CHAPTER 10

ADMINISTRATION AND LOGISTICS

Section I. GENERAL

57. (U) General

The battalion headquarters is considered both tactical and administrative; however, administrative functions of the battalion headquarters are not limited to coordination, supervision, and control. Normal administrative functions prescribed for batteries and companies are discussed in applicable Department of the Army publications. This chapter covers additional administrative, supply, and maintenance procedures which are peculiar to, or which must be emphasized for, this type of organization.

58. (U) Battalion Organization and Logistic Responsibilities

The command, policy, and maintenance and supply channels of the field artillery missile battalion, Redstone, are shown in figure 14. The logistic mission of the battalion is to establish, supervise, and coordinate logistic policies that are compatible with operational and technical requirements of the firing or using elements and the requirements established by higher headquarters.

a. The headquarters and headquarters battery logistic mission is the implementation of logistic procedures that will insure compliance with

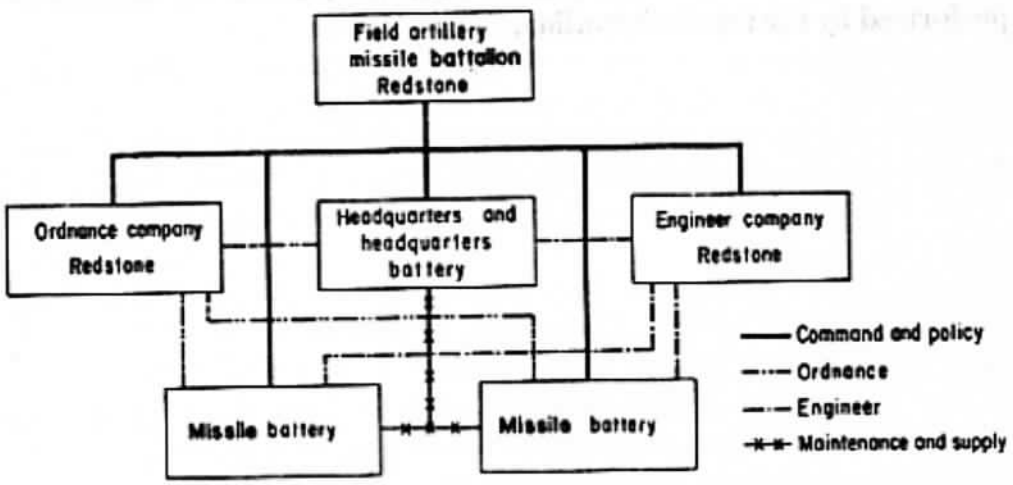

Figure 14. (U) *Maintenance and supply channels, field artillery missile battalion, Redstone.*

the battalion logistic policy and the supply of all items for which responsibility has not been delegated to the ordnance and engineer companies.

b. The Redstone firing battery logistic mission is the implementation of battalion logistic procedures.

c. The logistic mission of the ordnance company, Redstone, is to—

(1) Provide supply and maintenance service for ordnance and signal equipment within the battalion.

(2) Provide technical assistance to the artillery commanders on maintenance and supply matters concerning the Redstone missile system.

(3) Assist in gathering and forwarding field engineering data on materiel failure.

(4) Supply hydrogen peroxide (H_2O_2) and mixed alcohol.

d. The logistic mission of the engineer company, Redstone, is to—

(1) Provide field maintenance for all engineer mechanical equipment within the battalion.

(2) Manufacture and supply liquid oxygen (LOX) and liquid nitrogen (LN_2).

(3) Provide technical assistance to artillery commanders on maintenance and supply matters.

(4) Assist in gathering and forwarding field engineering data on materiel failures.

59. (U) General Support Policies

a. Technical support must be provided in a manner which precludes cancellation or delay of a firing mission because of failure to have serviceable materiel or supplies at the point of employment.

b. The ordnance and engineer support companies will operate under policies and procedures established by the battalion commander.

c. Continuous communication between the support units and elements of the battalion will be maintained.

d. Upon firing a mission, the special ammunition load of the firing unit will be replenished by the support companies.

e. If a missile in the firing position should fail to pass firing readiness checks, the decision as to whether to repair the missile or to replace it will be made by the battalion commander or his designated representative.

