation kit electronic equipment: MK-2565/VRC-97	1
Power supply: PP-6224/U	1
Speech security equipment digital subscriber voice terminal: TSEC/KY-68	1
Telephone wire with reel: MX-10891/G	2
Telephone digital nonsecure voice: TA-1035/U	1
Terminal radio-telephone mobile subscriber: AN/VRC-97	1
Data transfer device: AN/CYZ 10	1
Radio set: AN/VRC-90A	1
Reeling machine cable hand: RL-39	3
Truck utility: cargo/troop carrier, 1 1/4-ton, 4x4, with equipment (HMMWV)	1
Telephone set: TA-312/PT	1

OPERATIONS

The section plans, monitors and coordinates all aspects of training, tactical operations, area security and communications within the battalion’s area of responsibility. The battalion S2/S3 ensures the branches under his control adequately perform their duties in a systematic, coordinated effort in support of the battalion’s mission.

ORGANIZATION.

The battalion S2/S3 section is organized into branches to do its mission. The branches are responsible for specific functions which are described in the following paragraphs.

Security and Plans Branch

Mission. This branch supervises the employment, deployment, training, and security of the battalion. It also covers battalion units and the petroleum distribution system. The branch--

- Develops plans and supervises training of assigned and attached units.
- Develops and implements training programs for the headquarters and subordinate units.
- Develops and implements general educational development programs.
- Plans, directs, coordinates, and supervises intelligence, counterintelligence, and civil affairs programs.
- Develops and coordinates plans for security and defense of the headquarters and subordinate units.
- Develops the situation paragraph for OPORDs and OPLANs. Makes recommendations to the battalion S2/S3, petroleum operations officer, and battalion commander on the best method to protect the force.
- Plans all training to comply with applicable national, state, local and host nation environmental protection laws to determine potential for environmental impact.

Responsibilities. A Petroleum Sergeant, (E7, 77F40), is NCOIC of this section. He--

- Prepares broad planning guidance, policies, and programs for command organizations, operations, and functions.
- Develops policies and guidance for the training of the command and evaluating this training.
- Plans all activities to comply with applicable national, state, local, and host nation environmental protection laws.
- Exercises staff supervision over all OPSEC activities.
- Manages the security clearance program for the battalion.

Personnel. Key personnel include—

Intelligence Sergeant (E5, 96B20). Performs intelligence preparation of the battlefield. Provides technical advice to the staff on intelligence matters. Assists in writing the intelligence estimates for OPORDs and OPLANs.

Administrative Clerk (E3, 71L10). Performs all administrative functions to include setting up and operating MARKS, and prepares section correspondence.

Operations. This branch of the S2/S3 section performs the following intelligence and security operations:

Intelligence operations include c onducting intelligence preparation of the battlefield, developing intelligence estimates, and providing intelligence support. This branch maintains the current intelligence summary and an estimate. An analysis of a summary and an estimate will help in preparing an OPLAN and OPORD. The branch reviews and revises intelligence and counterintelligence requirements. Intelligence information is collected, analyzed, processed, and disseminated continuously. This process requires close supervision and planning to execute. FM 34-60 covers counterintelligence. It discusses the counterintelligence estimate, work sheet, and plan. The work sheet is vital. It is used to prepare counterintelligence plans, orders, and requests. The security and plans branch analyzes the threat situation and

makes recommendations when necessary. It also provides information to subordinate units as required. FM 34-60 gives more information on intelligence. Higher headquarters will provide the battalion with an intelligence report on the expected action of opposing forces. The section sends applicable report portions to all battalion units. It informs higher headquarters of subordinate units' current operational situation. The briefing covers the daily organization, operation, coordination, intelligence, and physical security aspect of the unit. It stresses information that may affect mission performance.

Security measures include RAP and OPSEC. The branch reviews, updates, and coordinates rear area security and area damage control plans for all battalion units. The branch updates ground, antiarmor, and air defense plans based on the threat level. It uses adequate programs for information and signal security. It also carries out physical security and deception programs. It sets up liaison with higher headquarters intelligence. The branch denies essential elements of friendly information to the enemy and confuses the enemy force in its attempt to estimate the course of action the group will take.

Equipment. The equipment required for the security and plans branch is listed in Table 3-5.

Table 3-5. Security and plans branch TOE-prescribed equipment list for TOE 10416.

ITEM	QUANTITY
Cable telephone: WD-1/TT DR-8 1/2-km	1
Camouflage screen support system: woodland/desert	3
Camouflage screen system: woodland lt wt radar scat without support system	3
Reeling machine cable hand: RL-39	1
Truck utility: cargo/troop carrier, 1 1/4-ton, 4x4, with equipment (HMMWV)	1
Telephone set: TA-312/PT	1

Petroleum Operations Branch.

Mission. This branch provides a central dispatching element. It schedules and directs the flow of bulk petroleum through both commercial and military multiproduct pipelines. The branch also coordinates bulk petroleum movement by means other than pipeline.

Responsibilities. The Petroleum Operations Officer (Captain, 92F00) supervises branch operations. He also directs dispatching operations. He conducts all operations that follow good environmental protection and compliance procedures, to minimize environmental impact of the operations, within the scope of the tactical situation.

Personnel. Key personnel include--

Assistant Petroleum Operations Officer (Lieutenant, 92F00). Assists the petroleum officer. Usually supervises the second shift.

Freight Movements Officer (Lieutenant, 88B00). Coordinates bulk petroleum movement by rail, highway, air, or water.

Petroleum Dispatch Sergeant (E7 (2 each), 77F40; E6 (2 each), 77F30). Maintains dispatching operations on a 24-hour basis.

Petroleum Supply Sergeant (E6, 77F30). Monitors and supervises the petroleum inventory control sergeants and specialists and maintains accounts of bulk petroleum received, stored, and dispensed.

Construction Operations Sergeant (E6, 51H30). Coordinates and assists in planning pipeline systems and installation and repair of pipelines, pumping stations, and storage tanks. Inspects pipeline construction for breaks,

rusty pipe, and flat places. Inspects for leaky gaskets, loose connections, or other defects. Evaluates existing fixed facilities to determine capability for military use. Develops petroleum systems maintenance procedures.

Petroleum Inventory Control Sergeant (E5 (2 each), 77F20). Maintains data on current bulk petroleum on-hand inventories. Maintains the total ullage by terminal and type fuel.

Petroleum Inventory Control Specialist (E4 (2 each), 77F10). Assists the inventory control sergeant in maintaining current petroleum supply records.

Movements Specialist (E4, 88N10; E3, 88N10). Assists the freight movements officer in coordinating fuel movement by means other than pipeline.

Technical Engineer Specialist (E4, 51T10). Prepares drawings for pipelines, terminals, and storage facilities.

Administrative Specialist (E4, 71L10). Performs all administrative functions to include setting up and operating MARKS, and prepares section correspondence.

Administrative Clerk (E3, 71L10). Performs administrative functions to include sustaining and operating MARKS, and prepares section correspondence.

Operations. Branch operations include--

- Pumping schedules. Personnel in the branch determine daily requirements and available storage space. They determine the quantity of product authorized to be on hand at the various terminals. Also, they develop consumption graphs for projected consumption and deliveries. FM 10-67-1 gives more information on pumping schedule development.

- Dispatching records and controls. Effective dispatching operations depend on well-kept records. The daily pumping record records daily data related to pumping operations. FM 10-67-1 gives more information on maintaining dispatching records.

- Loading schedules. The section uses dispatching records and controls to develop loading schedules. First, it determines the estimated requirement, availability of transportation and products, and the needs of the supported unit. Then it uses these data to develop loading schedules.

- Policies. The section maintains close coordination with movement programs, directives, and policies of higher commands. This ensures the branch gets the greatest use of movement capability. It also ensures DA policies concerning direct throughput of bulk petroleum products are strictly followed. FMs 10-67 and 55-10 give information on bulk petroleum transportation. FM 100-10 gives more information on rail, highway, air, or water transportation.

- Operation reports. The section receives operation reports from all pump stations and terminals. These reports cover hourly pumping and delivery data. The section uses this information with a consumption graph and progress chart to maintain control of the pipeline system. The section must investigate all discrepancies between fuel pumped and received. FMs 10-67 and 10-67-1 have more information.

- Inventory procedures. The chief dispatcher must account for pipeline fill and forward this information to the accountability officer. FM 10-67 has more information. The monthly bulk petroleum accounting summary notes differences between book balance and physical inventories. The inventorying unit will also provide an explanation of the discrepancy. The unit must also originate a report of survey if losses exceed allowable amounts.

- Pipeline system construction. Section personnel must coordinate with and assist the pipeline engineer. They help the engineer plan pipeline systems and install and repair pipelines, pumping stations, and storage tanks.

Personnel inspect pipelines for breaks, rust, flat places, leaky gaskets, and loose connections. They should also inspect for other defects. FM 5-482 gives guidance on performing these duties. It discusses route location, layout, and profile of the pipeline system. It also covers pipeline systems inspections. FM 10-67 also gives guidance for planning the pipeline system. Pipeline planners should ensure that environmental and safety risk assessments are completed for every plan. Also, environmental compliance and risk reduction must be considered in the design of pipeline systems.

- Transportation coordination. The transportation cell coordinates with external movements activities. They ensure bulk petroleum movement by means other than pipeline are coordinated and support the overall inland petroleum distribution plan.

Equipment. The equipment prescribed for the petroleum operations branch by TOE 10416 is listed in Table 3-6.

Table 3-6. Petroleum operations branch TOE-prescribed equipment list for TOE 10416.

ITEM	QUANTITY
Antenna: OE-254 GRC	1
Battery case: Z-AIJ-E1	4
Cable telephone: WD-1/TT DR-8 1/2-km	1
Cable telephone: WF-16/U	1
Camouflage screen support system: woodland/desert	3
Camouflage screen system: woodland lt wt radar scat without support system	3
Drafting equipment set battalion: charts, sketches, and overlays	1
HF radio set: AN/GRC-193A	1
Installation kit: MK-2462/GRC-193 F/AN/GRC-193A in M882/M1008A1	1
Installation kit: MK-2326/VRC F/AN/VRC-89/91/92 in HMMWV	1
Installation kit: MK-2506/GRC F/AN/GRC-106 or AN/GRC-106A	1
Lightweight digital facsimile: AN/UXC-7	1
Power supply: PP-4763/GRC	1
Power plant electrical trailer-mounted: 5-kw, 60-hz, 2 each, mounted on M103A3	1
Radio set: AN/VRC-89A	1
Reeling machine cable hand: RL-39	2
Speech security equipment digital subscriber voice terminal: TSEC/KY-68	1
Telephone wire with reel: MX-10891/G	3
Telephone digital non-secure voice: TA-1035/U	2
Truck utility: cargo/troop carrier, 1 1/4-ton, 4x4, with equipment (HMMWV)	1
Telephone set: TA-312/PT	2
Wireline adapter: HYX-57/TSEC	4
Combat service support control system	1
Data transfer device: AN/CYZ-10 (C)	1
Data transfer device: AN/CYZ-10	1

Petroleum Laboratory Branch

Mission. This branch analyzes petroleum products received and stored in operating units. It also provides area petroleum laboratory support as directed. This branch operates a mobile petroleum laboratory. The laboratory performs partial analysis testing for petroleum products. FM 10-67-2 describes mobile laboratories and their operational procedures.

Personnel. Key personnel include--

Petroleum Laboratory Officer (Lieutenant, 92F00). Directs the petroleum laboratory in inspecting and testing petroleum products.

Petroleum Laboratory Supervisor (E6, 77L30). Supervises the performance of standard physical and chemical tests on petroleum products. Evaluates test results for compliance with federal and military specifications. Supervises the maintenance of assigned equipment.

Petroleum Laboratory Sergeant (E5, 77L20). Performs standard physical and chemical tests on fuel handled through the battalion pipeline distribution system.

Petroleum Laboratory Specialist (E4, 77L10; E3 (2 each), 77L10). Performs actual testing of petroleum products under the supervision of the petroleum laboratory sergeant.

Operations. The section functions using many of the same procedures as the base laboratory assigned to the petroleum group. However, the laboratory performs only type B1 or below tests.

Equipment. The equipment prescribed for the petroleum laboratory branch by TOE 10416 is listed in Table 3-7.

Table 3-7. Petroleum laboratory branch TOE-prescribed equipment list for TOE 10416

ITEM	QUANTITY
Air conditioner: AC 208-416-v, 3-ph, 60 cycles, 60,000-BTU	1
Cable telephone: WD-1/TT DR-8 1/2-km	1
Camouflage screen support system: woodland/desert	6
Camouflage screen system: woodland lt wt radar scat without support system	6
Dolly trailer converter: 8-ton, 2-wheel, with equipment	1
Facsimile set: AN/UXC-7	1
Generator set diesel engine trailer mounted: 60-kw, 60-hz, PU-805	1
Laboratory petroleum semitrailer mounted	2
Reeling machine cable hand: RL-39	2
Telephone wire with reel: MX-10891/G	1
Testing kit petroleum: aviation fuel contamination	1
Truck utility: cargo/troop carrier, 1 1/4-ton, 4x4, with equipment (HMMWV)	1
Telephone set: TA-312/PT	1
Testing kit petroleum	1
Truck cargo: MTV, with equipment	1

Section VI. S4 Section

MISSION AND RESPONSIBILITIES

The primary responsibilities of the S4 officer are to advise the battalion commander on logistics, plan the logistics portions of operations, and supervise the battalion S4 section. The S4 section provides technical assistance on supply and maintenance to the units in the battalion. The S4 officer is responsible for the overall coordination, advice, and assistance the section gives to the battalion and its units. He directs the actions they take on maintaining supply policies and levels. He also directs them in maintaining stockage lists, maintenance policies and inspection, and financial management information. He administers pertinent portions of the unit's environmental stewardship program. Areas of environmental interest for the S4 include the proper accumulation, management, and transportation to a permitted disposal facility of all HM and HW generated in POL, supply room, food service, and maintenance operations; disposal of solid and liquid wastes associated with food service operations; and environmentally safe maintenance practices. He should ensure all battalion supply functions are automated using the ULLS S4.

PERSONNEL

Effective operation of the section requires identifying key personnel and understanding their primary duties and responsibilities. Key personnel in the S4 section include--

Unit Maintenance Technician (Warrant Officer Two, 915A0). Provides technical advice and assistance on automotive equipment maintenance to the petroleum pipeline and terminal operating companies. Sets up an environmental stewardship program for motorpool operations. Reviews maintenance practices to ensure they are done in an environmental safe manner.

Engineer Equipment Repair Technician (Warrant Officer Two, 919A0). Provides technical advice and assistance on engineer equipment maintenance to all assigned and attached units.

Property Accounting Technician (Warrant Officer Two, 920A0). Manages the units' property books. Provides the petroleum pipeline and terminal operating companies with technical assistance on organizational supply matters.

Senior Maintenance Supervisor (E8, 63B50). Assists the companies in obtaining the necessary equipment and supplies needed by their maintenance sections. Ensures maintenance operations are conducted in an environmentally safe manner. Implements the units environmental stewardship program in maintenance operations. Coordinates the maintenance practices and procedures of the companies.

Supply Sergeant (E7, 92Y40). Supervises the battalion's internal supply functions. Plans, coordinates, and inspects unit and organizational supply operations. Manages hazardous material supply items IAW locally set up procedures and regulations. Supervises the preparation and maintenance of supply records of subordinate units. Assists the PBO.

Assistant Supply Sergeant (E5, 92Y20). Assists the battalion supply sergeant.

Supply Specialist (E4, 92Y10; E3, 92Y10). Requests, receives, and processes the necessary supplies and equipment for subordinate units.

Administrative Specialist (E4, 71L10). Performs all administrative functions to include setting up and operating MARKS, and prepares section correspondence.

MAINTENANCE OPERATIONS

The section's primary function is to provide guidance and assistance on internal logistics for the unit. To do this, the section addresses these factors in the following paragraphs.

Procedures

The S4 section personnel should conduct staff inspections of maintenance operations IAW DA Pamphlet 738-750. During these inspections, they should review files to determine the number, type, and frequency of repairs and the time involved. The section sets up and monitors equipment service schedules. It also consolidates and forwards various equipment and maintenance status reports. Section personnel should also inspect SOPs and procedures to ensure they comply with environmental protection regulations. See Appendix A. DA Pamphlet 738-750 gives more information on these functions.

Material Readiness Assistance Visits

S4 section personnel make liaison visits to subordinate units of the battalion and advise them on ways to improve their readiness. They contact direct support facilities to place command emphasis on demands and incoming

requisitions. They also place emphasis on supply status reports, as well as requirements for current and planned operations. AR 710-2, DA Pamphlet 710-2-1, and DA Pamphlet 738-750 are references for these actions.

Material Readiness Reports

The section processes DA Forms 2406 for the battalion. These reports provide information on the condition of equipment in the hands of using organizations. DA Pamphlet 738-750 gives more information.

Storage of Supplies and Equipment

Supplies and equipment should be managed and cared for according to the standards outlined in the current Unit Supply Update. Receipt, storage, and issue of environmentally hazardous materials should comply with all pertinent national, state, local and host nation environmental regulations. See Appendix A. The S4 section makes periodic inspections of unit supply storage procedures.

Supply Procedures

The battalion units send all authorization supply documents to the section. DA Pamphlet 710-2-1 describes these documents' uses. Review them to see that--

- All equipment authorized is on hand or on request.
- Unit supply requests and priority designator procedures are not being abused.
- Requested quantities for environmentally hazardous materials are the minimum needed to do the mission.
- Prescribed loads of ammunition are managed IAW local policy.
- Individuals have clothing and equipment as authorized by CTA 50-900.
- Arms, ammunition, and explosives are maintained according to ARs 190-11 and 190-40 and local policy.
- Excess property accountability and disposition.

Receipts and Records

The PBO maintains automated organizational property books and all other property records. References that should be available are ARs 190-11, 220-1, 700-84, 703-1, 710-2, 710-3, 735-5, 735-5; DA Pamphlets 600-8 and 710-2-1; FMs 10-14 and 10-14-2; SB 700-20; and the AMDF. The property book should be maintained by checking:

- All equipment authorized by MTOE. It should be on hand or on order.
- Shortage annexes. Prepare for all missing components of end items. Personnel are held responsible for sets, kits, and outfits.
- Components. Components will be checked for serviceability and listed on hand receipt annexes.
- Temporary hand receipts. When used, hand and subhand receipts are adjusted every six months. The six-month period starts on the date entered on the oldest temporary hand receipt. Ensure that change documents are being used for turn-in and issues between the six-month hand-receipt reconciliation periods.
- On-hand physical inventories. Ensure monthly sensitive items and 10 percent inventories are conducted. The PBO must maintain a copy of these inventories.

- Documents file for transactions for nonexpendable items. It should be maintained as a supporting document to the property book.

Budgets

The S4 officer should evaluate and control costs in the battalion. He plans supply and equipment needs for the year. The S4 recommends priorities for spending the money allocated quarterly by higher headquarters. He must also set up some system of monitoring funds spent by the battalion

Nonexpendable Supplies

The S-4 section requests, receives and issues nonexpendable supplies from the unit providing direct supply support. These actions are recorded on DA Form 1064.

Requests for supplies. Ensure all items requested are authorized to customers. Record all requests in the document register, and give it a document number. Send all requests to the SSA. Use DA Pamphlet 710-2-1 for more detailed information.

Issue of supplies and equipment. When issuing items to a supported unit--

- Use DA Form 2062 to record the issue of property book items.

- Use DA Form 3161 as a temporary hand receipt document for issue and turn-in transactions. Stamp document, "temporary hand receipt." Temporary hand receipts are posted to the DA Form 2062 at least once every six months.

- List in the property book all items with serial numbers as outlined in AR 710-2.

- Issue items on the DA Form 2062 if they are defined in AR 710-2 and in the Army Log as durable items.

Turn-ins. Subordinate units turn in unserviceable items and excess serviceable items to the S4 section. Prepare a temporary hand receipt for the turn-in. Give it to the hand receipt holder. Prepare a request for turn-in on all turn-in items. Enter the transactions on the document register. Send the turn-in documents to your supply support activity. Turn in the equipment when directed to do so.

Lost, damaged, or destroyed property. When property has been lost, damaged, or destroyed by a supported unit, your section is notified. The responsible unit prepares a DA Form 362 and other documents required by AR 735-11.

Requests for ammunition. The S4 section processes DA Forms 581 for basic load items. They review and verify each request, using the weapons density, controlled supply rate, and consumption projections for each unit. Requests are processed IAW locally established policy.

EQUIPMENT

TOE 10416 prescribes the equipment for the S4 section. See Table 3-8 for a list of this equipment.

Table 3-8. S4 section TOE-prescribed equipment list for TOE 10416.

ITEM	QUANTITY
Cable telephone: WD-1/TT DR-8 1/2-km	3
Camouflage screen support system: woodland/desert	4
Camouflage screen system: woodland lt wt radar scat without support system	4
Reeling machine cable hand: RL-39	2
Telephone wire with reel: MX-10891/G	1
Telephone digital nonsecure voice: TA-1035/U	1
Truck utility: cargo/troop carrier, 1 1/4-ton, 4x4, with equipment (HMMWV)	1

Telephone set: TA-312/PT	2
Truck cargo: 2 1/2-ton, 6x6, with equipment	1

Section VII. Company Headquarters

MISSION AND RESPONSIBILITIES

The company headquarters provides command, control, discipline, training, personnel administration functions, organizational maintenance functions and supply functions for the soldiers in the company. It also coordinates with higher headquarters and staff sections to do given missions.

PERSONNEL

Effective operation of the headquarters requires identifying key personnel and understanding their duties and responsibilities. Key personnel include those listed below.

Company Commander (Captain, 92F). Is responsible for the leadership, welfare, discipline, and training of all the soldiers in the company. Sets priorities and coordinates present and future missions of the company. Directs and supervises all technical operations and support activities that impact the headquarters operations. Ensures all required reports and data are prepared and transmitted to staff elements as required. Conducts safety and environmental risk assessments for each operation.

First Sergeant (E8, 77F5M). Assists the commander in supervision of company administration functions. Prepares roster, schedules, reports, correspondence, orders, and other materials. Coordinates the activities of the company. Ensure the company SOP includes instructions for--

- Submitting operating reports.
- Defending the area.
- Requesting supplies.
- Preparing personnel actions.
- Reporting intelligence information.
- Submitting material readiness and unit status reports.
- Delivery of mail.
- Submitting disciplinary actions.
- Conducting NBC operations.
- Ensuring Safety/Environmental Protection.
- Adhering to Unit Recycling.

Supply Sergeant (E5, 92Y20). Requisitions, receives, stores, accounts for, and issues all classes of supply (except Class IX) for the company. Manages hazardous material supply items IAW locally established procedures and regulations. Ensures that environmental protection program is adequate and sufficient through coordination with the local environmental officer and the chain of command.

Decontamination Specialist (E4, 54B10). Advises the commander on unit NBC training and operations. Supervises the training of unit NBC teams. Maintains organic NBC equipment and PLL. Manages hazardous materials IAW locally established procedures and regulations.

Personnel Administrative Specialist (E4, 75B10). Performs all administrative functions for the company. Inputs personnel actions using SIDPERS. Prepares--

- Strength reports and casualty reports.
- Recommendations for awards and decorations.
- Leave requests and pay documents.
- Recommendations for promotions.
- Rosters.
- Unit mail records.
- Correspondence

Light-Wheeled-Vehicle Mechanic (E4, 63B10). Augments the supporting unit assigned to provide organizational maintenance. Ensures maintenance procedures comply with locally established environmental protection regulations and procedures.

Armorer/Supply Specialist (E4, 92Y10). Maintains the unit small arms and assists the supply sergeant. Manages hazardous materials IAW locally established policies and regulations.

Cook (E3, 92G10). Cooks and serves for unit personnel. Maintains and sanitizes assigned equipment. Augments supporting unit's food service section.

TACTICAL AND ADMINISTRATIVE OPERATIONS

Key areas of interest while operating in a tactical environment are given below. Also highlights of company administration are given in both the tactical and garrison environment. It is important to note the company is not self sufficient in food service and unit maintenance and will need outside support to meet mission requirements for these areas.

Command and Control

Unit defense. The battalion S2/S3 officer sets up the overall defensive plans for the group and its subordinate units. The company commander then develops a company defense plan within these guidelines. FM 21-75 gives details on how to set up the company defense. Key points are--

- Make sure the unit defense includes observation posts and interlocking fields of fi re. It should also include adequate communications, minefields, and antiarmor barriers.

- Hold rehearsals to make sure that all elements of the plan are coordinated.

- Check range cards, sector sketches, and defensive fire plans.

- Assign a final prote ctive line and principal direction of fire for each machine gun.

- Submit to the battalion commander reports of intention to lay minefields. Also report to him the start and completion of the laying of the minefields. FM 20-32 gives more information.

- Check to see that artillery and mortar final protective fires are determined. Make sure they have been coordinated with the designated fire support unit.

Camouflage. Camouflage is one of the most critical means of defense for combat service support units. Camouflage should protect the unit from detection from the air and the ground. The unit should use all available natural and man-made devices to camouflage its site by using approved techniques. The company leadership should constantly evaluate camouflage for its effectiveness. FM 5-20 gives helpful information on camouflage techniques.

Field sanitation. A field sanitation team performs the sanitation duties for the company. An NCO from within the headquarters monitors the work of the team. He also inspects units to make sure they are following all sanitary procedures. He ensures--

- Steps are taken to control insects. Disease-bearing animals and other threats to sanitation should also be controlled.
- Field sanitation standards comply with the regulations and policies in the field sanitation SOP.
- The field sanitation team is properly trained and coordinates with outside agencies for help when needed.
- The company has the prescribed amount of field sanitation kits on hand and/or the appropriate materials for field sanitation functions.

Unit-level maintenance. One light-wheeled vehicle mechanic is assigned to the company. He augments the unit assigned to provide organizational maintenance. His key duties include--

- Provide limited organizational maintenance support to the company.
- Ensure proper use of tools and ensure proper test equipment maintenance.
- Review TAMMS forms for completeness and accuracy.
- Assist the supporting unit's maintenance personnel with the maintenance program to include organizational-level maintenance, drivers' training program, oil analysis program, and other programs as directed.
- Ensure unit maintenance follows set up environmental protection guidelines.

Medical support. The company commander is responsible for coordinating proper medical support. FM 8-10 gives medical support guidance. Key points in this area are--

- Proper medical coordination is made with higher headquarters.
- Policies and procedures are up to date.
- Personnel receive medical aid during any unit operation.
- Emergency aid and unscheduled medical support are available during day-to-day operations. FM 21-11 gives more information.
- The unit has the appropriate number of trained combat lifesavers. All required Class VIII equipment is available to qualified unit personnel.

Response to ground attacks. Response to ground attack should be thoroughly practiced as a battle drill. The severity of the ground attack should be assessed immediately and reported to higher headquarters. Indirect fires should be used as appropriate. The company should have (as a minimum) a squad-sized QRF armed with an automatic weapon. The QRF will be under direct control of the company headquarters section at all times. The

QRF will respond immediately to suppress an attack on any portion of the perimeter. The company should be able to defeat a level I attack without further reinforcement. Higher levels of attack will require outside support and possible displacement of the company to avoid and potentially defeat the enemy force.

Physical security. Access to restricted areas should be strictly controlled. Dismount points must be set up and manned. Observation posts are positioned around the area as appropriate. Personnel must be assigned camouflaged positions along the perimeter. Weapons, ammunition, and explosives must be physically secured. FM 19-30 and AR 190-11 are the primary references for physical security.

Captured enemy personnel and material. The company must process any captured enemy personnel and equipment correctly. Key points in handling enemy personnel include--

- Disarm and search prisoners for concealed weapons and for documents of intelligence value.
- Segregate the prisoners by status, rank, and sex.
- Give wounded personnel lifesaving and life-sustaining medical treatment. Evacuate them to the nearest medical facility as soon as possible.
- Keep them silent.
- Tag, safeguard, and move all equipment and documents to the rear or to the battalion headquarters. FM 34-1 gives more information.
- Prepare tags to give the date and time of capture, the capturing unit, and the circumstances surrounding the capture. Tags should also state if documents or equipment were found on the prisoner. (Under no circumstances may documents and equipment be altered or kept as souvenirs.) Make sure operations are followed within the limits set forth in FMs 19-40 and 27-10, Chapter 3.
- Give prisoners no comfort items. They retain safety items such as their helmet and protective mask.
- Treat all prisoners according to Geneva Convention provisions. FM 27-10 gives guidance. Transfer prisoners to the nearest military police activity as soon as possible.

Administrative and Logistical Support

SIDPERS input. The personnel administrative specialist inputs all personnel administrative data using SIDPERS transactions. He provides data to the group headquarters S1 section by secure means. DA Pamphlet 600-8-1 gives guidance. The information to be gathered includes--

- Casualty reports.
- Replacement personnel requests.
- Promotion recommendations.
- Disciplinary actions.
- Awards requests.
- Other administrative data required for unit support.

Mortuary affairs. When soldiers in the unit are killed in action, it is the unit's responsibility to take the remains to the nearest mortuary affair teams providing area support. If remains cannot be recovered due to tactical or logistical limitations, the unit must report their location to higher headquarters. If the remains are not recovered, the unit personnel specialist will prepare a report on where the remains are located and why they have not been recovered. JTTP 4-06, FM 10-297, and STP 10-57F14-SM-TG give more guidance.

Food service support. The company requires food service support augmentation for its one assigned cook.

Unit supply. FM 10-14 and the most current unit supply update give detailed guidance for unit supply. In general, the supply sergeant requests, accounts for, stores, issues, and turns-in (excess and unserviceable) all classes of supply except Class IX. The supply sergeant also maintains property records. Under the guidance of the battalion S4 and the PBO, he--

- Automates all supply room functions using the ULLS-S4 module
- Arranges supplies so the unit can provide fast and efficient support.
- Manages supply items that are hazardous materials IAW locally established environmental procedures and regulations.
- Checks replenishment supplies and verifies them against the suspense file.
- Issues supplies promptly.
- Protects supplies from adverse weather, pilferage, and sabotage.
- Issues by subhand receipt procedures all property on the commander's hand receipt.
- Prepares shortage annexes for all missing components of end items issued on subhand receipts.
- Handles supplies IAW DA Pamphlet 710-2-1 and ULLS-S4 procedures.
- Maintains unit's combat basic load of Class I, II, and IV expendable supplies.
- Supervises the unit armorer and provides the armorer with assistance as needed.

Requests for and receipt of ammunition. Company personnel will manage the unit's Class V account. In combat, Class V is provided on a push basis. Emergency requests for ammunition are sent through the group S4 section. In garrison, ammunition must be requested IAW locally established procedures. Key points for requesting and handling ammunition are--

- Prepare copies of DA Form 581 according to DA Pamphlet 710-2-1.
- Store ammunition according to quantity, class, and compatibility IAW locally established environmental procedures and regulations. Maintain required distance between cells or areas.
- Check ammunition to make sure it is not damaged and it is marked by lot number, type, and quantity.
- Account for ammunition when received, when stored, and when issued.
- Use dunnage according to TM 9-1300-206. Manage and dispose of used dunnage IAW with locally established environmental policies and procedures.

- Observe established environmental and safety precautions at all times when handling ammunition and associated waste products.

EQUIPMENT

The equipment prescribed for the company headquarters by TOE 10416 is listed in Table 3-9.

Table 3-9. Company headquarters TOE-prescribed equipment list for TOE 10416.

ITEM	QUANTITY
Alarm chemical agent automatic: portable manpack	2
Binocular: modular construction, military scale, reticle, 7x50-mm, with equipment	2
Monitor chemical agent	2
Battery case: Z-AIJ-E1	1
Cable telephone: WD-1/TT DR-8 1/2-km	6
Camouflage screen support system: woodland/desert	7
Camouflage screen system: woodland lt wt radar scat without support system	7
Decontaminating apparatus: power-driven, lightweight	2
Generator set: diesel engine-driven, skid-mounted, 15-kw, 50/60-hz	1
Installation kit: MK-2325/VRC F/AN/VRC-87/88/90 in HMMWV	1
Launcher grenade 40-mm: single-shot, rifle-mounted, detachable, with equipment	6
Light set general illumination: 25-outlet (Army)	3
Machine gun 7.62-mm: light flexible	2
Mask chemical biological: M40	67
Mount tripod machine gun: 7.62-mm	2
Pump centrifugal: gas-driven, frame-mounted, 1 1/2-inch, 65-GPM, 50-ft hd	2
Pistol 9-mm automatic: M9	5
Radiac set: AN/VDR-2	1
Radiac set: AN/PDR-75	1
Radiac meter: IM-174/PD	1
Radio set: AN/VRC-88	2
Reeling machine cable hand: RL-39	4
Radio set: AN/VRC-88A	1
Rifle 5.56-mm: M16A1	61
Telephone wire with reel: MX-10891/G	1
Telephone digital nonsecure voice: TA-1035/U	1
Truck utility: cargo/troop carrier, 1 1/4-ton, 4x4, with equipment (HMMWV)	3
Tank liquid storage metal: petroleum products, skid-mounted, 600-gallon	1
Telephone set: TA-312/PT	4
Tool kit general mechanics: automotive	1
Tool kit carpenters: engineer squad with chest	1
Tool kit small arms repairman: ordnance	1
Wireline adapter: HYX-57/TSEC	2
Trailer cargo: 3/4-ton, 2-wheel, with equipment	2
Watch wrist: nonmaintainable	7
Boresighting equipment weapon: small arms XM30	1
Computer set general: AN/GYK-33B	1
Data transfer device: AN/CYZ10	1
Key processor KP TSEC/KOK-22	1
Pocket radiac	1

Section VIII. Communications Section

MISSION

The communications section coordinates installation, operations, and management of information systems in support of the battalion headquarters communications facilities. The section provides--

- FM radio (SINCGARS).
- AM HF radio.
- Mobile subscriber user equipment.
- Message center service.
- Computer installation and configuration
- SOI production with RBECS
- Field wire and telephone service
- NCS for AM and FM radio nets.

RESPONSIBILITIES

The signal officer is responsible for all battalion information systems (both tactical communication and commercial computer systems). He supervises the communications section. He also coordinates with supporting signal units for entry into the common user systems and preparation of the battalion SOI.

PERSONNEL

Effective operation of the section requires identifying key personnel and understanding their primary duties and responsibilities. Key personnel include--

Section Chief (E7, 31U40). The senior enlisted advisor to the section officer. Primary responsibility is tactical communication liaison with the battalion subordinate company elements. Prepares the battalion SOI using RBECS. Supervises all enlisted soldiers assigned to the communication branch.

Signal Information Service Specialist (E4, 31U10). Installs and maintains battalion MSE, SINCGARS, and AM HF digital and voice equipment. Responsible for battalion computer system installation and configuration.

OPERATIONS

The section is responsible for the information system integration plan; SINCGARS; AM HF radio: MSE interface equipment; and message center. It is also responsible for computer installation and configuration; RBECS-SOI construction; field wire and switchboard; and the radio NCS.

SINCGARS

The unit is equipped with the AN/VRC-90 SINCGARS FM radios. SINCGARS is a new family of VHF-FM radios that replace the old FM AN/VRC-12 series of radios. These radios provide the battalion with a tactical secure FM radio net for internal command and control and external base cluster defense coordination. These radios feature simple, quick operation using a 16-element keypad for push-button tuning. They have short-long range operation for voice or digital data communications. The planning range is 8 to 35 kilometers. They operate in a jam-resistant, frequency-hopping mode that can be changed as needed. The NCS uses the AN/VRC-92 radio that is a dual long-range system that can also operate as a retrans system as mission dictates.

AM High-Frequency Radio

The battalion will employ the AN/GRC-193A HF radio. The AN/GRC-193 is a rugged, tactical, vehicular/base station HF radio set. The set's high power (100-400 watts) makes it capable of long-range communications needed to link all pump stations in the AM HF pipeline net that may span in excess of 300 miles. (The AN/GRC-213 low power AM HF radio is unacceptable for use with the omnidirectional coverage NVIS antenna, which requires maximum power output.) The AN/GRC-193 radio set can be mounted in a wheeled vehicle or installed in a fixed location, such as a building or tent. When installed in a fixed location, the radio requires a power supply providing 24 to 32 volts DC (such as the PP-1451/G). To use this system in the radio teletype mode, the KG-84 and computer terminal, AN/UGC-144, is needed. Secure voice requires a KY-68. Both secure and radio teletype operation is mandatory for pump station operation.

Mobile Subscriber Interface Equipment

The supporting signal unit provides connectivity to the battalion that allows it to interface with the theater digital or corps mobile subscriber network. Users access MSE network via fixed subscriber terminals or mobile subscriber terminals. The fixed subscriber terminals are hard wired to a SEN through a junction box, J-1077. The three fixed instruments are the DNVT, TA-1035; the DSVT, KY-68; and the communication terminal, AN/UGC-144. The MSRT is the AN/VRC-97. The MSRT, which consists of a very high-frequency radio and a digital secure voice terminal (KY-68), is in a vehicle-mounted assembly. It interfaces with the MSE system through a RAU. As long as the radio unit has line-of-sight contact with the RAU, it has connection in the MSE area system. The operational planning range is 15 kilometers from any RAU.

Message Center

Message center operations orient on the AN/UGC-144 computer terminal that enables access into the DMS, DDN, and MSE network. Both the S4 and POL Operations sections are authorized these terminals. These terminals are user-owned and user-operated message terminals. Through menu-driven screens and passwords, it allows composition, transmission, and formal record traffic receipt. Each terminal has a KY-68 DSVT that provides autodial encryption capability. Section personnel, with the assistance of the communication section, process incoming and outgoing messages according to assigned priorities. They will observe the following precedence, time frames, and procedures IAW FM 24-17 and AR 25-11:

- Flash--less than 10 minutes
- Immediate--within 30 minutes
- Priority-- within 2 hours
- Routine--within 6 hours

Computer Installation and Configuration

The communications section is responsible for all battalion information systems to include computers and peripheral devices. Responsibilities include--

- Ensuring all computer systems are accredited for the appropriate classification and networking level.
- Properly configuring all computer communication devices (modems).
- Installing, maintaining, and providing operational guidance on battalion software.

RBECS/SOI Construction

The communications section creates and maintains SOI databases tailored to specific missions. Using RBECS, the section is able to generate processing, displaying, editing, printing, storing and transferring SOI information. RBECS also processes the frequency hopping data, (TSK, HOPSET, NET IDs), for the SINCGARS and other radio

systems. RBECS can selectively compartmentalize information based on need and transfer the data to ANCD and ECCM fill devices (MX-10579 and MX 18290). RBECS requires formal training.

Local Field Wire and Switchboard

The communications section will devise and use a wire net plan. The plan identifies each user telephone connected to the switchboard (SB-3614) or MSE/TRI-TAC switch. The plan will show where the wire is buried or installed overhead. Also, the wire team will designate a wire team to coordinate telephone installation with supported units and identify manpower and equipment requirements. Users are responsible for wire installation and connection to the switchboard. Section personnel--

- Test wire before installation.
- Connect and lay the wire according to the wire net plan.
- Lay the lines by the shortest distance allowed by terrain.
- Secure lines at their start point and at any point where they change direction or run into construction.
- Tag wire according to FM 24-20 and the SOI.
- Make maximum use of terrain and natural vegetation to conceal wires.
- Make sure that construction techniques meet the requirements of FM 24-20.
- Check all splices to make sure they are taped and correct.
- Make preinstallation checks of the switchboard.
- Install and ground the switchboard in an area protected from moisture.
- Attach telephone lines and trunk connections at the switchboard.
- Label the switchboard according to the telephone directory.
- Keep wire splices clear of standing water and maintain a correct amount of slack in the wire.
- Check the wire periodically to make sure no one has tampered with it.
- Recover field wire without damaging it. See FM 24-20.
- Wind wire evenly on reels with enough slack at the start to allow easy testing and servicing.

Radio Communications Net

There are nine SINCGARS radios dispersed throughout the company. Section personnel set up the radio communications net for these radios. When performing their duties, they should--

- Ground the equipment.
- Check at first light (when the station is set up during darkness) to make sure it is concealed. If it is not, conceal it immediately.
- Make initial entry into the designated net within the time frame set by the commander.

- Use operating signals, prosigns, and authentication when required by the NCS.
- Process messages, requiring coding or decoding, promptly and without error according to FM 24-18.
- Adhere to all COMSEC procedures.
- Follow the guides in FM 21-2 when setting up the radio net.

