Report Date: 05 Dec 2014

Summary Report for Individual Task
551-88M-1656
Conduct Refueling Operations using Tactical Refueling Vehicles
Status: Approved

Condition: In an operational environment, given an M1088 Tractor with M967 tank semitrailer with full or partial load of fuel, basic issue items (BII), grounding and bonding materials, protective clothing and equipment, fire extinguishers, spill containers, appropriate gauging equipment, dispensing log, assistance from another person, vehicle(s) to refuel, level ground, and instructions on amount of fuel to dispense.

Some iterations of this task should be performed in MOPP 4. This task should be trained under IED Threat conditions.

Standard: Emplace your refueling vehicle, perform all pre-operation safety checks, ground and bond the vehicle properly, refuel designated vehicle(s) or storage area, contain and recover any spillage, and properly prepare for movement to subsequent locations without violating any safety measures, causing injury to personnel, damage to equipment, or contaminating the environment.

Special Condition: Must have hazardous materials endorsement on operator's license. Possess a fuel handler's card. Refueling operations requires two persons.

Safety Risk: High

MOPP 4: Sometimes

Task Statements

Cue: Your unit is assigned to provide refueling capability to units moving along a designated route of movement in theater.

DANGER

Adhere to all dangerous warnings covered in the fueler's TM regarding refueling operations.

WARNING

Adhere to all WARNING statements in the TM for refueling operations.

CAUTION

Adhere to all CAUTION statements regarding refueling operations.

Remarks: None

Notes: The performance of this task is usually the responsibility of the tank refueler operator of a Medium Truck Company POL.

Performance Steps

1. Apply risk management procedures.

a. Refer to ATP 5-19 and local SOP for guidelines applicable to this procedure. Ensure all aspects of these operations are assessed for the risk involved.

b. Fill out the Deliberate risk assessment worksheet (DD Form 2977). Notify chain-of-command if assessment determines requirement for approval from higher authority.

WARNING

WARNING
FREQUENT INSPECTION OF EQUIPMENT, SAFETY DEVICES, AND WORKING AREAS MUST BE PERFORMED TO ENSURE PERSONAL AND OPERATIONAL SAFETY AND TO CORRECT POTENTIAL OR ACTUAL HAZARDS. THE SEMITRAILER MUST NOT BE OPERATED IF ANY OF THE FOLLOWING CONDITIONS EXIST.