Section II. ENGINEER COMPANY

60. (CMHA) Capabilities

The engineer company is 100 percent mobile. The company is organized and equipped in such a manner that it is capable of—

a. (U) When equipped with 5-ton per day liquid oxygen generating plants—

(1) Manufacturing liquid oxygen at a sustained rate of 20 tons per day.
(2) Storing 117 tons of liquid oxygen in mobile storage equipment.
(3) Manufacturing liquid nitrogen at a rate of 800 pounds per day while producing liquid oxygen at a sustained rate of 20 tons per day.

b. (U) Storing 9 tons of liquid nitrogen on mobile storage equipment.

c. (U) Providing field maintenance and repair parts support for all group engineer mechanical equipment.

d. (U) Transporting and transferring liquid oxygen and liquid nitrogen.

e. (U) Providing all necessary mess, supply, and administrative functions except that required for personnel management.

f. (CMHA) With adequate warning, supporting a maximum rate of fire of 4 missiles in a single 24-hour period.

g. (CMHA) Supporting a sustained rate of fire of one missile every 48 hours.

61. (U) Functions

The engineer company is organized as shown in figure 6. The functions of the elements of the engineer company are as follows:

a. Company Headquarters. The company headquarters is the command and administrative element of the company. It provides mess, unit supply, and all administrative facilities for the personnel of the unit. The unit commander, in addition to his normal command functions in the company, is the special staff adviser to the battalion commander for all engineer matters.

b. Maintenance Platoon. The maintenance platoon is responsible for field maintenance of mechanical engineer equipment in the battalion, and it provides all engineer repair parts for the battalion. It provides engineer maintenance contact teams for repair at the firing position and on a standby basis during fire missions. It also provides second echelon maintenance on its organic ordnance and engineer equipment.

c. Liquid Oxygen Generating Platoons. Each of the liquid oxygen generating platoons generates, stores, and transports liquid oxygen. In addition these platoons produce liquid nitrogen and perform preventive maintenance on all their operating equipment as required.

62. (U) Coordination in Liquid Oxygen Supply

The nature of liquid oxygen is such that it is very difficult to manufacture and store. Lost production time due to defrost and cool-down operation, and evaporation losses incurred in storage, transfer, and the

missile, make liquid oxygen a most critical item. It is essential that the missile batteries and the engineer company maintain close coordination to insure that liquid oxygen is available in sufficient quantities, when it is needed. A more detailed discussion on the problems of manufacturing, handling, and storing liquid oxygen can be found in paragraphs 68 through 76.

Section III. ORDNANCE COMPANY

63. (CMHA) Capabilities

The ordnance company is a 100 percent mobile unit capable of direct ordnance and signal maintenance and supply support for ordnance equipment peculiar to the Redstone system, including the supply of alcohol and hydrogen peroxide. However, additional transportation must be acquired or organic transportation shuttled to move the complete load of missiles and warheads in the supply point. The organization of the company is such that it is capable of—

a. Providing support of such a nature that a missile may be fired within 6½ hours after arrival of the firing battery at a prepared firing position. If firing is delayed, support can be rendered to maintain the missile for 24 hours in condition to fire within 1 hour or less.

b. Supporting a maximum rate of fire of 4 missiles in a single 24-hour period with adequate warning and supply of additional missiles.

c. Supporting a sustained rate of fire of one missile per 48-hour period.

d. Furnishing organic field maintenance support for major items of ordnance and signal equipment peculiar to the Redstone system and field maintenance support for those common items directly associated with equipment within workload capabilities.

e. Providing contact teams and repair at the firing position as required.

f. Providing all necessary mess, supply, and administration functions for personnel assigned and attached to the company.