NCS

The battalion NCS operates according to the procedures in FM 24-18. Section personnel--

- Open and close the net.
- Control transmission.
- 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.

EQUIPMENT

TOE 10416 prescribes the equipment for the communications section. See Table 3-10 for a list of this equipment.

Table 3-10. Communications sections TOE-prescribed equipment list for TOE 10416.

ITEM	QUANTITY
Axle cable reel: RL-27	2
Cable telephone: WD-1/TT DR-8 1/2-km	1
Cable telephone: WD-1/TT RL-159 2-km	2
Camouflage screen support system: woodland/desert	1
Camouflage screen system: woodland lt wt radar scat without support system	1
Power supply: PP-4763/GRC	1
Power plant electrical trailer-mounted: 5-kw, 60-hz, 2 each, mounted on M103A3, AN/MJQ-16	1
Reeling machine cable hand: RL-31	1
Reeling machine cable hand: RL-39	1
Tone signaling adapter: TA-977/PT	1
Truck utility: cargo/troop carrier, 1 1/4-ton, 4x4, with equipment (HMMWV)	1
Splicing kit telephone cable: MK-356/G	1
Switchboard telephone manual: SB-22/PT	2
Telephone set: TA-312/PT	2

CHAPTER 4

PETROLEUM PIPELINE AND TERMINAL COMPANY

Section I. The Organization

MISSION AND ASSIGNMENT

The mission of the Petroleum Pipeline and Terminal Operating Company is to operate petroleum pipeline and terminal facilities for receipt, storage, issue, and distribution of bulk petroleum products in support of an independent corp or theater army area of operations. The unit is organic to an HHC, Petroleum Pipeline and Terminal Operating Battalion (TOE 10416L000), or an HHC, Petroleum Group, (TOE 10602L000). It may also be attached to a Theater Army Area Command or Corps in the absence of the above headquarters.

CAPABILITIES

The personnel strength levels prescribed in its TOE determine the company's capabilities. The petroleum pipeline company, organized under TOE 10417, has the following capabilities.

Full Strength

At full strength (TOE level 1) and operating on a 24-hour basis, this unit--

- Operates terminal facilities for storage of up to 500,000 barrels (42 gallons/barrels) of bulk petroleum depending on capacity and type of storage facilities available. A facility normally consists of two tank farms, each with a capacity of up to 250,000 barrels of bulk petroleum products, or operates a TPT, with storage capability of up to 90,000 barrels, when permanent or semipermanent facilities are not available. The TPT provides the equipment and storage capacity for off-loading tanker ships over the shore.

- Ships bulk petroleum products (about 720,000 gallons per day) through 150 kilometers (90 miles) of pipeline.

- Operates six pump stations 24 hours per day to deliver bulk product through 6- or 8-inch multiproduct coupling pipeline.

- Operates facilities for shipment of bulk products by coastal tanker, barge, rail, and tank trucks.

- Maintains a prescribed reserve of bulk petroleum products for the theater or an independent corps.

- Operates an FSSP for bulk issue operations.

- Installs and operates up to 8 kilometers (5 miles) of tactical hose line.

- Provides limited bulk fuel reduction capabilities.

- Provides food service support for assigned personnel.

- Provides support for Engineer Company, Pipeline Construction (TOE 05434L000), when assembling pipeline.

TOE Strength Levels 2 and 3

Operational capabilities are reduced to about 90 percent for level 2 and 80 percent for level 3.

Type B Organization

The capabilities of a type B organization are the same as those of a level 1 organization. There are some differences in personnel, however. A type B organization requires fewer US military personnel. Non-US personnel can fill vacancies existing in this organization. Interpreters and translators required under the type B organization will be provided from the appropriate MACOM.

REQUIRED SUPPORT

External support is required. This unit depends on

- Appropriate elements of the corps or theater army for legal, health service support, finance, and personnel and administrative services.
- Engineer fire-fighting teams-fire truck (TOE 05510LB00) for required fire-fighting support.
- Petroleum laboratory support from HHC, petroleum pipeline battalion.
- Military police security company for security in the theater area or corps.
- Engineer pipeline construction company (TOE 05343L) for pipeline construction.

MOBILITY

This unit can transport 616,700 pounds (27,176 cubic feet) of TOE equipment with organic vehicles. This unit--

- Has 321,256 pounds (19,230 cubic feet) of TOE equipment requiring transportation.
- Requires 33 percent of its TOE equipment and supplies to be transported in a single lift using its authorized organic vehicles.

ORGANIZATION

The company is organized with a company headquarters, petroleum product control section, terminal operating platoon, pipeline operations platoon, and maintenance section. The company headquarters, petroleum product control section, and maintenance section are discussed in Sections II through IV. Chapter 5 gives the details of the terminal operating platoon. Chapter 6 gives the details for the pipeline operating platoon. Figure 4-1 shows the organization of the petroleum pipeline and terminal operating company.

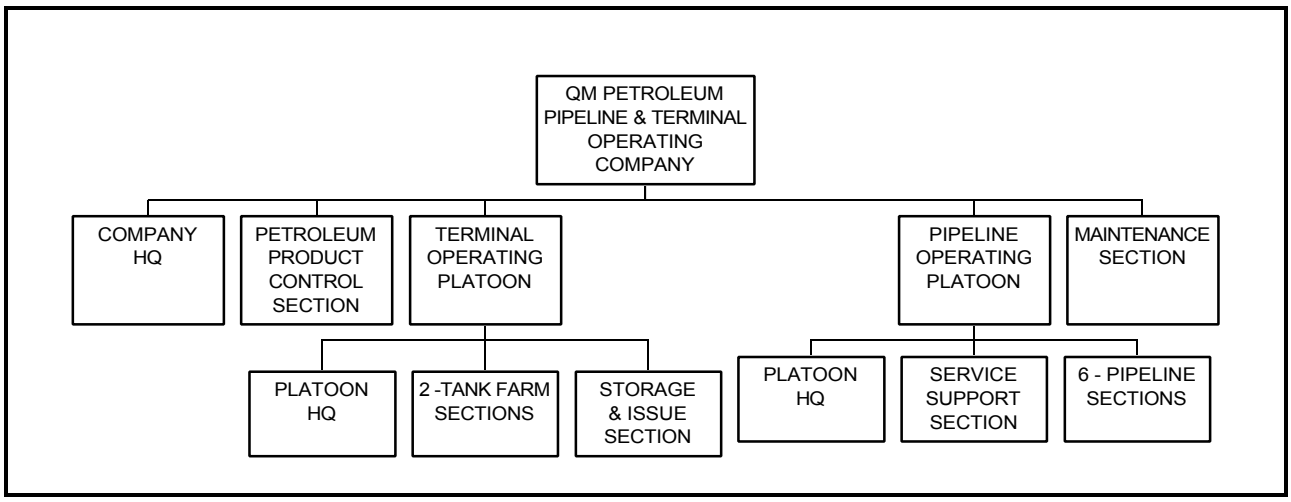


Figure 4-1. Company organization

Section II. Company Headquarters

MISSION

The primary function of the company headquarters is to provide command and control. Other functions include administration, and logistical support required to conduct unit operations.

DUTIES OF PERSONNEL

Effective operation of the headquarters requires identifying key personnel and understanding their duties and key responsibilities. Key personnel include--

Company Commander (Captain, 92F). The company commander is responsible for everything his company does or does not do, and he cannot delegate this responsibility. He can delegate authority to his subordinates and make them responsible to him. However, the company commander is responsible to his commander for everything done or not done by the company. Only he is answerable for the company. Specifically, the company commander must--

- Make sure that the company performs its mission.
- Train your soldiers.
- Prepare your soldiers for the rear battle mission. This includes rear area security and damage control.
- Maintain discipline and esprit de corps.
- Provide a program to sustain the fitness of your soldiers.
- Ensure safety and environmental compliance.
- Make sure the company functions according to command regulations and policies.
- Keep higher headquarters and your soldiers informed.
- Maintain communications and electronic security.

First Sergeant (E7, 77F5M). Assists the company commander in the supervision of company administration functions. Prepares rosters, schedules, reports, correspondence, orders, and other materials. When the company officers are not available, the first sergeant assumes most of the duties of the company commander. The unit clerk is under his direct supervision. Also, the first sergeant--

- Coordinates the activities of the company.
- Makes scheduled and unscheduled inspections; takes corrective action immediately when deficiencies are noted.
- Plans for time to listen to the troops and makes sure they feel free to discuss their problems both personal and professional.
- Ensures the company SOP includes instructions for--
  - Submitting operating reports.
  - Displacement and defense.
  - Reporting intelligence information.
  - Requesting supplies.
  - Submitting material readiness and unit status reports.
  - Submitting disciplinary actions.
  - Ensuring safety/environmental compliance.
  - Delivery of mail.
  - Recycling.

Personnel Administrative Specialist (E4, 75B10). Performs administrative and clerical duties for the company headquarters. Prepares reports including--

- Strength reports.
- Casualty reports.
- Recommendations for awards and decorations.
- Leave requests.
- Pay documents.
- Duty rosters.
- Unit mail records.
- Unit files.
- Reports on promotions.

Petroleum Light Vehicle Driver (E3, 77F10). Operates the radio in the command 1 1/4-ton truck (HMMWV), drives for the commander, and performs all operator maintenance on the 1 1/4-ton truck. The vehicle driver also can be the unit courier between the unit and the headquarters of the petroleum operating battalion.

Senior Food Operations Sergeant (E7, 92G40). Supervises cooks assigned to the company. He--

- Selects field kitchen site.
- Prepares production schedules.
- Adjusts menus.
- Prepares food ration requests.
- Conducts daily meetings.
- Inspects food kitchen personnel.
- Supervises food preparation.
- Assigns duties.
- Inspects field kitchen.
- Prepares SOP for kitchen personnel, including instruction sheet for headcounters; instructs headcounters.
- Inspects serving lines.
- Reports equipment shortages and maintains informal equipment repair logbook

NBC NCO (E6, 54B30). Serves as primary advisor to the company commander for all NBC matters. Assists the commander in planning and conducting NBC operations and advises the commander on the organization and training of the unit NBC teams. He--

- Schedules and supervises maintenance and employment of equipment.
- Computes radiation factors affecting personnel, equipment, and operations.
- Assists in preparation and analysis of NBC reports, records, maps, and sketches.
- Prepares radiological fallout and chemical and biological downwind predictions.
- Assists in analysis of chemical target vulnerability.
- Trains company personnel in protective measures to be taken during NBC attacks or operations.

Supply Sergeant (E6, 92Y30). Prepares and maintains supply records for the unit. He--

- Provides locked facilities to safeguard supplies and property stored in unit supply room and other company storage areas.
- Processes unit laundry.

- Handles issue and turn-in of property between company and personnel.
- Assists personnel with supply matters.
- Requests, receives, and issues supplies.
- Prepares adjustment documents for property lost, damaged, or destroyed.
- Supervises armorer and supply specialist.

First Cook (E5, 92G20). Supervises second shift operations of the field kitchen. He--

- Ensures that cooks follow menus.
- Inspects food storage and food preparation.
- Directs personnel in construction of grease traps, soakage pits, garbage pits, hand-washing devices, and incineration pits.
- Instructs headcounters in duties.
- Prepares the more complex food items.

Cook (E4 (2 each), 92G10; E3, 92G10). Prepares, cooks, and serves food according to recipes, cooking times, cooking temperatures, and field kitchen SOP. They--

- Cleans work area, equipment, and cooking utensils.
- Receives, inspects, and stores food items.
- Prepares assigned food items. Sets up serving lines.
- Portions and serves food on serving lines or from food containers.
- Performs preventive maintenance on kitchen equipment.

Armorer (E4, 92Y4). Repairs and performs unit maintenance (excluding operator and crew) on unit small arms; keeps records for weapons (AR 710-2 and DA Pamphlet 710-2-1); and performs duties assigned by the supply sergeant.

Supply Specialist (92Y10, E3). Assists the supply sergeant. Requests, receives, stores, and issues authorized supplies and equipment needed for the operation of the company.

EQUIPMENT

Table 4-1 lists equipment identified for the company headquarters by TOE 10417. Other equipment may be authorized by CTAs. Use CTA 50-900 for clothing and individual equipment and CTA 50-909 for field and garrison furnishings and equipment. (See equipment registers in Appendix B for equipment descriptions.) Expendable and durable supplies are listed in CTAs 8-100 and 50-970.

Table 4-1. Company headquarters TOE-prescribed equipment list for TOE 10417

ITEM	QUANTITY
Accessory outfit, gasoline, field range: accommodates 50 soldiers	1
Alarm, chemical agent automatic: portable manpack	1
Cable telephone: WD-1/TT DR-8 1/2-km	5
Charger, radiac detector: PP-1578/PD	4
Installation kit: MK-2503/VRC for AN/VRC-47/VRC-12	1
Heater, immersion, liquid fuel-fired	12
Launcher, grenade, 40-millimeter	4
Light set, general illumination: 25-outlet	1
Machine gun, 7.62-millimeter	4
Mask chemical, biological: M40	187
Mount tripod, machine gun, 7.62-millimeter	4
Pistol, caliber .45 automatic	1
Radiac meter: IM-93/UD	2
Radiac set: AN/PDR-27	1
Radiac meter: IM-174/PD	1
Radio set: AN/VRC-47	1
Range outfit, field gasoline	3
Reeling machine cable hand: RL-39	3
Rifle, 5.56-millimeter	186
Telephone set: TA-312/pt	4
Truck, utility: cargo/troop carrier, 1 1/4-ton, 4x4, with equipment (HMMWV)	1
Tool kit, carpenters:	1
Tool kit, small arms repairman:	1
Trailer, cargo: 1 1/2-ton, 2-wheel, with equipment	2
Trailer, tank, water: 400-gallon, 1 1/2-ton, with equipment	2
Truck, cargo: 2 1/2-ton, 6X6, with equipment	2
Watch wrist	19

OPERATIONS

A major function of company headquarters is to provide supervision and direction to the overall operation of the company. To do this, the commander and his staff must consider the following factors.

Site Selection

Your unit may begin its operation at beachheads or base terminals near theater ports of entry. It may be used along any 100-kilometer sector of pipeline extended as far forward in the theater as possible. The general area for your company's pipeline, pumping stations, and tank farms are selected for you when the petroleum distribution system is set up by the theater command. Tank farm sites will be located so that they will be accessible from the available transportation networks. Engineer personnel will select the actual sites within the general area assigned taking into consideration:

- Road and rail facilities. They should be adequate for transport of pipeline equipment and supplies.

- Size. Sites should be large enough for expansion of tank farm and for tanks to be placed far enough apart to reduce fire hazard.

- Distinctive landmarks. There should be no distinctive landmarks or terrain features that could provide easy identification for enemy aircraft.

- Environmental protection.

Be sure to select an alternate area in case your unit must move because of enemy action; NBC contamination; or the effect of weather on the terrain. When you select an operating site for each element, consider the volume of traffic, needed space, safety requirements, and defense.

Site Defense

You are responsible for the security and defense of your soldiers and equipment. Your unit may face attack from threat forces. Your soldiers must be able to defend themselves initially with the assets in your unit. You must develop a defense plan, assign specific duties, and ensure that your soldiers are trained to perform defense tasks. The defense plan, to include a reaction force, must be rehearsed to ensure that all site NCOs understand the concept. Rehearsals must be both planned and unplanned. You will need to develop your defense plan in conjunction with higher headquarters and adjacent units.

Rear Area Protection

The rear area is the space within a command where the majority of the combat support and CSS functions are performed. RAP includes protecting the pipeline from interruptions by enemy activity, sabotage, or natural and manmade disasters. RAP operations are secondary missions for combat service and CSS units. The headquarters charged with a RAP responsibility draws up workable plans for RAP and supervises the RAP functions. RAP is divided into two separate functions: RAS and ADC. The commander of the pipeline and terminal operating company gets RAP instructions from higher headquarters and:

- Publishes the RAP requirements in the SOP.

- Assigns RAS duties to qualified personnel.

- Sets up ADC plan designed to keep casualties and destruction as low as possible in case of enemy action or natural and manmade disaster.

- Sets up teams to aid injured in case of enemy attack.

ADMINISTRATIVE MANAGEMENT

A PAC may be activated at a higher level of command and tasked to provide formal administrative support to the company (Chapter 3). When this occurs, the commander retains responsibility for the readiness posture of his company and for ensuring that assigned soldiers are properly supported. He also retains responsibility for military justice and for informal administrative actions. See DA Pamphlet 1-2 for more information on the PAC. The following paragraphs are written from the standpoint of a company tasked to perform its own administrative functions. The commander's key assistants in providing and maintaining company administrative services are the first sergeant and company clerk. You are responsible for developing administrative management procedures. Use DA Pamphlet 1-2 and AR 340 series for guidance. Administrative management activities for which you must plan include those covered below.

Reports

A report is an account or statement describing in detail an event, situation, or similar matter, usually resulting from observation or inquiry. A number of unit reports are required.

SIDPERS. For a SIDPERS overview, see DA Pamphlet 600-8-20. SIDPERS gives you information about your people so that you can manage them individually and collectively. However, SIDPERS can work for you only if your company promptly reports personnel strength and organization change data. DA Pamphlet 600-8-1 gives detailed procedures for preparing and submitting SIDPERS input reports. Make the personnel administrative specialist accountable for prompt and accurate submission of change data, immediate resolutions of errors, and continuing maintenance of files and source data. DA Pamphlet 600-8-8 lists performance indicators and standards for evaluating the personnel administrative specialist's performance.

Conduct and efficiency ratings. Along with other data, these ratings help determine eligibility for certain personnel actions such as promotion, assignment, or award. Also, they can be used to determine the type of discharge a soldier will receive on completion of enlistment. Conduct ratings are based on demonstrated reliability, good moral influence, sobriety, and obedience. Efficiency ratings are based on job performance. Make sure all key personnel are familiar with the enlisted rating system described in AR 600-200. See AR 623-105 for guidance on rating officers. Make sure all ratings are fair and impartial.

Unit status report. The unit status report produces information to help the Army manage its resources. The payoff is military readiness. The Army wants your company to have its authorized personnel on board, its authorized equipment available in working order, and its required supplies on hand. Also, the Army wants your company to do what it is supposed to do--turn out soldiers who will assist the unit mission. See AR 220-1 for your company's reporting requirements.

Materiel condition status report. You must be constantly aware of materiel readiness status within the company. You can do this through a timely system of inspections and reports. These reports are made out by your maintenance element supervisor on DA Form 2406 following instructions in DA Pamphlet 738-750, Appendix C. You should review these reports carefully before forwarding them so that you can determine the readiness status of reportable equipment, reasons for shortcomings, and corrective action that must be taken.

Records

A record is an account in writing or similar means preserving the memory or knowledge of facts or events. A report becomes a record when it is filed or maintained in a repository indefinitely or for a specified period of time. You need an efficient and economical records management program to make sure you and your supervisory and administrative staffs have needed information. Make sure records are properly receipted for, used, stored, dispatched, and when no longer useful, destroyed. AR 340-1 governs records management activities and identifies other regulations dealing with the subject. Some of the records kept by company headquarters are discussed here.

Plans, orders, and SOP. Your plans and orders are based on those received from higher headquarters. Plans set forth a logical sequence of steps to be taken by each unit element in performance of the company's mission. Orders should fit each specific situation and not merely refer to a checklist or repeat the SOP. The company SOP is a written set of instructions which has the force of orders. The SOP sets forth routine or recurring matters. If prepared in detail and updated frequently, the SOP is an effective management and supervisory tool for clarifying duties and responsibilities and making information available to all. The purposes of an SOP are to--

- Reduce the number, length, and frequency of orders.
- Simplify the preparation and transmission of orders.
- Simplify operations.
- Relieve supervisors of the need to make repetitious decisions on routine work.
- Minimize confusion and errors.
- Provide an authoritative reference for answering questions on responsibilities and recurring matters.
- Ensure uniform practices and results.

If an SOP is to serve its purpose, the authority to grant departures from it must be restricted. However, do not make it so restrictive that it prevents subordinates from exercising judgment or initiative. An SOP may include information on one or more of the topics shown in Appendix C. Thus, your company may have one SOP that covers all details of unit operations, or it may have several SOPs (for example, kitchen SOP, unit supply SOP, safety SOP) combined to make up the company SOP. Develop an SOP that reflects your company's needs. In drawing up the SOP, use the format for a descriptive combat service support unit SOP in FM 101-5. However, do not be restricted by this format.

Qualification record. This record reflects duties performed and skills acquired by personnel. It is used to determine duty assignments and required training. Although this record may not be kept at company level, you should review it periodically. AR 600-200 has information on preparing and maintaining enlisted qualification records; AR 640-2-1 has information on officer qualification records.

Duty roster. DA Form 6 publishes duty assignments and ensures their fair distribution. The first sergeant or the personnel administrative specialist prepares and maintains this record. The first sergeant should periodically review the duty roster to make sure the personnel administrative specialist is following directions and samples in AR 220-45.

Policy file. This record is not mandatory, but it can be helpful. It is used to summarize decisions, experiences, directives from higher headquarters, and other information affecting unit activities. The policies, which may be in the form of plans, directives, or brief notes may include charts, maps, and tables.

Unit journal. Higher headquarters may require this record. If kept, it should be prepared daily. It should be an accurate, objective record of events, actions, and operations involving the company. It may include personal recollections of persons involved and information and suggestions helpful to similar units performing under similar conditions. The unit journal is, in effect, the unit history.

Environmental records. Spill reports, spill clean up, disposition of contaminated materials, inventory discrepancies and other such records must be maintained IAW federal and host nation agreements, policies, laws, and regulations.

Office Management

Office management is concerned with the routine administrative matters occurring within the company command post or orderly room. These matters include correspondence, files, publications, mail, and unit fund.

Correspondence. Usually you or your first sergeant must review each piece of correspondence. Before signing correspondence, check it for proper format, correctness, and accuracy. Train your personnel to prepare correspondence to the standards in AR 25-50. Try to handle each piece of correspondence only once.

Files. Periodically survey unit file procedures to make sure they conform to guidance in ARs 340-2 and 340-18. Proper files management involves the following:

- Are files properly identified, labeled and arranged?
- Are proper file numbers being used?
- Are correct disposition instructions on the folder labels?
- Are disposable records destroyed at the end of retention periods?
- Are applicable records transferred to a holding area or records center?

- Are file personnel trained to use the Army Functional Files System and proper filing procedures?

Publications. Publications management involves requesting and posting publications and making them available to those who need them. To determine publication needs, consult reference listings in applicable STPs and the applicable ARTEP/AMTP. Review DA Pamphlet 310-1 for technical manuals for equipment listed in the TOE. The reference list at the back of this manual identifies required publications which should be in your company library. Publications must be complete, current, and accessible to personnel who need them. Require prompt posting of changes and periodic scans of DA Pamphlet 310-1 to see if changes have been published or publications have been superseded or rescinded. See DA Pamphlet 310-13 for posting information.

Mail. The purposes of mail services are to safeguard official and personal correspondence and to deliver mail quickly and correctly to addressees or to dispose of mail that cannot be delivered. A unit mail supervisor who you appoint assists you. The mail supervisor oversees a unit mail clerk and an alternate mail clerk, both additional duties. Duties of unit mail personnel are-

- Unit Mail Supervisor. Supervises unit mail clerks. Trains mail clerks IAW DOD 4525.6-H. Makes sure mail is delivered promptly. Ensures collection hours are posted on mail boxes. Accounts for registered, insured, and certified mail. Inspects unit mail room. Reviews personnel locator directory for currency. Reviews postal records. Makes sure mail is treated properly. Reports immediately to unit commander any known or suspected cases of loss, theft, destruction, or other mistreatment of mail.

- Unit Mail Clerk. Safeguards mail until delivery or other disposition. Ensures prompt delivery of mail. Assists and advises unit personnel on postal matters. Maintains personnel locator directory. Maintains mail records IAW DOD 4525.6-H. May be held responsible for any loss brought about by improper handling of mail in their care. Appointed on DD Form 285.

- Alternate Unit Mail Clerk. Takes charge of unit mail operations in absence of regular mail clerk. Appointed on DD Form 285.

Unit Fund Management

The primary source of unit fund income is a share of the profits from activities such as post exchanges and motion picture theaters. Other sources include proceeds form sales of unserviceable fund-owned property or serviceable fund-owned property sold to other nonappropriated funds. Also, the fund may receive income from savings accounts and investments in US government securities. The unit fund is administered and supervised by a custodian (normally the commander) aided by a fund council.

Custodian. The custodian receives, safeguards, disburses, and accounts for fund property and assets. Disbursements are made by check except for petty cash. Fund records are maintained according to AR 215-5. The custodian has financial responsibility for administration of the fund. The custodian may have to reimburse the fund improper expenditures or for losses resulting from negligence or failure to comply with fund regulations.

Council. The commander appoints the council. It should consist of a custodian, as president, and at least two other unit commissioned or noncommissioned officers. The commander may appoint specialist in grade E4 and above when a higher commander approves such appointments. The council meets at least quarterly at the custodian's call. Make sure the proceedings are recorded and filed. The junior council member is usually the recorder.

Personnel Management

Personnel management involves getting things done by the soldiers. The ability to do this is a measure of the success of a commander. Listed below are helpful personnel management principles.

- Establish objectives. State in written form what you want to do. Make sure the objectives are obtainable. Make them known to your personnel in clear, realistic terms.

- Motivate your personnel. Make them want to do their best as team leaders.

- Communicate effectively. Express yourself clearly and concisely. Make sure you say what you want your personnel to hear. Be a good listener.

- Be innovative. Find new and better solutions to problems. Encourage your personnel to offer suggestions. If you use their ideas, reward and recognize them.

- Maintain cooperation. Use your skills to develop and sustain a spirit of teamwork within the unit.

- Develop your subordinates. Assess their skills and abilities and determine what training is best in their professional development. Encourage them to take advantage of opportunities for career development.

- Keep abreast of personnel management trends. Participate in personnel management training sessions.

Personnel Actions

Personnel actions are those actions that put into effect personnel management principles. The actions include assignment, promotion, and reduction of personnel and submission of recommendations for awards, decorations, and commendations.

Assignment. As a rule, assign personnel according to MOS. Put the right person in the right job. Take the time to know what each person can do. Assign worthwhile and constructive tasks. Consider rotating assignments to allow for professional development. You may wish to reassign personnel to make better use of their skills or for reasons of health, morale, or safety.

Promotion and reduction. Your authority to promote or reduce enlisted personnel is given in AR 600-200. Be careful in performing these actions. They can help or harm company morale and efficiency. Be prudent in making or recommending promotions. They should never be automatic or based on partiality. Make sure your personnel know the qualifications and requirements for the next higher grade. Encourage them to prepare for more responsible positions.

Awards, decorations, and commendations. You may recommend personnel for awards decorations, and commendations. See AR 672-5-1 for details. Submit recommendations to higher headquarters. You may also award letters of commendation to personnel for outstanding job performance. When you do, make sure copies of the letter are placed in the individuals' personnel files.

Replacements

Replacements come to your company from higher headquarters. Replacement of personnel is based on unit strength reports provided to SIDPERS element of higher headquarters. In-processing procedures can help shape new replacements' attitudes. Chapter 7 of FM 22-101 has guidance on reception and integration of new members of a unit. The adjutant (S1) at higher headquarters will normally advise you where to put replacements for their best use. On the other hand, the personal desires of replacements should be considered, when possible. You should meet all replacements as they arrive. You or the first sergeant should interview them to make sure they have the things they need and understand the company organization and mission. Replacements should be assigned sponsors to help them process in. Then the newly assigned soldiers should meet their supervisors and start their jobs.

Enemy Personnel and Materiel

Follow procedures given in FM 19-40 in dealing with captured enemy personnel. More information is in DA Pamphlet 27-1-1 and FM 27-10 which outline how the Geneva and Hague Conventions apply.

Non-US Labor

You may be able to fill vacancies with non-United States personnel. Host nation personnel may be used in any capacity except for handling remains. Refer to DA Pamphlet 690-80 and FM 41-10 for guidance on obtaining and employing non-US labor. The number of non-US personnel must be determined by higher headquarters and will depend on the capacity of available personnel, the number of shifts, and local conditions. The term "non-US labor" may include native personnel, refugees, evacuees, displaced persons, and prisoners of war. If prisoners of war are used, they may not be assigned to any dangerous or purely military activity. Training, supervision, and security need to be considered in using non-US labor.

Training. Training may be necessary before non-US labor can operate effectively. Training should be in line with standard procedures which take into consideration cultural, language, and economic differences between non-US labor and US forces.

Supervision. Normally, military personnel supervise non-US labor. In some areas, where close supervision is possible, local civilian supervisors may be used.

Security. The use of non-US labor must not endanger the security of military forces and operations. Make certain all non-US personnel have proper identification. Precautions must be taken to prevent pilferage of military goods.

MORALE SERVICES

Morale services assist you in maintaining a high level of morale in the unit. They also protect the physical and psychological health of troops.

Safety

Injuries and accidents can seriously affect the company. The result can be a drop in unit readiness. To keep this from happening, you have to come up with a safety program that works and that covers all aspects of your company's operations (DA Pamphlet 385-1). Your soldiers have to be thoroughly trained in the proper handling of material and the precautions to be taken when handling or storing dangerous items. All safety rules and practices must be followed without exception. Also, everyone should be impressed with the importance of staying alert to detect potential hazards, taking corrective action to reduce or eliminate dangers, and promptly reporting all accidents and safety hazards. Your safety program should emphasize safety requirements for all company operations. Describe the program in your safety SOP, and make sure requirements for specific operations are covered in other SOPs. Also, train your personnel in all aspects of the safety program. Make sure your solders are aware of all safety hazards involved in their work and that they practice safety precautions daily. You have to work at achieving safety. Apply the following principles of accident prevention.

Active interest. Emphasize safety at all times in all company activities. Safety programs succeed when everyone participates and keeps up an active interest. Appeal to the personal pride, and point out responsibilities each individual has in the program. Ask for and carefully consider suggestions for making operations safe. Give credit where credit is due; let the successful suggester (and the rest of the company) know an idea has been adopted. On the other hand, if a suggestion is not adopted, let the suggester know why. Your supervisors should be interested in what the accident rate does to efficiency. Supervisory interest can be maintained by providing facts and figures to show how accidents can affect company productivity and, conversely, how increased demands for productivity can increase accidents.

Fact-finding. When an accident occurs, get the facts. What happened? How did it happen? Was anyone hurt? Was anything damaged? When and where did the accident take place? How serious was it? The answers to these questions should give you the answer to the most important question of all: Why did the accident happen? Your fact-finding should focus on any act connected with the accident and why the act took place. Also, check the nature of any mechanical failure or physical hazard. If a tool or piece of equipment contributed to the accident, find out if an improper item was being used, if it was being used properly, and if it was defective.

Corrective action. Use the facts you gather on safety, accidents within your unit, injuries to personnel, and damage to equipment to come up with a workable pattern of corrective action. Go beyond the basic requirement to report accidents. Require that near accidents be reported, with all available information, so that steps can be taken to eliminate hazards, unsafe procedures, or unsafe conditions. In the same way, anything that constitutes a threat to safety should be reported so that corrective action can be taken. If you have soldiers who are repeatedly accident victims, consider placing them in assignments in which they are less likely to endanger themselves and others.

Field Sanitation

Disease can have a significant impact on your unit's ability to perform its mission. Proper sanitation practices are crucial in reducing this threat. Your responsibility for sanitation includes training your soldiers in preventive medicine, providing necessary sanitation equipment and supplies, and setting up and enforcing sanitation procedures. AR 40-5 directs that you set up and train a unit field sanitation team. Use TC 8-3 to train the team. After the team is operational, supervise field sanitation operations. Ensure proper sanitation procedures are followed IAW federal, state, local and host nation environmental/safety laws, regulations, and policies. For more information on field sanitation operations, see FM 21-10 and AR 40-5.

Health Services

Coordinate with higher headquarters for health service support and make sure it is available during operations. Plan for emergency medical treatment to be available during day-to-day operations. Your responsibility also includes providing for the training of all unit members in self-aid/buddy-aid (first aid) procedures. To survive on the integrated battlefield, each soldier must be proficient in first aid. See FM 21-11 for more information on first aid procedures. When a soldier goes on sick call, DD Form 689 serves as a link between you and the medical or dental officer. Normally, the first sergeant or personnel administrative sergeant prepares the form for the sick or injured person who takes it to the medical facility. You are informed of the disposition of the individual's case when medical personnel return the sick slip to you. In emergencies, the sick slip may be initiated at the medical facility. The sick slip is not a permanent record. After it has served its purpose, it may be destroyed, except when it must be forwarded to an officer exercising special court martial jurisdiction in a line-of-duty investigation. Prepare sick slips according to AR 600-6. During maneuvers or in theater of war operations, DD Form 689 is not used.

Shower, Laundry, and Clothing Repair

In the field, your troops will require periodic shower service and exchange of clothing. Coordinate with higher headquarters to make certain that your company is scheduled for service by the SLCR section operating in your area. The SLCR section may also provide delousing operations supervised by medical personnel.

Mortuary Affairs

The company is responsible for searching for, recovering, and evacuating remains. Search involves going into the casualty area and collecting remains. Recovery involves identifying remains, recording all equipment and personal effects found with remains, and sketching the recovery site. Evacuation is the moving remains from the recovery site to the nearest mortuary affairs collection point. Under some circumstances, the unit may have to bury remains. Emergency burial of remains should only be performed when the tactical situation does not allow evacuation or when remains are NBC-contaminated. If remains are contaminated, be sure to mark the burial site with the correct NBC marker. Make certain you, your officers, and NCOs are familiar with the information in

JTTP 4-06. Deceased personnel may be a result of accidents or combat; therefore, you must know which reports are required and the reporting channels for each.

Personal Financial Management

You should concern yourself with the finances of your soldiers and their families. Good money management can contribute to individual and unit morale. Designate individuals within the company as financial counselors and set aside time for them to counsel troops. Make sure each unit member has a copy of TC 21-7. Use the practical exercises in Chapter 7 of the training circular to set up personal financial management training.

Environmental Compliance

Environmental laws, regulations, and policies, have been devised with protection of human health as a primary consideration. Complying with these requirements unconditionally is the best way to ensure that a given area will remain habitable, indefinitely, for conducting Army operations. However, it is understood that the level of environmental protection will vary, as during wartime or battlefield conditions, depending on available resources. Nonetheless, it is Army policy, per AR 200-1 and JTTP 4-04, that it will comply with all federal, state, local, and host nation environmental laws, regulations, and policies. Fostering a proper environmental ethic and ensuring environmental compliance through proper practices and procedures within the company, is the surest way to protect human health and the environment. Also, this practice will keep personnel from facing unnecessary legal burdens.

TRAINING

Make sure training is available and effective for all administrative and morale services. See Chapter 9 for information on managing training and securing training materials

UNIT SUPPLY

The unit supply element supports the company with certain supplies and TOE equipment. You are responsible to the commander for internal supply operations. The most important publications to use are in the Unit Supply Update. You also need your company's MTOE. Make sure you and your soldiers understand the mission of supported units.

Required Information

To manage unit supply operations, you have to know the--

- Requirements and authorization of your company.
- Desires of the commander regarding unit supply.
- Size and physical characteristics of the unit supply element.
- Location and layout of the element.
- Type and amount of support needed to run an element.
- Number, type, and particular needs of soldiers in the company.
- Impact of operations on internal supply operations.
- Request and issue cycle of higher headquarters.
- Location of each supply support activity furnishing support.

Unit Supply SOP

Develop a unit supply SOP. It may be a separate SOP or part of the unit SOP.

- Responsibilities for company supply operations (Chapter 6).
- Hours of operation of the supply element.
- Procedures for controlling durable items.
- Measures for controlling issued property.
- Types of records, reports, and forms required.
- Detailed procedures for requesting, receiving, storing, inventorying, issuing, and turning in supplies and equipment.
- Procedures for adjusting records for lost, damaged, or destroyed items.
- Procedures for safekeeping property of absentees.
- Guidelines and directions for maintaining equipment and supplies.
- Procedures for laundry service.
- Safety, fire and emergency procedures.
- Information on supply training.
- Table of measurement equivalents (FM 10-13).
- Procedures for operating in an NBC environment.

Responsibility

Property responsibility is the obligation of a person to ensure that government property entrusted to his possession, command, or supervision is used properly and cared for and that proper custody and safekeeping are provided. Although you run the unit supply element, all soldiers have certain responsibilities for property. These include supervisory and personal responsibility according to AR 735-5.

Accountability

Accountability is the obligation of a person to keep an accurate record of property. It includes maintaining formal records that contain item identification data, debits, credits, available balances on hand or in use, and locations of property. The property book officer issues property to the commander on hand receipts. You assist the commander, who must--

- Ensure that all property is posted correctly to property records.
- Know what property is on hand through physical inventories.
- Take action to resolve shortages or overages.

Operations

As supply NCO, you request, receive, store, protect, inventory, issue, and turn in supplies. You may also have to obtain laundry support for the company.

Requests. See Table 4-2 for authorization documents which list items you may request. Have a consolidated company request prepared, and send it to the battalion S4. See Table 3-3 for request and turn-in forms. Check the request for accuracy and completeness before it leaves the company. Initiate follow-up action if supplies are not received on schedule, and periodically review the current need for requested supplies. See DA Pamphlet 710-2-1, Chapter 2, for details.

Table 4-2. Authorization documents for property

TYPE OF PROPERTY	AUTHORIZATION DOCUMENT
Organization Property	MTOE CTA 50-900, Section II CTA 50-909, Appendix C TDA Joint Table of Allowance AR 840-10
Installation Property	CTA 50-909
Expendable Supplies Repair Parts	Technical manuals containing repair parts and special tool lists
Other Expendables	CTA 8-100 (Medical) CTA 50-970 (all except medical, ammunition, repair parts, and heraldic items)
Personal Clothing	AR 385-32 AR 700 84 CTA 50-900

Receipts. The commander uses DA Form 1687 to designate those authorized to sign for supplies. This form is sent to the support activity. The commander remains fully responsible for the supplies. See DA Pamphlet 710-2-1, Chapter 2. When you receive, take these steps:

- Check quantities and NSNs.

- Check the serial numbers when you receive items with serial numbers. Check each item's serial number with the one recorded on the receipt document. If there is no serial number listed on the receipt document, enter it.

- Inventory components of end items against applicable technical manuals or supply catalogs to make sure all components have been received.

- Report discrepancies to the supply support activity according to AR 735-5.

Property book items. Issues of property book items must be recorded on DA Forms 2062, 3161, or 3749. The hand receipt holder must sign the form.

Petroleum reports. DA Form 3643 and DA Form 3644 are used to report issues of petroleum for operating the pumping station, FSSP, FARE, and related equipment. These forms are completed and submitted according to the SOP and DA Pamphlet 710-2-2.

Storage and Protection.

The unit supply may be required to store and protect certain items. See AR 735-5.

Ammunition. Operational situations may prevent storage of ammunition in magazines or special storage rooms. If so, the unit commander may be authorized to store the basic load of ammunition on vehicles or trailers or in other ways demanded by the situation. See AR 190-11.

Rations. Store the basic load of rations on dunnage under tarpaulins. This prevents damage from moisture and rodents.

Lubricants and oils. Store containers on dunnage or pallets. See DA Pamphlet 746-1 for details on pallets. Inspect all cans for leaks before storing them. Store empty containers separately. Make sure the proper type extinguishers are available and that sand barrels are nearby.

Hazardous wastes. Hazardous wastes may be generated by maintenance activities, POL spills, spills or leaks within supply's hazardous materials storage areas, as well as other sources. They are to be stored in properly segregated, hazardous wastes accumulation site areas. They must be stored in containers in good condition, with proper signs, safety equipment, and compliance with labeling, dating, accumulation time, and other requirements, IAW the local environmental protection program.

Weapons. The armorer controls and protects stored weapons. Make sure he performs these functions according to FM 10-14, Chapter 7.

Issue

Nonexpendable items. Usually nonexpendable items received at the supply room are for issue to the user. The items must be put up on the hand receipts before they are issued.

Expendable items. These items are dropped from accountability; but for good supply economy, every effort must be made to control them. Simple records and control sheets should be set up for expendable items issued from the supply room and repair parts issued from the maintenance section by the PLL clerk.

NBC protective items. Store replacement stocks of individual MOPP gear so that they are ready for issue in the event of NBC warfare. Be prepared to replace defective items or items that are incorrectly sized. You should have at least one extra overgarment for each soldier in your company.