2. Perform before-operation preparations by inspecting the following critical areas.

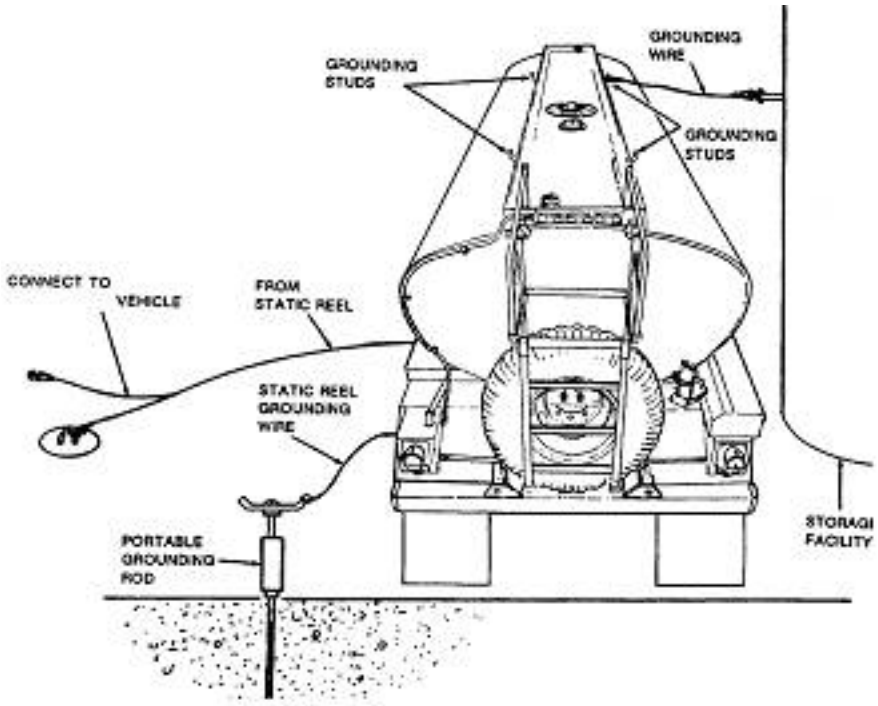

Figure 3-32.
Typical Grounding Connections

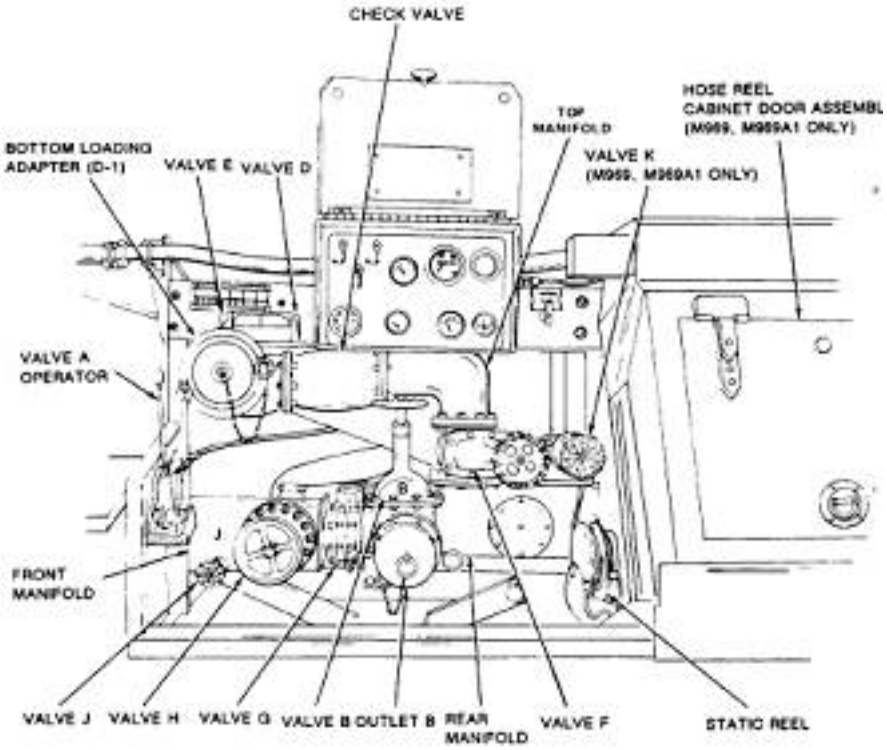

Figure 3-33.
Engine and Pump Assembly

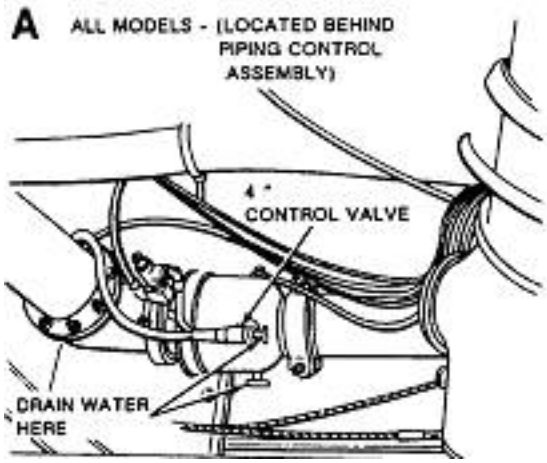

Figure 3-34a.
Pilot Line Water Drains-1

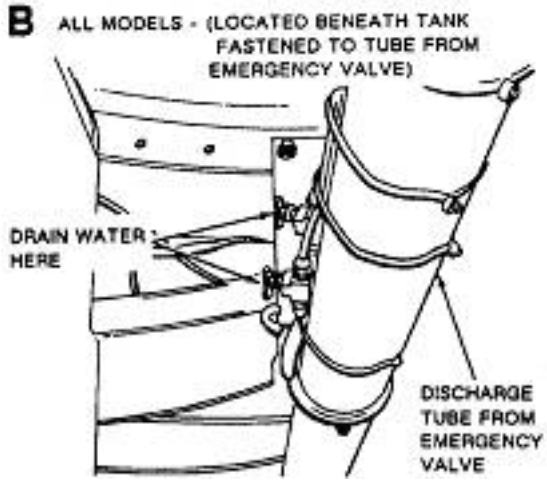

Figure 3-34b.
Pilot Lines Water Drains-2

a. Fuel leaks.

b. Damage to lighting fixtures, wiring or electrical conduits, or lights inoperative.

c. Damage to towing vehicle or semitrailer.

d. Primary or parking brake systems inoperative.

e. Vents plugged, inoperative, or removed.

Note: Pressure, vacuum, and fusible vents are installed to meet code requirements and to protect the semitrailer from damage. A plugged or inoperative vent can cause extensive shell damage if design pressure or vacuum is exceeded. The fusible vents are designed to operate at high temperatures. If these vents are coated with paint, dirt, or other foreign material, the temperature when relief occurs may be greatly increased.