64. (U) Functions

The ordnance company is organized as shown in figure 7. The functions of the elements of the ordnance company are as follows:

a. Company Headquarters. The company headquarters is the command and administrative element for the company. It provides mess, unit supply, and all administrative facilities for the personnel of the unit except that required for personnel management. The unit commander, in addition to his normal command functions in the company, is the special staff adviser to the battalion commander for all ordnance matters.

b. Operations Section. The operations section is the focal point for all mission activities performed by the unit. The operations officer is the coordinator for all maintenance and supply activities. The master control records for maintenance and supply functions are maintained by this section and requests for special contact teams are coordinated.

c. Missile Maintenance Platoon. The missile maintenance platoon provides all missile system maintenance. It must supply the contact teams to work outside the physical confines of the unit shop. This will include the missile batteries and the ordnance unit storage points. The main functions include preissue inspections, component repair, in-storage inspections, and other tasks as directed.

d. Supply Platoon. The supply platoon will handle all supply functions within the unit with the exception of unit supply. This supply function will include the supply of major Redstone items and missile fuel as well as all repair parts to both of the operating sections of the ordnance company and the missile batteries. Present technical and safety considerations indicate that one or more missile and fuel supply points should be established at some distance from the unit proper with the control remaining centrally located in the supply platoon headquarters. The special weapons section of the supply platoon maintains and prepares for issue items peculiar to nuclear weapons and makes instorage periodic technical surveillance inspections of all nuclear warheads within the battalion. The supply platoon is responsive to the needs of the operations section for personnel to augment the contact teams.

e. Automotive Maintenance Platoon. The automotive maintenance platoon is responsible for all supporting functions to the unit, such as machine shop facilities, welding facilities, wrecker service, and field maintenance for automotive equipment. The platoon will provide special personnel and equipment to the contact teams as deemed necessary for the performance of a particular task.

f. Firing Trainer Section. The firing trainer section operates and maintains the Redstone trainer and furnishes training support to the missile batteries. This support will be coordinated by the S3.

Section IV. AMMUNITION HANDLING PROCEDURES

65. (U) General

The ammunition supply procedures for the battalion are generally the same as those prescribed for other field artillery units with a nuclear capability. For ordnance procedures see FM 9–5 and TM 9–1903.

66. (U) Complete Round

A complete round is considered to be 3 missile sections (thrust unit, aft unit, and warhead unit), guidance components, missile batteries, explosive bolts, igniter squib, fuels (alcohol and hydrogen peroxide), and sufficient perishable items (liquid oxygen and liquid nitrogen) to insure that a suitable firing level is maintained over a minimum period of 8 hours without replenishment.

67. (CMHA) Missile Handling Procedures

a. Capability. The battalion is capable of transporting four missiles (complete rounds). Of the 4 missiles, 2 are in ready storage at the ordnance company and 1 at each missile battery.

b. Drawing. The ordnance company will draw missiles from a designated supply point. Missiles are packaged in 4 packages consisting of the thrust unit, aft unit, warhead unit, and the stabilized platform (ST–80). A fifth container is used for transporting expendable battalion support equipment.

c. Checkout.

(1) The ST–80 missile and warhead will be checked out by the ordnance company, prior to issue to the missile battery, as prescribed in TM 39W39–16.1 and TM 9–1400–350–34/2.

(2) The winterization kits are used as required.

d. Transport.

(1) The ST–80 is transported to the firing position on an M35, 2½-ton truck, cargo, 6 x 6.

(2) The ST–80 container temperature must be maintained between 32° F. and 105° F. The container has heating facilities for temperature control when needed. This heating device utilizes a 24-volt d.c. power source for use during motor marches and a 110-volt a.c. power source for storage purposes. (For detailed instructions see TM 9–1410–350–14/1, Ballistic Guided Missile XM8; Shipment, Handling, and Storage.)

e. Storage.

(1) There will be a missile and fuel storage area for each missile in the battalion special ammunition load. Of the 4 storage areas, 2 will be manned by ordnance and 1 by each of the 2 missile batteries. These areas will be dispersed for tactical reasons as determined by the battalion commander.

(2) Each missile component will be stored in its own shipping container.

(3) The missile packages and fuels should be stored in an area affording good hardstand, road nets, and camouflage. The storage areas should allow entry and exit of servicing vehicles with a minimum of movement of the missile components.

(4) The explosive components, explosive bolts, and igniters will be stored in accordance with like items listed in FM 9–5 and TM 9–1903, and current regulations.

(5) The special weapons section of the ordnance company will perform in-storage periodic technical surveillance inspections on all nuclear warheads within the battalion as prescribed in appropriate publications. Storage monitoring will be accomplished by the ordnance company.