FIELD KITCHEN

The Army field feeding system calls for two hot meals and one MRE as the basic combat ration. A food service team with its food service equipment provides the T-ration meals from unitized modules. The basic equipment for the field kitchen is either the mobile kitchen trailer or the kitchen, company level field feeding. The trailer-mounted field kitchen (MKT-75, MKT-75A, or MKT-82) is a collection of food preparation and serving equipment mounted on a 1 1/2-ton trailer. The prime movers for the MKT are the 2 1/2-ton or 5-ton medium cargo trucks. See FM 10-23 for more information on the MKT.

Responsibilities

As food operation sergeant (92G), you are responsible for field kitchen operations. Use the kitchen SOP and production schedule to provide written instructions. They detail on a day-to-day and meal-by-meal basis such matters as responsibilities, work procedures, standards, and acceptable methods. To manage field kitchen operations, you must know the following:

- Where the field kitchen is to be set up.
- Location and strength of supported soldiers.
- Location of transfer points, Class I supply points, and water points.
- Location of Class III supply points for refueling kitchen vehicles and securing fuel for kitchen equipment.
- Ration issue frequency and turnaround time for obtaining rations and water.
- Time required to reach and serve soldiers operating at remote locations. Food in insulated containers will hold serving temperature for up to four hours.
- Designated ration cycle.
- Location of garbage collection points.

SOP for Field Kitchen Operations

An SOP will ensure that all field kitchen personnel know what is expected of them. The food operation sergeant coordinates the pickup days and time for ration and water with the supply activity. The SOP for operation of the field kitchen should include the following:

- Responsibilities for field kitchen operations.
- Schedule for serving meals.
- Sanitation requirements.
- Safety precautions.
- Information on care and operation of equipment.
- Records and reports required.
- Procedures for delivery of meals to those who cannot come to the field kitchen.
- Procedures for pickup of rations and water.
- Information on how to store rations.
- Information on training programs.
- Measurement equivalents.
- Ration forecasting and accountability, meal card control, and cash control procedures.
- Preparation and serving of food and water in an NBC environment.

Operations

Set up a system for the routine operation of the feeding site. Check with the S1 section or have the first sergeant or unit clerk report any changes in troop strength. These changes will affect rations delivered. Inform the field kitchen of any operational changes and the location of soldiers. If possible, make this part of your SOP. Check them for signs of illness or infection. Refer those who show such signs to a medical facility for evaluation. See TB MED 530 for more guidance. As a rule, the following assumptions apply to your operation:

- Although food can be prepared in one central location, rather than food service soldiers, using unit soldiers will pick up, deliver, and serve prepared food at the unit location. They will return insulated food containers to the kitchen site.

- T-rations will be issued in preconfigured, packaged meals, according to the approved menu.

- Each T-ration module will contain a different meal, and each meal will have a unique stock number.

- MREs will be used when T-rations cannot be prepared.

- When rations have not been unitized, units will order rations by giving the number of meals required.

- Cooking will be curtailed during NBC operations.

These assumptions apply to the following specific operations:

- Site selection. The food operation sergeant may assist the company commander in selecting the site for a field kitchen. The area selected should be one where food can be prepared efficiently. The layout must permit a smooth flow of traffic through the serving line. FM 10-23 can be used as a guide in planning the site. Some of the items to be considered when selecting the site are:

  - Good access roads.
  - High, dry ground with good drainage.
  - Sandy loam or gravel.
  - Availability of water approved by medical activity.
  - Accessibility to troops to be fed.

- Establishment of field kitchen. After the site is selected, the food operation sergeant is ready to supervise the setup of the field kitchen using FM 10-23. The cooks set up the kitchen tent, serving line, and dining and messkit laundry areas. FM 10-23 and the equipment TMs will explain how to set up and operate the equipment and give dishwashing procedures and a checklist that can be used for inspections.

- Preparation of food. The food operation sergeant is responsible for the preparation of food for the unit. He cannot be present for the entire 24-hour-a-day operation; therefore, he must:

  - Prepare an SOP to cover the procedures.
  - Keep his own schedule flexible so he can be present at different times during the food preparation and serving operations.
  - Make sure that the communication lines are open and the cooks feel free to come to him for advice or help.
  - Issue concise oral or written instructions.

- Control of quality. The food operation sergeant must check constantly to ensure that the food being served is up to health standards. Food must be prepared under sanitary conditions and served within the prescribed time to be free of microorganisms that cause food spoilage and illness.

- Tools for controlling preparation of food.

  - DA Form 3034 is required in training situations and can be used to give instructions to cooks; get data on number of meals prepared, number drawn, overages and shortages, and number of persons fed; assign duties; and record leftovers.

  - The daily cook's meeting allows the food operation sergeant to distribute workload; take care of morale and discipline problems; determine training needs; and brief the incoming shift on day's requirements.
  - A checklist will help when the food operation sergeant makes an inspection to monitor preparation and serving of meals; check rations in storage; and determine that sanitary measures are used.

- Remote site feeding. Remote site feeding is feeding soldiers deployed more than walking distance from the food preparation site. It may be done by a variety of methods. Battalions may send hot meals forward to remote units using insulated food containers. When this is not feasible, the battalion may attach a KCLFF or MKT with cooks to the remote unit for preparation of hot meals. Depending on its strength, length of mission, and other tactical and logistical considerations, the remote unit may be administratively attached for rations to the nearest unit with a ration preparation capability.

- Records And Reports. Higher headquarters will determine record keeping requirements under field conditions. You may find it helpful to keep an informal equipment logbook. Keep notes on maintenance services,

repairs, and replacement of parts. The notes will help you develop a planning replacement program. They will also help you spot careless use of equipment or poor operator maintenance.

Section III. Petroleum Products Control Section

MISSION

The mission of the petroleum products control section is to receive operating instructions from the system's dispatcher/scheduler or higher headquarters. These instructions are on the time receipt, type, and quantity of bulk petroleum products received in the tank farms. The section performs supply control and accounting functions for bulk petroleum products received, stored, and issued by the company. It monitors bulk petroleum requests from operating platoons. The section then consolidates and forwards appropriate reports to higher headquarters.

PERSONNEL

Effective operation of the petroleum products control section requires identifying key personnel and understanding their duties and responsibilities. Key personnel include those listed below.

- Petroleum Operations Officer (Lieutenant, 92F). Supervises the section. Controls the receipt, transfer, and issue of petroleum products. Prepares schedules for the entire distribution system. These schedules include the time, type, and quantity of product to be transferred or issued; flow rates; and operating pressures. Is highly mobile in the command and control of the section and performs liaison with the pipeline pump stations. Ensures compliance with federal, state, local, and host nation environmental laws, regulations, and policies. Sets the example for the environmental ethic within the unit. Ensures the adequacy of the environmental compliance program, including the local SPCC plan, with its specific requirements for reporting and clean up.

- Petroleum Operations Sergeant (E7, 77F40). Assists the petroleum officer. Coordinates and supervises petroleum testing and wholesale and retail storage and distribution operations by pipeline, air, rail, highway, water, and hose line. Consolidates reports being kept and sent to higher headquarters.

- Petroleum Dispatch Sergeant (E6 (3 each), 77F30). Monitors the movement of product through the pipeline. Coordinates deliveries with customers, prepare dispatch records and control orders for incoming fuel. Coordinates the daily pumping schedules and orders with pump stations.

- Petroleum Inventory Control Specialist (E5 (2 each), 77F20; E4 (2 each), 77F10). Receives and consolidates the stock status reports received from the elements of the terminal platoon and then forward the report to higher headquarters. Also maintains inventory control and location records of bulk petroleum products; prepares and edits supply requisitions; processes requests and receipt documents; and prepares and maintains account records. The E4s also serve as light vehicle operators.

- Movement Specialist (E4 (2 each), E5 (2 each) 88N10). Notifies transportation agencies of type and quantity of product to be moved. Coordinate with operation personnel to ensure prompt loading. Also prepares and processes transportation documents for movement.

- Senior Radio Operator-Maintainer (E5, 31C20). Supervises and performs authorized maintenance on communications equipment. Directs the installation of radios and antennas. Also recognizes and employs electronic counter-measures.

- Radio Operator-Maintainer (E4 (2 each) 31C19; E3 (2 each), 31C10). Installs, operates, and performs unit level maintenance on single channel radio, radio teletypewriter, single channel vehicular mounted satellite terminals, and COMSEC equipment.

- Signal Support Systems Maintainer (E4, 31U10). Installs and troubleshoots signal support equipment and terminal devices. Provides technical assistance and training for user operated automation and communication equipment.

- Forward Support Specialist (E4, 31U10). Installs, maintains, and operates the unit's organic wire net on a 24-hour basis. Operates switchboard.

- Administrative Clerk (E3, 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 service; and distributes incoming and outgoing requisitions.

A more detailed description on the duties of the petroleum products control section is discussed in section operations later in this section.

EQUIPMENT

TOE 10417 prescribes the equipment for the petroleum products control section. See Table 4-3 for a list of this equipment.

Table 4-3. TOE equipment list for the petroleum products control section

ITEM	QUANTITY
Alarm chemical agent automatic: Portable manpack	1
Antenna: RC-292	1
Axle cable reel: RL-27	1
Cable telephone: WD-1/TT DR-8 1/2-km	6
Cable telephone: WD-1/TT RL-159/U 2-km	1
Duplicating machine stencil process	1
Facsimile set: AN/TXC-1	1
Generator set diesel engine: 5-kw, 60-hz, 1-3 ph, AC 120/208, 120/240-v	1
Inst kit: MK-2503/VRC for AN/VRC-47/VRC-12	1
Inst kit: MK-1429/GRC-106A for GRC-106A	1
Light set general illumination: 25-outlet	1
Multimeter digital: AN/PSM-45	1
Power supply: PP-4763/GRC	1
Power supply: PP-6224/U1	1
Radio set: AN/GRC-106	1
Radio set: AN/VRC-47	1
Radio set control group: AN/GRA-39	2
Receiver-transmitter control group: AN/GRA-6	1
Reeling machine cable hand: RL-31	1
Reeling machine cable hand: RL-39	3
Radio test set: AN/PRM-34	1
Tone signaling adapter: TA-977/PT	1
Truck utility: cargo/troop carrier 1 1/4-ton, 4X4, with equipment (HMMWV)	1
Splicing kit telephone cable: MK-356/G	1
Switchboard telephone manual: SB-22/PT	1
Telephone set: TA-312/PT	2
Tool kit electrical equipment: TK-101/GSQ	1

OPERATIONS

The petroleum officer is in charge of this section and is responsible for the coordination of the entire operation. He must set up procedures and then see that each element in the pipeline company is doing its part. The following methods should ensure cooperation of the pipeline personnel and help to coordinate the operation:

- Train the personnel to work as a team.
- Issue clear, concise oral instructions and then check to see that they are executed.
- Keep the SOPs, directives, reference publications, and other written instructions up to date and be sure they are followed.
- Reward good work with praise; take corrective action for inadequate performance.
- Listen to subordinates; sound ideas often originate at the lower level.
- Delegate responsibility; too much supervision stifles initiative.
- Keep the personnel informed of changes that affect the pipeline operations.
- Check the hourly pumping delivery reports for indications of trouble areas. Be on the lookout for friction between various sections.

Layout Plan

The layout plan that is developed will depend on terrain in the area. The site for the petroleum products control section should be central to the overall company mission area. It should have natural cover and concealment, if possible.

Testing and Preparing a New System

After the engineer unit has finished the construction of the pipeline, the company commander or his representative (usually the petroleum officer) makes an inspection with the representative from the engineer unit. In testing long or short sections of the pipeline, use the procedures given in FM 5-482.

Communicating with members of inspection team. There must be reliable communications between operators at each end of the test section and crews examining the pipeline. Any or all of the equipment listed below may be used:

- Radio or telephone.
- Short range hand radio sets between the crews.
- Vehicle-mounted radios for contact with the pumping stations.

Checking the line and fixing leaks. Leaks can be easily seen if couplings and fittings are well exposed. Eliminate slight leaks by shaking the joint. Place a pick handle, crowbar, or similar lever under coupling and lifting the coupling several times. (This should set the seal.)

NOTE
If small leaks cannot be corrected by shaking the joint or by tightening the coupling, mark the coupling as defective .

Shut down the pumping station if a large leak occurs. Temporarily install overleak clamp and resume testing. In case of a POL spill or leak, an environmental cleanup or restoration must be completed. Spill reporting requirements must also be met. For further information, refer to the local SPCC plan and consult with the local environmental officer through the chain of command. (See Appendix A).

- Purging the line. If water was used to test the line, the line must be purged with fuel. If water is scarce, divert water into a storage tank or temporary impounding basin if the next section is not ready.

- Making repairs. Required repairs are made before the line is packed.

- Preparing reports. Submit data according to SOP on the following:

  - Section tested.
  - Number of miles tested.
  - Test pressure.
  - Test method.
  - Duration of test.
  - Approximate number of leaks per day.

Operational Control of the Pipeline and Terminal System

The petroleum officer is supervisor of the control section. He is responsible for a smooth running operation. A great deal of his time will be spent in monitoring the work, coordinating with higher headquarters, and making sure required reports are accurate and submitted on time. Therefore, he should be sure there is a SOP and that it is up to date at all times.

Company is operating with a petroleum operating battalion. When the company is part of the battalion operation, he will receive from higher headquarters pumping schedules for transfer, storage, and delivery. Personnel under his supervision make the hourly pumping and delivery report to the chief dispatcher of the petroleum operating battalion. Give the following information:

- Number of barrels pumped from storage location.
- Number of barrels received at each storage location.
- Cumulative barrels corrected to $60^{o}F$ ($16^{o}C$).
- Suction and discharge pressures.
- Revolutions per minute for operating pumps.
- Batch changes and interface cuts.
- Rates of flow.

Also, the following should be reported immediately to the chief dispatcher at the petroleum operating battalion:

- Line breaks.
- Leakage/spills.
- Fire.
- Suction or discharge loss or buildup of pressures.
- Other interruptions.

Company is operating independently. The petroleum officer of a company operating independently (not under the battalion petroleum activity) is responsible for the receipt, transfer, and issue of petroleum products. He should:

- Prepare schedules for the entire distribution system. These schedules include the time, type, and quantity of product to be received, transferred, or issued; flow rates; and operating pressures.

- Prepare order showing operations in chronological sequence for each element. The orders will show batch numbers; specific amounts of product by type; interface cuts; line temperature; suction pressure; and discharge pressure.

- Issue dispatching instructions to all elements of the distribution system.

- Monitor the flow of product through the system to prevent commingling of product; ensure compliance with operation orders; and detect line breaks, leakage, and other problem areas.

Establishment and Maintenance of Stock Accounting Records

Stock accounting records are prepared on DA Form 1296 and maintained as given in DA Pamphlet 710-2-2. Other accounting forms may be used when prescribed by the SOP. One record is required for each type of product. Petroleum inventory control specialists periodically check the records for accuracy and completeness and post the following information to the records:

- Receipts.
- Issue from the service station-type operations on DA Form 3643. See DA Pamphlet 710-2-2.
- Issues to tank trucks, tankers, barges, and railcars on DD Forms 250, 250-1, 1149, and 1348-1 (Chapter 8 **)**, and other issues on DA Form 2765.
- Monthly inventories as required in DA Pamphlet 710-2-2. Use FM 10-67-1.
- Losses covered by DA Forms 4702-R or 4697 as outlined in ARs 710-2 and 735-5.

Coordination of Transportation Requirements for Movement of Bulk Fuels

When orders are received from higher headquarters that bulk fuels are being shipped to a company that is operating independently, the petroleum officer:

- Checks with the command transportation office for mode of transportation by which the product will be shipped (railcar, tanker, or other means).
- Requests transportation from the command transportation office if the product must be picked up at a distribution point.
- Issues orders to the storage and issue section or tank farm section listing the type of product, quantity, mode of transportation, and other information the section chief will need to plan the storage.
- Reviews the plans made by the storage and issue section or tank farm section chief and gives any assistance necessary.

The movements specialist:

- Notifies transportation agencies of type and quantity of product to be moved.
- Coordinates with operations personnel to ensure prompt loading.
- Prepares and processes transportation documents for movements.
- Set up controls to verify that security measures are being taken.

Coordination of Inventories

Inventories are taken of the fuel at the tank farms, storage and issue section, and pumping stations according to DA Pamphlet710-2-2 and DOD 4140.25M. The petroleum officer is responsible for scheduling the actual

inventories, consolidating the results, and submitting the required reports. He should prepare a SOP so all sections can conduct inventories according to the published schedule. The SOP should contain the following requirements:

- Daily status reports. Record receipts and issues daily.
- Bulk fuel. Take inventory monthly. Use MBPAS.
- All other items. Take inventory annually in CONUS, semiannually in overseas areas.
- Monthly loss. Report loss allowable under AR 710-2 and DA Pamphlet710-2-2 and on DA Form 4702-R. Report loss above maximum allowable loss on DA Form 4697.
- Issues. Know procedures for emergency issues while inventory is being conducted.

The petroleum inventory control specialist must be trained to post inventories to the stock record account and to prepare the required adjustments.

Establishment and Supervision of the Petroleum Products Quality Surveillance (STANAG 3149)

Quality surveillance is all the measures taken to ensure that petroleum products are of the required quality. Quality surveillance includes:

- Watching over and caring for products during storage and handling operations.
- Adherence to handling methods.
- Testing of products.

The product in this company is actually tested at the terminal operating platoon by the petroleum laboratory specialist. However, the pumping orders and control of the operations of the company are responsibilities of the petroleum officer. He must set up SOPs, directives, training schedules, and other guidelines to ensure that the petroleum product is kept as close as possible to the original quality. The following is a list of topics that need to be in the SOP and the publications where information on these topics can be found:

- Sampling--MIL-STD-457, ATMS, FTMS, MIL-HDBK-200 (latest edition), and FM 10-67-1.
- Testing-- MIL-HDBK-200 (latest edition), ATSM, FTMS, and FMs 10-67-1 and 10-67-2.
- Storage-- MIL-HDBK-200 (latest edition).
- Packaging and marking--MIL-STD-290 and MIL-HDBK-200 (latest edition).
- Control of product in pipeline--FM 10-18 and MIL-STD-101A.
- Reports and records--DA Pamphlet 710-2-2.
- Safety Precautions--FM 10-67-1.
- Clean tanks--MIL-STD-457 and FM 10-67-1.

Inspections. One way to be aware of the conditions that affect petroleum products is through scheduled and unscheduled visits to the operating sections. A simple checklist will be a help when inspections are made. The checklist should include procedures for:

- Security against pilferage.
- Fire protection.
- Cleaning of test equipment, work areas, and sandtraps.
- Preventing and fixing leaks.
- Spill prevention/cleanup.
- Corrosion prevention.
- Enforcement of "NO SMOKING" and safety rules.
- Use of safety equipment.

- EPA compliance.
- Completing and maintaining records.

Records and reports. The four pumping stations, the FSSP, the FARE, and various other activities in the company submit records and reports. The reports contain information that will help the petroleum officer to do his quality surveillance tasks. Data from the reports can point out:

- Need to change scheduling of product flow.
- Causes of accidents.
- Need for additional training.
- Personnel problems.
- Slowdowns because of repairs or need for replacement equipment.
- Future needs for personnel, equipment, and new plans.
- Need for help from a Petroleum Technical Assistance Team (AR 710-2).

Dispatching

Dispatching is the regulation of station pumping and line pressures to control the movement of products through the pipeline. Effective dispatching is a matter of precision and timing. The petroleum officer acts as the chief dispatcher for the company. The operations sergeant acts as the chief petroleum dispatch sergeant. They plan and coordinate the preparation of schedules and dispatching instructions. Three petroleum dispatch sergeants are assigned to this company (one is assigned to each shift).

Chief Petroleum Dispatch Sergeant. The chief dispatch sergeant uses FM 10-67-1 as an aid in carrying out his duties. He must coordinate the preparation of the monthly schedules; relay daily pumping orders to dispatchers; keep records of hourly reports from the pump stations, tank farms, and other activities; and report daily information to higher headquarters.

Petroleum Dispatch Sergeants. These sergeants are responsible for reporting for duty early enough to be briefed for shift change; monitoring movements of product from adjoining company, if required; coordinating deliveries with customers served by pipeline; ensuring that radio communications are used when teletypewriter and telephone circuits are out of order; preparing dispatching records and controls; making graphic progress charts of stream tapes as visual aids to dispatching (FM 10-67-1); and preparing tabulation of displacement, if visual means are not used, as outlined in FM 10-67-1.

Scheduling

Pipeline scheduling is the basic plan that governs the movement of products throughout the system. Usually, a pipeline schedule covers one month's operations and shows the pumping sequence, the volume, and the product to be delivered by the pipeline each day. Scheduling personnel and their duties are as follows:

Chief Petroleum Dispatch Sergeant. Determines when specific products will be needed, where the products will be needed, the amount of storage available, and the length of time it will take for the product to reach its destination. Make sure consumption graphs showing projected consumption and deliveries are made. He uses his knowledge of daily requirements, quantity authorized to be on hand, and available space along the line for storage when he prepares these graphs (FM 10-67-1). Supervise the petroleum dispatch sergeants in the preparation of consumption graphs, monthly pipeline schedules, and daily pumping schedules and orders. Makes sure a batch number is assigned when a batch of a product is put into the line. When a batch is pulled into an intermediate terminal, it loses its numbers. It is given a new batch number when it is taken out and moved farther up the line.

Petroleum Dispatch Sergeants. Under the supervision of the chief dispatch sergeant, the petroleum dispatch sergeants prepare the following:

- Consumption graph. A consumption graph (Figure 4-2, page 4-28) is set up to show the total barrels of a given product for each terminal or storage point. Each terminal should have some sort of consumption chart for consumers who use large quantities of any one product. Consumption graphs will allow petroleum dispatch sergeants to visualize present and future stocks and storage positions. The graphs will also give data for determining trends in consumption. When petroleum dispatch sergeants prepare the graphs for each type of product, they use FM 10-67-1 as a guide. The following should be shown on the consumption graph:

    - Storage capacity for product in thousands of barrels.
    - Five percent of total storage capacity at the top of the graph as an allowance for vapor space.
    - Safety level at the bottom of the graph based on theater policy.
    - Calculated issues and receipts.
    - Projected tank cleaning and repairs.

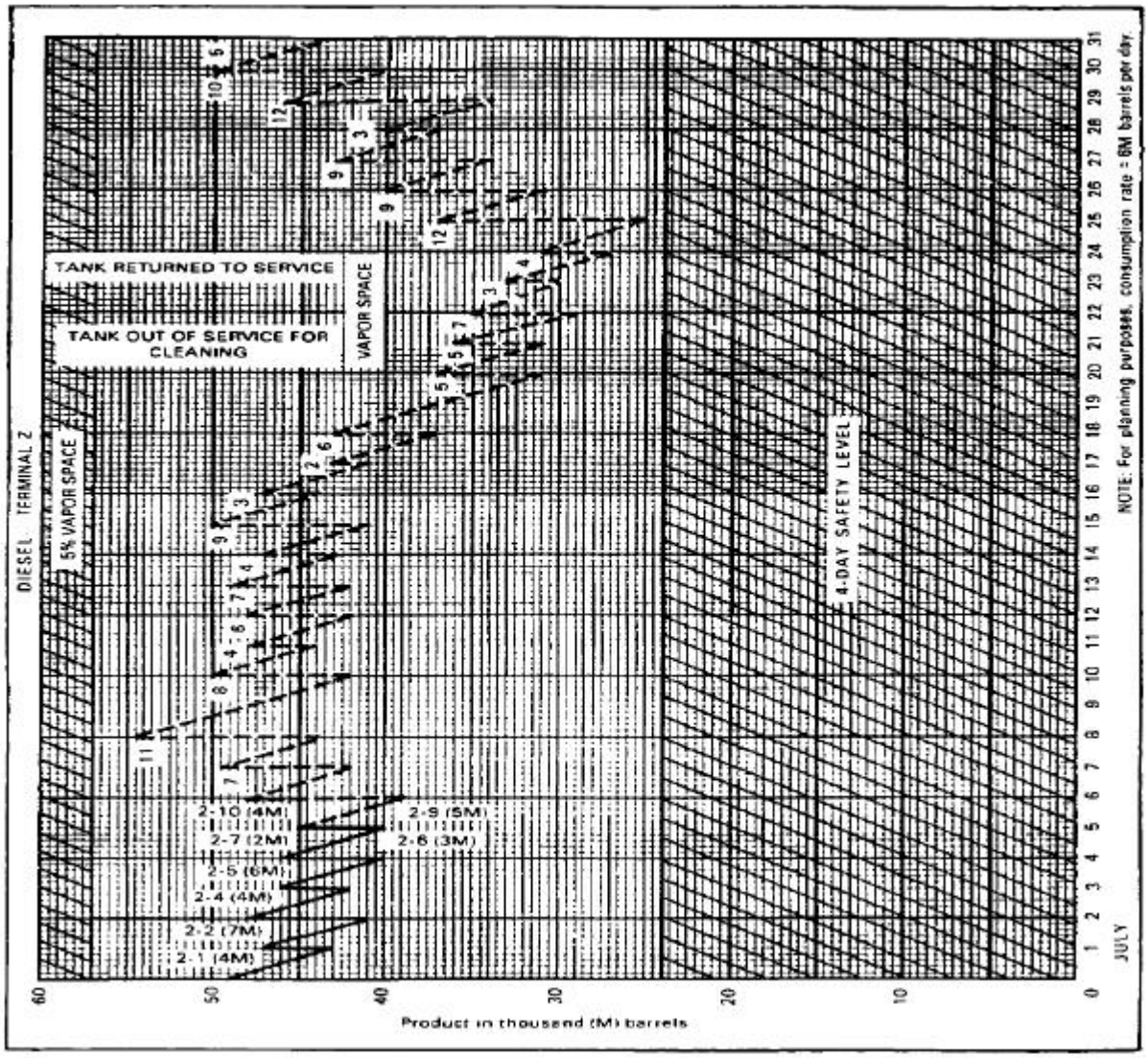


Figure 4-2. Consumption graph

- Monthly pipeline schedule. Petroleum dispatch sergeants use FM 10-67-1 as a guide for preparing schedules. They need to know what products are required for the 30-day period. Also, they must determine the time it will take the product to reach its destination. Then they prepare the schedule--actually a graph that shows the line capacity in barrels plotted against time in hours.
- Daily pumping schedules. Petroleum dispatch sergeants prepare the daily pumping schedules as a guide for dispatch operations (Figure 4-3). Daily schedules are usually prepared a week in advance so the graphic progress chart and the daily pumping orders can be prepared. These schedules show the monthly requirements broken down into the daily dispatches along with the emergency requirements and any changes.

Date: 5 July xx (Continued from 4 July)							
		Terminal X		Terminal Y		Terminal Z	
Time	Description	In	Out	In	Out	In	Out
0001	RE MOGAS FE JP-4		500				
0200	RE JP-4 FE MOGAS					500	
0400	RE JP-4 FE MOGAS		500				
	RE MOGAS FE JP-4			250			
0800	RE JP-4 FE MOGAS			250		250	
1200	RE MOGAS FE diesel		500				
	RE MOGAS FE JP-4					250	
1500	RE diesel FE MOGAS		500				
1600	RE JP-4 FE MOGAS					500	
	RE MOGAS FE diesel			Check time of passing			
1800	RE MOGAS FE JP-4		500				
1900	FE MOGAS RE diesel			500		Shut down	
2200	RE MOGAS FE JP-4			250		250	
2400	RE JP-4 FE MOGAS		500				
	RE MOGAS FE diesel					250	

Figure 4-3. Daily pumping schedule

- Daily pumping orders. Petroleum dispatch sergeants use FM 10-67-1 or SOP for the format for the daily pumping order. General guidelines are as follows:

  - Show time in chronological sequence--for example, 0001 through 2400.
  - Give definite times for specific actions.
  - Show each terminal, intermediate terminal, and any pump stations.
  - Give specific orders for each terminal or station in clear, concise language.
  - State all product and batch number.
  - Give amount of product to be handled and type of interface cuts.

Batching the Product

Since MOGAS, AVGAS, diesel, and JP-8 must be pumped through a pipeline, the chief dispatcher at battalion headquarters schedules the products in a pumping order. This scheduling is known as "batching." Most of the time, a buffer product (usually MOGAS) is pumped between the different products to separate them. The buffer is different in quality or gravity from the product it is following; the part that mixes with the product is called the "interface." When a buffer is not used, the area of commingling is also called the interface. The interface is drawn off and disposed of according to instructions from the quality surveillance officer. When the interface is mixed with another product to improve or downgrade it, the action is called "blending." If the company is operating as a separate company, the dispatcher of the petroleum products section is responsible for batching. He should use FM 10-67-1 for detailed instructions on:

- Batching procedures.
- Control of interface.
- Determining deterioration limits of the interface product. (Also see MIL-HDBK-200.)
- Switching procedures.
- Delivery procedures, including reporting (at 1-minute intervals) change of color or gravity.
- Making cuts.

NOTE
A batch interface detector, NSN 6680-01-035-5553 (LIN G03783), is a CTA item. An engineer unit installs it.

Section IV. Maintenance Section

MISSION

The maintenance section's mission is to maintain all fixed facilities, vehicles, power generators, and other equipment assigned to the company. The chief of the maintenance section makes decisions on the following:

- Building (built by engineer units for the pipeline complex and turned over to the petroleum pipeline and terminal operating company for upkeep).
- Fire and water systems.
- Roads and railroad sidings.
- Soil erosion and camouflage growth.
- Weed and grass control.

PERSONNEL

Your most valuable resources are your personnel. To employ them effectively, you must understand their duties. The maintenance section personnel and their duties are discussed below.

Unit Maintenance Technician (915A, W2). Plans, supervises, and directs the unit maintenance of all organic equipment of the petroleum pipeline company. Keeps the commander and staff members advised of the maintenance material readiness situation.

Motor Sergeant (63B50, E7). Assists the unit maintenance technician in the supervision of all maintenance functions. Directly responsible for the supervision of motor maintenance and supporting personnel. Applies

production and quality control principles and procedures to maintenance operations. Prepares informal daily work assignment sheet, listing priorities, tasks, mechanics, area cleanup responsibilities, and special requirements for such items as tools, parts, and lubricants. Monitors use of hand and power tools. Responsible for security of tools. Conducts informal spot check inspections. Enforces safety and environmental compliance procedures. Supervises recovery operations. Performs administrative duties.

Senior Mechanic (63B30, E6). Performs light-wheel vehicle mechanic duties, performs heavy-wheel vehicle mechanic duties, supervises lower ranking soldiers, and provides technical guidance to the soldiers of the maintenance section to do their duties. Supervises unit maintenance on wheel vehicles, MHE, power generation equipment, and upkeep of hand and power tools. Performs BDAR. Supervises recovery operations.

Construction Equipment Repairer, (62B20, E5 and 62B10, E3). Performs unit maintenance on construction equipment (crane and bulldozer), air compressors, and pneumatic tools. Inspects traction suspension, booms, and blades. Inspects clutches and brakes for wear, alignment, and slippage. Replaces starters, generators/ alternators, spark plugs, carburetors, fuel pumps, radiators, fans, hoses, and belts. If needed, serve as a welder. E5 supervises lower grade soldiers and provides technical guidance to soldiers to do their mission. E3 also serves as a light-wheeled vehicle driver.

Light Wheel Vehicle Mechanic, (63B20, E5; 63B10, E4 and two E3s). Performs unit maintenance of the company's organic vehicles and equipment. Maintains power-assisted brake systems, wheeled vehicle suspension systems, wheel/hub assemblies, mechanical and hydraulic steering systems, and wheeled vehicle crane/hoist/winch assemblies. Records maintenance on DA Form 2402. Maintains tools and test equipment. The E5 also supervises lower grade soldiers and provides technical guidance to do their duties. The E3 light-wheel vehicle mechanics also drive the 5-ton cargo truck when required.

QM & Chem Equipment Repairer, (63J20, two E5s; 63J10, two E4s and two E3s). Performs unit maintenance on QM equipment, including FSSP elements (350-GPM pumps, filter/separators), tank and pump unit, field ranges, immersion heaters, space heaters, and tents. Disassembles, inspects, and replaces equipment components. Lubricates equipment. Records maintenance on DA Form 2402. Maintains tools and test equipment. The E5 also supervises lower grade soldiers and provides technical guidance to do their duties.

Welder, (44B10, E4). Operates and performs preventive maintenance on the welder's tool kit and cutting and welding torch outfit.

Power Generator Equipment Repairer, (52D20, E5 and 52D10, E3). Performs unit maintenance on company generators.

Heavy-Wheel Vehicle Mechanic, (63S20, E5 and 63S10, E4). Performs unit maintenance on heavy-wheel vehicles (prime movers designated as more than 5 tons and their associated trailers) and MHE.

Recovery Vehicle Operator, (63S1H8, E4). Operates the 5-ton wrecker used to recover disabled organic vehicles and equipment. Also operates radio when required.

Equipment Records & Parts Specialist, (92A10, E4 and E3). Assists the unit maintenance technician in maintaining the equipment maintenance records and schedules for organic vehicles and equipment as required by TAMMS. Maintains stock locator system and administers document control procedures. Performs PLL and SSL duties in manual and automated supply applications. Requests, receives, and stores all repair parts and reference publications to support mechanics performing unit maintenance. Prepares maintenance reports and schedules vehicles for maintenance. Performs dispatching procedures using manual and automated systems. Also serves as radio operator and drives light vehicle when required.

EQUIPMENT

Table 4-4 lists the equipment prescribed by TOE 10417L for the maintenance section. It is needed for completion of the mission.

Table 4-4. TOE equipment list for the maintenance section

ITEM	QUANTITY
Analyzer set engine: Portable solid state	1
Anvil blacksmiths: Cast iron body 2000-lb, 16 1/4 L x 4-1/2-in W	1
Cable telephone: WD-1/TT DR-8 1/2-km	2
Charger battery: PP-34/MSM	1
Cleaner steam pressure jet:	1
Comp unit RCP: Air rec gas drvn 5-CFM 175-PSI	1
Comp unit RCP: Trk 2-whl pneu tires gas-drvn 5-CFM 175-PSI	1
Generator set: Ded skid-mounted, 5-kw 60-hz	2
Installation kit: MK-2502/VRC F/AN/VRC-46/64 or AN/GRC-160	1
Heater duct type PTBL: Gas 250,000-BTU whl-mtd	2
Hose assembly: nonmetallic, fuel/oil hydrocarbon	8
Jack dolly type, hydraulic: 10-ton capacity	1
Installation kit: MK-1443/VRC-46 for VRC-46	1
Light set general illumination: 25-outlet	1
Lubricat-serv unit, power-operated: trailer-mounted, 15-CFM air comp, gas-driven	1
Multimeter, digital: AN/PSM-45	1
Pneumatic tool and compressor outfit: 250-CFM trlr-mtd	1
Radio set: AN/VRC-46	2
Reeling machine, cable hand: RL-39	1
Shop equip contact maint trk-mtd	1
Truck utility: cargo/troop carrier 1 1/4-ton, 4X4 , with equipment (HMMWV)	1
Truck wrecker: 5-ton, 6x6, with winch, with equipment	1
Telephone set: TA-312/PT	2
Tent: frame type, maintenance, medium, light metal cotton duck OD	2
Shop equipment auto maint and repair: OM common no 1 less power	1
Shop equipment auto maint and repair: org supply no 1 less power	1
Tool kit, general mechanics: automotive	19
Trailer cargo: 3/4-ton, 2-wheel, with equipment	1
Vise machine table: screw-type	1
Welding shop trailer-mounted	1
Trailer cargo: 1 1/2-ton, 2-wheel, with equipment	1
Truck cargo: 4x4 LMTV with equipment with winch	1

OPERATIONS

With personnel performing maintenance at distance sites as well as the maintenance area, efficient scheduling is crucial. The motor sergeant may need to reschedule maintenance services to enable mechanics to repair malfunctions reported by equipment operators on DA Form 2404. The motor sergeant must schedule maintenance to keep personnel working at or near capacity. To do so, he needs to know maintenance personnel duties, equipment capabilities, and typical repair times. The sergeant must schedule the sequence of repairs around the availability of parts. This means understanding the repairer parts request system and request times.

Setup and Closedown

Site setup and closedown are important and complicated. Field situations seldom allow you to operate under ideal conditions. However, the area selected for maintenance should be centrally located, be on or near a good road, provide concealment, be easy to secure, and be relatively hard and well drained.

- Setup. See FM 55-30 for information on setting up a tactical motor pool. To set up the maintenance element in the field, you need to develop a layout plan, pitch tents, position equipment in the tents, and organize for maintenance operations and repair parts issue.

- Closedown. When the unit has to move, the commander will issue a warning order telling you when to close down and prepare to move. As you plan for the move you should evaluate the following:

  - By what date must the unit be ready to move?
  - What types of operations are expected?
  - How many soldiers will move to the new area?
  - Will some soldiers continue to operate at the old area?
  - When will equipment be deployed?
  - Is special maintenance required for equipment before or on arrival in the new area?
  - Will advance elements require any special maintenance support?
  - What are climate and terrain like in the new area?
  - Environmental/safety concerns?

Unit Maintenance

Make sure that your soldiers do not perform maintenance beyond their capabilities. Deficiencies discovered before, during, and after operation which are beyond the operator's capability become the responsibility of unit mechanics. Your mechanics perform maintenance services on equipment and repair items sent to them. When they cannot repair items, they send them to DS maintenance. Make sure the mechanics use technical manuals for the equipment in performing quarterly maintenance services and troubleshooting. The mechanics also use DA Form 2404, just as the operator does, to note any defects they find. If the mechanics cannot correct the defects and must send them to DS maintenance, they note that on the form. Once the DS maintenance activity completes the work, DA Form 2407 or DA Form 5504 showing the hours of labor, parts, and other materials used, and cost of repairs is sent back to the unit.

Repair Parts

Your section is authorized a PLL to support daily maintenance operations. Usually, this is for a specific number of days supply based on the average customer wait time. The unit commander approves the PLL. You supervise the PLL clerk and make sure the list is set up and maintained according to DA Pamphlet 710-2-1 (TMs in the 38-L32 series if your unit is automated).

Mandatory parts list. Consolidated MPLs list the repair parts you must have for use on combat-essential equipment. The unit commander should check to make sure there is an MPL for each on-hand end item identified in the Mission Profile Development List for his unit. Request more MPLs according to DA Pamphlet 710-2-1. The commander should also check the mandatory stockage quantity and update the PLL records according to DA Pamphlet 710-2-1.

Repair parts requests. The PLL clerk makes requests for parts. 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 setting up PLL levels, for using priority designators, for requesting follow-ups, and for reporting delays.

Tool Maintenance and Accountability

Set up an effective tool 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 details on tool use and care. DA Pamphlet 710-2-1 has toolroom procedures. You are authorized a set of common tools and equipment. The set is usually mounted on a secured vehicle. One side of the vehicle can be used for storing tools and test equipment, and the other side can be used to store key repair parts. This setup will help your soldiers find the tools they need quickly and will speed on-site repair. Assign a tool keeper to maintain a tool sign-out register. Make sure the equipment is returned at the close of each working day. Issue an automotive tool kit on a hand receipt to each mechanic. Each mechanic is responsible for ensuring that assigned tools are properly maintained and stored when not in use. Set up a secure tool storage area.

The Army Maintenance Management System

TAMMS is the key to good maintenance management. TAMMS records give your commander the data needed to manage equipment resources. These records enable him to evaluate modification work orders, repair parts requirements, material readiness, and support requirements. They help him evaluate equipment operation, including availability, deficiencies, and failure frequency. DA Pamphlet 738-750 contains specific instructions on the preparation and use of the maintenance system forms. The three types of records are operational, maintenance, and historical. Operational records are used to control operators and equipment, plan for maintenance operations, and make best use of equipment. Maintenance records control maintenance scheduling, inspection procedures, and repair work loads. They also provide a uniform method for recording corrective actions. They are used to determine equipment readiness and reliability and to determine use and logistical requirements. Historical records document permanently the receipt, operation, maintenance, and disposal of equipment.

