

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.

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- 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

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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:

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- 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 contaminants 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

<p>If a small battery-operated radio transmitter is available, it can be placed on the scraper and traced with a receiving set.</p> <p>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.</p> <p>The steel-type scraper cannot turn corners of more than 30 degrees. Refer to FM 5-482 for information on pipe bends.</p> <p>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.</p>

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.

<p style="text-align: center;">NOTE</p> <p>There is a sand trap bypass which allows the product to continue through the line while a sand trap is being cleaned.</p>
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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.