(6) Periodic tests, as described in TM 9–1400–350–34/2 and TM 9–1400–350–12, must be made by the ordnance company and firing battery respectively to maintain the system in an operational condition at all times.

f. Issue.

(1) During tactical operations, battalion headquarters will alert the ordnance company as early as possible when a fire mission has been received.

(2) The ordnance company will immediately notify the backup support echelon to ship a replacement missile to the ordnance company.

(3) The replacement missiles for the missile batteries will be delivered by the ordnance company to a specified location or may be picked up by organic transportation of the missile batteries.

Section V. PROPELLANT HANDLING PROCEDURES

68. (U) Liquid Oxygen-Nitrogen Production

The engineer company is equipped with eight 5-ton per day liquid oxygen-nitrogen mobile generator units. The 5-ton generator unit is mounted in 2 semitrailers; 1 trailer contains the air supply unit and the other an air separator unit.

a. The 5-ton per day air supply unit contains four diesel engine driven air compressors. The compressors connected in parallel, compress atmospheric air to 3,000 psi.

b. The air separator semitrailer assembly contains the equipment for separating the compressed air into liquid oxygen and liquid nitrogen. The compressed air is first dried, then cooled and passing through an expansion valve is liquified. The liquid air is then filtered to remove carbon dioxide and hydrocarbons before flowing to the distillation columns for separation into liquid oxygen and nitrogen. The actual separation of oxygen/liquid nitrogen takes place within the distillation columns. The liquid oxygen/liquid nitrogen is then subcooled and passed to storage.

69. (U) Liquid Oxygen-Nitrogen Production Losses

Liquid oxygen-nitrogen production rates will vary with the losses due to changes in the ambient temperature, the local barometric pressure, and the plant cooldown time. Because compressor performance decreases in direct proportion to the decrease in atmospheric pressure, the output of a generator will decrease at an estimated rate of 4 percent per inch of mercury drop in barometric pressure (equivalent to an increase in altitude of 1,000 feet). Production of liquid oxygen-nitrogen also drops as the ambient temperature increases. Assuming a normal ambient temperature of 85° F., the output of the generator will decrease at a rate of 2 percent per 10° F. rise in ambient temperature. Shutdown time of the 5-ton-per-day plant for maintenance, repair, and defrosting will result in an approximate loss of 30 percent of rated production. The support of the normal sustained fire rate precludes frequent shutdown of the generators because of attendant losses in production due to defrost, disassembly, movement, assembly, and cooldown time. Time lost in movement cannot exceed 1 day per 5 days of full production, if the sustained fire rate is to be maintained.

70. (U) Handling Liquid Oxygen and Liquid Nitrogen

The presence of dirt and impurities in liquid oxygen and liquid nitrogen is one of the most probable sources of equipment mulfunction. Care must be taken to avoid contaminating lines and fittings with oil and dirt. Purity standards for handling and testing should be in accordance with Federal Specification BB–0–925 dated September 16, 1954. Personnel handling liquid oxygen and liquid nitrogen should be properly protected from the extremely low temperature. The safety requirements in TM 5–351–1, Liquid Oxygen and Nitrogen, should be rigidly adhered to. The principal safety precautions are as follows:

a. Wear asbestos gloves.

b. Wear face shield.

c. Clear away combustible materials from a liquid oxygen handling area.

d. Use only materials and lubricants specified for use with liquid oxygen.

e. Use only water in fighting fires involving liquid oxygen.

f. Clean all metallic fittings with trichloroethylene or a hot solution of soda ash and water.

g. All generating and storage equipment should be grounded when operating.

h. Do not smoke or allow open flames within 100 feet of a liquid oxygen container.

i. When cleaning equipment, make sure that the cleaning area is well ventilated. Provisions of TB ORD 584, sections III and V must be adhered to.