Unit Level Logistics System-Ground

ULLS-G provides supervisory control and flexibility to maintenance operations. ULLS expedites repair parts supply and maintenance functions at the lowest level. ULLS also communicates with other systems by magnetic media (diskette) transfer or telecommunications. Also, incorporated into ULLS is the AMSS, which replaces the manual reporting requirements in AR 700-138, Army Logistics Readiness and Sustainability. ULLS performs many jobs for your unit with little input from the operator. When your clerk orders repair parts, ULLS edits the request, updates the document control register, and provides information to update deadline. ULLS edits transactions using an internal catalog and information provided in the equipment data file. When your clerk issues a part from the PLL, ULLS makes, computes, and generates a replenishment requisition. ULLS is divided into three major areas: Class IX supply, maintenance, and utilities or files maintenance. ULLS supply data are sent to the supply support activity at the DSU level. The data are then forwarded to the DS4 level. ULLS speeds up supply and maintenance operations at the unit level while eliminating errors that could occur under a manual operation. It allows supervisory control of the system with passwords, user identification codes, and the commanders exception report. In case of emergency, when ULLS is not available or operative, your unit may use manual procedures. For procedures and frequency of ULLS application see Table 4-5.

Table 4-5. Operator/supervisor working matrix.

PROCEDURE	DAILY	WEEKLY	MONTHLY
Dispatch vehicles	X		
Process received/installed parts	X		
Requisition parts	X		
1. Review AMSS reports	X		
2. Verify information (NSN, part number)	X		
3. Check PLL	X		
4. Enter part data	X		
5. Run commanders exception report	X		
6. Process requisitions through OSC	X		
7. Review OSC transactions	X		
8. Turn in maintenance/supply diskette	X		
9. Process maintenance/supply status	X		
Review NMC report and maintenance request register	X		
Review next day dispatch requests	X		
Back up data files	X		
Provide commander with with NMC report and maintenance request register		X	
Run zero balance report (verify req status)		X	
Review document control register (update)		X	
Provide commander AMSS reports		X	
Review excess management report and process excess for turn in		X	
Update Class IX catalog			X
Review PLL inventory report and inventory			X
Review demand analysis report and make required changes			X
Provide commander service scheduled listing			X

Dispatch

Dispatch procedures apply to vehicles, generators, forklifts, and engineer equipment. They also apply to other items the commander may designate.

Before mission. The operator contacts the dispatcher with a vehicle requirement. A vehicle is designated. The operator performs a before-operation check using the appropriate technical manual and DA Form 2404. If he finds any deficiencies, they are either corrected or another vehicle is designated. The operator documents the discrepancies on DA Form 2404. The dispatcher uses DA Form 2401 and DA Form 1970 to dispatch the vehicle to the operator.

During Mission. The operator performs during-operation checks. Make sure the operator knows that any maintenance problems found during these checks should be reported at once, if possible, and recorded on performance records for the equipment.

After Mission. The operator tops off the fuel, performs after-operation checks, and makes appropriate entries on the DA Form 2404. The operator then returns the DA Form 2404 and DD Form 1970 to the dispatcher. The dispatcher reviews the entries and posts the mileage or hours. He then enters the time of return to close out the DA Form 2401 entry for that item.

Recovery and Evacuation

It may become necessary to recover equipment which becomes disabled in a location away from the motor pool. If your soldiers are unable to repair disabled equipment, arrange to evacuate it, and have it serviced elsewhere.

Recovery. To prepare for recovery, consult technical manuals for the weight of the item and for other necessary data. Reconnoiter the area to determine the best method of anchoring the wrecker. FM 20-22 discusses various types of ground anchors, equipment needed, safety precautions, and records for computing equipment capacities. FM 21-305 provides each vehicle driver with vehicle recovery and field expedient information. Each of your drivers should have a copy of FM 21-305. Use the maintenance SOP to standardize signals between wrecker and winch operators. If an item is so contaminated that it cannot be recovered, contact the higher headquarters for advice and assistance.

Evacuation. If a unit cannot recover an equipment item, notify the supporting maintenance activity and request evacuation. Tell the maintenance activity the type of equipment and its location. If the situation allows, a crew member should remain with the equipment until it is picked up by the supporting activity.

CHAPTER 5

TERMINAL OPERATING PLATOON

Section I. Platoon Overview

MISSION

The mission of the Terminal Operating Platoon is to receive, store, and issue multiple types of bulk fuel on a 24-hour-a-day basis. Also, the platoon will provide quality surveillance on the fuel it handles. This mission will normally be performed by two shifts with one hour overlapping at each shift change for continuity. Each tank farm section can operate a tank farm with storage of up to 250,000 barrels. The tank farms are connected by a pipeline and switching manifold so that one or more bulk fuels can be moved into, out of, and between storage tanks and tank farms as required.

ORGANIZATION

The Terminal Operating Platoon consists of the following sections: headquarters, two tank farms, and a storage and issue section. For more information on each of these sections, see Sections II through IV.

TERMINALS

There are no distinct plans for setting up a pipeline system with terminals. The theater commander may decide that two or more Petroleum Pipeline and Terminal Operating Companies should operate together. In this case, the pipeline system and terminals would be divided into districts for efficient operation and command and control. The following describes the types of terminals commonly found along a pipeline system.

Base

A base terminal is near the port of entry (Figure 5-1, page 5-2) and serves as the port of entry and the initial storage facility for bulk fuel in the theater. A theater may have more than one base terminal. A base terminal should have:

- Room for future expansion.
- Enough storage area to take in a full cargo of the largest scheduled tanker within a 72-hour period.
- A reserve storage of each type of fuel to be dispatched through the pipeline.
- Sufficient operating pipeline and manifold capacity to receive product from ocean tankers and dispatch fuels to rail cars and trucks and into pipelines simultaneously.
- Sufficient storage capacity to allow fuel that is received to settle at least 24 hours before it is pumped or issued to tank trucks or railcars.
- Access to a petroleum laboratory for quality surveillance needs beyond the capabilities of the platoon.
- Alternate facilities to be used in the event the base terminal is attacked. The alternate facility should be far enough away from the original that both couldn't be critically damaged in a single attack.

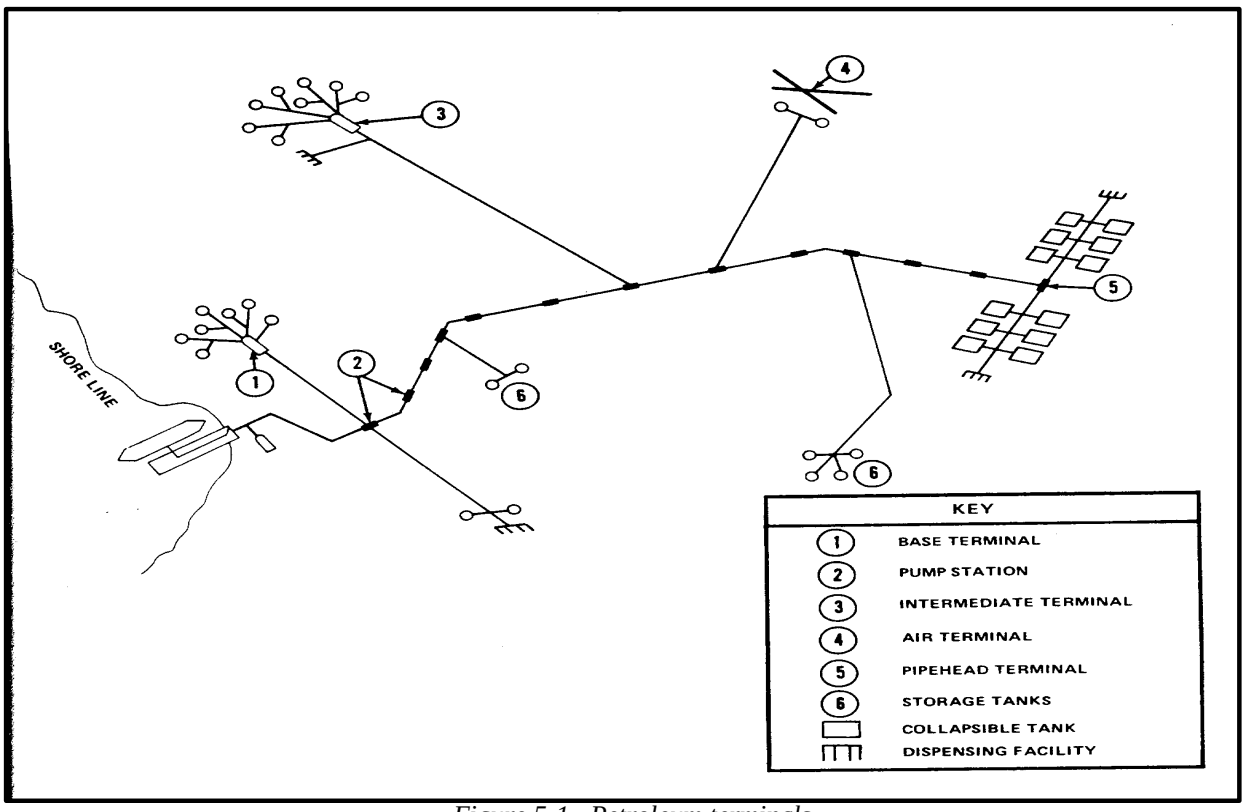


Figure 5-1. Petroleum terminals

Intermediate

Intermediate terminals are set up when a pipeline extends over a considerable distance. These terminals may serve both as reserve storage and as dispensing and regulating activities. Usually tankage is provided for each type of fuel so that one can receive fuel while another product is being delivered to the dispensing facilities. These terminals are normally located where branch pipelines leave the main line. The tank capacity and placement of the terminals is normally determined when requirements are established for the theater.

Head

The head terminal is the last terminal in a pipeline system. At the head, terminal fuel is dispensed from storage into tank trucks, rail tank cars, barges, tank vehicles, and other bulk fuel storage and distribution equipment. The hose line outfit may be used to extend the reach of the pipeline beyond the head terminal. The head terminal can be located off of a branch line to provide fuel for a specific need like an airfield with heavy fuel requirements.

STORAGE TANKS

The type of tanks used will be determined by the availability of suitable commercial facilities. A theater in a developed part of the world may have adequate commercialized facilities available to meet military requirements. In this situation, the military might lease and operate the terminal or may augment the civilian work force with soldiers. The soldier augmentee's would provide oversight of the operation protecting US interests and assist the civilian workers with loading military vehicles. In an undeveloped theater, terminals would consist of tactical petroleum terminal and fuel units. In addition to the storage of theater reserves, tanks may be used to regulate the flow of product. When the pipeline system is being constructed, certain tanks can be set aside (usually at an intermediate terminal) to hold fuel temporarily. This is done to allow continued pumping upstream in the event of a breakdown down stream. These tanks are known as regulating tanks.

Steel Tanks

These welded steel tanks are common in the commercial sector. They may have either fixed or floating roofs. Floating roof tanks are most often used with high vapor pressure fuels (MOGAS or JP-4) while fixed roof tanks are used for low vapor pressure fuels (diesel, heating oil). These tanks require little maintenance.

Underground Tanks

Underground tanks may be of various types to include steel or concrete which will have a protective lining or coating. They may also be of natural materials such as a tank dug into bedrock.

Collapsible Fabric Tanks

Collapsible tanks (or bags) are used as temporary site storage such as with the FSSP or when a unit is going into an undeveloped theater where the TPT is used. Collapsible bags may also be used to temporarily store fuel while hard wall tanks are being cleaned, repaired, or replaced. Collapsible tanks currently vary in size from 3,000 to 210,000 gallons.

PUMPS

Pumps are the heart of the pipeline. While several different types of pumps may be used, a pump with different manifolds arrangements can be used for more than one function. While civilian facilities may use a multitude of different types of pumps including electric and automated pumps the TPT and IPDS rely on the 600-GPM pump.

Station Pumps

Station pumps are used at the pump stations along a pipeline.

Booster Pumps

Booster pumps are used in off loading tankers when there is a long ship-to-shore pipeline, a long line from the dock to storage, or where the terminal storage is located considerably above sea level. Ordinarily the tanker has pumps of sufficient capacity to push the fuel to the terminal storage tanks.

Flood and Transfer Pumps

Flood (or feeder) pumps are used to provide suction pressure to the mainline pump stations. They are also used to push fuel through short branch lines to dispensing tanks. Transfer pumps are connected to the switching manifold of the tank farm to move large volumes of bulk fuel into, out of, and within the tank farm. These pumps can be used to:

- Transfer fuel from damaged or leaking tanks to other storage.
- Consolidate fuel from partially empty tanks
- Empty tanks to provide space for new fuel receipts which must be tested before it is mixed with the product on hand or issued.
- Blend different batches of fuel to uniform specifications.
- Relay tank contents to dispensing tanks.
- Load rail tank cars, tank trucks, and barges.

The 600-GPM pump included with the IPDS and TPT performs all of the functions of the three different types of pumps listed above.

SWITCHING MANIFOLD

The switching manifold is an assembly of pipe, fittings, and valves that enables the simultaneous receipt and delivery of as many types of fuel as the tank farm handles. It is one of the most critical pieces of equipment in the entire system. The size of the manifold varies with the number of tanks in the tank farm, the number of different products handled, and the size of the servicing pipeline. The switching manifold may be used singly or in multiples.

Section II. Platoon Headquarters

MISSION

The mission of the terminal operating platoon headquarters is to supervise the receipt, storage, issue, and distribution of bulk fuels. The headquarters provides platoon administration and internal safety and security. They also inspect and perform quality surveillance on bulk fuel handled by the platoon.

PERSONNEL

Effective operation of the platoon headquarters requires identifying key personnel and understanding their duties and responsibilities. Key personnel include--

Platoon Leader (Lieutenant, 92F). Directs and supervises platoon operations assisted by the platoon sergeant. Is responsible for--

- Planning the layout of major and critical pieces of equipment and section locations.
- Requisitioning major end items.
- Setting up SOPs for the platoon to include what to do in the event of an attack.
- Preparing training schedules and instructions.
- Issuing daily operations orders based on orders from the battalion operations section and the company product control section.
- Writing additional safety/environmental protection precautions.
- Ensuring records are maintained and that daily, weekly, quarterly, and annual reports are submitted correctly and on time.

Platoon Sergeant (E7, 77F40). Assists the platoon leader in directing and supervising terminal operations. Assumes responsibility of operations when the platoon leader is absent. Is responsible for consolidating all reports prepared in the operating sections. Forwards statistical data to the company's operations section and maintains the files kept by the platoon.

Construction Equipment Operator (E5, 62E20 and E4, 62E10). Constructs and maintains berms and roadways within the terminal area. Lifts and moves containers as required to construct the terminal and to effect pipeline repairs. Lifts and moves heavy valves, pipes, fittings, and filter/separators as required for construction of the TPT. Digs ditches for drainage and road crossings, levels sites, improves storage areas, prepares a site for the

FSSP (building firewalls, berms, and road networks), and covers or cleans up any petroleum spills as the tactical situation permits.

Rough-Terrain Container Handler (E4, 92A1B1). Operates MHE to unload barges and flatcars. Also lifts valves into position; moves filters and strainers; and offloads heavy-gauge pipe lengths, tank shells, valves, and couplings, skid-mounted pumps, generators, and compressors. Operates the forklift truck.

Administrative Clerk (E3, 71L10). Prepares terminal operating reports and maintains platoon personnel and equipment records. Acts as the interface between the unit administrative specialist and the soldiers of the platoon. Drives and maintains one of the platoon light-wheeled vehicles used by the platoon leader for mobility and command and control.

Petroleum Laboratory Specialist (E3, 77L10). Performs quality surveillance on bulk fuels incoming, in storage, and being issued. Performs C-type and modified B-type testing on bulk fuels as prescribed in the latest revision of MIL-HDBK-200 as needed. Performs routine test using the petroleum testing kit. When the testing requirements surpass the capabilities of the petroleum test kit, he forwards samples to higher headquarters for testing.

EQUIPMENT

The minimum amount of equipment, from TOE 10427, required for the platoon headquarters is listed in Table 5-1. For a complete listing of equipment, refer to your unit's MTOE.

Table 5-1. TOE equipment list for the terminal operating platoon headquarters

ITEM	QUANTITY
Alarm chemical agent automatic: Portable manpack	1
Cable telephone: WD-1/TT DR-8 1/2-km	2
Generator set diesel engine: 3-kw, 60-hz, 1-3 ph, AC 120/208, 120/240-v	1
Installation kit: MK-2502/VRC for AN/VRC-46/64 or AN/GRC-160	1
Light set general illumination: 25-outlet	1
Radiacmeter: IM-93/UD	2
Radiacmeter: IM-174/PD	1
Radio set: AN/VRC-46	1
Reeling machine cable hand: RL-39	1
Semitrailer low bed: 40-ton, 6-wheel, with equipment	1
Sign painting kit: with components	1
Truck lift fork: 5,000-pound, container handler, rough-terrain	1
Truck lift fork: 4,000-pound, rough-terrain	1
Truck tractor: 8x6, 75,000 GVW, with winch	1
Truck utility: Cargo/troop carrier 1 1/4-ton, 4x4, with equipment (HMMWV)	1
Top handler attachment: 20-foot, freight container	1
Telephone set: TA-312/PT	1
Testing kit petroleum	1
Tractor full tracked low speed: diesel, MED, DBP, with bulldozer, with scarif winch	1
Tractor wheeled IND: diesel, with backhoe, with loader, with hydraulic tool attachment	1
Trailer cargo: 3/4-ton, 2-wheel, with equipment	1

OPERATIONS

The operations of the platoon headquarters is to provide command and control, plan, organize, coordinate, and direct the terminal operations.

Planning

Planning includes the layout of the operation, workflow, shift schedule, spill response, and sleep plan of the operation. It determines the order and when to do everything to include gaging, sampling, performing PMCS, fire suppression, and all other aspects of operations.

Organizing

The platoon leader organizes the operations to provide bulk fuel to serviced units and to ensure that the platoon operations interface with those of the larger system. It is essential that operations be organized so that soldiers know what is expected of them and they can perform their duties with confidence.

Coordinating

Coordination is one of the most important duties the platoon headquarters performs. Coordinating ties planning, organizing, controlling, and directing together. The flow of order bulk fuel; the cleaning and maintenance of equipment; and the receipt, storage, and issue of bulk fuel all rely on clear, concise coordination. Since the platoon operates on shifts, the work schedule must ensure efficient use of soldiers and equipment. When the shift changes, the oncoming section is briefed on the day's operations and to prepare them to resolve any ongoing problems.

Controlling

Control is to ensure that everything is done according to set plans and procedures. Checks are made comparing the desired results to the actual results with corrective action taken when necessary. A supervisor's checklist for the daily operation of the platoon will assist in this.

Directing

Skillful direction gets soldiers to do their missions efficiently, willingly, and quickly. The platoon leader's orders, oral or written, must be clear and concise. SOPs, acting as guides for the platoon, will help make this direction more effective.

Maintaining Equipment and Facilities

As soon as the headquarters section is set up, the platoon leader should:

- Make a list of scheduled inspections of and any facilities for which he is responsible.
- Arrange informal unscheduled inspections to see if PMCS is being performed IAW the applicable TMs.
- Ensure that unserviceable items that must be sent to higher headquarters for repair/replacement are reported promptly IAW applicable regulations and policies.
- Ensure that reports and records are being submitted and maintained IAW applicable regulations, TMs, FMs, SOPs, and other guidance.
- Plan training for soldiers operating and maintaining equipment.
- Set up an inventory schedule and inventory at the change of property book officer and change of hand receipt holders.

Monitoring Communications

The platoon leader or platoon sergeant needs to do the following to make sure that the platoon's communication equipment is operational at all times.

- Check equipment connections are IAW equipment TMs.
- Check PMCS procedures and log books.
- Verify that repairs are performed or help is requested from higher headquarters.
- Make arrangements with the communications section at the battalion for training of soldiers.
- Make provisions for the storage of the SOI and for the disposal of the SOI as it becomes out of date or compromised.

Testing of Bulk Fuels

The laboratory specialist is responsible for testing bulk fuel as it is incoming, in storage, or being issued. FM 10-67-2 contains instructions for the use of the petroleum testing kit and a table that shows the tests that can be performed with this kit. Testing will be performed IAW the latest version of MIL-HDBK-200.

- Test results. The test performed using the petroleum test kit can show the presence of contamination and identify a bulk fuel.

- Actions on failed samples. When the tested fuel does not conform to standards, the laboratory specialist must:

    - Assume the fuel is unsuitable for use.
    - Report results immediately to his supervisor and recommend suspension of its use.
    - Forward a sample to a petroleum laboratory for further analysis.

Firewalls/Berms

All fuel tanks must have firewalls or berms. Firewalls should have been built around hard wall tanks at the time the terminal was constructed. If these firewalls were not built or have been damaged making them useless, then the construction equipment operators must construct earthen berms around the tanks until the firewalls can be repaired. Collapsible bags used with the FSSP and TPT are almost always protected by earthen berms. Firewalls/berms should be high enough and dense enough to adequately protect the tank or bag from collateral damage or shrapnel from bombs, artillery, missiles and explosive shocks. They must have an impermeable liner. They must be high enough to contain all of the fuel that would flow from the tank if a tank ruptures or overflows plus at least 1 foot for safety. They should also help prevent the spread of fire to other tanks and installations.

Section III. Tank Farm Section

MISSION

The mission of the two tank farm sections is to provide personnel to operate fixed bulk petroleum terminals. The terminals consists of welded steel tanks, bolted steel tanks, underground tanks, or any combination of the above. Each tank farm may have a storage capacity of up to 250,000 barrels. The tank farms may be located at the port of entry or along the pipeline extending over a considerable distance. The terminal could also be located at the pipehead (the last terminal in the system), which provides bulk petroleum reduction facilities. The bulk petroleum reduction facilities dispense fuel into tank trucks, barges, vehicles, drums, and cans. The hose line outfit may be

used to allow portable dispensing beyond the reach of the pipeline. Tank farm and storage and issue sections may be tasked to operate and maintain an over-the-beach TPT. The TPT is designed for ship-to-shore receipt of fuel from offshore tankers. Depending on how calm the sea is, about 600,000 to 720,000 gallons of fuel may be delivered each day. Components of the TPT can also be used to set up a Class III supply point for receipt, storage, and issue of three types of fuel from 5,000-gallon tank trucks. It conducts bulk fuel operations on a 24-hour basis. The product (usually MOGAS, diesel, or JP-8) is moved through the pipeline to the storage tanks at the tank farm. Switching manifolds controls the flow of the product. This section can transfer fuel at the rated capacity of the system (usually between 700 and 1,300 barrels per hour) to the main pipeline. Additional tank farm sections as required can augment it.

PERSONNEL

Effective operation of the sections requires identifying key personnel and understanding their primary duties and responsibilities. Key personnel in each tank farm section are discussed below.

Section Chief (E6, 77F30). Supervises and controls the tank farm section personnel. He supervises the installation, operation, and maintenance of petroleum storage facilities.

Petroleum Inventory Control Specialist (E5, 77F20). Assists the section chief in coordination of tank farm operations and maintenance. Maintains control of opening and closing inventories IAW AR 710-2. Keeps records on receiving and shipping and supervises the second shift.

Petroleum Heavy Vehicle Operator (E4, 77F1H7). Operates vehicles used to support the hose line outfit equipment and evacuate fuel products.

Petroleum Supply Specialist (E3/E4 (12 each), 77F10). Operates and maintains the TPT, FSSP, or other service or civilian equipment as required. Fills out appropriate receipt and shipping documents as required. Is responsible for--

- Operating tank farm transfer and booster pumps, switching manifolds, and loading facilities.
- Gaging and sampling incoming bulk fuels and bulk fuels in tanks and maintain records.
- Performing PMCS on tanks, coupled lines, hose line, valves, fittings, pumps, and filter/separators.
- Serving as fireguards and operating fire extinguishers and fire-suppression equipment.
- Directing flow of fuel into proper storage.
- Driving and maintaining the tactical vehicle used in the control of and in support of tank farm operations.

EQUIPMENT

The minimum amount of equipment, from TOE 10427, required for each tank farm section is listed in Table 5-2. For a complete listing of equipment, refer to your unit's MTOE.

Table 5-2. TOE equipment list for the tank farm section.

ITEM	QUANTITY
Alarm chemical agent automatic: Portable manpack	1
Cable telephone: WD-1/TT DR-8 1/2-km	2
Compressor unit: air, trailer-mounted, diesel-driven, 250-CFM, 100-PSI	1
Detector kit: auto/aviation fuel water and solid contamination	1
Filter/separator liquid fuel: 350-GPM	1
Floodlight set electrical: portable, 6 lights, mast-mounted, 5-kw, 120/208-v	6
Generator set diesel engine: 3-kw, 60-hz, 1-3 ph, AC 120/208, 120/240-v, tactical utility	6
Hose line outfit fuel handling: 4-inch diameter hose	1
Pumping assembly flammable liquid engine-driven wheeled: 350-GPM, 275 feet of head	1
Radiac meter: IM-93/UD	1
Radiacmeter: IM-174/PD	1
Radio set: AN/PRC-77	2
Reeling machine cable hand: RL-39	1
Resuscitator-Aspirator: intermittent, positive pressure, manual cycle	2
Safety equipment set: respiratory, gasoline tank cleaning	2
Semitrailer flat bed: breakbulk/container transporter, 22 1/2-ton	1
Semitrailer tank: fuel-servicing, 5,000-gallon, 12-ton, 4-wheel, with equipment	1
Terminal tactical petroleum: marine	*
Truck utility: cargo/troop carrier 1 1/4-ton 4x4, with equipment (HMMWV)	1
Telephone set: TA-312/PT	1
Tool kit pipe cutting grooving and beveling: 6-, 8-, 10-, and 12-inch pipe	1
Trailer cargo: 3/4-ton, 2-wheel, with equipment	1
Trailer cargo: 1 1/2-ton, 2-wheel, with equipment	1
Truck cargo: 5-ton, 6x6, with equipment	1
Truck dump: 5-ton, 6x6, with equipment	1
Truck lift fork: 6,000-pound, rough-terrain	*
Truck tractor: 5-ton, 6x6, with equipment	1

* Authorization is one per company.

OPERATIONS

The section chief is responsible for the daily operations of the tank farm. As such, he supervises the activities discussed below.

Preparation of Operations Orders

Operations orders are prepared from the daily pumping order. FM 10-67-1 is used as a guide and gives suggestions for preparing:

- Standard orders which can be used for tasks commonly performed.
- General orders which assign specific personnel slots to perform specific tasks.
- Specific orders which show the products and the quantity of each being moved, where the products go, and the times to start and stop each operation.

Sampling the Product

A small portion of the product is inspected; from this the quality of the fuel is determined. The accuracy of the laboratory test results directly depends on the care taken in obtaining the fuel sample. FM 10-67-2 describes sampling devices, what they are used for, and the procedures for their use. The fuel in a tank must be sampled before and after new fuel is delivered to that tank.

Measuring the Fuel

When soldiers measure for fuel quantity, they must do the following:

- Step 1--Gage. Gaging is measuring the product in a tank. FM 10-67-1 gives instructions on gaging a tank. The two methods are an innage gage and an outage gage. An innage gage is performed when you measure how high the product is in the tank. This is normally what occurs in hardwall storage tanks and tank trucks. An outage gage is performed when you determine the distance between a known reference point above the fuel to the surface of the fuel. In addition to measuring the amount of product in the tank, the amount of BS&W must also be gaged. Then using a strapping chart, determine the total volume displaced in the tank and subtract the amount of BS&W. This should equal the amount of fuel in the tank uncorrected for temperature.

- Step 2--Measure Temperature. All volumes of fuel of 3,500 gallons or more must be corrected for temperature. The unit commander may direct lesser volumes be corrected at his discretion. To correctly determine temperature in a standing cylindrical tank, three readings must be recorded. The three readings are taken from the top third, the middle third, and the bottom third of the tank. The three readings are added together and divided by three to get the average temperature of the tank. In tank trucks, collapsible bags, or other tanks that do not have enough height to have a temperature variation, only one recording may be made as outlined in FM 10-67-1. Note: No temperature correction is required in volumes of fuel less than 10,000 gallons. The commander may direct otherwise at his discretion.

- Step 3--Determine observed API Gravity. API gravity is the density or weight of the fuel. A hydrometer is used to determine API gravity according to instructions found in FM 10-67-1.

- Step 4--Convert the Volume. The quantity of product determined at step 1 and the temperature from step 2 are used to determine what the quantity would be at 60°F. The observed API gravity from step 3 is converted to API gravity at 60°F with charts from API/ASTM/IP Table 5. The API gravity at 60 °F and API/ASTM/IP Table 6 are used to find the multiplier (conversion factor). The net quantity at observed temperature is multiplied by the conversion factor to determine the net quantity at 60 °F. Examples of conversions are found in FM 10-67-1 and API/ASTM/IP.

Cleaning Tanks

The tank farm attendants clean the storage tanks IAW the section SOP. The SOP is written IAW FM 10-67-1 and MIL-STD-457. Equipment may have to be ordered if not already on hand. The training should include cross-training of pump operators.

Receiving Bulk Fuel

. The tank farm attendants should be trained in all phases of receiving bulk fuels. As the section chief supervises activities, he uses FM 10-67-1 as a guide. He should keep in mind the following:

- Empty storage tanks should be inspected prior to receiving fuel.

- Another tank valve must be opened to receive incoming fuel when the first tank is filled to allowable capacity.

NOTE: Always open a valve before closing one when receiving fuel. This will prevent overpressurizing the system and blowing the pipeline.

- Tables in FM 10-67-1 show minimum allowable outage.
- Minimum quality surveillance requirements are in MIL-HDBK-200.

Issuing Bulk Fuel

The section chief uses FM 10-67-1 as he trains and supervises tank farm attendants to issue bulk fuel. The following points are important:

- Storage tanks should be checked for water before issue is made. The water should then be removed before the issue is made.
- An attendant should be assigned to each pump if more than one pump is used for the issue.

Loading and Unloading Tankers, Barges, Rail Tank Cars, and Tank Trucks

Depending on the location of the company, personnel of this section will be required to load and unload bulk fuel on barges, coastal tankers, rail tank cars, and tank trucks. When the section chief sets out the SOP for loading and unloading bulk fuels, he uses the following publications as a guide:

- Tank cars--FM 10-67-1.
- Tank trucks--FM 10 67-1 and the appropriate TM.
- Tankers and barges--FM 10-67-1 and MIL-HDBK-200.

Processing Records and Reports

The records and reports listed below are required for terminal operations. The reports clerk uses FM 10-67-1 and the SOP as guides for preparation and submission of--

- The status report which covers the 24 hour period.
- The daily status report which is prepared for receipts and issues.
- DA Form 4786 which is used to record the flow of bulk fuels into storage areas (FM 10-67-1).
- DA Form 10-235 which is used to record the flow of bulk fuel from storage areas (FM 10-67-1).
- DD Form 250-1 which is used to record the flow of bulk fuel from tankers or barges to storage tanks.

Supervising PMCS

Each piece of equipment must have before-, during-, and after-performance maintenance as required by the applicable TM. Reports required by TM 38-750 will be prepared and submitted. Inoperable equipment that cannot be repaired will be reported according to the SOP.

Communications

Communications between the operating point (usually the pump) and all other areas/sections of the operation must be maintained so that the flow of product can be quickly stopped if necessary.

Tactical Petroleum Terminal

The tank farm section and storage and issue section may be required to operate a TPT in support of a bare base environment or to supplement or replace available commercial storage. The TPT is designed primarily to receive product from a pipeline (normally the IPDS) and act as either the base, intermediate, or head terminal. When used with the IPDS, the TPT may receive up to 720,000 gallons per day (600-GPM for 20 hours). This may be supplemented by truck or barge receipts. The TPT is configured into three fuel units.

- Fuel unit. Major components of the fuel unit are:

  - Six each 5,000-barrel BFTAs to store up to 30,000 barrels (1,260,000 gallons) of fuel.
  - One each switching manifold which controls the flow of fuel into, out of, and around the fuel unit.
  - One each truck fill assembly which dispenses filtered fuel to receiving tank trucks and or rai l tank cars.
  - One each pump station to pump the fuel into receiving vehicles or into the pipeline.

While the TPT may handle up to three different fuels (one per fuel unit), the fuel unit can only carry one.

Layout considerations. The tactical situation determines the general location for the TPT. Existing terrain and cover affect the actual layout. Nevertheless, you will need to plan for and consider the following:

Site selection. The site you select should be level and drained to prevent water damage. Keep in mind that any *slope must not exceed 1 1/2 percent* or the tanks could roll toward the low side. Select a site that has easy access to road networks; this is a prime consideration if it will be used to fill tank trucks. Avoid low areas where vapors may collect. Environmental protection considerations for siting must be addressed. Consult with the local environmental officer, via the chain of command, to comply with local and host nation requirements. In general, the TPT should not be located uphill or upstream from a potable water supply or other environmentally sensitive areas.

Offloading. RTCHE is required to move the 20-foot ISO containers used to pack and transport the TPT. *Do not discard the wood used for packing the TPT in the containers--you will need it when you pack it up.* A rough-terrain forklift is required to move the heavier components (BFTAs, filter/separators, valves) into place.

Operational suggestions. To help operations, prevent damage to the collapsible tanks, and prevent products from mixing, direct soldiers to--

- Search for and remove any sharp objects that could damage the collapsible bags before laying the tank out.

- Inspect the collapsible tank for holes and tears as it is being laid out.

- Construct a wooden support to relieve stress placed on the tank by the elbow coupling.

- Paint the name and type of fuel stored in the collapsible tank on the tank so it is visible from all directions.

CAUTION
Do not use an acid-based paint.

- Tag all valves on the switching manifold with the type of product and tank or tank farm the valve services.

- Use a 5,000-gallon tanker to pack the lines in reverse before using the pump station to pump fuel from collapsible tanks.

- Gently slope the ground toward the outlet side of the collapsible tank. Do not exceed 1 1/2 percent.

- Where possible, set up dedicated ship-to-shore lines, one per type of fuel handled, to remove the requirement for an interface system.

Section IV. Storage and Issue Section

MISSION

The mission of the storage and issue section is to operate the FSSP, two 5000-gallon tankers, and four tank and pump units. This section, when required, can also perform limited bulk fuel reduction.

PERSONNEL

Effective operation of the platoon headquarters requires identifying key personnel and understanding their duties and responsibilities. Key personnel include--

Section Chief. The section chief (E6, 77F30) supervises the day-to-day operations of the section to include:

- Prepares work, cleaning, and maintenance schedules along with reports and records.
- Designates and trains one soldier to assist the section chief and be in charge of the second shift if required.
- Represents the section at meetings and conferences.
- Plans training and cross-training for all personnel to include licensing for the section's equipment.

Petroleum Heavy Vehicle Operator. The petroleum heavy vehicle operator (E4 (2 each), 77F10) operates 5-ton tractors, 5,000-gallon fuel servicing tanker, and 12-ton stake semitrailer. Distributes fuel to the FSSP and local customers.

Petroleum Light Vehicle Operator. The petroleum light vehicle operator (E4 (1 each) 77F10, H7; E4 (1 each), 77F10; E3 (3 each) 77F10) performs the following duties:

- Drives and maintains the 5-ton cargo trucks with trailers.
- Operates the 5-ton cargo trucks and trailers with the tank and pump unit installed.
- Performs duties similar to those listed for petroleum heavy vehicle operators.

Petroleum Supply Specialists. The petroleum supply specialist (E4 (3 each) 77F10; E3 (5 each), 77F10) performs the following duties:

- Cleans and fills petroleum containers.
- Marks petroleum containers to include nomenclature; NATO code number; weight or volume; filling date; and safety precautions as required.
- Performs operator maintenance and emergency repairs on all equipment.
- Posts identification and safety signs for storage locations.
- Digs trenches and firewalls/berms to protect storage locations.
- Inspects and gages theater reserve stocks as required.

- Operates pumps, manifolds, and generators.
- Operates dispensing equipment.
- Prepares and submits reports and records.
- Operates the section's light- and heavy-wheeled vehicles and MHE.

EQUIPMENT

The minimum amount of equipment, from TOE 10427, required for the storage and issue section is listed in Table 5-3. For a complete listing of equipment, refer to your unit's MTOE.

Table 5-3. TOE equipment list for the storage and issue section.

ITEM	QUANTITY
Cable telephone: WD-1/TT DR-8 1/2-km	1
Dispensing pump: hand-driven, hose-nozzle discharge, adjustable range	1
Filter/separator liquid fuel: 350-GPM	2
Floodlight set electrical: portable, 6 lights, mast-mounted, 5-kw, 120/208-v	1
FSSP: portable, 60,000-gallon, less filter, pump, and tanks	1
Generator set diesel engine: 5-kw, 60-hz, 1-3 ph, AC 120/208, 120/240-v, tactical utility	1
Pumping assembly flammable liquid engine-driven wheeled: 350-GPM, 275 feet of head	2
Radio set: AN/PRC-77	4
Reeling machine cable hand: RL-39	1
Repair kit collapsible fabric tank: type II repairs, up to 6 inches	1
Semitrailer flat bed: breakbulk/container transporter, 22 1/2-ton	1
Tank and pump unit, liquid-dispensing, truck mounting	4
Tank assembly, fabric collapsible: 10,000-gallon petroleum	6
Tank, liquid-dispensing, trailer mounting	4
Telephone set: TA-312/PT	1
Trailer cargo: 1 1/2-ton, 2-wheel, with equipment	5
Truck cargo: 5-ton, 6x6, with equipment	5
Truck lift fork: 10,000-pound, rough-terrain	1
Truck tractor: 5-ton, 6x6, with equipment	1

OPERATIONS

The section chief is responsible for the daily operations of the storage and issue section. As such, he supervises the activities below.

Fuel System Supply Point

The FSSP consists of two 350-GPM centrifugal pumps, two 350-GPM filter/separators, six collapsible tanks of varying sizes, 4-inch Y- and T-assembly, fittings, discharge and suction hoses, and various tools and accessory items. (The pumps, filter/separator, and tanks are all separate TOE items.) The fuel system is used to receive and store fuel from trucks, railway cars, barges, pipelines, assault hose line, and aircraft and to dispense fuel to using units in the field. Fuel enters the system through the 4-inch Y- and T-assembly and is moved to the collapsible tanks by one of the 350-GPM pumps. In some cases, the fuel will be moved to the tanks by the transport's pump or by residual pressure from the pipeline or assault hose line. When fuel is dispensed, it is pumped from the

collapsible tanks through the filter/separators to the vehicles or containers. When necessary, the system can be divided into two parts and operated independently so that more than one fuel can be handled or customers can be serviced more effectively.

The section chief supervises setting up the FSSP. TB 5-4930-201 shows how to prepare the terrain and place the equipment. FM 10-69 describes and details the operation of the supply point. The following should help the section chief supervise the layout and operation of the system:

- Ensure that equipment manuals are on hand for each piece of equipment.
- Fire extinguishers are required for each pump, collapsible tank, receiving point, and issuing point. CTA 50-915 contains data for requesting fire extinguishers.
- The section SOP should contain instructions for testing, using, and maintaining fire extinguishers.
- DA Pamphlet 710-2-1 contains detailed instructions for filling out and processing DA Forms 3643 and 3644.
- When a unit brings 500-gallon collapsible drums, issue should be requested on a DA Form 2765 or DD Form 1348-1. A copy of these documents are retained and turned over to the control section as support documents for the DA Form 3644.

Training should always stress safety to include:

- Fire extinguisher operation.
- Grounding and bonding procedures.
- Cautions on overfilling vehicles and containers.
- Operator's maintenance procedures and practices.
- Spill prevention and response.

Petroleum Tank Vehicles

Petroleum tank vehicles may be used for internal support (retail issues or bulk movement and storage) and external support (retail issues and limited bulk deliveries). Use FM 10-67-1 in addition to the equipment technical manuals for detailed guidance on their operations and maintenance. Some general operating and training follows:

- Never overfill the tanks, always leave room for expansion and to prevent fuel spillage when traveling cross-country.
- Attend nozzles constantly and do not wedge open or block the nozzle operating lever.
- Keep pump filled to avoid having to prime it.
- Avoid touching metal with bare hands in cold weather.
- Train all soldiers in the location of fire extinguishers and emergency procedures.
- Cross-train soldiers so that they can operate and maintain all vehicles and equipment during day and night operations.

Assault Hose Line Outfit

The hose line outfit provides about 2 1/2 miles of flexible hose that can be quickly installed for temporary use in various situations involving the transfer of bulk fuel. The outfit consists of the hose (in 13 flaking boxes); roadway guard crossing; repair, packing, flow control, displacement and evacuation, and suspension kits; and the wheel-mounted 350-GPM regulated pumping assembly.