71. (U) Storage and Transportation of Liquid Oxygen and Liquid Nitrogen

In addition to manufacturing liquid oxygen and liquid nitrogen, the engineer company is charged with transportation and storage to the supply point designated by the battalion commander. To accomplish this mission, the company has transport and storage containers. The missile batteries also have the capability of transporting liquid oxygen and liquid nitrogen from the engineer company to the firing position.

a. Each platoon is provided with five 9-ton capacity, semitrailer-mounted, liquid oxygen transport containers. The transport containers have an estimated loss rate of 2 to 3 percent per day when the product is in transit and 1 percent per day when in storage.

b. Each generating plant has receiving tanks capable of storing 1⅝ tons of liquid oxygen and 200 pounds of liquid nitrogen while plant is in operation. Normally, accumulated storage is transferred to the mobile containers every 8 hours.

c. The engineer company has one 9-ton capacity, semitrailer-mounted, liquid nitrogen transport container. This container has an estimated loss rate of 2 to 3 percent per day in transit and 1 percent in storage. Liquid nitrogen is transported from the engineer company to the missile batteries in four 150-gallon, trailer-mounted containers.

72. (U) Transfer Rates

In order to estimate the time required to manufacture, transfer, and load liquid oxygen and liquid nitrogen for any mission, it is essential to know the transfer rates of all components within the system. Before a delivery schedule can be established, pumping rates must be known. Although transfer time can be decreased by skilled personnel through experience, the overall time requirement is determined by equipment capability.

a. The estimated transfer rates are listed below:

(1) From on-plant storage to the 9-ton container is 60 to 100 pounds per minute using pressure transfer.

(2) From on-plant storage to the 9-ton container is 140 gallons per minute using pump transfer.

b. The loading rate of the missile from one 9-ton trailer is 150 gallons per minute. With 2 trailers and manifolded the maximum rate is approximately 250 gallons per minute.

c. The replenishing rate from the 9-ton container to the missile is 35 gallons per minute.

d. When the missile is being unloaded into a 9-ton container, the rate is approximately 80 gallons per minute.

e. Liquid nitrogen is automatically transferred to the missile cooling system as needed. Approximately 70 gallons per hour are used.

Note. The rate in *b* above is based on use of electrical pumping equipment. All other rates are applicable using pressure transfer means at reduced rates.

73. (U) Liquid Oxygen and Liquid Nitrogen Storage, Transfer, Transport and Cooldown Losses

Losses in liquid oxygen and liquid nitrogen during the various phases of handling and utilization vary with insulation, pumping rates, turbulence, ambient conditions of pressure and temperature, wind velocity, and the specific heat of containers. The following estimates of loss rates are based on limited experience and are not intended to reflect ambient conditions or pumping rates:

a. Nine-Ton Semitrailer Liquid Oxygen Container Losses.

(1) Loss of liquid oxygen in 10-foot hose used in transferring 9 tons of liquid oxygen from liquid oxygen generating plant into trailer (filling time is approximately 45 minutes)—0.2 ton.

(2) Loss associated with container (cold—containing some residual liquid oxygen)—0.2 ton.

(3) Liquid oxygen loss associated with container (warm—0.75 tons).

(4) Evaporation loss per day (full container) in static storage—0.00 ton.

(5) Evaporation loss per day in transit—0.27 ton.

(6) Residual loss in 9-ton containers:

(*a*) When pumping against 75 psig head at 150 gallons per minute—0.3 ton.

(*b*) When pumping against 30 psig head at 150 gallons per minute—0.4 ton.

(*c*) When transferring by pressurization only at approximately 30 to 50 gallons per minute—0.02 ton.

b. Missile Losses.

(1) Initial cooldown losses and boiloff replacement during filling—2.5 tons.

(2) Boiloff from filled missile—0.9 ton per hour. (Rates may vary between 15 and 45 pounds per minute, depending on the ambient conditions of pressure and temperature.)

(3) Hose loss per hour during transfer of liquid oxygen from 9-ton container to missile to replace boiloff—0.5 ton.

74. (U) Alcohol

a. Receipt. The ordnance company obtains alcohol from the next higher supply echelon. Alcohol is supplied in 55-gallon drums or by exchange of alcohol trailers. The method of supply depends on the local supply requirements.

b. Mixing. The mixing of alcohol and water is accomplished by the ordnance company. The 3,000-gallon alcohol trailer is filled with a basic load of fuel (75.5 percent alcohol and 24.5 percent water ±1 percent by weight) from the 55-gallon drums and engineer-processed water.

c. Issue. Each missile battery is authorized 1 alcohol trailer, and the ordnance company is authorized 3 alcohol trailers. Each missile battery obtains a trailer load of mixed alcohol from the ordnance company and stores the loaded trailer at the battery. The ordnance company stores two of its trailers loaded with mixed alcohol in a ready-for-use condition. Resupply of alcohol may be made by exchanging an empty trailer for a loaded trailer or by refilling the empty missile battery trailers. The method of resupply used within the battalion will be prescribed by the battalion commander.

d. Storage. Filled alcohol trailers will normally be stored within the same area as the missile. The storage of these trailers is subject to quantity and distance requirements for flammable fuels.

e. Inspection. Inspection of mixed alcohol in trailers will be performed by a fuel specialist team from the ordnance company. The fuel specialist team will conduct a mixture concentration test on all filled trailers in the battalion as directed. This team will carry sufficient alcohol in 55-gallon drums to restore the fuel mixture to the required concentration.

f. Special Precautions. The mixed alcohol must be at least the required minimum temperature before loading. The minimum alcohol temperature is furnished as fire mission data. The minimum required alcohol temperature graph is used as a guide in maintaining the approximate alcohol temperature until the fire mission command sheet is received. After the alcohol has been loaded in the missile, the temperature is periodically monitored to insure it does not drop below the minimum required temperature. The efficiency of the rocket engine varies with alcohol temperature, and is controlled by adjusting the fuel ratio mixture control valve shortly before firing. During standby conditions, electric heaters in the alcohol trailer may be used to maintain the required alcohol temperature.

g. Operating Instructions. See chapter 3, TM 9-2330-350-14.

h. Maintenance Instructions. See chapter 4, TM 9-2330-350-14.

75. (U) Hydrogen Peroxide

a. Receipt. The ordnance company receives the hydrogen peroxide (H_2O_2) from the next higher support echelon. Premixed hydrogen peroxide is received in vented containers.

b. Storage. Although no temperature conditioning is required for hydrogen peroxide during storage, its temperature must be checked upon receipt to determine that drum temperature and ambient temperature do not indicate an abnormal temperature difference. After temperature check on receipt the drums must be checked once each day for 5 days for heat generation, which indicates decomposition. Place hand on outside of drums to perform temperature checks. If the temperature in any drum indicates higher than the ambient temperature, but not excessively high, the drum must be isolated and placed under close surveillance. If the temperature continues to rise, the contents must be dumped. For detailed instructions, see TM 9-1450-350-14/1.

c. Issue. The missile batteries will use specially designed organic transportation to pick up hydrogen peroxide at the ordnance company and transport it to the firing position. The ordnance company does not have the special H_2O_2 trucks required for this purpose.

d. Inspection. The hydrogen peroxide in sealed containers will be inspected and tested every three months by ordnance technicians. If the mix is not within tolerance, the ordnance fuel specialists will take corrective action as described in TM 9-1450-350-14/1.

e. Operating Instructions. See chapter 2, TM 9-1450-350-14/1.

f. Special Precautions. During firing operations, heating and cooling facilities in the hydrogen peroxide servicer must be used to condition the hydrogen peroxide to a temperature between 65° F. and 85° F., after the hydrogen peroxide is loaded aboard the missile. If the temperature falls outside the limits, the hydrogen peroxide must be drained back into the servicer to be either heated or cooled.

76. (U) Safety Precautions

a. General. A battalion SOP should be prepared to provide procedures for fighting different types of fires.

b. Alcohol.

(1) Fire fighting equipment will always be available during mixing and loading. A fog nozzle is most effective for extinguishing an alcohol fire.

(2) No smoking or unnecessary vehicle movement should be allowed within the immediate vicinity of propellant loading operations.

(3) Excessive exposure to fumes should not be allowed.

c. Liquid Oxygen (LOX).

(1) Fire fighting equipment will always be available during liquid oxygen loading. Liquid oxygen alone does not burn but it actively supports combustion.

(2) No smoking or unnecessary vehicle movement should be allowed in the immediate vicinity of propellant loading operations. Combustibles usually ignite at much lower temperatures in an oxygen-enriched atmosphere, thereby creating a fire hazard.