- Uses:

  - Moving product from the storage area to the user's storage area. These might include an airfield, airbase, or main supply battalion.
  - Moving fuel from the point of delivery to the storage area such as from a rail tank car or barge off-loading operation.
  - Furnishing b ulk fuel to areas where more cover and concealment is needed or where truck traffic is not suitable.

- Layout. FM 10-67-1 contains information on choosing a route; loading the boxes; laying down the hoses to include stream crossings, gaps, and road crossings; and marking the route.

- Training. The section chief should include the following in the training plan:

  - Use of metal and wood road-crossing guards.
  - Fire hazards
  - Procedures for removing the fuel from the line before the line is repacked for shipment.
  - Procedures for repair and testing the hose line.

The 500-Gallon Collapsible Drum

The 500-gallon collapsible drum is a durable, nonvented, collapsible container. When it is filled to capacity through a pressure control valve, it can be towed at speeds up to 10 MPH (16 km/h) for short distances over smooth terrain. It is towed using the towing and lifting yoke. The drum is impregnated with fuel-resistant synthetic rubber. It can be collapsed, folded, and transported by cargo truck. Follow these guidelines to fill the 500-gallon collapsible drum:

- Select a level and firm site near the source of fuel. The site should be clear of debris so that the drums can be lined up, filled, and then rolled away to allow room to fill more drums.

- Secure the drums if necessary to prevent slipping or rolling while being filled. Drums may be secured by chock blocks, ropes, and stakes, or other means as required.

- Inspect all drums before to filling them as outlined in FM 10-67-1. Segregate all serviceable from unserviceable drums. Store drums according to the fuel being used in them.

- Drums must be cleaned before being used for another type of fuel.

- Ensure drums are marked properly.

Maintenance of Theater Reserve Stocks

Higher headquarters will determine what types of fuel, in what quantities, and in which locations theater reserves will be stored. Normally, theater reserves are stored in the same tanks as operating stocks. This makes managing and maintaining the stocks simpler because they are continually being rotated and sampled. However, under certain circumstances storage will be allocated strictly for theater reserves.

Storage. The engineers usually emplace the collapsible storage tanks needed to store the theater reserve when the pipeline is constructed. If the storage area is not set up, the section chief, along with the platoon leader and company commander will need to develop a layout plan. Earth-moving equipment and lifting equipment will be needed from the platoon headquarters along with the operators. The area for the storage must be located far enough from the nearest activity that an attack on one will not affect the other. The area must provide natural cover and protection or be easily camouflaged. The section chief makes sure the following are done:

- Higher headquarters furnishes tanks if the requirement exceeds that of the FSSP.
- An area is designated for each type of fuel.
- Each tank is numbered and the numbering system is consistent throughout the system.
- Control records are set up and maintained to show type and quantity of fuel in each tank.

Inspection. Inspect collapsible tanks daily for signs of leaks, tears, punctures, unusual wear, and fabric deterioration. Enter inspection results on the inspection control sheets.

Sampling. Sample reserve stocks according to the established schedule of the SOP. Record dates and results on the sample control sheet. Report any contamination to the nearest laboratory.

Gaging. If hardwall tanks are used, the tank farm attendants will gage the tanks weekly or IAW the established schedule or SOP. If collapsible tanks are used, the gage may be visually estimated as follows:

- Start with each tank completely empty.
- Fill the tank to capacity using a meter or known quantity of fuel such as two 5,000-gallon tank trucks for one 10,000-gallon collapsible tank.
- Drive a stake into the ground on opposite sides of the tank that are higher than the tank. Fasten a wire to the stakes so that it is taut and just barely touches the top of the tank.
- Estimate by noting the level of the tank in relation to the wire.

Issue. If an order to issue reserve stocks is received, the section chief makes sure the product is used on an FIFO basis.

Fire Protection

The section chief sets up the fire protection plan. FM 10-67-1 contains information on types of fire extinguishers and characteristics of various fuels. The section chief must develop and implement procedures and training for preventing, controlling, and extinguishing fires. The section chief must check:

- Fire extinguishers for condition and a full charge.
- The condition of firewalls/berms for worthiness.
- For spills, leaks, and improper tank ventilation.
- That no smoking areas are enforced.
- That equipment is marked as required by MIL-STD-101 or 161.

The section chief should hold fire drills in the daylight hours until all soldiers are well trained. He then should call day or night drills without notice. These drills should include the following:

- Simulate closing valves and shutting down pumps.
- Soldiers should man the fire extinguishers and at least one should be operated during each drill.
- Use training film in the training to make soldiers aware of the causes of fire and the precautions that prevent them.

Spill Response

In case of POL spills or leaks, an environmental clean-up or restoration must begin immediately. Immediate spill reporting requirements must also be met. Spill cleanup kits must be available on site and properly maintained. Personnel must be familiar with the local SPCC plan, have spill-response training, and have participated in spill exercises. For more information, refer to the local SPCC plan, consult with the local environmental officer through the chain of command, and see Appendix A.

CHAPTER 6

PIPELINE OPERATING PLATOON

Section I. Platoon Overview

MISSION

This platoon operates about 90 miles (150 kilometers) of multiproduct 6- or 8-inch coupled pipeline 24 hours a day. The pipeline moves large amounts of petroleum product to support the theater distribution system. The diameter of the pipeline and capacity of the pumps used by the company depend on the quantity of product to be moved. Four pump stations are located along the pipeline operated by this company. The pump stations, with connecting manifolds, move product at the desired rate of flow from tankers or barges through the line to storage, to branch lines, to tank farms, or to dispensing facilities. Engineer units construct pump stations; they include standard line pipe or lightweight tubing, couplings, nipples, valve sections, fittings, and the required number of pumps.

ORGANIZATION

The pipeline operating platoon is made up of the platoon headquarters, a service support section, and six pipeline sections (Figure 4-1, page 4-3). The platoon headquarters directs and coordinates the operations of the platoon. The service support section is responsible for organizational and direct support maintenance on the pipeline, pump stations, and all equipment. Each of the six pipeline sections is also responsible for patrolling the pipeline for leaks, fires, sabotage, and pilferage.

COMMUNICATION

Pipeline operations are controlled primarily by teletypewriter, although voice communications by radio and telephones are freely used for control and administration. If the teletypewriter circuit is disrupted the voice facilities can be used to maintain contact. Besides communicating with other elements of the company, each pump station can usually communicate with adjacent pump stations by teletypewriter and telephone. If needed, the stations can use vehicle-mounted radios to contact the dispatcher and any other station. See Chapter 7 for further information on communications.

Section II. Platoon Headquarters

MISSION

The mission of the pipeline operating platoon headquarters is to supervise and direct operation of about 150 kilometers (90 miles) of multiproduct pipeline and six pump stations.

DUTIES OF PERSONNEL

Effective operation of the platoon headquarters requires identifying key personnel and understanding their duties and responsibilities. Key personnel and their duties are discussed below.

Platoon Leader (Lieutenant, 92F). Directs and supervises platoon operations assisted by the platoon sergeant. Is responsible for--

- Supervises and directs the operation of the pipeline and pump stations.
- Prepares SOPs, directives, and other operating instructions.

- Plans training for all platoon personnel.
- Coordinates with company commander on need for more persons for patrol duty, fire fighting, surveillance, and defense.
- Ensures that soldiers know how to operate the C-E equipment.
- Receives and reviews the daily pumping order from higher headquarters and sets up the work schedule.
- Reviews DA Forms 2077 and makes decision on use or disposition of product.
- Sets up the environmental and spill control programs.
- Publishes fire regulations and schedules fire protection training.

Platoon Sergeant (E7, 77F40). Performs the following duties:

- Assists the platoon leader in the supervision of the platoon.
- Schedules personnel for OJT.
- Supervises the administrative clerk.
- Operates the C-E equipment.
- Prepares monthly and annual reports.
- Supervises the pumping of pipeline products.
- Prepares and submits DA Form 285.

Crane Operator (E5, 62F20 and E4, 62F10). Operates the 20-ton crane for pipeline and pump station maintenance. Also operates the crane to move hose line flaking boxes.

Administrative Clerk (E3, 71L10). Performs the following duties:

- Drives a 1 1/4-ton HMMWV.
- Operates the AN/VRC-46 radio set.
- Prepares and sends to the chief dispatcher at battalion operations reports covering hourly pumping and delivery information.
- Sets up and maintains files.
- Maintains the following records of pump station operations:
- DA Form 4818 shows suction and discharge pressures, pump revolutions per minute, and water temperature for each pump at a station.

EQUIPMENT

The minimum amount of equipment, from TOE 10417, required for the platoon headquarters is listed in Table 6-1. For a complete listing of equipment, refer to your unit's MTOE.

Table 6-1. TOE equipment list for the pipeline operating platoon headquarters

ITEM	QUANTITY
Alarm chemical agent automatic: Portable manpack	1
Antenna: RC-292	1
Cable telephone: WD-1/TT DR-8 1/2-km	3
Crane wheel-mounted: 20-ton, with 30-foot boom crane, with 20-ton block and tackle	1
Generator set gas engine: 3-kw, 60-hz, 1-3 ph, AC 120/208, 120/240-v	1
Inst kit: MK-2502/VRC for AN/VRC-46/64 or AN/GRC-160	1
Light set general illumination: 25-outlet	1
Power supply: PP-6224/U	1
Radiacmeter: IM-93/UD	1
Radiacmeter: IM-174/PD	1
Radio set: AN/VRC-46	2
Radio set control group: AN/GRA-39	1
Reeling machine cable hand: RL-39	2
Truck utility: cargo/troop carrier 1 1/4-ton, 4x4, with equipment (HMMWV)	1
Switchboard telephone manual: SB-993/GT	1
Telephone set: TA-312/PT	1
Tool kit carpenters: engineer, squad, with chest	1
Trailer cargo: 3/4-ton, 2-wheel, with equipment	1

OPERATIONS

Batches of product are pumped into the line at times shown in the daily orders. All stations are notified by the headquarters of the starting time, quantity, route, and destination. The pump stations report to headquarters every hour on cumulative barrels pumped, line temperatures, pressures, product codes, and batch numbers. FM 10-67-1 contains specific instructions on:

- Sampling product.
- Pumping operation.
- Delivery operation.
- Interfaces.
- Shutting down.
- Reports (see also DOD 4140.25M).

Section III. Service Support Section

MISSION

The service support section performs organizational, DS, and GS maintenance on the pipeline, pump stations, and on all related equipment assigned to the platoon. In normal operations, personnel of the section may work a

maximum of 90 miles (100 kilometers) from the base of operations. The company maintenance section gives backup support and technical assistance. Maintenance functions include repairing and replacing valves, blinds, pressure gages, meters, line strainers, pump units, welded pipelines, coupled lines, hose lines and related pipeline equipment. The 5-ton trucks carry pipe, valves, pumps, and bulky supplies needed to make organizational and direct support repairs. The HMMWV with the AN/VRC-46 radio is used as the command vehicle and carries repair parts for organizational and DS maintenance when it is necessary to make repairs or gives assistance to the patrolman at night. The portable floodlight set is pulled by the truck.

PERSONNEL

Effective operation of the platoon headquarters requires identifying key personnel and understanding their duties and responsibilities. Key personnel and their duties are discussed below.

Power Generation Equipment Repairer (E5, 52D20 and E3, 52D10). Performs organizational maintenance on platoon power generating equipment. Receives assistance from the power generation repairers in the maintenance section. Coordinates the scheduling of repairs and overhauls of power generating equipment with the maintenance section; test-operates equipment and determines extent of repair required; and prepares, maintains, and processes maintenance records and files.

Quartermaster Equipment Repairman (E5, 63J20 and E3, 63J10). Performs organizational maintenance on the main pipeline and pump station equipment. Makes entries on reports. Maintains records for repair work completed.

Wheeled Vehicle Repairman (E5, 63W20; E4, 63W10; and E3, 63W10). Performs organizational maintenance on platoon vehicles and trailers assigned to the section. Test-operates equipment and determines extent of repair required. Prepares, maintains, and processes maintenance records and files. Drives the contact truck, working independently to repair vehicles in remote areas. Also coordinates the scheduling of repairs and receives assistance from the maintenance section.

Equipment Receipt/Parts Specialist (E5. 92A20). Coordinates the Class IX requirements with the supply support activity; receives, stores, and issues repair parts for organizational maintenance on platoon equipment; sets up and maintains a locator system for shelved or binned items; and drives the 5-ton truck for transportation of equipment and parts for maintenance on pipeline and pump stations. Also operates the VRC-46 for command and control of the section.

Plumber/Pipefitter (E4, 51K10). Uses the pipe cutting grooving and beveling tool kits and the pipefitter’s tool kit to maintain and repair pipeline. Anchors, buries, and retrieves pipeline.

Construction Equipment Repairer (E4, 62B10). Performs organizational maintenance on construction equipment (crane and bulldozer), air compressors, and pneumatic tools of the pipeline operating platoon. Coordinates the scheduling of repairs and receives assistance from the maintenance section.

EQUIPMENT

The minimum amount of equipment, from TOE 10417, required for the service support section is listed in Table 6-2. For a complete listing of equipment, refer to your unit's MTOE.

Table 6-2. TOE equipment list for the service support section

ITEM	QUANTITY
Cable telephone: WD-1/TT DR-8 1/2-km	1
Dispensing pump hand-driven: piston type, 1 quart per stroke	1
Floodlight set electrical: portable, 6 lights, mast-mounted, 5-kw, 120/208v	1
Generator set diesel engine: 5-kw, 60-hz, 1-3 ph, AC 120/208, 120/240v, tactical utility	1
Installation kit: MK-1443/VRC-46 for VRC-46	1
Multimeter digital: AN/PSM-45	1
Pump centrifugal: sump. pneumatic-driven, unmounted, 2 1/2-inch, 210-GPM, 25 feet of head	1
Pump unit reciprocating power-driven: 4-inch, 100-GPM, 10-foot suction lift	1
Radio set: AN/VRC-46	1
Reeling machine cable hand: RL-39	1
Saw power hack portable: 2- to 8-inch pipe size	1
Shop equipment contact maintenance truck-mounted	1
Telephone set: TA-312/PT	1
Tool kit general mechanics: automotive	9
Tool kit pipe cutting grooving and beveling: 6,- 8-,10-, and 12-inch pipe	1
Tool kit pipefitters: 2 1/2- to 4-inch pipe	1
Torch outfit cutting and welding: organizational maintenance set number 5	1
Trailer cargo: 1 1/2-ton, 2-wheel, with equipment	1
Truck cargo: 5-ton, 6x6, with equipment	1
Welding set arc: inert gas, shield, water-cooled, aluminum weld	1

OPERATIONS

The daily operations of this section are to perform maintenance. Maintenance is performed on the equipment listed below.

- Pump Units. Specific maintenance instructions for each of the pump units are found in the equipment TMs. FM 10-67-1 covers organizational maintenance of pump units. Organizational maintenance is performed as required. The TM lists the maintenance services for the engine and accessories, engine electrical system, control system, frames, and the pump. DS maintenance charts and troubleshooting charts are included in the TM.

- Coupled Pipeline. Three types of clamps are used to repair leaks in coupled lines. FM 10-67-1 gives detailed instructions for using pit-leak, split-leak, and overcoupling-leak clamps.

- Welded Pipelines. Leaks in welded pipelines can be temporarily or permanently repaired. Welding (under emergency conditions only) can also repair the line. See FM 10-67-1 for instructions.

- Hose Line. There is a repair kit (NSN 3835-00-686-1007) for repairing seeping or spraying leaks in hose line. Instructions are in FM 10-67-1.

- Tank and Pump Units. Tank and pump units are usually truck-mounted. The equipment TM gives instructions for mounting the equipment in a truck and for organizational maintenance, PMCSs, and troubleshooting. Also, the TM shows how to remove and replace equipment authorized for removal and replacement at DS level. Repair parts and equipment are listed in the parts TM. See Appendix B for reference manuals for equipment in this company. The following suggestions will help when personnel mount the unit in a 5-ton cargo truck:

- Bracing material is needed to construct the frames to hold the equipment.
- A forklift truck or crane from the company headquarters is needed to place the tanks and pump on the truck.
- The tie-down assembly is part of the equipment.

- Tank Units. Tank units are usually trailer-mounted, but may also be setup for use without a trailer. In the organizational section of the equipment TMs are instructions for installing the tank unit and for performing organizational PMCSs and troubleshooting.

- Other Pipeline and Hose Line Accessories. QM equipment repairmen maintain all gate, glove, plug, and check valves; line blinds; pressure gages; meters, and line strainers. The repairs that can be performed on these items are outlined in FM 10-67-1.

- Filter/Separators. Several types of filter/separators are used in petroleum pipelines to remove water and solid contaminates from liquid fuels. Each model will have an equipment TM that covers the organizational and DS maintenance. FM 10-67-1 discusses inspection and preventive maintenance services and replacement of filter elements.

- Generator Sets. There are eight generator sets authorized for the four pump stations. Each pump station has two, which are to be used alternately on a 24-hour basis. These generators and the other ones in the platoon must be serviced, inspected, and repaired as specified in the equipment TM for organizational and DS maintenance. The TMs also give instructions for ensuring that all generator sets are properly equipped and maintained for radio interference suppression.

- Radios. There are radio sets and other C-E equipment in this platoon. The repairer installs equipment, performs troubleshooting procedures, repairs equipment, and removes and replaces components as outlined in the equipment TMs for organizational and DS maintenance. See Appendix B for listing of applicable TMs. The repairer also prepares and maintains records connected with prescribed load lists.

REPAIR PARTS AND RECORDS

The PLL clerk in the maintenance section of the company maintains the PLL. Repair parts are requested according to the SOP. They are stored and identified as shown in FM 38-741. Log books and other TAMMS records are prepared and maintained as shown in TM 38-750. Issues of repair parts are controlled by the records shown in the SOP or according to AR 710-2.

Section IV. Pipeline Sections

MISSION

The mission of the pipeline sections is to provide personnel for the operation of six pump stations and for patrolling the pipeline.

PERSONNEL

Effective operation of the section requires identifying key personnel and understanding their duties and responsibilities. Key personnel and their duties are discussed below.

Pump Station Foreman (E6, 77F30). Supervises pump station operations and a portion of the pipeline. Assigns duties and spot checks work performed by operating personnel, prepares shift schedules, and plans training sessions. Is responsible for OJT of section personnel.

Pump Station Operator (E5, 77F20). Assists the station foreman in supervising the operations of the pump station and supervises the second shift. Maintains records showing the products' flow through the pump station by sampling for color, appearance, and gravity. Reports batch changes.

Pump Station Operator (E4/E3, (6 total per section), 77F10). Operates the pump stations; launches and receives the pipeline scraper; inspects, cleans, and replaces facility pressure gages and meters; performs operator maintenance on all pipeline equipment; and assists with patrol duties as required.

Radio Operator-Maintainer (E4/E3 (2 per section), 31C10). Responsible for the installation, maintenance, and operation of C-E equipment to include antennas, radios, and teletypewriters. Supervised by either a radio supervisor (E6, 31C30) or a senior radio operator-maintainer (E5, 31C20). The company is authorized three of each to be distributed among the six pipeline sections.

EQUIPMENT

TOE 10417 prescribes the equipment for the pipeline section. See Table 6-3 for a list of this equipment. For a complete listing of equipment refer to your unit's MTOE.

Table 6-3. TOE equipment list for the pipeline section

ITEM	QUANTITY
Alarm chemical agent automatic: Portable manpack	1
Antenna: RC-292	1
Cable telephone: WD-1/TT DR-8 1/2-km	4
Drum fabric collapsible: potable water	1
Facsimile set: AN/TXC-1	1
Floodlight set electrical: portable, 6 lights, mast-mounted, 5-kw, 120/208-v	1
Generator set diesel engine: 5-kw, 60-hz, 1-3 ph, AC 120/208, 120/240-v	2
Installation kit: MK-2502/VRC for AN/VRC-46/64 or AN/GRC-160	1
Installation Kit: MK-1429/GRC-106A for GRC-106A	1
Installation kit: MK-1443/VRC-46 for VRC-46	1
Light set general illumination: 25-outlet	1
Loudspeaker permanent magnet: LS-454/U	1
Machine gun 7.62-mm: light flexible	1
Mount tripod machine gun: 7.62-mm	1
Power supply: PP-4763/GRC	1
Power supply: PP-6224/U	1
Pump centrifugal: diesel engine-driven, skid-mounted, 6-inch, 800-GPM, 1800 feet of head	2
Radiacmeter: IM-93/UD	1
Radiacmeter: IM-174/PD	1
Radio set: AN/GRC-106	1
Radio set: AN/VRC-46	2
Radio set control group: AN/GRA-39	1
Receiver-transmitter control group: AN/GRA-6	1
Reeling machine cable hand: RL-39	2
Truck utility: cargo/troop carrier 1 1/4-ton, 4X4, with equipment (HMMWV)	1
Tank fabric collapsible: petroleum, 3,000-gallon	1
Telephone set: TA-312/PT	1
Tie-down assembly: chain type for holding collapsible fabric drums	1
Tool kit pipefitters: 1/8- to 2-inch pipe	1
Tool kit supplemental pipeline pump station: 4-, 6-, and 8-inch	1
Trailer bolster: general purpose, 4-ton, 4-wheel, with equipment	2
Trailer cargo: 3/4-ton, 2-wheel, with equipment	1
Truck cargo: 5-ton, 6x6, with equipment	1
Yoke towing and lifting collapsible fabric drum: 500-gallon capacity	1

OPERATIONS

After the pipeline is completed, checked out, and accepted, it is put on line. The section is ready to receive pumping orders and begin operation.

Hours of Operation

The pipeline operates on a 24-hour basis; one hour at the beginning and end of each shift is allotted for operator maintenance and changeover of crews. Pumping operations continue during changeover period.

Pumps

Each pump station has two pumps. Usually one is on line and one is on standby. The two pumps are rotated so that each pump gets equal use.

Orders

The chief dispatcher (at battalion level unless company is operating separately) issues the pumping orders for a 24-hour period at midnight, to go into effect at 0001. All stations are notified of the starting time, quantity, route, and destination of each batch. Each pump station reports on cumulative barrels pumped, temperatures, pressures, product code, and batch number.

Daily Operations

After the pumping operations begin, arrangements are made for line sampling and testing en route to mark progress and position of interfaces. Batches are pumped at specified times and reports made hourly. This allows the dispatcher to make adjustments in the schedule and notify downstream of changes. When the schedule shows that the pumping operations will be light, and fewer personnel will be needed to man the pumps, the foreman of the shift should:

- Assign additional personnel to patrol the pipeline to check for sections needing repair.
- Schedule training sessions and classes in NBC, perimeter defense, firefighting, and other areas.
- Arrange to have foliage and grass cut.

Shutdown.

The pipeline is not shut down except in emergencies. When it is necessary to shut down, the line is packed to ensure a full line under positive pressure.

Layout Plans

When the pipeline is planned, the layout plans for the pump station are included. Standard plans are used, with modifications for special purposes. The engineer unit constructs the six pump stations. Each facility is a complete unit and has the required number of pumping units with manifolds, valves, sandtraps, and pipe cleaner stations needed to connect the pumping station into 4-, 6-, or 8-inch pipe. Each pump station has a separate fuel supply facility that has 3-inch hose sections, couplings, gaskets, and valves for connecting a 3,000-gallon fabric tank (to furnish fuel for operating pumps and related equipment). The tank size will be adequate to provide bulk fuel for operation of the pump stations. If the pump stations are not in place, tents must be used for troop quarters until the engineer unit builds permanent facilities.

Troop Quarters. Troop quarters for each station provide shelter for the 6- to 10-man operation crew. The quarters are placed at least 100 feet from the pump station to lessen noise and to ensure troop safety. For security, the quarters should not be more than 200 feet from pump station.

Pump Sheds. Pump stations do not usually require a building; however, when the climate makes protection necessary, the engineer unit constructs a shelter. If shelters are provided, they should be fire-resistant. The roof should be at least 8 feet from the floor. Salvaged pipe may be used for the framework with the sides left open for vapor dispersion.

Pump Foundation. Earthen foundations are not satisfactory for the pumps. Usually the engineer unit will build concrete or gravel pads for the pumps when the pipeline is laid.

Cleaning Pipeline

Each pump section has a launching and a receiving scraper trap. Each scraper trap is made up of the cleaner barrel, nipples, elbows, and valves used to block off the scraper trap from the main line. The traps provide a means for inserting and removing a pipeline scraper that is run through the line periodically to remove rust, scale, and other debris. Scrapers come in different sizes. There are various designs available. The scraper is put into the line at the launching trap. (There is no shutdown of the pumping operation.) The product will force the scraper through the line at a rate of about 5 to 10 percent less than the velocity of the product. If the line is shut down, the sediment ahead of and behind the scraper may cause the scraper to stick. FM 10-67-1 describes the cleaning of the pipeline with a line scraper. Suggestions and cautions for scraper operations are listed in Table 6-4.

Table 6-4. Suggestions and cautions for scraper operations

If a small battery-operated radio transmitter is available, it can be placed on the scraper and traced with a receiving set.
The steel-type scraper cannot be used where it comes in contact with check and plug valves or other valves that are smaller than the size of the line.
The steel-type scraper cannot turn corners of more than 30 degrees. Refer to FM 5-482 for information on pipe bends.
If the scraper is stopped by an obstruction, the line is broken and drained at the point where the scraper stopped and the obstruction is removed.

Cleaning Sand Traps

Sand traps are sediment chambers that collect most of the dirt, scale, sludge, and floating debris that are pumped through the pipeline. A sand trap is installed on the suction side of each pump station. A trap consists of two 14-inch drumlike steel barrels with three sections. The middle section is removable and is easily rolled aside for cleaning. The outlet section has a settle in the sand trap. Sand traps are cleaned each time the scraper is run and must be checked periodically between line cleanings. When the traps are cleaned, the strainers are removed and rinsed and cleaned. Any sediment that accumulates in the trap is scooped out. FM 10-67-1 gives detailed instructions for cleaning the traps.

NOTE

There is a sand trap bypass which allows the product to continue through the line while a sand trap is being cleaned.

Controlling Corrosion

Most military aviation fuels and motor gasolines contain approved rust inhibitors to reduce corrosion in the pipeline. FM 10-67-1 covers the information on inhibitors to be used in pipelines and methods of checking the effectiveness of the inhibitors.

Patrolling the Pipeline

Usually two persons patrol the section (about 15 miles (24 kilometers) for which the pump station is responsible. They look for leaks, fire, sabotage, and pilferage. The HMMWV with the mounted radio is used for carrying repair parts they will need to make minor on-the-spot repairs. If the terrain is too rough or the pipeline is not accessible from the road, the patrol is made on foot. Then a portable radio is carried by one person, and wrenches and the other carries other small items needed for minor repairs. Generally, the pipeline is not patrolled during the night hours since leaks are not readily detected with a flashlight. If it becomes necessary to mount a patrol at night for any reason, the night foreman must summon the patrolmen. A patrol schedule is prepared daily or accordingly to SOP and posted. When the pipeline foreman plans classes and on-the-job training, he should include and emphasize the following:

- Instruction for operation of C-E equipment.
- Need to carry extra flashlight and radio batteries.
- Procedures for notifying the pump station foreman emergencies.
- Preparation of records and reports.
- Tests for determining that patrolmen know how to perform the required maintenance
- Plans for training of patrolmen by the maintenance section, if required
- Need for each patrolman to have a copy of the SOP. (It can be used as a handout at the training session.)

NOTE
The pipeline foreman should be sure to tell the patrolmen that dead grass and foliage around the pipeline are a good indication of leakage

Records and Reports

When the SOP is prepared, it should include the records and reports required daily, weekly, and monthly. FM 10-67-1 covers reports and records for controlling the flow of the product. The pipeline foreman may also be required to furnish data for bulk petroleum product reports required under the provisions of DOD 4140.25M. The number of reports and records maintained by this platoon will depend on the requirements of the battalion. (Reports for higher headquarters are usually consolidated at the battalion.) The SOP should cover the preparation and processing of the following:

- DA Form 4818 is for recording suction and discharge pressure, pump revolutions per minute, and water temperatures for each pump at the pump station. The operator on each shift inspects the pumps hourly and makes the required entries on the form.

- DA Form 4193 is for recording the flow of petroleum products that pass through a pump station.

- TAMMS records and reports are for recording equipment maintenance as given in TM 38-750.

- Other reports and records are required by SOP for furnishing data to the battalion for reports to higher headquarters.

CHAPTER 7
COMMUNICATIONS

Section I. General

ASSETS AND SERVICES

Communications help you support unit missions, carry out administrative duties, maintain contact with higher headquarters, transmit tactical information, and defend the unit. The commander must set up communications with all elements. Their personnel must communicate with higher headquarters, supported units, and internal elements. Communications help may be needed in setting up an adequate system. Assistance can usually be obtained from COSCOM or EAC in which the unit may operate, from the battalion headquarters company to the subordinate units, or from the headquarters detachment of a petroleum group.

Assets

Communications equipment authorized includes the AN/GRC-106/160/193, AN/PRC-77, AN/VRC-43/46/47, VRC-87/88/89/90/91/92 series radios, AN/VRC-97 MSE, and the AN/GRA-6/39 radio set control groups. See Appendix B for a complete equipment listing and publication data. The commander is responsible for allocating these communications assets. Equipment should be allocated as needed to perform the mission. For example, in a tactical situation, OPs or LPs might have priority on phones. Another source of communications would be the MP security company, if attached to the petroleum group. It would have organic communications equipment mounted on each of its vehicles.

Services

Communications services will differ depending on the area or zone in which the unit operates. Services are provided in both the COMMZ and the corps area.

In the COMMZ. Because the unit will be deployed throughout the COMMZ, you will need outside help to set up your communications system. This assistance comes from signal organizations of the communications command in EAC. These signal units install, operate, and maintain a network of area signal centers in the COMMZ. Trunking systems connect the centers. Use the centers to supplement your organic communications to higher, subordinate, or nearby units.

In the corps. The corps communications system operates in the combat zone and provides communications for corps units. It is an integrated system with a single-channel command radio and multichannel facilities to provide service on both command and area basis. Direct links go from corps main command post to assigned divisions and selected subordinate units. The area communications system is linked to the command system. The area system has area signal centers (nodes) situated to provide corps-wide access. The corps system is linked to the communications system of the EAC and to adjacent corps and divisions.

METHODS

There are many different communication methods. Use the methods that offer maximum reliability, flexibility, security, and speed with a minimum of effort and material. Do not depend on one method. Use methods which complement each other. Also, signal equipment (particularly when connected to cables or antennas) can be damaged by electromagnetic pulse. Alternate means of communication should always be available in the event of nuclear warfare. Refer to FM 24-1 for more information on the various methods of communication.

Wire and cable

Wire systems use field wire and cable, telephones, and the switchboard to provide person-to-person conversations. Wire is more secure than radio. If radio links are used in your system, the enemy can intercept your telephone conversations. Make sure your personnel know this and practice communications security. Be sure to cover security in the unit SOP. In your SOP, include details of the telephone system, priorities for laying wire, and responsibilities for setting up the system. See FM 24-20 for information on field wire activities and the general characteristics of equipment used with field wire systems.

Radio

Make sure the allocation of radio equipment is documented in the SOP. Radio is one of the most versatile methods of communication. Since it is wireless, you can operate while mobile. It can handle large volumes of traffic. Radio is your main method of communication with unit elements too far away for contact by local telephone. However, radio is the least secure communications method. Radio communication is subject to jamming and interception, deception, and interference. Radios can be severely damaged by the electromagnetic pulse resulting from a nuclear detonation. During the blackout (ionization of the atmosphere) following detonation, radio transmissions will be impossible. If your unit is in or expects to be in a nuclear environment, measures must be taken to protect your radios. For more information, refer to FM 25-50. Put both security and protective measures in your unit SOP. When setting up operating sites, your personnel should enter the net using procedures in FM 24-18.

Automation

Automation means are methods of sending, receiving, processing, or storing information by an automated capability (such as computers). Automated capability is able to process large volumes of information and provide real-time delivery. Automation provides speed, accuracy, improved text and video display, programmable output and formats, and is easily secured. However, it requires a manual system for a backup and is susceptible to electromagnetic pulse, power fluctuations, induced viruses and magnetic disturbances.

Manual

Manual method consists of sending, receiving, or storing documents by physical capabilities, without passing over electronic media. This method includes messengers and records management system. This method is reliable, flexible, and uses assets found in every unit. It is also the most secure means available. The records management system provides a backup for data storage. However, there is a large requirement for space. It is manpower intensive. The messenger, when used, is subject to enemy intervention and may be constrained by weather, terrain, and time.

Visual and sound signals

Visual and sound signals can be used to send messages over short distances. These signals are most useful during periods of radio silence. They are used as alarms or warnings, especially of enemy attack, or as a means of sending prearranged messages. Messages transmitted by visual or sound signal are easily misunderstood; therefore, care must be taken in the selection of the means and the message to be conveyed. Messages transmitted by this means should be few, prearranged, and simple. Visual signals include road signs, flags, lights, panels, arm and hand signals, and pyrotechnics. Sound signals include horns, bells, whistles, weapons fire, and sirens.

Section II. Defense Against Electronic Warfare

SECURITY

COMSEC consists of measures taken to keep unauthorized persons from getting information from the communications system. Make sure your personnel understand and observe COMSEC measures described in AR 380-40. Two measures they should practice are transmission security and physical security.

Transmission Security

All transmissions are governed by the SOI. SOI is a series of orders issued for technical control and coordination of signal support activities for a command. As a rule, you receive only an extract of a SOI, that part necessary to manage your nets. Among other things, the SOI may give you a list of EEFI which must not be transmitted. Your operators will have a copy of this list. They should monitor transmissions to see if information on the list is being passed. Other ways for making transmissions more secure are:

- Choose means of communication according to the urgency of the situation. Use the most secure means to send your message.
- Transmit only when necessary.
- Use low transmitting power when possible.
- Be wary if a radio station's signal strength suddenly changes.
- Plan your message. Keep the message as short as possible.
- Cut out unnecessary talk. Maintain communication silence as much as possible.
- Use only authorized codes and ciphers.
- Avoid identifying yourself or others.
- Demand authentication. Do not talk to anyone who will not authenticate.

Physical Security

Impress on your operators the need to protect communications equipment from abuse, damage, or capture. Make sure they guard against disclosing the locations of equipment. Phone wires should be put inside the defensive perimeter and along frequently traveled routes. Bury wires and cables whenever possible to protect against electromagnetic pulse. Proper grounding will also protect electronic equipment during nuclear attack. Radios should be put in well defended locations. Instruct your operators to move transmitters frequently. Be sure to rotate your operators so that an enemy will not associate an operator with a specific unit or operation.

UNWANTED SIGNALS

Radio reception may be hindered, confused, or prevented by unwanted signals. These signals may be unintentional (from friendly or natural sources) or intentional (from unfriendly sources). Unwanted signals should be reported according to SOI supplemental instructions. Before reporting, the operator should disconnect the receiving antenna to determine whether or not the unwanted signal is from an outside source. The operator should follow the procedures in FM 24-33 to determine the nature of the unwanted signal.

Unintentional Signals

Electromagnetic signals caused by sources other than the enemy may interfere with your radio reception. These sources include friendly radio signals, faulty electrical components, weather conditions, and nearby generators. This type of unwanted signal is caused interference.

Intentional Signals

Electronic devices have created ways for the enemy to operate against you in combat situations. Through electronic warfare, the enemy attempts to monitor and break up your communications. The intentional unwanted signals you will most often encounter include deception, jamming, and squelch capture.

Deception. Deception is the entrance of false or altered information into friendly signal paths so that operators react to it. The enemy may try to enter the communications system by imitating a friendly unit or station so as to get or give information that could affect an operation. Train your operators to counter deception by using correct operation codes, brevity lists, and operating signals. Make certain they require authentication and observe transmission security.

Jamming. Jamming is the deliberate effort to prevent the passage of information or degrade reception. It can disrupt a single frequency or a frequency spectrum. All radio frequencies can be jammed. An operator who hears an unusual noise on the radio must try to determine its source. If it cannot be traced to a friendly source, the radio is probably being jammed. The operator should try to identify the kind of noise and report it. Under no circumstances, should the operator let the enemy know that jamming efforts are successful. Antijamming measures and techniques are described in FM 24-33.

Reports

When an operator suspects interference, you should be notified immediately. The operator should make a report according to SOI supplemental instructions and in the format shown in FM 24-1. The report should be made whether or not the operator is successful in working through the interference. After you review the report, send it to higher headquarters. This is required by the SOI.

CHAPTER 8
ACCOUNTING

GENERAL

This company is responsible and accountable for DLA-owned and Army-owned stocks of bulk petroleum. AR 710-2 and DA Pamphlet 710-2 prescribe accounting procedures for Army-owned stocks. DOD 4140.25-M prescribes those for DLA-owned stocks. All losses will be accounted for according to AR 710-2 or DOD 4140.25-M. The accountable office for these stocks is usually at battalion or higher level, where the actual accounting processes take place. This chapter gives an overall view of the requirements for accountability; however, you will usually be accountable only for unit operating stocks. When your company is operating as a separate unit, you are required to prepare all the records and reports discussed in this chapter.

DEFINITIONS

Applicable terms must be understood before a general discussion of accountability. The following definitions apply to the accounting of petroleum products by this company:

- Army-Owned Bulk Fuel. Bulk petroleum products issued to and consumed by Army units are accounted for according to AR 710-2 and are known as Army-owned stocks. The only Army-owned stocks handled by this company are stocks for operation of the pump stations and related equipment and vehicles.

- Bulk Petroleum Products. Liquid petroleum products that are normally transported by pipeline, rail tank car, road tank truck, road tank trailer, barge, harbor or coastal tanker, and ocean-going tanker and are stored in a tank or container having a fill capacity greater than 55 US gallons (208 liters). The exception is fuel in 500-gallon collapsible drums.

- DLA-Owned Stocks. Bulk petroleum products owned by DFSC that are in the pipeline and stored in the terminal operating platoon storage tanks are known as DLA-owned stocks.

- Slate. Monthly reports of planned requirements prepared at theater level are called slates. Slating represents current and future requirements. All slating activities calculate requirements for four months (current plus three months).

REQUIREMENTS

Requirements for bulk fuels are determined by the JPO. The DFSC plans deliveries for the theater based on theater-consolidated slate.

DLA-Managed Stocks. When the product is received at the terminal tank farm, the accountable officer sets up accountability. The product in the terminal storage tanks is DLA-owned. The product remains in the DLA account as it is pumped through the pipeline. Data from the monthly pipeline schedules are used as input for requirements for the oversea slate.

Army-Owned Stocks. The receipt and issue data are accumulated and forwarded to the accountable officer who uses the data to prepare and submit requirements. If the company is operating as a separate company, the company commander is responsible for submitting requirements for the fuel to operate the company vehicles and the pump stations.

DLA-MANAGED STOCKS

The DFSC of the DLA has worldwide responsibilities for inventory management of bulk petroleum products until their delivery to the point of sale to a DOD facility such as DA. The Army has an SCP to manage the products owned by the Army. In oversea areas, there is a JPO and there may be a DFSC Fuel Region Office, representing theater and DLA responsibilities respectively. At various levels (above the company), accountable officers are appointed to control the product and to submit the necessary financial records and reports. Your company will use the accounting documents discussed below in the day-to-day operation of the terminal and pipeline when handling DLA-owned stocks.

Receipts

For bulk petroleum product received or shipped by tankers or barge, the document is DD Form 250-1 (Figure 8-1, page 8-3), regardless of the source of the product. DD Form 250 (Figure 8-2, page 8-4) is used in the movement of bulk petroleum product by overland transport or pipeline. DOD 4140.25-M has detailed instructions for making entries on these forms and for processing them.

DD Form 1149 may be used instead of DD Form 250 to document intraservice issues and returns and sales to other customers, including non-DOD, if this document is agreed upon in advance. Tanker and barge movements are still made only on DD Form 250-1.

DD Form 1348-1 may be used in the same manner as DD Form 1149. Receipts are posted to DA Form 1296 or other authorized stock control records.

Requisitions

When a customer needs DLA-owned product, he sends a requisition to the terminal complex. DD Forms 1149 (Figure 8-3, page 8-5), 1348, or 1348-1 (Figure 8-4, page 8-6), depending on desires and capabilities of the individual customer, is used. DD Form 1149 is prepared according to DOD 4140.25-M; DD Forms 1348 and 1348-1, according to MILSTRIP (AR 725-50). The requisitions are distributed as outlined in DOD 4140.25-M. Usually the company is only required to consolidate the issue documents and send them to the accountable officer. If the company is operating as a separate company, issues made on these requisitions are posted to the stock record account and the following reports are required:

- Bulk Petroleum Storage Facilities Report (CONUS and overseas) RCS DD-MIL (A) 506. The report is submitted to USAPC every three years by activities with a 500-barrel capacity or more, either singly or in a manifold configuration.