(3) Fires are of greater intensity in an atmosphere enriched with oxygen.

d. Hydrogen Peroxide (H_2O_2).

(1) Fire fighting equipment will always be available during testing and loading. The principal objective in extinguishing ing an H_2O_2 fire is to dilute the H_2O_2 with water; therefore, a stream of water is usually used.

(2) Cleanliness of equipment is mandatory. H_2O_2 is extremely sensitive to impurities. Should dirt, grease, or other extraneous material come into contact with the H_2O_2, an explosion is likely to occur.

(3) Protective clothing and face masks must be worn for H_2O_2 operation.

(4) Leaking H_2O_2 or spillage must be washed away with water.

(5) Containers found to be leaking in storage should be washed down with water. The ordnance company should be notified immediately in order that the ordnance fuel specialist may dispose of the container. Washing of the leaking container must be continuous from the time of discovery to disposal by the fuel specialist.

Section VI. MAINTENANCE AND SUPPLY

77. (U) General

a. A concentrated effort is required to maintain the large amount of complex materiel in the Redstone battalion. Command supervision of maintenance, a rigorous preventive maintenance program, and other unit maintenance principles must be aggressively applied in this battalion.

b. The battalion commander, based on the recommendations of the technical support unit commanders, may, within the limits of prescribed technical procedures, alter the performance of maintenance operations to suit the capabilities and requirements of the individual units. The principal governing factors are the level of skill, equipment, and time required. Normally, maintenance by the user will be limited to replacement of major assemblies and components, and the

engineer and ordnance unit will, within their capabilities, repair components and subassemblies within the major assemblies and components.

c. The battalion commander will establish priorities for evacuating items requiring maintenance beyond the workload capabilities of the support units.

d. The general procedures set forth in FM 9–1 and FM 9–3 will be used for establishing shop SOP's and production control within the ordnance company. TM 5–505 will be used as a guide for the proper maintenance of engineer equipment.

78. (U) Operational Procedures

a. Work Order Procedures. The work order procedures prescribed in FM 9–1 and FM 9–3 will be followed when materiel is delivered to support company shops by using personnel.

b. Contact Teams. Work to be accomplished at the firing position by contact teams will be handled by a similar work order procedure.

c. Repair Parts Supply. The support companies will be responsible for requisitions from depots and for storage and issue of repair parts for equipment peculiar to the Redstone system within the battalion.

d. Supply Liaison. The following liaison procedures will apply:

(1) Support companies will furnish contact parties to assist firing batteries with maintenance and technical supply problems and procedures.

(2) Contact party personnel will be alert for problem areas and report them to their respective company commanders.

(3) Company commanders, acting as battalion technical staff officers, will recommend solutions to the battalion commander for approval.

e. Technical Inspection Procedures.

(1) Each support company will inspect the materiel for which it has maintenance and supply responsibility as required by appropriate technical publications or at least once annually.

(2) Technical inspections will be made to determine the condition of materiel, adequacy of maintenance and supply procedures, and training requirements. These inspections will be for the specific purpose of improving the condition of materiel. Personnel to conduct the inspections will be drawn from the appropriate sections of the support companies with personnel of the firing batteries assisting as required.

(3) The support company inspection personnel will assist the battalion commander in conducting command inspections.

f. Reporting Failures.

(1) A failure reporting system will be made part of the battalion logistic system.

(2) The support companies will forward the failure report forms each week to a designated agency for evaluation and processing. Field engineers attached to the support company will review these reports and make necessary comments.

g. Field Engineers.

(1) Field engineers will be attached to the engineer and ordnance companies.

(2) The duties of the field engineers will be directed by the support company commanders within the scope of the contract, to include but not to be limited to the following:

(*a*) Supplement the technical capabilities of the support companies by analyzing difficulties, evaluating deficiences, and reporting deficiencies with analyses and evaluations.

(*b*) Evaluate prescribed and improvised maintenance procedures, tools, and equipment.

(*c*) Evaluate the adequacy of repair parts provided and of packaging and packing.

(*d*) Assist in technical training.

(*e*) Assist in the application of modifications and in retraining in the use of modified equipment.

(*f*) Conduct specific engineering investigations.

(*g*) Review and comment on failure reports.

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