- Bulk Petroleum Storage Facilities Report (CONUS) AMC 830. This report will be submitted to USAPC annually upon request, by activities with a capacity under between 200 and 21,000 gallons.

- Bulk Petroleum Message Report RCS DLA (W) 1884 (DFSC). This report will be submitted to DFSC weekly.

- Prepositioned War Reserve Requirements for Terminal Storage RCS DLA (A) 1887 (DFSC). This report will be submitted to USAPC annually.

- Source Identification and Ordering Authorization Control Records RCS DLA (M) 1882 (DFSC). This report is submitted to DFSC monthly from information obtained from DD Form 1886 maintained by the activity.

- Defense Energy Information Systems Report (DEIS I and DEIS II) RCS DD-M (AR) 1313. This report will be submitted monthly to their respective MACOM.

TANKER/BARGE MATERIAL INSPECTION AND RECEIVING REPORT

TANKER [X] LOADING REPORT [ ] DISCHARGE REPORT

4. INSPECTION OFFICE: DFSC QAR Honolulu, HI	5. REPORT NUMBER: 1-0757
1. AGENCY PLACING ORDER (Shipper, City, State and ZIP Code) (Loading) / LOCAL ADDRESS (Loading): DFR-PAC Cp Smith Honolulu, HI	3. DEPARTMENT: DLA
6. PRIME CONTRACT OR P.O. NUMBER: DLA600-79-D-0757	7. NAME OF PRIME CONTRACTOR (City, State and/or Local Address) (Loading): Hawaiian Independent Refinery Barbers PT Hawaii
8. STORAGE CONTRACT	9. TERMINAL OR REFINERY SHIPPED FROM (City, State and/or Local Address): Barbers Point, Hawaii FOB Origin
10. ORDER NUMBER ON SUPPLIER: 79-0001 10 Jan XX	11. SHIPPED TO (Receiving Activity, City, State and/or Local Address): US NAVAL Fuel Det - SASEBO SASEBO JAPAN FPO 98762
12. B/L NUMBER	13. REQN OR REQUEST NUMBER
14. CARGO NUMBER: C-0757	15. VESSEL: USNS SEALIFT PACIFIC
16. DRAFT ARRIVAL: FORE 5'06" AFT 15'10"	17. DRAFT SAILING: FORE 24'00" AFT 24'6"
18. PREVIOUS TWO CARGOES: FIRST DFM LAST JP4/DFM	19. PRIOR INSPECTION
20. CONDITION OF SHIP'S TANKS: Full Before and After Loading	21. APPROPRIATION (Loading): 98X4962.5101.01 26 S44204
22. CONTRACT ITEM NUMBER: 0601	23. PRODUCT: Fuel Oil, Diesel, Marine DFM NSN 9140-00-273-2377 NATO F-76
24. SPECIFICATIONS: MIL-F-16884C and AMD #1	

25. STATEMENT OF QUANTITY	LOADED	DISCHARGED	LOSS GAIN	PER CENT
BARRELS (60°F) Net	221,405.16			
GALLONS (60°F)	9,299,017			
TONS (Long)	28,840.062			

26. STATEMENT OF QUALITY

TESTS	SPECIFICATION LIMITS	TEST RESULTS
API Gravity @ 60°F	Record	38.1
Appearance	C & B	C & B
Color, ASTM, MAX	3	L1
Cetane Number, MIN	45	55
Distillation		
90% point °F MAX	675	650
End point °F MAX	725	682
Loss + Residue %, MAX	3.0	2.0
Flash point °F, MIN	140	156
Pour point °F, MAX	20	10
Cloud point °F, MAX	Deleted per Contract	
Viscosity at 100°F CS	1.8 - 4.5	2.374
Carbon Residue, 10% BOTT %, MAX	0.20	0.06
*Sulfur, % MAX	0.20	0.17
Corrosion at 212°F, MAX	1	1b
Ash, % MAX	0.005	NIL
Demulsification, Minutes, MAX	Deleted per Contract	
Acid Number, MAX	0.3	0.05
Neutrality	Neutral	Neutral
Aniline pt °F	Record	171
Accelerated Stability	Deleted by Contract	

*Modified by Contract

Ullage at Loading 220,200.1b bbls

27. TIME STATEMENT	DATE	TIME
NOTICE OF READINESS TENDERED XXXXXXX	10 Jan 79	0600
VESSEL ANCHORED XXXXX	10 Jan 79	0600
HOSES CONNECTED	10 Jan 79	0630
STARTED PUMPING XXXXXX		
FINISHED PUMPING XXXXXX		
INSPECTED AND READY TO LOAD XXXXXXX	10 Jan 79	0725
SAMPLES SENT TO LAB	10 Jan 79	0730
COMMENCED XXXXXXX	10 Jan 79	0800
STOPPED LOADING XXXXXXX	10 Jan 79	0820*
RESUMED LOADING XXXXXXX	10 Jan 79	0845
FINISHED PUMPING XXXXXXX	11 Jan 79	0315
CARGO HOSES REMOVED	11 Jan 79	0400
VESSEL RELEASED XXXXX	11 Jan 79	0445
COMMENCED XXXXXX		
FINISHED PUMPING		
VESSEL LEFT BERTH XXXXX	11 Jan 79	0800

28. REMARKS (Note and detail causes of delays such as reports, investigations, surveys, shortages, etc.)

US GOVERNMENT-OWNED CARGO
*pumping stopped 10 Jan 79 0820 to 0845 Due to Manifold Leak. Ship at Fault.
PSS-371277,SSS-371278
#1 MASTER 371-279, #2 - 371280
#3-371281, #4 - 371282
Investigation Conducted. All DATA Correct. Ship has history of loading light.

29. COMPANY OR RECEIVING TERMINAL

WALDO GREEN (Signature) SHIPPING

30. I CERTIFY THAT THE CARGO WAS INSPECTED ACCEPTED AND LOADED DISCHARGED AS INDICATED HEREON.

11 Jan 79 (Date) JOHN Q. DOE DFSC QAR SJ0901 (Signature of Authorized Government Representative)

31. I HEREBY CERTIFY THAT THIS TIME STATEMENT IS CORRECT*

JOHN GROVE (Master or Agent) 1st MATE

DD FORM 250-1 REPLACES DD FORM 250-1 JUL 68, WHICH MAY BE USED

Figure 8-1. DD Form 250-1 (Tanker/Barge Material Inspection and Receiving Report)

MATERIAL INSPECTION AND RECEIVING REPORT

Form Approved OMB No. 0704-0248

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0248), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO EITHER OF THESE ADDRESSES.

SEND THIS FORM IN ACCORDANCE WITH THE INSTRUCTIONS CONTAINED IN THE DFARS, APPENDIX F-401.

1. PROC. INSTRUMENT IDEN. (CONTRACT)	(ORDER) NO.	6. INVOICE NO./DATE	7. PAGE	OF	8. ACCEPTANCE POINT
DSA-owned stock			1	1	S

2. SHIPMENT NO.	3. DATE SHIPPED	4. B/L	5. DISCOUNT TERMS
00012	30 Aug XX	TCN AZ40ZZ81930044XXX	

9. PRIME CONTRACTOR	CODE	10. ADMINISTERED BY	CODE

11. SHIPPED FROM *(If other than 9)*	CODE	FOB:	12. PAYMENT WILL BE MADE BY	CODE
BULK STORAGE FACILITY APO AE 09345				

13. SHIPPED TO	CODE	14. MARKED FOR	CODE
TANK FARM 209TH SUPPLY CO APO AE 09227			

15. ITEM NO.	16. STOCK/PART NO. DESCRIPTION *(Indicate number of shipping containers - type of container - container number.)*	17. QUANTITY SHIP/REC'D*	18. UNIT	19. UNIT PRICE	20. AMOUNT
1	9130-00-031-5816 Turbine Fuel, Aviation, Grade JP-8, Kerosene type, MIL-T-83133	5,000	bbl		0

21. CONTRACT QUALITY ASSURANCE

A. ORIGIN

☐ CQA ☐ ACCEPTANCE of listed items has been made by me or under my supervision and they conform to contract, except as noted herein or on supporting documents.

DATE | SIGNATURE OF AUTH GOVT REP

TYPED NAME AND OFFICE

B. DESTINATION

☐ CQA ☐ ACCEPTANCE of listed items has been made by me or under my supervision and they conform to contract, except as noted herein or on supporting documents.

DATE | SIGNATURE OF AUTH GOVT REP

TYPED NAME AND TIITLE

22. RECEIVER'S USE

Quantities shown in column 17 were received in apparent good condition except as noted.

DATE RECEIVED | SIGNATURE OF AUTH GOVT REP

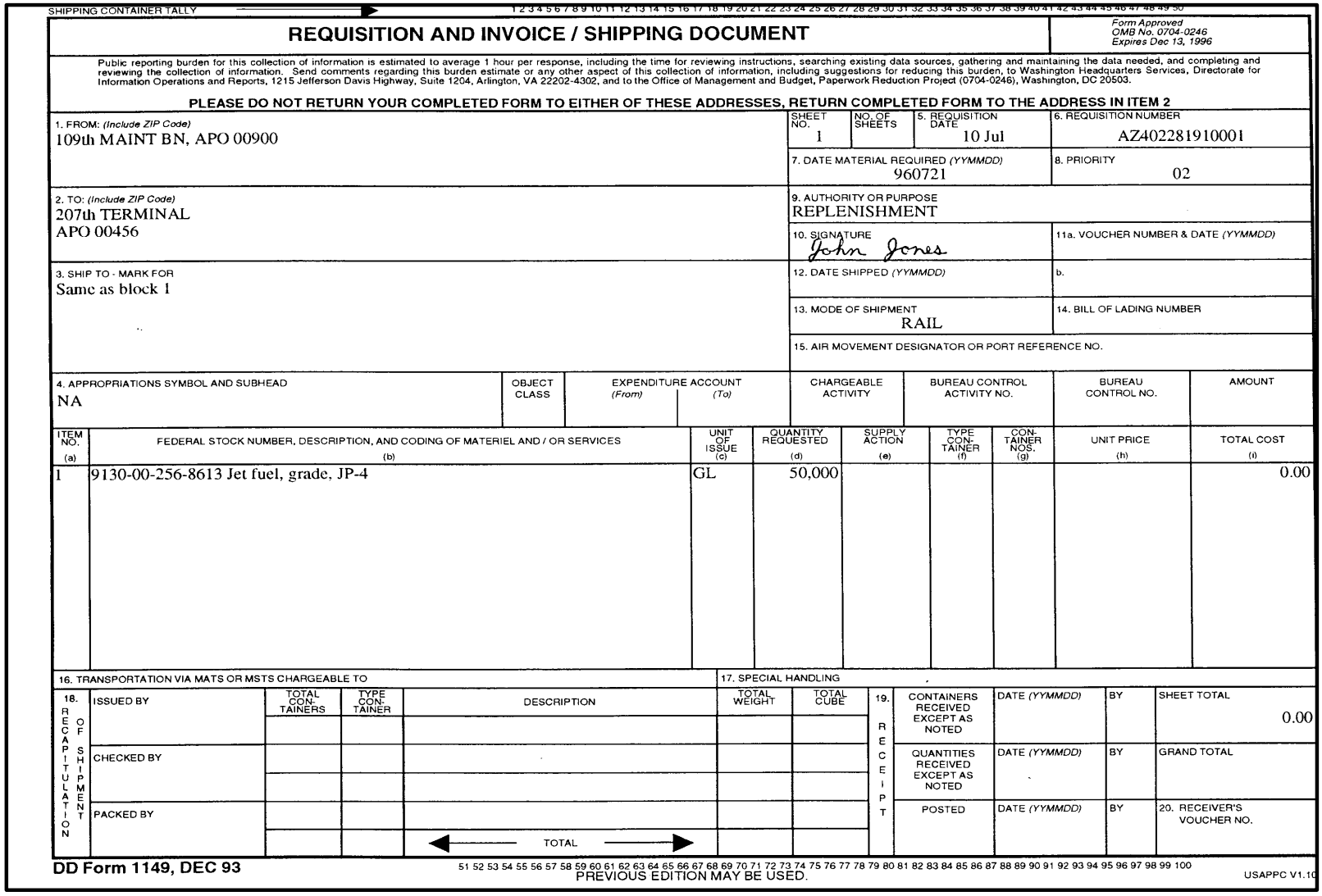
TYPED NAME AND OFFICE

** If quantity received by the Government is the same as quantity shipped, indicate by (✓) mark, if different, enter actual quantity received below quantity shipped and encircle.*

23. CONTRACTOR USE ONLY

DD Form 250, NOV 92 *Previous edition may be used.* USAPPC V2.00

Figure 8-2. DD Form 250 (Material Inspection and Receiving Report).



SHIPPING CONTAINER TALLY → 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

REQUISITION AND INVOICE / SHIPPING DOCUMENT

Form Approved
OMB No. 0704-0246
Expires Dec 13, 1996

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0246), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO EITHER OF THESE ADDRESSES, RETURN COMPLETED FORM TO THE ADDRESS IN ITEM 2

1. FROM: *(Include ZIP Code)* 109th MAINT BN, APO 00900	SHEET NO. 1	NO. OF SHEETS	5. REQUISITION DATE 10 Jul	6. REQUISITION NUMBER AZ402281910001
	7. DATE MATERIAL REQUIRED *(YYMMDD)* 960721			8. PRIORITY 02
2. TO: *(Include ZIP Code)* 207th TERMINAL APO 00456	9. AUTHORITY OR PURPOSE REPLENISHMENT			
	10. SIGNATURE John Jones			11a. VOUCHER NUMBER & DATE *(YYMMDD)*
3. SHIP TO - MARK FOR Same as block 1	12. DATE SHIPPED *(YYMMDD)*			b.
	13. MODE OF SHIPMENT RAIL			14. BILL OF LADING NUMBER
	15. AIR MOVEMENT DESIGNATOR OR PORT REFERENCE NO.			

4. APPROPRIATIONS SYMBOL AND SUBHEAD	OBJECT CLASS	EXPENDITURE ACCOUNT (From)	EXPENDITURE ACCOUNT (To)	CHARGEABLE ACTIVITY	BUREAU CONTROL ACTIVITY NO.	BUREAU CONTROL NO.	AMOUNT
NA							

ITEM NO. (a)	FEDERAL STOCK NUMBER, DESCRIPTION, AND CODING OF MATERIEL AND / OR SERVICES (b)	UNIT OF ISSUE (c)	QUANTITY REQUESTED (d)	SUPPLY ACTION (e)	TYPE CONTAINER (f)	CONTAINER NOS. (g)	UNIT PRICE (h)	TOTAL COST (i)
1	9130-00-256-8613 Jet fuel, grade, JP-4	GL	50,000					0.00

16. TRANSPORTATION VIA MATS OR MSTS CHARGEABLE TO

17. SPECIAL HANDLING

18. RECAPITULATION OF SHIPMENT		TOTAL CONTAINERS	TYPE CONTAINER	DESCRIPTION	TOTAL WEIGHT	TOTAL CUBE
	ISSUED BY					
	CHECKED BY					
	PACKED BY					
				TOTAL		

19. RECEIPT				
	CONTAINERS RECEIVED EXCEPT AS NOTED	DATE *(YYMMDD)*	BY	SHEET TOTAL 0.00
	QUANTITIES RECEIVED EXCEPT AS NOTED	DATE *(YYMMDD)*	BY	GRAND TOTAL
	POSTED	DATE *(YYMMDD)*	BY	20. RECEIVER'S VOUCHER NO.

DD Form 1149, DEC 93

51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

PREVIOUS EDITION MAY BE USED.

USAPPC V1.10

Figure 8-3. DD Form 1149 (Requisition and Invoice/Shipping Document)

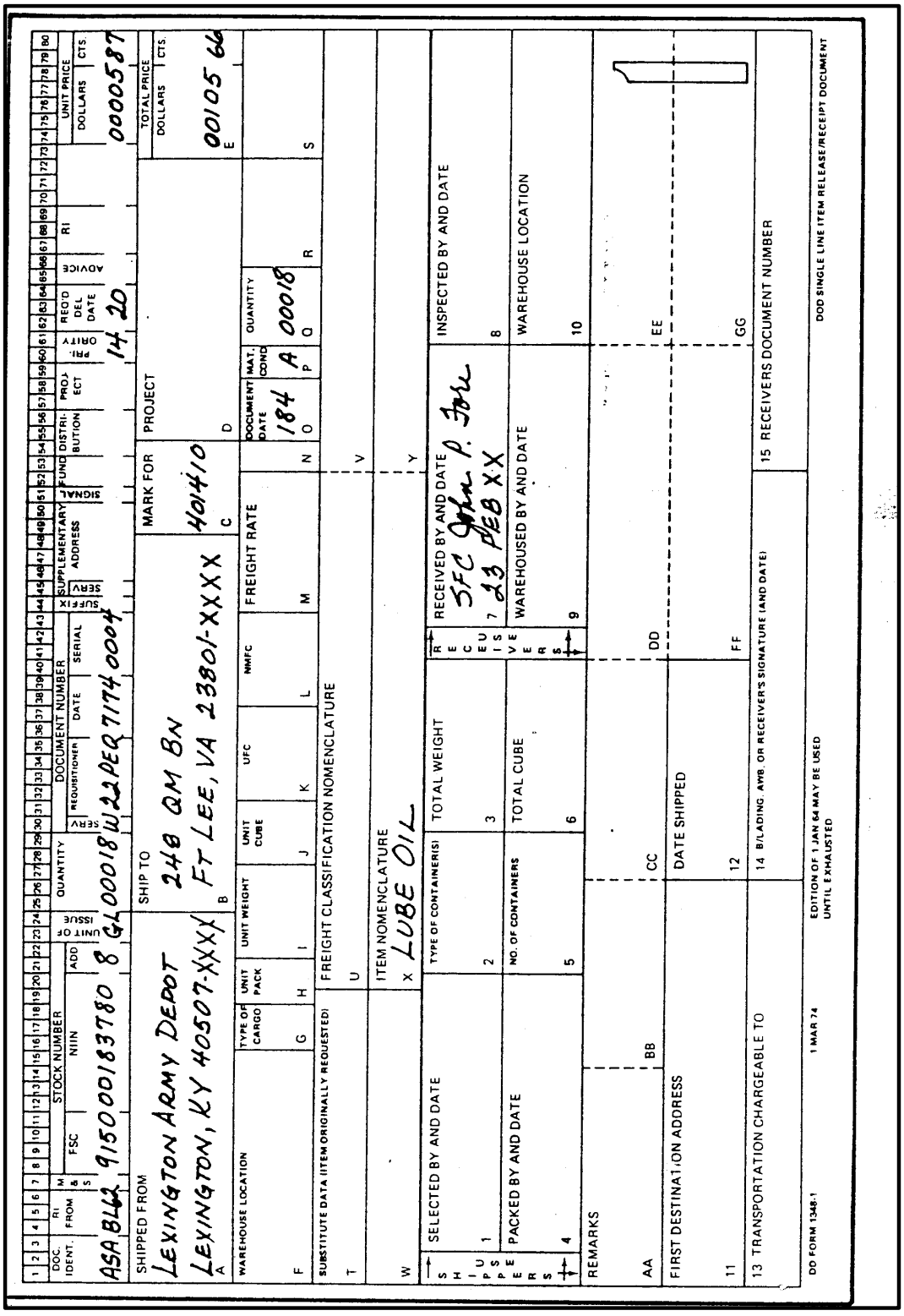


Figure 8-4. DD Form 1348-1 (DOD Single Line Item Release/Receipt Document)

Other Issues

The issue documents used to issue DLA-owned petroleum to the distribution section for local delivery to authorized activities, to vehicles, to pumps and other equipment, to aircraft on an emergency basis, and for bulk reduction for supported units are indicated in the SOP and in directives from higher headquarters. The following documents may be used for these issues:

- DD Form 1348-1--usually for issues to tank trucks and tank and pump units.
- DA Forms 2765 or 2765-1--usually for issues to supported units.
- DA Form 3643--for issues to vehicles.

The issue documents for issues (except those to vehicles) are posted to DA Form 1296 (Figure 8-5, page 8-8) as "issues." The issues to vehicles that are in the area and in need of fuel are recorded on DA Form 3643 (Figure 8-6, page 8-9). These issues are totaled each day and posted to DA Form 3644 (Figure 8-7, page 8-10). The total quantity for the month as shown on DA Form 3644 is posted to the document register and to the stock accounting record as "issues."

NOTE
If fuel is to be dispensed to vehicles of other services (such as Navy and the foreign countries in the area), make a separate DA Form 3643 for each service or country.

Physical Inventories

A monthly physical inventory of DLA-owned products is taken at the beginning of the first working day of each month (according to DOD 4140.25-M) for the purpose of reconciling records with actual quantities on hand. Volume measurements and correction to 60°F (15°C) are accomplished and the data are forwarded to the battalion operations office, accountable officer, or other activity designated in the SOP. You may be required to submit the results of the gaging and the temperatures along with the inventories to back up the computations. After inventories are completed, the records are posted and the required adjustments are made.

Adjustments for DLA-owned stocks are discussed in detail in DOD 4140.25-M. Terminal operating losses of aviation and motor gasolines are allowed up to the extent of the actual loss when they do not exceed 0.5 percent of the total of the opening plus the receipts for the monthly period covered. The allowable loss for jet fuels, distillates, and residuals (JP-5/JP-8/DF-2) is 0.25 percent of the total of the opening inventory plus the receipts. The following adjustment documents are prepared and submitted to the activity indicated in the SOP.

Responsible officers at bulk terminals initiate DA Form 4697. It is used to fix responsibility and serve as a basis for initiating corrective action. A DA Form 4697 is required when actual loss is greater than allowable loss authorized by DOD 4140.25-M. The report will show the entire quantity lost.

When there are discrepancies in shipment of bulk petroleum, SF 361 is used, if the monthly gain/loss exceeds the allowable tolerance IAW DOD 4140.25-M.

ARMY-OWNED STOCKS

Unit operational stocks for use at the pump stations and fuels in storage for use in organic vehicles and equipment are Army-owned stocks. Data on issues, inventories, and adjustment from these stocks are forwarded to the battalion or higher headquarters. If your company is operating as a separate company, the following information will help you account for the Army-owned fuel for which the company is responsible.

STOCK NUMBER: 9130-00-256-8613 JP-4 | SCC

DATE	DODAAC	DATE SERIAL	DEMAND RECUR	DEMAND NON-RECUR	GAIN	LOSS	BALANCE
	BALANCE BROUGHT FORWARD ▶						28,750
5032	WK392A	5032 9004				2,500	26,250
5033	WK392A	5033 9007				2,500	23,750
5033	WRY5AA	5033 9005			7,500		31,250
5033	WRY5AA	5033 9006			10,000		41,250
5035	W392AR	5035 9333				600	40,650
5039	WK4ABC	5039 9001				5,000	35,650
5039	WK4ABC	5039 9002				5,000	30,650
5043	WRY5AA	5043 9001			15,000		45,650
5057	W392AR	5057 9005				1,200	44,450
5059	WRY5AA	5059 9001				1,753	42,697
5059	WRY5AA	5059 9002				614	42,083

SUMMARY OF DEMANDS

MONTH								
RECUR								
NON-RECUR								

STOCK ACCOUNTING RECORD

FOR USE OF THIS FORM, SEE DA PAM 710-2-2; THE PROPONENT AGENCY IS DCSLOG.

DA FORM 1296 JAN 82 — Edition of Aug 66 is obsolete.

Figure 8-5. DA Form 1296 (Stock Accounting Record)

DAILY ISSUES OF PETROLEUM PRODUCTS
For use of this form, see AR 703-1; the proponent agency is DCSLOG

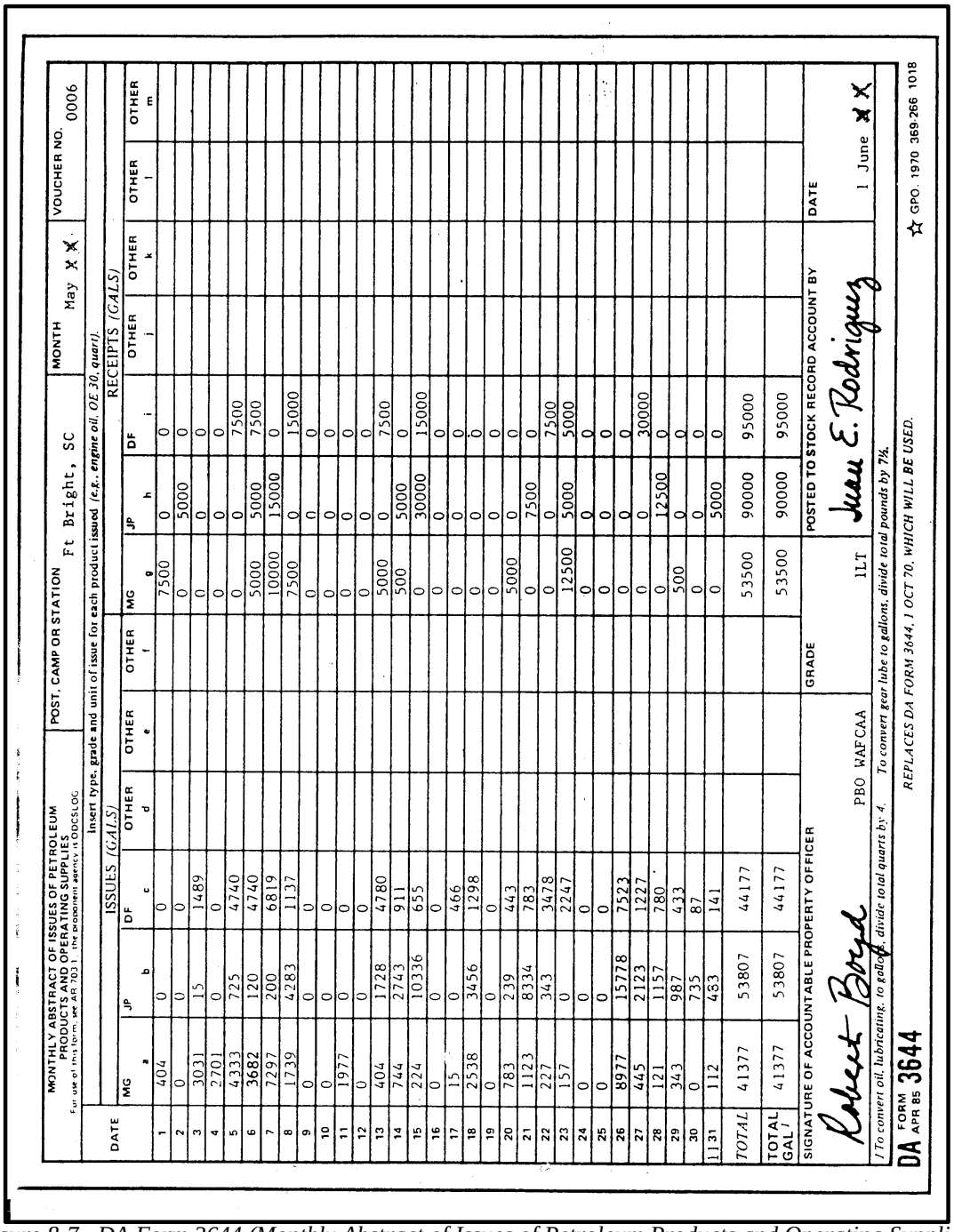
PAGE NO. 1 | NO. OF PAGES 1

VEHICLE USA REGISTRATION NUMBER	TYPE, GRADE AND UNIT OF ISSUES FOR EACH PRODUCT ISSUED — ISSUES (GAL)			RECEIPTS (GAL)			ORGANIZATION AND ADDRESS (Indicate Service: A, Army; AF, Air Force; N, Navy; M, Marine Corps)	SIGNATURE, GRADE
	JP8	MOGAS		JP8				
a	b	c	d	e	f	g	h	i
4H12351				22			524th Maint Co (A)	J. Fitz, CW3
3B71512	63						524th Maint Co (A)	J. Monday, SGT
2X99412	175						524th Maint Co (A)	K. Kan, SSG
5A11136	13						643d CS Det (A)	M. Walker, SPC
#1 M2 Burner		5					HHC, 123 FA (A)	W. Brown, PFC
1Z32611	37						C/24th (A)	J. Armor, SGT
TOTAL RECEIPTS	XX	XX	XX	22				
TOTAL ISSUES	288	5		XX	XX	XX		

POST, CAMP OR STATION	DATE	SIGNATURE OF ATTENDANT
555th, S&S Co. (DS)	15 Jun XX	Joe Petro, SPC

DA FORM 3643 EDITION OF 1 OCT 70 IS OBSOLETE. ☆U.S GPO: 1989-242-450/0225

Figure 8-6. DA Form 3643 (Daily Issue of Petroleum Products)



MONTHLY ABSTRACT OF ISSUES OF PETROLEUM PRODUCTS AND OPERATING SUPPLIES
For use of this form, see AR 703-1; the proponent agency is ODCSLOG

POST, CAMP OR STATION: Ft Bright, SC

MONTH: May XX

VOUCHER NO.: 0006

Insert type, grade and unit of issue for each product issued (e.g., engine oil, OE 30, quart).

DATE	ISSUES (GALS)						RECEIPTS (GALS)					
	MG a	JP b	DF c	OTHER d	OTHER e	OTHER f	MG g	JP h	DF i	OTHER j	OTHER k	OTHER l	OTHER m
1	404	0	0				7500	0	0				
2	0	0	0				0	5000	0				
3	3031	15	1489				0	0	0				
4	2701	0	0				0	0	0				
5	4333	725	4740				0	0	7500				
6	3682	120	4740				5000	5000	7500				
7	7297	200	6819				10000	15000	0				
8	1739	4283	1137				7500	0	15000				
9	0	0	0				0	0	0				
10	0	0	0				0	0	0				
11	1977	0	0				0	0	0				
12	0	0	0				0	0	0				
13	404	1728	4780				5000	0	7500				
14	744	2743	911				500	5000	0				
15	224	10336	655				0	30000	15000				
16	0	0	0				0	0	0				
17	15	0	466				0	0	0				
18	2538	3456	1298				0	0	0				
19	0	0	0				0	0	0				
20	783	239	443				5000	0	0				
21	1123	8334	783				0	7500	0				
22	227	343	3478				0	0	7500				
23	157	0	2247				12500	5000	5000				
24	0	0	0				0	0	0				
25	0	0	0				0	0	0				
26	8977	15778	7523				0	0	0				
27	445	2123	1227				0	0	30000				
28	121	1157	780				0	12500	0				
29	343	987	433				500	0	0				
30	0	735	87				0	0	0				
31	112	483	141				0	5000	0				
TOTAL	41377	53807	44177				53500	90000	95000				
TOTAL GAL[1]	41377	53807	44177				53500	90000	95000				

SIGNATURE OF ACCOUNTABLE PROPERTY OFFICER: Robert Boyd, PBO WAFCAA

GRADE: 1LT

POSTED TO STOCK RECORD ACCOUNT BY: Juan E. Rodriguez

DATE: 1 June XX

[1] To convert oil, lubricating, to gallons, divide total quarts by 4. To convert gear lube to gallons, divide total pounds by 7½.

DA FORM 3644 APR 85 — REPLACES DA FORM 3644, 1 OCT 70, WHICH WILL BE USED.

☆ GPO: 1970 369-266 1018

Figure 8-7. DA Form 3644 (Monthly Abstract of Issues of Petroleum Products and Operating Supplies)

Receipts

When bulk fuel is drawn from the pipeline for unit operational stock and for operation of vehicles and equipment, a DA Form 2765 or DD Form 1348 (as specified by the SOP or other directive) is prepared as a receipt document. The receipt document is assigned a document number from DA Form 2064 (Figure 8-8, page 8-1 **2**) and is posted to the property book (DA Form 3328) (Figure 8-9, page 8-13) according to AR 710-2 and DA Pamphlet 710-2-1.

Issues

Issues to vehicles are recorded on DA Form 3643. Each day the quantity issued is totaled and recorded on DA Form 3644. The quantity issued to operate the pump station and equipment is determined by gaging. The DA Form 3644 for the issues of Army-owned stocks for the company's use is recorded on DA Forms 2064 and 3328.

> NOTE
> Daily issues are usually recorded on some sort of daily status report that should be identified in local SOPs. This is an internal control and is consolidated and sent to battalion or used in preparing reports and setting up controlling actions as needed.

Physical Inventories

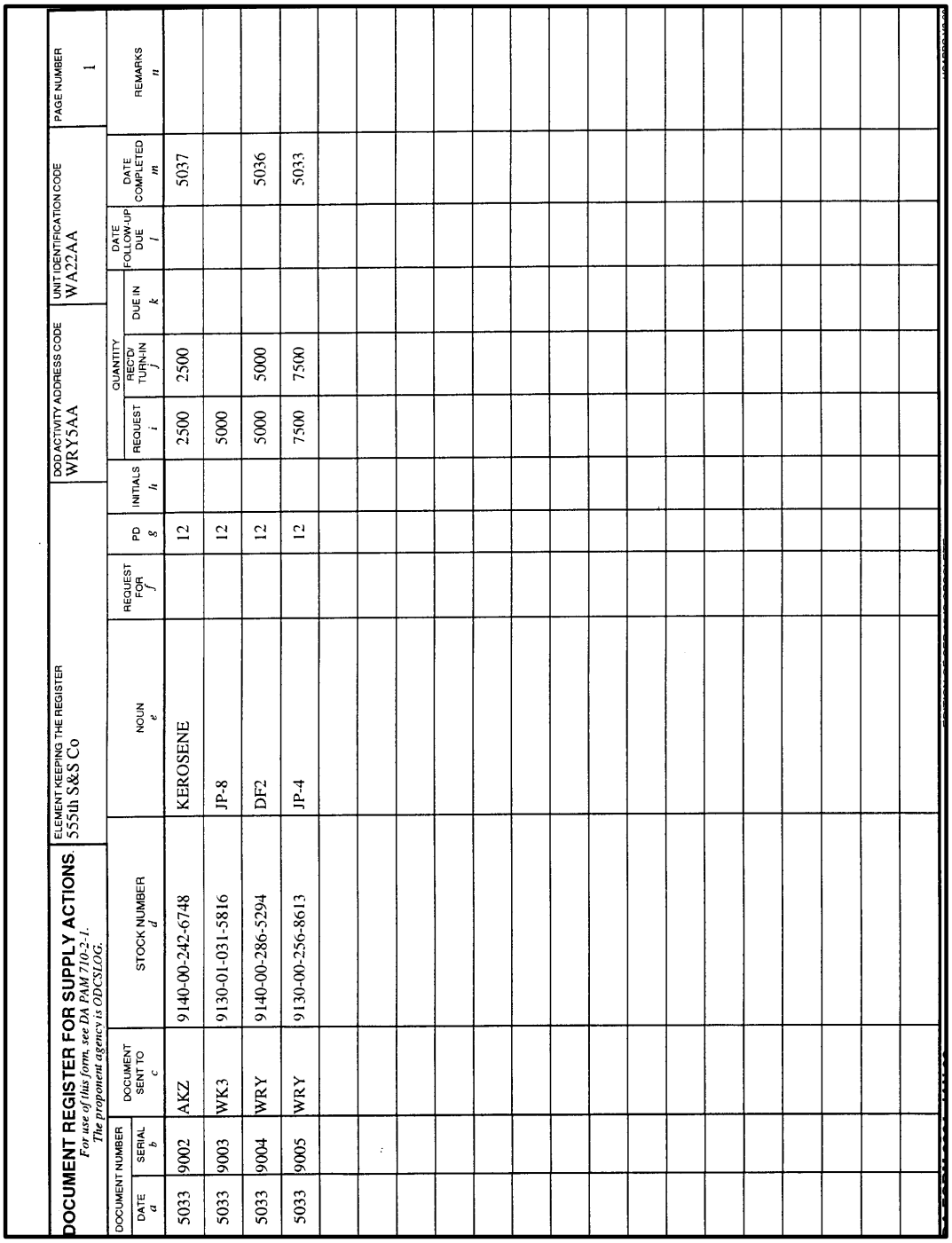
In addition to the daily and weekly inventory, a physical inventory of Army-owned petroleum is conducted for each product type handled by the company. The inventory will reflect the quantity on hand as of 0800 local time, the last day of the month. When the last day of the month is a nonduty day and no issues or receipts are made, the monthly inventory may be conducted at the close of business the last workday of the month. FM 10-67-1 gives detailed instructions for measuring the product. DA Form 4702-R (Figure 8-10, page 8-14) is prepared; it serves as the supporting document to the adjustment action. Results of the inventories are posted to the property book or stock record account, as appropriate. See AR 710-2 for posting procedures.

Adjustments. AR 710-2 gives detailed instructions for determining losses for Army-owned bulk petroleum. All losses shown on DA Form 4702-R are posted to DA Form 2064 and the property book.

Reports of Survey. When the allowable loss exceeds that set by AR 710-2, DA Form 4697 is prepared as an RS for the entire loss and processed according to AR 735-5.

Requisitions

Requisitions are directed to the supply support activities for replenishment of unit operational stocks. DD Form 1348 series or DA Form 2765 are used. If the SOP or directive from higher headquarters indicates that a DD Form 1348, 1348M, 1348-1, or 1348-1 is the form required, it is prepared as outlined in AR 725-50 and submitted to the higher headquarters. In some cases, the requesting document may be DA Form 2765 for a mechanical system or DA Form 2765-1 for a manual system. These forms are prepared according to AR 710-2 and submitted to the supply support activity.



DOCUMENT REGISTER FOR SUPPLY ACTIONS. *For use of this form, see DA PAM 710-2-1. The proponent agency is ODCSLOG.*

ELEMENT KEEPING THE REGISTER: 555th S&S Co

DOD ACTIVITY ADDRESS CODE: WRY5AA

UNIT IDENTIFICATION CODE: WA22AA

PAGE NUMBER: 1

DOCUMENT NUMBER		DOCUMENT SENT TO	STOCK NUMBER	NOUN	REQUEST FOR	PD	INITIALS	QUANTITY			DATE FOLLOW-UP DUE	DATE COMPLETED	REMARKS
DATE	SERIAL							REQUEST	RECD/ TURN-IN	DUE IN			
a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*	*n*
5033	9002	AKZ	9140-00-242-6748	KEROSENE		12		2500	2500			5037	
5033	9003	WK3	9130-01-031-5816	JP-8		12		5000					
5033	9004	WRY	9140-00-286-5294	DF2		12		5000	5000			5036	
5033	9005	WRY	9130-00-256-8613	JP-4		12		7500	7500			5033	

Figure 8-8. DA Form 2064 (Document Register for Supply Actions)

PROPERTY RECORD

For use of this form, see DA PAM 710-2-1; the proponent agency is DCSLOG.

DATE POSTED	DOCUMENT NUMBER	QUANTITY RECEIVED	QUANTITY TURN-IN	BALANCE	DATE POSTED	DOCUMENT NUMBER	QUANTITY RECEIVED	QUANTITY TURN-IN	BALANCE
5032	BALANCE BROUGHT FORWARD			28,750					
5032	5032-9004		2,500	26,250					
5033	5033-9007		2,500	23,750					
5033	5033-9005	7,500		31,250					
5033	5033-9006	10,000		41,250					
5035	5035-9333		600	40,650					
5039	5039-9001		5,000	35,650					
5039	5039-9002		5,000	30,650					
5043	5043-9001	15,000		45,650					
5057	5057-9005		1,200	44,450					
5059	5059-9001		1,753	42,697					
5059	5059-9002		614	42,083					
						BALANCE CARRIED FORWARD			

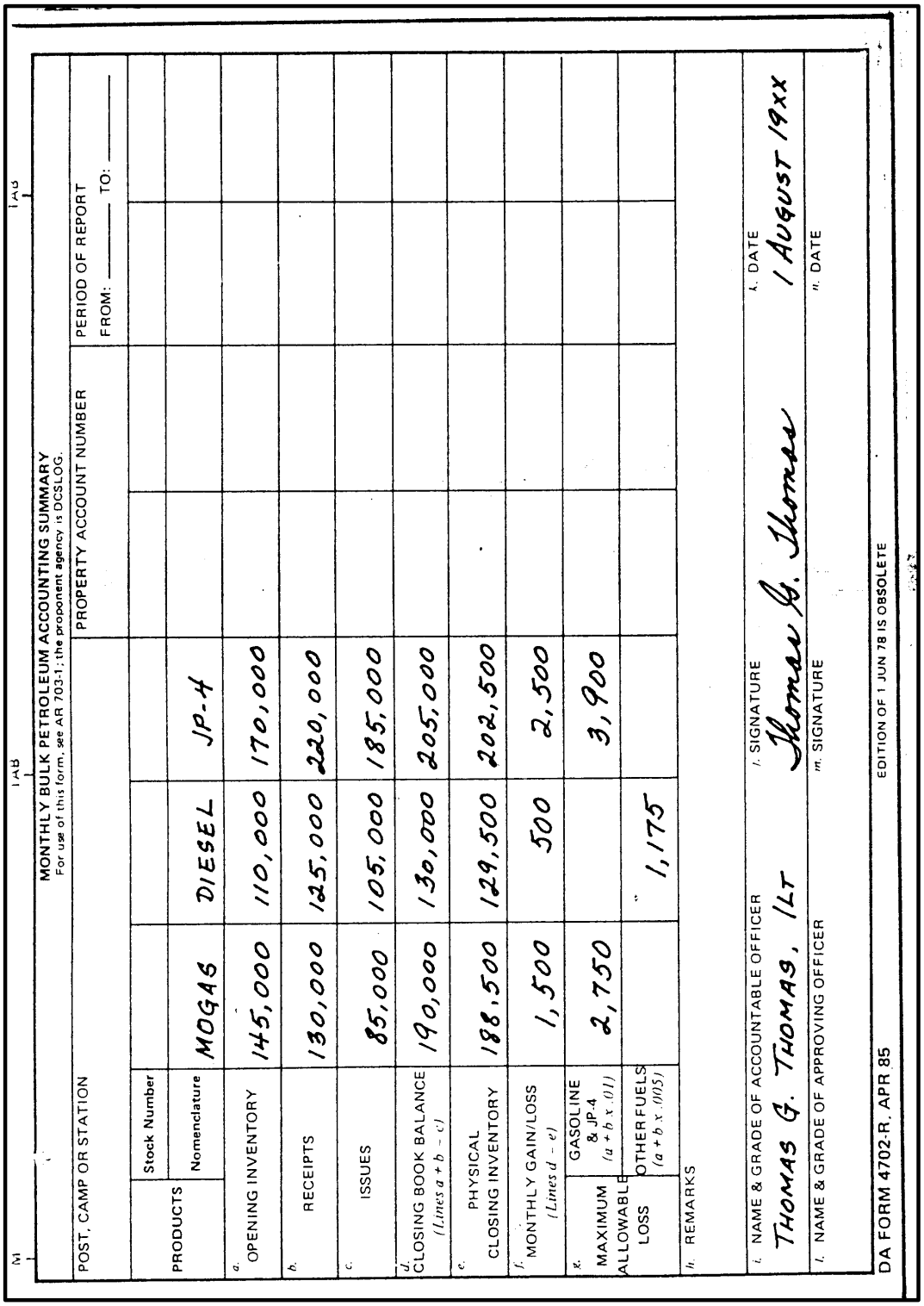
UIC	AUTHORITY	STOCK NUMBER	UI
WA22AA		9130-00-256-8613	GL

LIN	ERC	REQUIRED ALW	AUTHORIZED ALW	RICC	LCC	SEC	ECC

ITEM DESCRIPTION: JP-4

DA FORM 3328, JAN 82 — Together with DA Form 3328-1 replaces DA Forms 3328 Jan 77, and — USAPPC V1.00

Figure 8-9. DA Form 3328 (Property Record)



MONTHLY BULK PETROLEUM ACCOUNTING SUMMARY
For use of this form, see AR 703-1; the proponent agency is DCSLOG.

POST, CAMP OR STATION

PROPERTY ACCOUNT NUMBER

PERIOD OF REPORT
FROM: _____ TO: _____

PRODUCTS									
Stock Number									
Nomenclature	MOGAS	DIESEL	JP-4						
a. OPENING INVENTORY	145,000	110,000	170,000						
b. RECEIPTS	130,000	125,000	220,000						
c. ISSUES	85,000	105,000	185,000						
d. CLOSING BOOK BALANCE *(Lines a + b – c)*	190,000	130,000	205,000						
e. PHYSICAL CLOSING INVENTORY	188,500	129,500	202,500						
f. MONTHLY GAIN/LOSS *(Lines d – e)*	1,500	500	2,500						
g. MAXIMUM ALLOWABLE LOSS — GASOLINE & JP-4 *(a + b x .01)*	2,750		3,900						
OTHER FUELS *(a + b x .005)*		1,175							

h. REMARKS

i. NAME & GRADE OF ACCOUNTABLE OFFICER: THOMAS G. THOMAS, 1LT

j. SIGNATURE: Thomas G. Thomas

k. DATE: 1 AUGUST 19XX

l. NAME & GRADE OF APPROVING OFFICER

m. SIGNATURE

n. DATE

DA FORM 4702-R, APR 85 EDITION OF 1 JUN 78 IS OBSOLETE

Figure 8-10. DA Form 4702-R (Monthly Bulk Petroleum Accounting Summary)

CHAPTER 9
TRAINING

APPLICABILITY

This chapter provides an overview of current and future training trends, concepts, and policies. It applies to the Total Army.

MANAGEMENT

The purpose of the Army is to fight and win our nation's wars. Soldiers and units train to fight or support the fighting. Each soldier is trained to perform a job. The unit is trained to do its mission. As training manager of your unit, your aim is to use limited resources efficiently to train your soldiers so that they can perform their peacetime and wartime missions, as well as environmental protection and worker safety and health issues. The challenge to the Army as we enter the 21st century will be to prepare for both war and SASO. Training is a never-ending task. You must constantly challenge your soldiers to do their best in peacetime as well as in combat.

Leader Responsibilities

All leaders must require their subordinates to understand and perform their roles in training. The commander assigns primary responsibility to officers for collective training and to NCOs for soldier training. NCOs also have the responsibility to train sections, squads, teams, and crews. The commander is responsible to combine leader and soldier training requirements into collective training events using multiechelon techniques.

Types of Training

There are several different types of training. They are defined below.

- Individual training. Individual training is the training the soldier receives, either in institutions or units, that prepares him to do specified duties and tasks related to his assigned MOS and duty position.

- Collective training. Collective training is the training of a group of soldiers (crews, teams, squads, and platoons) to do tasks required of a group as a whole.

- Institutional training. Institutional training is conducted in schools (Army service school, USAR school, NCO academy, and unit school) or Army training centers. This training may be individual or collective.

- Unit training. Unit training is the training conducted in the unit. It may be individual or collective.

- On-the-job training. OJT is given during working hours under the supervision of designated members of the company. The trainee is expected to follow a training schedule that covers all aspects of their assigned duties.

- Distance learning. Distance learning is the delivery of standardized individual, collective, and self-development training to soldiers and units at the right place and time through the application of multiple delivery means and technologies. It may involve student-instructor interaction in real time or it may involve self-paced student instruction without the benefit of instructor access.

Principles of Training

Leaders must know and understand the principles of training to effectively train their units. The principles provide direction, but are sufficiently flexible to accommodate local conditions and the judgment of commanders and other leaders. The nine principles of training are:

- Train as a combined arms and service team.
- Train as you fight.
- Use appropriate doctrine.
- Use performance-oriented training.
- Train to challenge.
- Train to sustain proficiency.
- Train using multiechelon techniques.
- Train to maintain.
- Make commanders the primary trainers.

MISSION-ESSENTIAL TASK LIST

Since constraints are placed on training, not all tasks can be allocated the same amount of training time. Therefore, battalion and company commanders must compile the collective mission essential tasks which must be successfully performed for the organization to do its wartime mission. This compilation is referred to as the unit's METL. The METL will need to be developed and revised periodically. When the unit receives a new wartime mission, it will need to adjust their METL or develop new METL. The procedures for METL development are described in FM 25-101.

INDIVIDUAL TRAINING

Individual training is the training of individual soldiers in institutions or units to prepare them to do their missions. Unit commanders select and train the individual tasks that support the collective tasks of their unit METL. Individual training should be task-based, as realistic as possible, and performance-oriented; that is, it should concentrate on the actual performance of a specified task. Some of the products and materials available to leaders to train soldiers are given below.

Correspondence Courses

The Institute for Professional Development, under the Army Training Support Center, administers the ACCP. Certain individual proponents administer their own programs. Correspondence courses and subcourses are self-contained, self-paced, and portable. They are distributed worldwide through the US Postal Service. They help bridge the training gap between resident courses, make soldiers more proficient, and prepare them for additional duties or assignments. Correspondence courses currently earn promotion points for specialists (E4) and sergeants (E5). The courses, phases, subcourses, and enrollment instructions are described in DA Pamphlet 351-20. Enrollment is done by completing DA Form 145.

Soldier Training Publications

STPs consists of soldier’s manuals, training guides, and officer foundation standards manuals. The soldier training publications contain critical tasks and other training information used to train soldiers and standardizes individual training. It provides information and guidance in conducting individual training in your unit. These publications will aid the trainer, trainee, and commander in training individual critical tasks.

Graphic Training Aids

GTAs include printed texts, job aids, recognition cards, simulations, instructional charts, simple devices, and battlefield simulation games. An index of graphic training aids is found in DA Pamphlet 25-37.

Resident Training

These are the courses conducted at fully accredited and integrated AC/ARNG/USAR schools that provide standard institutional training and education to the Total Army. This training through the TASS is costly and takes

the soldier away from the unit. At times, it is the only way to teach complicated tasks. DA Pamphlet 351-4 lists and describes courses offered by TASS.

Interactive Courseware

ICW is the term used to describe any form of instruction in which a computer is used to enhance, deliver, or develop instruction. This is an interservice term that is synonymous with CBI. ATSC will develop the distribution plan for ICW products. Examples of ICW are:

- CAI is used to actually present the instruction. It involves interaction between the student and the computer. Text, graphics, and some low level computer audio are primarily used. CAI may be delivered on a videodisk, floppy disk, hard disk, or CD-ROM based system.

- CMI manages the instruction by computer, including registration, pretesting, diagnostic counseling, progress testing, post-test, and disenrollment.

- Multimedia uses text, graphics, digital audio, animation, and up to full motion digital video. It is delivered on a multimedia work-station or personal computer by hard disk, floppy disk, or CD ROM.

Video-teletraining

VTT is delivered via communications links such as satellite or cable links. VTT is a user-funded capability for all Army trainers. It takes the training to the students, expands the training base, and connects with other service, federal, and state networks for joint and multiservice training. VTT capability requires installation of equipment. When capability exists, a course begins with a unit's request to receive training. Virtually any course that can be taught in a classroom can be taught over VTT. For more information on VTT, refer to the VTT Procedures Guide.

Audiovisual Training Products

TASC provides centralized audiovisual support to all authorized users within a geographical area. Worldwide support center locations are listed in DA Pamphlet 350-100. Trainers can get a catalog listing audiovisual training products.

On-the-Job Training

OJT is conducted at the unit, while the soldier performs the duties he is being trained for, under supervision by unit personnel.

COLLECTIVE TRAINING

Collective training prepares cohesive teams and units to do their mission on the battlefield and in SASO. Collective tasks are derived from unit missions and require group participation for their accomplishment. It describes exact performance a unit must perform in the field under actual operational conditions. The critical collective tasks of a unit are the essence of the unit's METL. Some of the products and materials available to assist the commander and leaders to train collective tasks are given below.

Mission Training Plans

An MTP is a training document that provides a clear description of "what and how" to train critical collective tasks. They are designed to identify and elaborate on critical wartime missions in the form of TEOs. They are part of the ADTLP. The MTP for your unit is ARTEP 10-416-MTP for the petroleum pipeline and terminal operating battalion, ARTEP 10-416-30 MTP for the HHC of the petroleum pipeline and terminal operating battalion, and

ARTEP 10-417-30 MTP for the petroleum pipeline and terminal operating company. MTPs consist of the following chapters:

1. Unit Training.
2. Training Matrixes.
3. Mission Outlines.
4. Training Exercises
5. Training an Evaluation Outlines.
6. External Evaluations.

Drills

Drills are disciplined, repetitious exercises that teach and perfect a skill or procedure. They are linked to MTPs as a method for executing a collective task or task step. There are two types of drills. Both types require minimal leaders orders and are standard throughout the Army.

- Battle drill. This drill is a collective action executed by a platoon or smaller element. The action is vital to success in combat or critical to preserving life. The drill is executed on a cue, such as enemy action or a leader's order, and is a trained response.

- Crew drill. This drill is a collective action that a crew of a weapon or piece of equipment must perform. The action is a trained response to a leader's order or the status of the weapon or equipment.

Exercises

Collective task training designed to develop proficiency and crew teamwork in performing the task to standard. It also provides practice for performing supporting individual critical tasks. Types of exercises are:

- Command field exercise. A CFX is a field training exercise with reduced troop and vehicle density, but with full command and control, and combat service support elements.

- Command post exercise. A CPX is an exercise in which the forces are simulated. It may be conducted from garrison locations or between participating headquarters in the unit.

- Field training exercise. An FTX is a scenario-driven tactical exercise used to train and evaluate critical collective and supporting individual tasks in a collective environment that simulates the stress, sounds, and wartime conditions. It is conducted in an austere field environment through all weather conditions and during both night and day. The FTX should guide soldiers through a series of events exposing them to the rigors of duty performance during wartime operations.

- Live fire exercise. An LFX is an exercise designed to allow a unit/team to engage targets with its organic weapons and support.

- Situational training exercises. An STX is a short, scenario-driven, mission-oriented, tactical exercise that trains closely related collective tasks and drills together. Situational training exercises provide sustainment training for tactical mission proficiency.

Training Support Packages

A TSP is a complete, exportable package integrating training products, materials, and/or information necessary to train one or more critical tasks. It can be very simple or very complex. A TSP for collective training is a package that is used to train critical collective tasks in the unit.

Combat Training Centers

The Army CTC program provides realistic joint service and combined arms training in accordance with Army doctrine. It provides training units opportunities to increase their collective proficiency on the most realistic battlefield available in peacetime. The four components of the CTC are:

- The National Training Center
- The Combat Maneuver Training Center
- The Joint Readiness Training Center
- The Battle Command Training Program

ENVIRONMENTAL PROTECTION TRAINING

The following recommended courses should be tailored to meet specific unit environmental program requirements. Include the SPCC plan, as needed.

- Environmental Awareness
- Hazardous Communication
- Hazardous Waste Operations including spill response/cleanup
- Hazardous Waste Management
- Hazardous Waste Minimization or Pollution Prevention

TRAINING THE TRAINERS

Soldiers who assist in training the company also have to be trained. Training the trainers is one of the most important aspects of training. An untrained or ill-prepared trainer will destroy the best laid training plan.

APPENDIX A
ENVIRONMENTAL REGULATIONS

COMPLIANCE

Compliance with environmental laws and pollution control standards is necessary within the United States and its territories. AR 200-1 provides policy for complying with the existing laws and regulations. At bulk fuel facilities, the major area of environmental concern centers on the handling and storage of petroleum products. There are several environmental requirements that relate directly to fuel operations and facilities. All bulk fuel personnel shall be familiar with reporting requirements, equipment, and training needs that support environmental concerns.

CLEAN WATER ACT

The CWA requires state and federal regulators to enter into programs designed to prevent, reduce, or eliminate pollution of navigable waters of the United States. The Water Quality Improvement Act of 1974 governs the discharge of oil into navigable waters. The CWA also requires the immediate reporting to the USCG of all POL spills to the waters of the United States. On 11 December 1973, the EPA published regulations to prevent pollution of U.S. waters by oil coming from onshore and offshore facilities not related to transportation. These regulations are identified in Title 40, Code of Federal Regulations, Part 112 (40 CFR, Part 112), and became effective on 10 January 1974.

OIL POLLUTION ACT OF 1990

The OPA of 1990 consolidates and changes existing laws that govern prevention, oil spill liability, and preparedness and cleanup. The law affects pipelines, vessels, oil rigs, piers, and terminals (on shore) that transport, handle, or store crude oil and petroleum products. Many new and important provisions that will affect the DOD fuel facilities are contained in the act, including increased liability for oil spills, more comprehensive oil spill contingency plans, training and drill requirements, better response capability and tougher enforcement. Also, the OPA has strengthened the role of three separate federal agencies: The USCG, the EPA, and the U.S. Department of Transportation (Research and Special Programs Administration).

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

The SPCCP is designed to help prevent the discharge of oil. A spill contingency plan is developed based on guidance from the commander or the local base commander and the EPA. An outline of a typical contingency plan is provided in Figure A-1. The plan addresses responsibilities and procedures for containing and cleaning up spills. The following items must be addressed in the SPCCP:

- Oil is defined as petroleum products, including gasoline, kerosene, jet fuel, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged soil.
- An SPCCP is valid for 3 years, if no changes are made to the plan or the facility.
- Coast Guard, EPA, or RSPA approval is required.
- “Worst case” scenario must be addressed.
- Response capability must be documented.
- EPA Regional Administrator must be notified of spills IAW local SOPs.
- The SPCCP and facility Spill Response Plan must be available for inspection at the facility.
- The appropriate regulatory agency must be notified in the event of a spill.

Oil Spill Contingency Plan Outline

I. BACKGROUND

A. Inventory of petroleum products handled.
B. Identification of most likely areas where a spill could occur.
C. Types of operations that could result in a spill.
D. Location of biological, recreational, or other sensitive areas.
E. Spill responsibilities assigned by the local commander and EPA.
F. Inventory and location of spill clean-up equipment and materials.

II. SPILL PLAN(S)

A. Spill reporting procedures.
B. Telephone numbers for key points of contact and fire department.
C. Spill containment and clean-up procedures for possible scenarios including personnel resources requirements.

(1) Type of product spilled.
(2) Size of spill.
(3) Location of spill.
(4) Time of spill.
(5) Weather conditions.

D. Disposal procedures for product and clean-up materials.
E. Public affairs coordination.

III. SUPPORT

A. Procedures for obtaining spill equipment and material.
B. Spill equipment maintenance program.
C. Training.
D. Contacts for specialized assistance.

Figure A-1. Outline of a Typical Contingency Plan

Regulations require the preparation and implementation of an SPCCP for all nontransportation-related facilities that have discharged, or could reasonably discharge, into U.S. navigable waters, or the adjoining shorelines. The SPCCP must also be reviewed and certified by a registered professional engineer for oil storage facilities with a total above ground storage capacity of more than 1,320 gallons, or an underground storage capacity of 42,000 gallons or more, and located on or near navigable waters (which is almost any body of water or continuous stream).

If a spill occurs, the appropriate EPA Regional Administrator will be given the following information IAW local SOPs:

- Name of facility.
- Name(s) of the owner or operator of the facility.
- Location of the facility.
- Date and year of initial facility operation.
- Maximum storage or handling capacity of the facility and normal daily throughput.
- Description of the facility, including maps, flow diagrams, and topographic maps.

- A complete copy of the SPCCP with any amendments.
- The cause(s) of such spill(s), including a failure analysis of the system or subsystem in which the failure occurred.
- The corrective actions and countermeasures taken, including an adequate description of equipment repairs and/or replacements, and the cost involved.
- Additional preventive measures taken or contemplated to reduce the possibility of recurrence.
- Other information, as the Regional Administrator may reasonably require, pertinent to the plan or spill event.

EMERGENCY RESPONSE ACTIONS

Other federal and state regulations exist which prohibit the discharge of petroleum products into the environment (such as soil, ground water, and surface waters). If a spill occurs, the following steps must be taken immediately:

Step One. Stop the Spill. Prevent a further release of fuel to the environment by shutting off valves in a leaking pipeline, removing product from a leaking storage vessel, or taking other measures as needed.

Step Two. Contain the Spill. To contain a spill, construct berms around the area, use absorbent materials to soak up the spill, use containment boom on surface water spills, excavate cutoff trenches. For handling JP-4 and other volatile fuel spills on water, divert and contain the fuel away from structures and try to remediate as soon as possible. Because many of the petroleum products handled at government fuel facilities are ignitable, there should be no smoking, open flames, or equipment with magneto-sparked engines, catalytic converters, or equipment which might otherwise produce sparks or static electricity in the vicinity of the spill site. Also, many fuels may cause skin irritation, dizziness, fainting, or even death, and therefore should be handled with caution.

Step Three. Report the Spill. Personal safety is more important than environmental protection. If there is a threat to life or health, the local fire department should be the first official agency notified. The appropriate regulatory agency must be notified immediately. A list of agencies and phone numbers for reporting various types of spills should be included in all exercise plans and LOIs. Information that may be requested when the spill is reported is included in Figure A-2 ,page A-4. To protect a downstream public or water supply in the event of a spill, call the appropriate public works department or plant manager to have them shut down the intake valves. Report spills into or upon the navigable waters of the United States or adjoining shores to: U.S. Coast Guard, Washington, DC, National Response Center, 24-hour (800) 424-8802 or (202) 267-2675. See Figure A-2 for spill reporting information.

Step Four. Clean Up the Spill. After stopping and containing the spill, recover the spilled product and remediate the impacted soil, ground water, and/or surface water. Because Government facilities often do not have the necessary equipment, resources, or experience to access and remediate the impacted areas, obtain a spill response contractor through the Defense Fuel Region as quickly as possible to expedite the cleanup to reduce the spread of contamination.

Step Five. Notify the Defense Fuel Region. Once the Defense Fuel Region has been notified of the spill, they will notify DFSC that will then make arrangements to have a remediation contractor brought to the site, if needed. Regional contracts have been set up through DFSC to expedite the remediation process for DFSC facilities. Under the terms of the contracts, the remediation contractor must have a knowledgeable project manager on site within 24 hours of being notified. The facility Quality Surveillance Representative, the facility engineer, or POL officer should cooperate with the environmental contractor in providing any information requested to expedite the cleanup process.

SPILL REPORTING INFORMATION

Spill discovery time: _____Date: _____

Weather conditions/sea state: _____

Material spilled: _____

Amount Spilled: _____

Size of slick/area affected: _____

Location and source of spill: _____

Environmental damage/nearby freshwater terrain: _____

Cause/circumstance of spill: _____

Existing/potential hazards (fire, explosions): _____

Personal injuries or fatalities: _____

Corrective action being taken/timetable for control, containment, cleanup: _____

_____

Any other unique/unusual circumstances: _____

_____

_____

_____

Name, address, phone number of person who discovered spill: _____

_____

Name of supervisor/manager in charge: _____

Contacts:

Agency	Date	Time	Person

_____

_____

_____

_____

_____

Figure A-2. Spill Reporting Information

ASSESSMENT AND REMEDIATION

In the petroleum industry, the strategy for a comprehensive assessment and remediation is straightforward--the quicker the cleanup, the less the spread of contaminants. Therefore, assessment activities should be completed in a timely manner so that a remediation system may be designed and installed before significant migration of the contaminant plume occurs. Before a site can be remediated, the vertical and horizontal extent of contamination must be defined.

The Defining Method

The defining method used depends on the type of spill. For a surface spill, the method for defining the extent of contamination is by visual inspection and shallow soil sampling. For a subsurface spill, the method for defining the extent of contamination is through the installation of ground water monitoring wells.

Corrective Action

The cleanup of a subsurface spill can be a very slow, time-consuming process; therefore, long-term (several years) monitoring and operation of the remedial action system will likely be required. Once the extent of the contamination has been defined, more corrective action technologies can be selected and implemented. The type of technology selected is based on site-specific information such as:

- Volatility of the spilled product
- Type of media impacted (clay soil, sands, surface water, or ground water)
- Size of containment plume
- Cleanup goals.

PREVENTIVE BOOMING POLICY

DFSC practices preventive booming whenever state or local regulations dictate. DFSC follows this guidance:

- Transfers of nonpersistent fuels such as JP-4 and gasoline must not be boomed unless ordered by the Coast Guard.

- Fixed boom will not be required in the areas of swift current (1.5 knots or greater) when fuel will be deflected over the top or under the boom.

- Do not boom in situations deemed unsafe.

California

The state of California implemented a preventive booming regulation on 21 November 1992 and began enforcement on 21 December 1992. The state has concluded that most spills occur during bunkering operations; however, a significant amount of fuel is spilled in California waters during loading and unloading operations from tankers and naval oilers. The state further determined that preventive booming is good environmental policy to contain such spills and should be exercised to the greatest extent practicable. Thus, the state regulation requires a boom to be deployed, before initiating a fuel transfer, to encircle the vessel to contain any fuel spilled in the water. Now, terminals must either contract for the booming services or provide the personnel to deploy and retrieve boom during fuel transfer operations. Preventive booming is not required at DOD facilities in situations deemed unsafe or where impractical or ineffective. Preventive booming is not required in the following situations:

- Nonresistant fuels, such as JP-4 and gasoline should not be boomed due to the presence of explosive vapor. In this case, dispersion is the best solution as it allows the fuel to evaporate. Only persistent POL products (heavy ends and relatively high flash points) must be boomed.

- Fixed boom will not be required for marine transfer operations where the current is greater than or equal to 1.5 knots for at least 180 days of the year. Fixed booms will not effectively contain spills in such areas; the fuel will slide under or over the top of the boom.

- The state requires trained personnel standing by in a boat with adequate boom ready to deploy.

Other States

Until California implemented a preventive booming regulation, it was only a matter of local policy whether to boom. California perceived that spills occur most often in bunkering operations. However, preventive booming during all pier fuel transfer operations, when practical and safe, provides an added measure of assurance. Spills that are immediately contained in a congested harbor are easier to clean up and they provide for accurate identification of the spiller. Although preventive booming is required for transfer involving persistent products (crude and heavy oils) in Alaska and is proposed for Maine, there is no requirement to boom light-grade fuels in any other state. The requirement for preventive booming, which affects marine fuels transfer operations at wharf or pier facilities throughout the state of California, may be under consideration for adoption by the EPA, the Coast Guard, and other states.

APPENDIX B

EQUIPMENT REGISTER

Table B-1. Equipment register for the Petroleum Pipeline and Terminal Operating Battalion

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
A25551	AIR CONDITIONER: FLOOR-MOUNTED A/C 208-416 V, 3-PH, 60-CY 60,000 BTU	TM 5-4120-261-15 TM 5-4120-288-15 TM 5-4120-288-25P TM 5-4120-295-15 TM 5-4120-295-25P	**X**	
A03210	ACCESSORY OUTFIT GASOLINE FIELD RANGE: ACCOM 50 MEN	SC 7360-90-N03 TM 10-7360-204-13&P		*X*
A32060	ALARM CHEMICAL AGENT AUTOMATIC: PORTABLE MANPACK	TM 3-6665-225-12	*X*	*X*
A56243	ANALYZER SET ENGINE: PORTABLE SOLID STATE (STE/ICEPM)	MWO 9-4910-571-35 TB 9-4910-555-35 TM 9-4910-571-12&P TM 9-4910-571-34&P		*X*
A72260	ANTENNA: RC-292	TM 11-5820-348-15 TM 11-5820-348-24P	*X*	*X*
A84494	ANVIL BLACKSMITHS: CAST IRON BODY, 200-LB, 16 1/4- L X 4 1/2-IN W	No DA Publications		*X*
B07126	AXLE CABLE REEL: RL-27	TM 11-3895-201-13P	*X*	*X*
B58567	BASIC GENERATION UNIT	No DA Publications	*X*	
B67766	BINOCULARS	TM 9-1240-381-10 TM 9-1240-381-24&P	*X*	
C05701	MONITOR CHEMICAL AGENT	No DA Publications	*X*	
C18297	COMPUTER SET GENERAL	No DA Publications	*X*	
C68719	CABLE TELEPHONE: WD-1/TT DR-8 1/2 KM	No DA Publications	*X*	*X*
C68856	CABLE TELEPHONE: WD-1/TT RL-159/U 2 KM	No DA Publications	*X*	*X*
C69541	CABLE TELEPHONE: WF-16/U	No DA Publications	*X*	
C72376	CASE TRANSIT MONITOR KEYBOARD GROUP: OA-9252/TYQP-33(V)	No DA Publications	*X*	

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
C72626	CASE TRANSIT PRINTER UNIT GROUP: OA-9251/TYQ-33(V)	No DA Publications	*X*	
C89070	CAMOUFLAGE SCREEN SUPPORT SYSTEM: WOODLAND/DESERT	TM 5-1080-200-10-HR TM 5-1080-200-13&P	*X*	
C89145	CAMOUFLAGE SCREEN SYSTEM: WOODLAND LT WT RADAR SCAT W/O SPT SYS	TM 5-1080-200-10-HR TM 5-1080-200-13&P	*X*	
D40533	DIGITAL NONSECURE VOICE TERMINAL	No DA Publications	*X*	
D82404	DECONTAMINATING APPARATUS	No DA Publications	*X*	
D99573	CHARGER BATTERY: PP-34/MSM	TM 11-965 TM 11-6130-219-35P TM 750-5-6		*X*
E00533	CHARGER RADIAC DETECTOR: PP-1578/PD	TB SIG 226-8 TM 750-5-4	*X*	*X*
E10835	CHEST HYMNBOOK: W/HANDLES	No DA publications	*X*	
E32466	CLEANER STEAM PRESSURE JET: WITH STEAM GEN VASE MTD 125-PSI	TM 9-4940-525-14&P TM 9-4940-556-14&P		*X*
E69105	COMP UNIT RCP: AIR REC GAS DRIVEN 5-CFM 175-PSI	No DA publications		*X*
E70064	COMP UNIT RCP: TRK 2-WHL PNEU TIRES GAS-DRVN 5-CFM 175-PSI	TM 5-4310-241-15		*X*
E72804	COMP UNIT RTY: AIR TRLR-MTD DSL-DRVN 25-CFM 100-PSI	TB 5-4310-452-15 TM 5-4310-452-14 TM 5-4310-452-24P		*X*
E98103	ELEC TRANSFER KEYING DEVICE ETKD: KYW-13/TSEC	SEE DA PAM 25-35	*X*	
F39378	CRANE WHEEL-MTD: 20-TON W/BOOM CRANE 30-FT W/BLK TKLE 20-TON	TM 5-3810-295-12 TM 5-3810-295-20P TM 5-3810-295-34 TM 5-3810-295-34P TM 43-0001-32		*X*
G04106	DETECTOR KIT: AUTO/AVIATION FUEL WATER AND SOLID CONTAMINATION	No DA Publications		*X*
G11966	GEN SET: DED SKID-MTD 5-KW, 60-HZ	TB 9-6115-641-24	*X*	
G12170	GEN SET: DED SKID-MTD 15-KW, 50-60 HZ	No DA Publications	*X*	
G18358	GEN SET: DED SKID-MTD 3-KW 60-HZ	No DA publications		
G21472	DISPENSING PUMP: HAND-DRIVEN HOSE-NOZZLE DISCHARGE	No DA publications		*X*
G21609	DISPENSING PUMP HAND-DRIVEN: PISTON TYPE 1-QT PER STROKE	No DA Publications		*X*
G35226	DOLLY TRAILER CONVERTER: 8-TON 2-WHEEL W/E	TM 43-0001-31	*X*	

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
G44569	DRAFTING EQUIPMENT SET BATTALION: CHARTS SKETCHES AND OVERLAYS	SC 6675-90-CL-N04 SC 6675-90-CL-N04-HR	*X*	
G68998	DRUM FABRIC COLLAPSIBLE: POTABLE WATER	No DA publications		*X*
G78306	GEN SET: DIESEL TRAILER-MOUNTED 60-KW, 50-60 HZ	No DA Publications	*X*	
G84859	DUPLICATION MACHINE SPIRIT PROCESS: TABLE-MTD ELEC/HAND 9-15 L IN	No DA publications	*X*	
G85202	DUPLICATING MACHINE STENCIL PROCESS: BENCH-TYPE HAND-MOUNTED AUTO FEED	No DA Publications		*X*
H31136	FACSIMILE SET: AN/TX-1	TM 11-2258 TM 11-5815-246-20P TM 11-5815-246-34P	*X*	*X*
H35404	HF RADIO SET: AN/GRC-193A	TM 11-5820-924-13	*X*	
H52087	FILTER/SEPARATOR LIQUID FUEL: 350-GPM, 150-PSI, 4-IN INLET, 4-IN OUTLET	TM 5-4330-211-12		*X*
H79221	FLOODLIGHT ST ELEC: PTBL 6 LIGHTS MST MTD 5-KW 120/208-V (ARMY)	SC 6230-97-CL-E03 SC 6230-97-CL-E03-HR		*X*
J04717	FUEL SYSTEM SUPPLY POINT: 60,000 GAL LESS FLTR PUMP AND TRANK	SC 4930-97-CL-E01 SC 4930-97-CL-E01-HR TM 10-4930-232-12&P		*X*
J31161	INST KIT: MK-2310/VRC FOR AN/VRC-87/88/90 IN M1009	No DA Publications	*X*	
J31297	INST KIT: MK-2195/VRC FOR AN/VRC-87/88/90 IN 2 ½- AND 5- TON TR	SB 11-131-2 TB 11-5820-890-20-7		
J31569	INST KIT: MK-2325/VRC FOR AN/VRC-87/88/90 IN HMMWV	SB 11-131-2 TB 11-5820-890-20-27	*X*	
J31622	INSTL KIT: MK-1967/VRC F/KY-57/W AUXILARY RECEIVER R442	SB 11-700	*X*	
J32199	INST KIT: MK-2462/GRC-193 FOR AN/GRC-193A IN M882/M1008A1	No DA Publications	*X*	
J32997	INST KIT: VEHICULER ELECTRONIC EQUIPMENT MK-2564/VRC-97	No DA Publications	*X*	
J35629	GEN ST DSL ENG TM: 60-KW 60-HZ MTD ON M-200A1 UP-650	TM 5-6115-365-15	*X*	
J35813	GEN ST DSL ENG: 5-KW 60-HZ 1-3PH AC 120/208 120/240V TAC UTIL	TM 5-6115-584-12 TM 5-6115-584-12-HR TM 5-6115-584-24P TM 5-6115-584-34	*X*	*X*
J35835	GEN SET DSL ENG: 15-KW 60-HZ 3-PH AC 120/208 240/416 V TAC UTIL	LO 5-6115-305-12	*X*	
J45699	GEN ST GAS ENG: 3-KW 60-HZ 1-3PH 120/240 120/208V SKD TAC UTILITY	TM 5-6115-271-14 TM 5-6115-271-24P		*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
J47457	INST KIT: MK-2326/VRC FOR AN/VRC-89/91/92 IN HMMWV	SB 11-131-2 TB 11-5820-890-20-28	*X*	
J48402	INSTALLATION KIT: MK-2502/VRC F/AN/VRC-46/64 OR AN/GRC-160	SB 11-131-1	*X*	*X*
J48470	INSTALLATION KIT: MK-2503/VRC F/AN/VRC-47/VRC-12	SB 11-131-1	*X*	*X*
J48674	INSTALLATION KIT: MK-2506/GRC FOR AN AN/GRC-106 OR AN/GRC-106A	No DA Publications	*X*	
J71543	INSTL KIT: MK-2147/VRC F/KY-57 W//AN/VRC-43 OR AN/VRC-46	SB 11-700	*X*	
J87848	INST KIT: MK-2499/VRC FOR TSEC/KY-57 WITH SINCGAR	SB 11-131-2	*X*	
J88547	INST KIT ELECTRONIC EQUIPMENT: MK-2565/VRC-97	No DA Publications	*X*	
K24862	HEATER DUCT TYPE PTBL: GAS 250,000-BTU WHL-MTD	TM 5-4520-224-14 TM 5-4520-224-24P TM 5-4520-201-24P		*X*
K25342	HEATER IMMERSION LIQUID FUEL-FIRED: 34 ¾- IN LG OF HEATER	TM 10-4500-200-13		*X*
K52926	HOSE ASSEMBLY: NONMETALLIC WATER USE W/PIN OR ROCKER LUG WRENCHING	No DA Publications	*X*	
K53748	HOSE ASSEMBLY: NONMETALLIC FUEL/OIL HYDROCARBON USE BRASS FITTING	No DA publications	*X*	*X*
K54707	HOSELINE OUTFIT FUEL HANDLING: 4- IN DIA HOSE	SC 3835-97-CL-E03 TM 10-3835-219-14 TM 10-3835-219-24P		*X*
K87294	INST KIT: MK-1429/GRC-106A FOR GRC-106A	No DA Publications		*X*
K87328	INSTL KIT: MK-1443/VRC-46 F/VRC-46 INSTL NOT COVERED BY SPEC KIT	SB 11-131-1		*X*
L08724	JACK DOLLY TYPE HYDRAULIC: 10-TON CAPACITY	TM 9-4910-261-14P TM 9-4910-733-14&P		*X*
L33800	LABORATORY PETROLEUM SEMITRAILER MOUNTED	SC 6640-97-CL-E02 TM 5-6640-212-14 TM 5-6640-212-14-HR TM 10-6640-215-10-HR TM 10-6640-215-13 TM 10-6640-215-23P	*X*	
L44595	LAUNCHER GRENADE 40 MILLIMETER: SGLE SHOT RIFLE MTD DTCHBLE W/E	TM 9-1010-221-10 TM 9-1010-221-23&P	*X*	*X*
L63994	LIGHT SET GENERAL ILLUMINATION: 25-OUTLET (ARMY)	SC 6230-97-CL-E01 SC 6230-97-CL-E01-HR	*X*	*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
L67964	LIGHTWEIGHT DIGITAL FACSIMILE	No DA Publications	*X*	
L84098	LOUDSPEAKER PERMANENT MAGNET: LS-454/U	TM 11-5965-255-14P		*X*
L85283	LUBRICAT-SERV UNIT PWR OPER: TRLR-MTD 15-CFM AIR COMP GAS-DRVN	TM 5-4930-207-12 TM 5-4930-207-20P TM 5-4930-207-34 TM 5-4930-207-34P TM 5-4930-218-14 TM 5-4930-218-24P TM 5-4930-206-15 TM 5-4930-206-20P TM 5-4930-206-35P TM 5-4930-217-14 TM 5-4930-217-20P TM 5-4930-217-34P		*X*
L92386	MACHINE GUN 7.62-MILLIMETER: LIGHT FLEXIBLE	FT 7.62-A-2 TM 9-1005-224-10 TM 9-1005-224-24 TM 9-1005-224-24P	*X*	*X*
M11895	MASK CBR: PROTECTIVE FIELD	TM 3-4240-279-10 TM 3-4240-279-20&P TM 43-0001-26-1 TM 43-0002-31	*X*	*X*
M12418	MASK CHEMICAL BIOLOGICAL: M40	TM 3-4240-300-20&P	*X*	
M60449	MULTIMETER DIGITAL: AN/PSM-45	TB 9-6625-2147-35 TM 11-6625-3052-14 TM 11-6625-3052-24P TB 9-6625-2190-35 TM 11-6625-3199-14 TM 11-6625-3199-24P-1		*X*
M75714	MOUNT TRIPOD MACHINE GUN: 7.62-MILLIMETER	TM 9-1005-224-10 TM 9-1005-224-24 TM 9-1005-224-24P	*X*	*X*
N02758	NET CONTROL DEVICE NCD: KYX-15/TSEC	SEE DA PAM 25-35	*X*	

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
N96741	PISTOL CALIBER .45 AUTOMATIC	TM 9-1005-211-12 TM 9-1005-211-35	*X*	*X*
P11866	PNEUMATIC TOOL AND COMPRESSOR OUTFIT: 250-CFM TRAILER-MOUNTED	SC 3820-98-CL-E09 SC 3820-98-CL-E09-HR		*X*
P40745	POWER SUPPLY: PP-4763/GRC	TM 11-5820-765-12 TM 11-5820-765-34 TM 11-5820-765-34P-1	*X*	*X*
P40750	POWER SUPPLY: PP-6224/U	TM 11-6130-266-15 TM 11-6130-266-24P-2 TM 11-6130-458-14 TM 11-6130-458-24P	*X*	*X*
P41832	POWER PLANT ELECTRIC TM 5-KW 60-HZ 2 EA MTD ON M103A3 AN/MJQ-16	No DA Publications	*X*	
P91756	PUMP CENTRIFUGAL GAS-DRIVEN FRAME-MOUNTED 11/2-INCH 65-GPM 50 FEET OF HEAD	TM 5-4320-200-13&P	*X*	
P93102	PUMP CENTRIFUGAL: DED SKID-MOUNTED 6-INCH 800-GPM 1800 FEET OF HEAD	No DA Publications		*X*
P94496	PUMP CENTRIFUGAL: SUMP PNEUMATIC-DRIVEN UNMOUNTED 21/2-INCH 210-GPM 25-FEET OF HEAD	LO 5-4320-255-12 TM 5-4320-255-13		*X*
P95592	PUMP UNIT RECIPROCAL POWER DRIVEN: DIAPHRAM GAS WHEEL 4-INCH 100-GPM 10-FEET SUCTION LIFT	LO 5-4320-222-12 LO 5-4320-251-12 LO 5-4320-252-12 TM 5-4320-222-15 TM 5-4320-222-25P TM 5-4320-251-14 TM 5-4320-251-24P TM 5-4320-252-14 TM 5-4320-275-13&P		*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
P97051	PUMPING ASSY FLAMBLE LIQ ENG DRVN WHL: 4-IN OUT 350-GPM 275-FT HD	TM 5-4320-218-15 TM 5-4320-218-20P TM 5-4320-218-35P TM 5-4320-272-12 TM 5-4320-272-20P TM 5-4320-272-34 TM 5-4320-272-34P TM 5-4320-273-24P TM 10-4320-343-14 TM 10-4320-343-24P		*X*
P97119	PUMPING ASSY FLAML LIQ DRVN WHL: 4-IN 350-GPM 275-FT HD W/REG	TM 10-4320-343-14 TM 10-4320-343-24P		*X*
P98152	PISTOL 9MM AUTOMATIC: M9	TB 9-1005-317-23	*X*	
Q19339	RADIAC SET: AN/PDR-27	TM 11-6665-209-10 TM 11-6665-209-20 TM 11-6665-209-40 TM 11-6665-209-10-HR TM 11-5543 TM 750-5-4 TM 11-6665-228-15 TM 11-6665-228-20P TM 11-6665-228-40P TM 11-6665-230-12 TM 11-6665-230-20P TM 11-6665-230-34 TM 11-6665-230-12-HR TM 11-6665-224-15 TM 11-6665-224-20P TM 11-6665-224-40P TM 11-6665-249-14 TM 11-6665-249-20P TM 11-6665-249-34P	*X*	*X*
Q20935	RADIACMETER: IM-93/UD	TB SIG 226-9 TM 11-6665-214-10 TM 750-5-4	*X*	*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
Q21483	RADIACMETER: IM-174/PD	TM 11-6665-232-12 TM 11-6665-232-20P TM 11-6665-232-40 TM 11-6665-232-40P	*X*	*X*
Q32756	RADIO SET AN/GRC-106	TM 11-5820-520-10 TM 11-5820-520-12-HR TM 11-5820-520-20 TM 11-5820-520-34 TM 11-5820-520-20P-1 TM 11-5820-520-20P-2 TM 11-5820-520-34P-1 TM 11-5820-520-34P-2	*X*	*X*
Q34308	RADIO SET: AN/GRC-160	TM 11-5820-498-12 TM 11-5820-498-12-HR TM 11-5820-498-20P TM 11-5820-498-34P TM 11-5820-498-35	*X*	
Q38299	RADIO SET: AN/PRC-77	SB 11-660 TM 11-5820-398-12 TM 11-5820-398-20P TM 11-5820-398-34P TM 11-5820-398-35 TM 11-5820-667-12 TM 11-5820-667-12-HR TM 11-5820-667-20P TM 11-5820-667-34P TM 11-5820-667-35		*X*
Q53001	RADIO SET: AN/VRC-46	TM 11-5820-401-10-1 TM 11-5820-401-10-1-HR TM 11-5820-401-10-2 TM 11-5820-401-10-2-HR TM 11-5820-401-20-1 TM 11-5820-401-20-2 TM 11-5820-401-20P TM 11-5820-401-34-2-1 TM 11-5820-401-34-2-2	*X*	*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
Q54174	RADIO SET: AN/VRC-47	TM 11-5820-401-10-1 TM 11-5820-401-10-1-HR TM 11-5820-401-10-2 TM 11-5820-401-10-2-HR TM 11-5820-401-20-1 TM 11-5820-401-20-2 TM 11-5820-401-20P TM 11-5820-401-34-2-1 TM 11-5820-401-34-2-2	*X*	*X*
Q78282	RADIO SET CONTROL GROUP: AN/GRA-39	TM 11-5820-477-12		*X*
R14154	RANGE OUTFIT FIELD GASOLINE:	SC 7360-90-CL-N02 SC 7360-90-CL-N02-HR TM 10-7360-204-13&P		*X*
R20684	RADIAC SET: AN/VDR-2	TM 11-6665-251-10 TM 11-6665-251-20 TM 11-6665-251-40 TM 11-6665-251-40P	*X*	
R30662	RECEIVER-TRANSMITTER CONTROL GROUP AN/GRA-6	TM 11-5820-489-10 TM 11-5820-489-20 TM 11-5820-489-20P TM 11-5820-489-34P	*X*	*X*
R30925	RADIAC SET: AN/PDR-75	TM 11-6665-236-10-HR TM 11-6665-236-20P TM 11-6665-236-40 TM 11-6665-236-40P	*X*	

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
R44727	RADIO SET: AN/VRC-88	TB 11-5820-890-10-3 TM 11-5820-890-10-2 TM 11-5820-890-10-3 TM 11-5820-890-10-4 TM 11-5820-890-10-5 TM 11-5820-890-10-7 TM 11-5820-890-10-HR TM 11-5820-890-20-1 TM 11-5820-890-20-2 TM 11-5820-890-20P TM 11-5820-890-30 TM 11-5820-890-30P-1 TM 11-5820-914-40 TM 11-5820-914-40P	*X*	
R44795	RADIO SET: AN/VRC-89	See R44727	*X*	
R44863	RADIO SET: AN/VRC-89A	TM 11-5820-890-10-1 TM 11-5820-890-10-2 TM 11-5820-890-10-5 TM 11-5820-890-10-7 TM 11-5820-890-10-HR TM 11-5820-890-20-1 TM 11-5820-890-20P TM 11-5820-890-30P-1 TM 11-5820-914-40 TM 11-5820-914-40P	*X*	
R45203	RADIO SET: AN/VRC-90	See R44727	*X*	
R59023	REELING MACHINE CABLE HAND: RL-31	TM 11-3895-202-13 TM 11-3895-202-24P	*X*	*X*
R59160	REELING MACHINE CABLE HAND: RL-39	No DA publications	*X*	*X*
R67194	RADIO SET: AN/VRC-88A	See R44867	*X*	
R67908	RADIO SET: AN/VRC-90A	See R44867	*X*	
R73791	REPAIR KIT COLLAPSIBLE FABRIC TANK: TYPE II REPAIRS UP TO 6 IN	No DA publications		*X*
R88696	RESUSCITATOR-ASPIRATOR: INTERMITTENT POSITIVE PRESSURE MANUAL CYLE	No DA publications		*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
R93169	RADIO TEST SET: AN/PRM-34	TM 11-6625-3015-14 TM 11-6625-3015-14-HR TM 11-6625-3015-24P		*X*
R94977	RIFLE 5.56 MILLIMETER: M16A1	TM 9-1005-319-10 TM 9-1005-319-23&P	*X*	*X*
R95035	RIFLE 5.56 MILLIMETER: M16A2	See R94977	*X*	
S01373	SPEECH SECURITY EQUIPMENT: TSEC/KY-57	TB 10-5411-200-24 TM 10-5411-200-14	*X*	
S29227	SAFETY EQUIPMENT SET: RESPIRATORY GASOLINE TANK CLEANING	SB 740-94-7 SC 4240-95-CL-A01-HR TM 43-0001-26-1		*X*
S37933	SAW POWER HACK PORTABLE: 2- TO 8-INCH PIPE SIZE BLADE	No DA publications		*X*
S64488	SPEECH SECURITY EQUIPMENT DIGITAL SUBSCRIBER VOICE TERMINAL TSEC/KY-68	No DA publications	*X*	
S70027	SEMITRAILER FLAT BED: BREAK BULK/CONT TRANSPORTER 221/2-TON	TM 9-2330-358-14&P TM 43-0001-31		*X*
S70594	SEMITRAILER LOW BED: 40-TON 6-WHEEL W/E	TM 5-2330-360-14&P TM 43-0001-31 TM 5-2330-378-14&P		*X*
S72983	SEMITRAILER TANK: FUEL SERVICING 5000-GALLON 12-TON 4-WHEEL W/E	TM 9-2330-272-14 TM 9-2330-272-14-HR TM 9-2330-272-14&P TM 43-0001-31 TM 55-2330-200-15-1		*X*
T05741	TESTING KIT PETROLEUM: AVIATION FUEL CONTAMINATION	TM 5-6630-218-10	*X*	
T10138	SHOP EQUIPMENT CONTACT MAINTENANCE TRUCK-MOUNTED	TM 5-4940-200-12 TM 5-4940-200-35 TM 5-4940-200-25P TM 9-4940-421-14 TM 9-4940-421-24P TM 43-0001-46 TB 746-95-1		*X*
T25726	TONE-SIGNALLING ADAPTER: TA-977	TM 11-5805-262-12 TM 11-5805-262-34		*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
T25726	TONE-SIGNALLING ADAPTER: TA-977/PT	TM 11-5805-262-12 TM 11-5805-262-34	*X*	
T31872	TELEPHONE WIRE WITH REEL: MX-10891/G	No DA publications	*X*	
T40405	TAPE READER GENERAL PURPOSE: K01-18/TSEC	See DA Pam 25-35	*X*	
T45408	TELEPHONE DIGITAL NONSECURE VOICE: TA-1035/U	TB 11-2300-481-35 TB 11-5800-216-15 TM 11-5800-216-10-1 TM 11-5800-216-10-2 TM 11-5800-216-10-3 TM 11-5800-216-10-4 TM 11-5800-216-L TM 11-5805-761-12&P	*X*	
T47141	SIGN PAINTING KIT: WITH COMPONENTS	No DA publications		*X*
T48941	TRUCK LIFT FORK: DED 50,000-LB CONTAINER HANDLER ROUGH TERRAIN 48-INCH LOAD CAPACITY	LO 10-3930-641-12 TM 10-3930-641-10 TM 10-3930-641-20 TM 10-3930-641-10-HR TM 10-3930-641-34-1 TM 10-3930-641-34-2		*X*
T49255	TRUCK LIFT FORK: DIESEL-DRIVEN 4000-LB CAPACITY ROUGH TERRAIN	LO 10-3930-638-12 TM 10-3930-638-10 TM 10-3930-638-24&P		*X*
T55957	TERMINAL RADIO-TELEPHONE MOBILE SUBSCRIBER AN/VRC-97	No DA Publications	*X*	
T56041	TERMINAL TACTICAL PETROLEUM: MARINE	No DA Publications		*X*
T61171	TRUCK TRACTOR: MET 8X6 75000 GVW W/ C/S	MWO 9-2320-273-20-1 TB 9-2300-295-15-17 TB 43-0213 TM 9-2320-273-10 TM 9-2320-273-20 TM 9-2320-273-20P TM 9-2320-273-34 TM 9-2320-356-BD TM 43-0001-31 TM 55-2320-273-14		*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
T61494	TRUCK UTILITY: CARGO/TROOP CARRIER 11/4-TON 4X4 W/E (HMMWV)	TB 11-2300-478-30-1 TM 9-2320-280-10 TM 9-2320-280-20P TM 9-2320-280-34 TM 9-2320-280-34P TM 9-2320-280-10-HR TM 9-2320-280-20-1 TM 9-2320-280-20-2 TM 9-2320-280-20-3 TM 9-2320-356-BD TM 43-0001-31	*X*	*X*
T67595	TOP HANDLER ATTACHMENT: 20-FOOT IC FREIGHT CONTAINER MIL-T-52951 ME	No DA Publications		*X*
U05008	SPLICING KIT TELEPHONE CABLE: MK-356/G	SC 5975-91-CL-D01 SC 5975-91-CL-D01-HR	*X*	*X*
U81707	SWITCHBOARD TELEPHONE MANUAL: SB-22/PT	TM 11-5805-262-12 TM 11-5805-262-20P TM 11-5805-262-34 TM 11-5805-262-34P	*X*	*X*
U82529	SWITCHBOARD TELEPHONE MANUAL: SB-993/GT	TM 11-5805-294-12 TM 11-5805-294-14P		*X*
V12141	TANK AND PUMP UNIT LIQUID DISPENSING TRUCK MOUNTING:	TM 5-4930-228-14 TM 5-4930-228-24P TM 5-4930-230-13 TM 5-4930-230-23P TM 5-4930-227-14 TM 5-4930-227-24P		*X*
V12552	TANK ASSEMBLY FABRIC COLLAPSIBLE: 10,000-GAL PETRO	SC 5430-97-CL-E01 SC 5430-97-CL-E01-HR TM 5-5430-210-12 TM 5-5430-219-23P		*X*
V15086	TANK FABRIC COLLAPSIBLE: PETROLEUM 3,000-GALLON	TM 5-5430-210-12		*X*
V15566	TANK LIQUID STORAGE METAL PETROLEUM PRODUCTS SKID-MOUNTED 600 GALLONS	No DA Publications	*X*	
V19950	TANK UNIT LIQUID DISPENSING TRAILER MOUTNING:	TM 10-4930-220-13&P		*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
V31211	TELEPHONE SET: TA-312/PT	TM 11-5805-256-13 TM 11-5805-256-23P TM 11-5805-201-12 TM 11-5805-201-23P TM 11-5805-201-35	*X*	*X*
V48441	TENT: FRAME TYPE MAINTENANCE MEDIUM LIGHT METAL COTTON DUCK OD7	TM 10-8340-203-13 TM 10-8340-203-23P TM 10-8340-207-14		*X*
V98788	POWER SUPPLY VEHICLE: HYP-57/TSEC	No DA publications	*X*	
W02115	SAMPLING AND GAGING KIT: PETROLEUM MILITARY SPEC DOCUMENT TYPE	SC 6680-90-N01 TM 10-6630-230-13&P		
W05673	TESTING KIT PETROLEUM:	No DA Publications	*X*	*X*
W19880	TIEDOWN ASSEMBLY: CHAIN TYPE FOR HOLDING COLLAPSIBLE FABRIC DRUMS	TM 10-8110-201-10-HR TM 10-8110-202-10-HR TM 10-8110-202-13&P		*X*
W32593	SHOP EQUIPMENT AUTO MAINT AND REPAIR: OM COMMON NO 1 LESS POWER	No DA publications		*X*
W32867	SHOP EQUIPMENT AUTO MAINT AND REPAIR: ORG SUPPL NO 1 LESS POWER	SC 4910-95-A73		*X*
W33004	TOOL KIT GENERAL MECHNICS: AUTOMOTIVE	SC 5180-90-N26	*X*	*X*
W34648	TOOL KIT CARPENTERS: ENGINEER SQUAD W/CHEST	SC 5180-90-N08	*X*	*X*
W37483	TOOL KIT ELECTRIC EQUIPMENT: TK-101/GSQ	SC 5180-91-CL-R13 SC 5180-91-CL-R13-HR		*X*
W48485	TOOL KIT PIPE CUTTING GROOVING AND BEVELING: 6-, 8-, 10-, & 12-INCH PIPE	No DA Publications		*X*
W48622	TOOL KIT PIPEFITTERS: 1/8- TO 2-INCH PIPE	SC 5180-90-N13		*X*
W48759	TOOL KIT PIPEFITTERS: 2-1/2 TO 4 INCH PIPE	SC 5180-90-CL-N42 SC 5180-90-CL-N42-HR		*X*
W51910	TOOL KIT SMALL ARMS REPAIRMAN: ORDNANCE	SC 5180-95-CL-A07 SC 5180-95-CL-A07-HR	*X*	*X*
W60351	WIRE LINE ADAPTER HYX-57/TSEC	No DA Publications	*X*	
W65884	TOOL KIT SUPPLEMENTAL PIPELINE PUMP STATION: 4, 6, & 8 INCHES	SC 5180-90-N58		*X*
W67725	TORCH OUTFIT CUTTING AND WELDING: ORG MAINT SET NO 5	SC 4940-95-CL-B23 SC 4940-95-CL-B23-HR		*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
W76816	TRACTOR FULL TRCKD LOW SPD: DSL MED DBP W/BULDOZ W/SCARIF WINCH	TM 5-2410-233-10 TM 5-2410-233-20 TM 5-2410-233-24P TM 5-2410-233-34 TM 55-2410-237-14 TB 5-2410-237-14 TM 43-0001-32 TM 5-2410-237-10 TM 5-2410-237-24P TM 5-2410-237-34		*X*
W91074	TRACTOR WHL IND: DSL W/BACKHOE W/LOADER W/HYD TOOL ATTACH (CCE)	TM 5-2420-222-10/20P/34/34P TM 5-2420-222-20-1 TM 5-2420-222-20-2 TM 5-2420-222-20-3 TM 5-2420-222-20P TM 43-0001-32		*X*
W94536	TRAILER BOLSTER: GENERAL PURPOSE 4-TON 4-WHEEL WITH EQUIPMENT	TM 9-2320-287-14&P		*X*
W95537	TRAILER CARGO: ¾-TON 2-WHEEL W/E	TB 43-0213 TM 9-2330-202-14&P TM 43-0001-31	*X*	*X*
W95811	TRAILER CARGO: 11/2-TON 2-WHEEL W/E	TB 43-0213 TM 9-2330-213-14&P TM 43-0001-31		*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
W98825	TRAILER TANK: WATER 400-GALLON 11/2-TON 2-WHEEL W/E	TM 9-2330-213-14&P TM 9-2330-267-14&P TM 43-0001-31		*X*
X40009	TRUCK CARGO: 21/2-TON 6X6 W/E	MWO 9-2320-200-35-1 TB 9-2320-209-14 TB 9-2320-209-30/4 TB 43-0213 TM 43-0001-31 TM 9-2320-209-10-1-HR TM 9-2320-209-10-1 TM 9-2320-209-10-2 TM 9-2320-209-10-3 TM 9-2320-209-10-4 TM 9-2320-209-20P TM 9-2320-209-20-1 TM 9-2320-209-20-2-1 TM 9-2320-209-20-2-2 TM 9-2320-209-20-3-1 TM 9-2320-209-20-3-2 TM 9-2320-209-20-3-3 TM 9-2320-209-20-3-4 TM 9-2320-356-BD TM 9-2320-361-10 TM 9-2320-361-20 TM 9-2320-361-20P TM 9-2320-361-34 TM 9-2320-361-34P TM 55-2320-209-15-1	*X*	*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
X40146	TRUCK CARGO: 21/2-TON 6X6 W/WINCH W/E	MWO 9-2320-200-35-1 TB 9-2320-209-14 TB 9-2320-209-30 TB 43-0213 TM 9-2320-209-10-1-HR TM 9-2320-209-20P TM 9-2320-356-BD TM 9-2320-361-10 TM 9-2320-361-20 TM 9-2320-361-20P TM 9-2320-361-34 TM 9-2320-361-34P TM 43-0001-31 TM 55-2320-209-15-1		*X*
X40794	TRUCK CARGO: DROP SIDE 5-TON 6X6 W/E	MWO 9-2320-272-20-2 MWO 9-2320-272-24-1 TB 9-2300-295-15/21 TM 9-2320-272-10 TM 9-2320-272-10-HR TM 9-2320-272-20-1 TM 9-2320-272-20-2 TM 9-2320-272-20P TM 9-2320-272-34-1 TM 9-2320-272-34-2 TM 9-2320-272-34P-1 TM 9-2320-272-34P-2 TM 9-2320-356-BD TM 43-0001-31 TM 55-2320-272-14-1	*X*	

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
X40831	TRUCK CARGO: 5-TON 6X6 LWB W/E	TB 9-2300-295-15/21 TM 9-2320-272-10 TM 9-2320-272-10-HR TM 9-2320-272-20-1 TM 9-2320-272-20-2 TM 9-2320-272-20P TM 9-2320-272-34-1 TM 9-2320-272-34-2 TM 9-2320-272-34P-1 TM 9-2320-272-34P-2 TM 43-0001-31 TM 55-2320-272-14-1	*X*	*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
X43708	TRUCK DUMP: 5-TON 6 X6 WITH EQUIPMENT	LO 9-2320-211-12 LO 9-2320-260-12 LO 9-2320-272-12 TB 9-2300-295-15/21 TB 43-0213 TM 9-2320-211-10 TM 9-2320-211-20 TM 9-2320-211-35 TM 9-2320-211-20P TM 9-2320-211-34P TM 9-2320-211-10-1 TM 9-2320-211-10-2 TM 9-2320-211-10-3 TM 9-2320-211-10-4 TM 9-2320-211-10-HR TM 9-2320-260-10-1 TM 9-2320-260-10-2 TM 9-2320-260-10-3 TM 9-2320-260-10-4 TM 9-2320-260-10-HR TM 9-2320-272-10 TM 9-2320-272-20 TM 9-2320-272-34 TM 9-2320-272-35 TM 9-2320-272-20P TM 9-2320-272-34P TM 9-2320-272-10-1 TM 9-2320-272-10-2 TM 9-2320-272-10-3 TM 9-2320-272-10-4 TM 9-2320-272-10-HR		*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
X48914	TRUCK LIFT FORK: DIESEL-DRIVEN 6,000-LB CAPACITY ROUGH TERRAIN	LO 10-3930-242-12 LO 10-3930-634-12 TM 10-3930-242-12 TM 10-3930-242-34 TM 10-3930-634-12 TM 10-3930-634-34 TM 10-3930-634-30P TM 10-3930-634-34P		*X*
X49051	TRUCK KIFT FORK: DSL-DRVN 10,000-LB CAP ROUGH TERRAIN	TM 10-3930-243-12 TM 10-3930-243-20P TM 10-3930-243-34 TM 10-3930-243-34P TM 43-0001-32 TM 55-3930-243-14		*X*
X59326	TRUCK TRACTOR: 5-TON 6X6 W/E	MWO 9-2320-272-20-2 MWO 9-2320-272-24-1 TB 9-2300-295-15/21 TM 9-2320-272-10 TM 9-2320-272-10-HR TM 9-2320-272-20-1 TM 9-2320-272-20-2 TM 9-2320-272-20P TM 9-2320-272-34-1 TM 9-2320-272-34-2 TM 9-2320-272-34P-1 TM 9-2320-272-34P-2 TM 9-2320-356-BD TM 43-0001-31 TM 55-2320-272-14-1		*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
X63299	TRUCK WRECKER: 5-TON 6X6 W/WINCH W/E	MWO 9-2320-200-35-1 TB 43-0213 TM 9-2320-211-10 TM 9-2320-211-10-1 TM 9-2320-211-10-2 TM 9-2320-211-10-3 TM 9-2320-211-10-4 TM 9-2320-211-10-HR TM 9-2320-211-20 TM 9-2320-211-20-1 TM 9-2320-211-20-2-1 TM 9-2320-211-20-2-2 TM 9-2320-211-20-3-1 TM 9-2320-211-20-3-2 TM 9-2320-211-20P TM 9-2320-211-34-1 TM 9-2320-211-34-2-1 TM 9-2320-211-34-2-2 TM 9-2320-211-34-2-3 TM 9-2320-211-34-2-4 TM 9-2320-211-34P TM 9-2320-211-35 TM 9-2320-356-BD TM 43-0001-31 TM 55-2320-211-15-1		*X*
Y07779	VISE MACHINE TABLE: SCREW TYPE	No DA publications		*X*
Y34027	WATCH WRIST: NONMAINTAINABLE	No DA publications	*X*	*X*
Y47981	WELDING SET ARC: INERT GAS SHIELD WATER-COOLED GENERAL-PURPOSE ALUMINUM WELD	TM 5-3431-226-15 TM 5-3431-226-23P		*X*
Y48323	WELDING SHOP TRAILER-MOUNTED	SC 3431-95-CL-A01 SC 3431-95-CL-A01-HR TM 5-3431-229-13 TM 43-0001-46 TB 746-95-1		*X*

LIN	DESCRIPTION	BASIC PUBLICATIONS	PRESCRIBED BY TOE	
			10416L	10417L
Y96182	YOKE TOWING AND LIFTING COLLAPSIBLE FABRIC DRUM: 500-GAL CAP	TM 10-8110-201-10-HR TM 10-8110-201-14&P TM 10-8110-202-10-HR TM 10-8110-202-13&P		*X*
Z11021	BORESIGHTING EQUIPMENT WEAPON: SMALL ARMS XM30	No DA publications	*X*	
Z15940	CSS CS	No DA publications	*X*	
Z17545	COMPUTER SET GENERAL AN/GYK-33B	No DA publications	*X*	
Z17744	COMPUTER DIGITAL CP-2251	No DA publications	*X*	
Z21128	DATA TRANSFER DEVICE: AN/CYZ-10 (C)	See DA Pam 25-35	*X*	
Z26616	COMPUTER DIGITAL CP-2245	No DA publications	*X*	
Z31590	DATA TRANSFER DEVICE: AN/CYZ 10	See DA Pam 25-35	*X*	
Z36072	KEY PROCESSOR KP TSEC/KOK-22	No DA publications	*X*	
Z40430	TRUCK CARGO: 4X4 LMTV W/E	No DA publications	*X*	
Z40439	TRUCK CARGO: MTV W/E	No DA publications	*X*	
Z58750	RANDOM DATA GENERATOR AN/CSZ-9	No DA publications	*X*	
Z75367	POCKET RADIAC:	No DA publications	*X*	

APPENDIX C

Conversion Charts

TEMPERATURE

C=5/9(F-32)
F=9/5(C+32)

AREA

To Convert	To	Multiply By
Acres	Square Feet	43,560
	Square Yards	4,840
	Square Miles	0.0015625
	Square Meter	4,046.873
	Hectares	0.4046873
Hectares	Square Yards	11,959.85
	Acres	2.47104
	Square Miles	0.003861
	Square Meters	10,000
	Square Kilometers	0.01
	Square Feet	107,600
Square Centimeters	Square Feet	0.001076
	Square Inches	0.1550
	Square Meters	0.0001
	Square Miles	3.861×10^{-11}
	Square Millimeters	100
	Square Yards	0.000196
Square Feet	Acres	0.0000296
	Square Centimeters	929.0
	Square Meters	0.09290
	Square Inches	144.0
	Square Yards	0.11111
	Square Miles	3.587×10^{-8}
	Square Millimeters	9.29×10^{4}
Square Inches	Square Centimeters	6.452
	Square Feet	0.6944
	Square Millimeters	645.2
	Square Yards	0.000716
Square Kilometers	Acres	247.1

	Square Centimeters..... .....10^{10}	

AREA (Continued)

To Convert	To	Multiply By
	Square Feet.....	10.76×10^{6}
	Square Inches.....	1.550×10^{9}
	Square Meters.....	10^{6}
	Square Miles.....	0.3861
	Square Yards.....	1.196×10^{6}
Square Meters	Acres.....	0.0002471
	Square Centimeters.....	10,000
	Square Feet.....	10.76
	Square Inches.....	1,550
	Square Miles.....	3.861×10^{-7}
	Square Millimeters.....	10^{6}
	Square Yards.....	1.196
Square Miles	Acres.....	640.00
	Square Feet.....	27.88×10^{6}
	Square Kilometers.....	2.590
	Square Meters.....	2.590×10^{6}
	Square Yards.....	3.098×10^{6}
Square Yards	Acres.....	0.0002066
	Square Centimeters.....	8,361
	Square Feet.....	9.0
	Square Inches.	1,296
	Square Meters.....	0.8361
	Square Miles.....	3.228×10^{-7}
	Square Millimeters.....	8.361×10^{5}

FLOW

To Convert	To	Multiply By
Barrels per Day	Gallons per hour.....	1.75
	Gallons per minute.....	0.0292
Barrels per Hour	Cubic Feet per Minute.....	0.0936
	Gallons per Minute.....	0.7
Gallons per Hour	Cubic Feet per Hour.....	0.1337
	Cubic Feet per Minute.....	0.002228
	Gallons per Minute.....	0.016667

FLOW (Continued)		
To Convert	**To**	**Multiply By**
Gallons per Minute	Barrels per Day	34.2857
	Barrels per Hour	1.4286
	Barrels per Minute	0.02381
	Cubic Feet per Day	192.50
	Cubic Feet per Minute	0.1337
	Gallons per Day	1,440.0
	Liters per Second	0.6308
	Cubic Feet per Second	0.002228
Cubic Feet per Minute	Gallons per Second	0.1247
	Liters per Second	0.4720
	Cubic Centimeters per Second	472.0
Cubic Feet per Second	Million Gallons per Day	0.646317
	Gallons per Minute	448.831
Cubic Yards per Minute	Cubic Feet per Second	0.45
	Gallons per Second	3.367
	Liters per Second	12.74
Liters per Minute	Cubic Feet per Second	0.0005886
	Gallons per Second	0.004403

LENGTH

To Convert	To	Multiply By
Centimeters	Feet	0.03281
	Inches	0.3937
	Kilometers	1×10^{-5}
	Meters	0.01
	Miles	6.214×10^{-6}
	Millimeters	10.0
	Mils	393.7
	Yards	0.01094
	Microns	10,000
Feet	Centimeters	30.48
	Kilometers	0.0003048
	Meters	0.3048
	Miles (Nautical)	0.0001645
	Miles (Statute)	0.0001894

	Millimeters	304.8
LENGTH (Continued)		
To Convert	**To**	**Multiply By**
	Mils	12,000
	Microns	30,480
Kilometers	Centimeters	1×10^5
	Feet	3,281
	Inches	39,370
	Meters	1,000
	Miles	0.6214
	Millimeters	10^6
	Yards	1,094
League	Miles	3
Meters	Centimeters	100
	Feet	3.281
	Inches	39.37
	Kilometers	0.001
	Miles (Nautical)	0.0005396
	Miles (Statute)	0.0006214
	Millimeters	1.094
	Microns	1×10^6
Miles (Nautical)	Feet	6,080.27
	Kilometers	1.853
	Meters	1,853.0
	Miles (Statute)	1.1516
	Yards	2,027
Miles (Statute)	Centimeters	1.609×10^5
	Feet	5,280
	Inches	63,360
	Kilometers	1.609
	Meters	1,609.0
	Miles (Nautical)	0.8684
	Yards	1,760
Millimeters	Centimeters	0.1
	Feet	0.003281
	Inches	0.03937
	Kilometers	10^{-6}
	Meters	0.001
	Miles	6.214×10^{-7}
	Mils	39.37
	Yards	0.001094

LENGTH (Continued)

To Convert	To	Multiply By
	Microns	1,000
Microns	Centimeters	1×10^{-4}
	Inches	3.937×10^{-5}
	Meters	1×10^{-6}
Yards (US)	Centimeters	91.4402
	Fathoms	0.03
	Feet	3
	Inches	36
	Meters	0.9144
	Miles	5.68182×10^{-4}

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VOLUME

To Convert	To	Multiply By
Barrels (US)	US Gallons	42
	Cubic Inches	9,702
	Cubic Feet	5.6146
	Imperial Gallons	34. 9726
	Liters	158.984
	Cubic Meters	0.15899
Cubic Centimeters	Cubic Feet	3.531×10^{-5}
	Cubic Inches	0.06102
	Cubic Meters	10^{-6}
	Cubic Yards	$1,308 \times 10^{-6}$
	Gallons (US Liquid)	0.0002642
	Liters	0.001
	Pints (US Liquid)	0.002113
	Quarts (US Liquid)	0.001057
Cubic Feet	Cubic Centimeters	28,320.00
	Cubic Inches	1,728.00
	Cubic Meters	0.02832
	Cubic Yards	0.03704
	Gallons (US Liquid)	7.48052
	Liters	28.32
	Pints (US Liquid)	59.84
	Quarts (US Liquid)	29.92
Cubic Inches	Cubic Centimeters	16.39
	Cubic Feet	5.787×10^{-4}
	Cubic Meters	0.02832

	Cubic Yards	2.143×10^{-5}

VOLUME (Continued)

To Convert	To	Multiply By
	Cubic Gallons	0.004329
	Liters	0.01639
	Mil Feet	1.061×10^{5}
	Pints (US Liquid)	0.03463
	Quarts (US Liquid)	0.01732
Cubic Meters	Bushels (dry)	28.38
	Cubic Centimeters	1×10^{6}
	Cubic Feet	35.31
	Cubic Inches	61.023
	Cubic Yards	1.308
	Gallons (US Liquid)	264.2
	Liters	1,000
	Pints (US Liquid)	2,113.0
	Quarts (US Liquid)	1,057.0
Cubic Yards	Cubic Centimeters	7.646×10^{5}
	Cubic Feet	27.0
	Cubic Inches	46,656
	Cubic Meters	0.7646
	Cubic Gallons	202.0
	Liters	764.6
	Pints (US Liquid)	1,615.9
Gallons (Imperial)	Quarts (US Liquid)	807.9
	Cubic Inches	277.42
	Cubic Feet	0.160544
	US Gallons	1.20094
	US Barrels	0.028594
	Liters	4.54596
	Cubic Meters	0.004546
Gallons (US)	Cubic Centimeters	3,785.0
	Cubic Feet	0.1337
	Cubic Inches	231.0
	Cubic Meters	0.003785
	Cubic Yards	0.004951
	Liters	3.785
	Pints	8.0
	Quarts	4.0
Gills	Liters	0.1183
	Pints (Liquid)	0.25

VOLUME (Continued)		
To Convert	**To**	**Multiply By**
Liters	Bushels (US Dry)	0.02838
	Cubic Centimeters	1,000.0
	Cubic Feet	0.03531
	Cubic Inches	61.02
	Cubic Meters	0.001
	Cubic Yards	0.001308
	Gallons (US Liquid)	0.2642
	Pints (US Liquid)	2.113
	Quarts (US Liquid)	1.057

FORCE

To Convert	**To**	**Multiply By**
Pounds per Square Inch	Kilograms per Square Inch	703.06687
	Inch of Mercury	2.036009
	Feet of Water	2.306009
	Atmospheres	0.0680457
	Kilograms per Square Centimeter	0.7036
KGs per Square Meter	Pounds per Square Inch	0.00142234
	Pounds per Square Foot	0.2048169
	Inch of Mercury	0.0028959
	Feet of Water	0.003280833

WEIGHT

To Convert	**To**	**Multiply By**
Pounds	Grams	453.59
	Kilograms	45359
	Ounces (Avoirdupois)	16
	Ounces (Troy)	14.5833
	Long Tons	4.4643×10^{-4}
	Short Tons	5×10^{-4}
Short Tons	Kilograms	907.185
	Long Tons	0.892857
	Metric Tons	0.907185
	Pounds	2,000
Kilograms	Pounds	2.20462
	Short Tons	0.0011023
	Metric Tons	0.001

Long Tons.....9.842 x 10^{-4}

WEIGHT (Continued)		
To Convert	**To**	**Multiply By**
Long Tons	Kilogram	1,016.05
	Metric Tons	1.01605
	Pounds	2,240
	Short Tons	1.12
Metric Tons	Kilogram	1,000
	Long Tons	0.98421
	Pounds	2,204.6
	Short Tons	1.10231

GLOSSARY

AAR after action report
ABFDS Aerial Bulk Fuel Delivery System
AC active component
ACCP Army correspondence course program
ACE armored combat earthmover
ADC area damage control
ADCON administrative control
ADTLP-Army Doctrinal and Training Literature Program
AM- amplitute modulation
AMDF Army Master Data File
AMSS Army Material Status System
AMTP Army Mission Training Plan
ANCD automated net control device
AO area of operations
API American Petroleum Institute
AR Army regulation
ARNG Army National Guard
ARTEP Army training and evaluation program
ASCC Army Service Component Commander
attn attention
AVGAS aviation gasoline

BDAR battle damage assessment and repair
BFTA bulk fuel tank assembly
BSW bottom sediment and water
BTU beach termination unit

C Centrigade
CAI computer-assisted instruction
CBI computer-based instruction
C-E communications-electronics
CFX command field exercise
CINC Commander in chief
CJSC Chairman, Joint Chiefs of Staff
CK containerized kitchen
CMI computer-managed instruction
COCOM combatant command
COMMZ communications zone
COMSEC communications security
CONUS continental United States
COSCOM corps support command
CPX command post exercise
CSB Corps Support Battalion
CSG Corps Support Group
CSS combat service support
CTA common table of allowances

CTC combat training center
CZ combat zone

DA Department of the Army
DC direct current
DDN Defense data network
DFSC Defense Fuel Supply Center
DIRLAUTH direct liaison authorized
DLA Defense Logistics Agency
DMS defense message system
DOD Department of Defense
DS direct support
DS4 direct support unit standard supply system
DSU direct support unit

EAC echelons above corps
ECAS Environmental Compliance Assessment System
ECCM electronic counter-counter measures)
EEFI essential elements of friendly information
EIS environmental impact statement
EOP emergency off-take point
EPW enemy prisoners of war

F Fahrenheit
FARE forward area refueling equipment
FIFO first-in first-out
FLOT forward line of own troops
FM field manual; frequency modulated
FRAGO fragmentary order
FSSP fuel system supply point
FTX field training exercise

GPM gallons per minute
GS general support
GTA graphic training aid

HAZCOM hazardous communication
HAZMIN hazardous waste minimization
HF high frequency
HHC headquarters and headquarters company
HHD headquarters and headquarters detachment
HM hazardous material
HMMWV high-mobility multiwheeled vehicle
HW hazardous waste
hz hertz

IAW in accordance with
ICW interactive courseware
IPDS inland petroleum distribution system

JCS Joint Chiefs of Staff
JPO Joint Petroleum Office
JTTP joint tactics, techniques, and procedures

KCLFF kitchen company level field feeding
km kilometer
kw kilowatt

LFX live fire exercise
LIN line item number
LP listening post

MACOM Major Army Command
MARKS Modern Army Record Keeping System
MBPAS Monthly Bulk Fuel Petroleum Accounting Summary
MCSR material condition status report
METL mission essential task list
MHE materials-handling equipment
MILSTRIP Military Standard Requisitioning and Issue System
MKT mobile kitchen trailer
MMC Material Management Center
MOGAS motor gasoline
MOPP mission-oriented protective posture
MOS military occupational specialty
MP military police
MPL mandatory parts list
MRE meals, ready-to-eat
MSE mobile subscriber equipment
MSRT Mobile Subscriber Radio Terminal
MTOE modified table(s) of organization and equipment
MTP mission training plan

NATO North Atlantic Treaty Organization
NBC nuclear, biological, and chemical
NCA National Command Authorities
NCO noncommissioned officer
NCOIC noncommissioned officer in charge
NCS net control station
NEPA National Environmental Policy Act
NVIS near vertical incidence skywave

OCONUS outside the continental United States
OJT on-the-job training
OP observation post
OPCON operational control
OPDS Offshore Petroleum Discharge System
OPLAN operations plan
OPORD operations order

OPSEC operational security
OSC objective supply capability

PAC personnel administration center
PBO property book officer
PDC personnel data card
PLCA pipe line connection assemblies
PLL prescribed load list
PMCS preventive maintenance checks and services
POC point of contact
POL petroleum, oils, and lubricants

QMS Quartermaster Supply
QRF quick response force
QTB quarterly training brief

RAOC rear area operations center
RAP rear area protection
RAS rear area security
RAU radio access unit
RBECS revised battlefield electronic CEOI system
RTCHE rough terrain container handling equipment

SAPO subarea petroleum offices
SASO stability and support operations
SB supply bulletin
SC supply catalog
SCP service control point
SIDPERS Standard Installation/Division Personnel System
SINCGARS single channel ground-air radio system
SLCR shower, laundry, and clothing repair
SOI signal operating instructions
SOP standard operating procedures
SPCC spill prevention control and countermeasures
SSA Supply Support Activity
SSL shop stock list
STP soldier training publication
STX situational training exercises

TA theater army
TAACOM Theater Army Area Command
TACON tactical control
TAMMS The Army Maintenance Management System
TASC Training and Audiovisual Support Center
TASS Total Army School System
TB technical bulletin
TC training circular
TM technical manual
TOE table of organization and equipment

TSP training support package
TPT tactical petroleum terminal
TRADOC Training and Doctrine Command

UCMJ Uniformed Code of Military Justice
UCP unified command plan
ULLS-G Unit Level Logistics System-Ground
UMR unit manning report
UMT unit ministry team
USAF United States Air Force
USAR United States Army Reserve
USR unit strength report

VTT video teletraining

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INDEX

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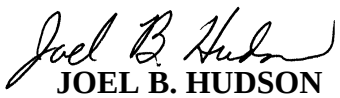

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