WARNING
ENSURE THAT GROUNDING CONNECTIONS ARE MADE PROPERLY AND FIRMLY BEFORE ANY FUELING OPERATIONS BEGIN. THIS WILL ENSURE THAT GROUNDING CONNECTIONS WILL NOT RELEASE, THUS ELIMINATING THE POSSIBILITY OF SPARKS CAUSED BY STATIC ELECTICITY, WHICH WILL IGNITE FUEL.

WARNING

WARNING
BEFORE AND AFTER FUEL SERVICING OPERATIONS, ALL VALVES ARE TO BE IN THE CLOSED POSITION. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN EXCESSIVE SPILLAGE AND CREATE A FIRE HAZARD.

f. Prior to starting engine perform the following steps.

(1) Ensure all manually operated valves are closed. This is a must before either starting or ending any fuel servicing operations.

(2) To prevent collapse of tank when filling or emptying tank, ensure that the top vent is working properly.

(3) Ground and bond vehicle.

(4) Remove fire extinguishers and bring them to the point of operation.

(5) Ensure engine fuel tank has enough fuel for operation.

(6) Remove engine dipstick and check oil level. Refill as needed.

WARNING

WARNING
CARBON MONOXIDE CAN BE DEADLY. DO NOT OPERATE ENGINE IN AN ENCLOSED AREA UNLESS IT IS ADEQUATELY VENTILATED.

(7) Check air cleaner restriction indicator. Clean or replace filter element as needed.

g. Starting the engine.

(1) Rotate engine switch to RUN. When engine is warm or restarted after short periods of time, preheating is usually not necessary. In temperatures below 30 degrees F, a longer preheating period is needed.

(2) Rotate pre-heater switch to ON for about one minute. Ensure indicator light has illuminated.

(3) After one minute, continue to hold pre-heater switch and rotate starter switch to START.

(4) Release both starter and pre-heater switches after engine starts.

(5) Check the gauges for correct indication. Stop the engine if a system malfunction is indicated.

CAUTION

CAUTION
Throttle engine to fast idle (1,200 rpm) for about 5 minutes before stopping to allow for gradual cooling of engine.

h. Stopping engine (if not used for refueling operations).

(1) Release throttle to low idle.

(2) Rotate engine switch to STOP.

i. Engine operation - High temperature.

(1) See that nothing obstructs the air flow to and from the engine oil cooler and the cylinder cooling fins.

(2) See that shrouds are properly installed and in good condition.

j. Engine operation - Low temperature.

Note: If operating in cold weather, cover (dust boot) of fuel stop solenoid must be cut off. Cover stiffens in cold temperatures and stops flow of fuel to engine.

(1) Ensure that engine has the proper oil and fuel for the existing temperatures.

(2) Keep batteries fully charged.

Note: Entire cold weather starting procedures may not be required. The colder the temperature, the more pre-heating and cranking will be required.

(3) When temperatures are below 30 degrees F, perform the following:

(a) Pull throttle about half way out.

(b) Engage pre-heater switch and leave turned on until engine has started, approximately five minutes at coldest temperature.

(c) After 1 3/4 minutes, move engine switch to RUN position. Wait 15 seconds, then engage starter switch to START position and crank engine for 15 seconds. Disengage starter switch.

(4) Wait one minute and engage starter switch. Crank for one minute or until running. Engine should be firing. Disengage starter switch.

(5) If engine still has not started, engage starter switch and crank for 1 minute. Engine should be firing. Disengage starter switch when engine is increasing speed.

(6) Turn off pre-heater switch.

WARNING

WARNING
TOP LOADING SHOULD ONLY BE DONE WHEN BOTTOM LOADING IS NOT POSSIBLE. BOTTOM LOADING MINIMIZES THE LEVEL OF STATIC ELECTRICITY BUILDUP. WHEN TOP LOADING THROUGH FILL COVER, THERE IS NO AUTOMATIC SHUTDOWN. MAN THE LOADING HOSE TO AVOID FUEL SPILLAGE. USE CAPACITY INDICATOR GAUGE AND DIPSTICK GAUGE TO DETERMINE AMOUNT OF FUEL LOADED. FAILURE TO FOLLOW THIS WARNING MAY RESULT IN UNCONTROLLED FUEL SPILLAGE AND A FIRE OR EXPLOSION HAZARD. LADDER HAS NARROW TREAD, BE CAREFUL WHEN CLIMBING.

3. Conduct basic haul and fuel services (operation NOT involving engine and pump).

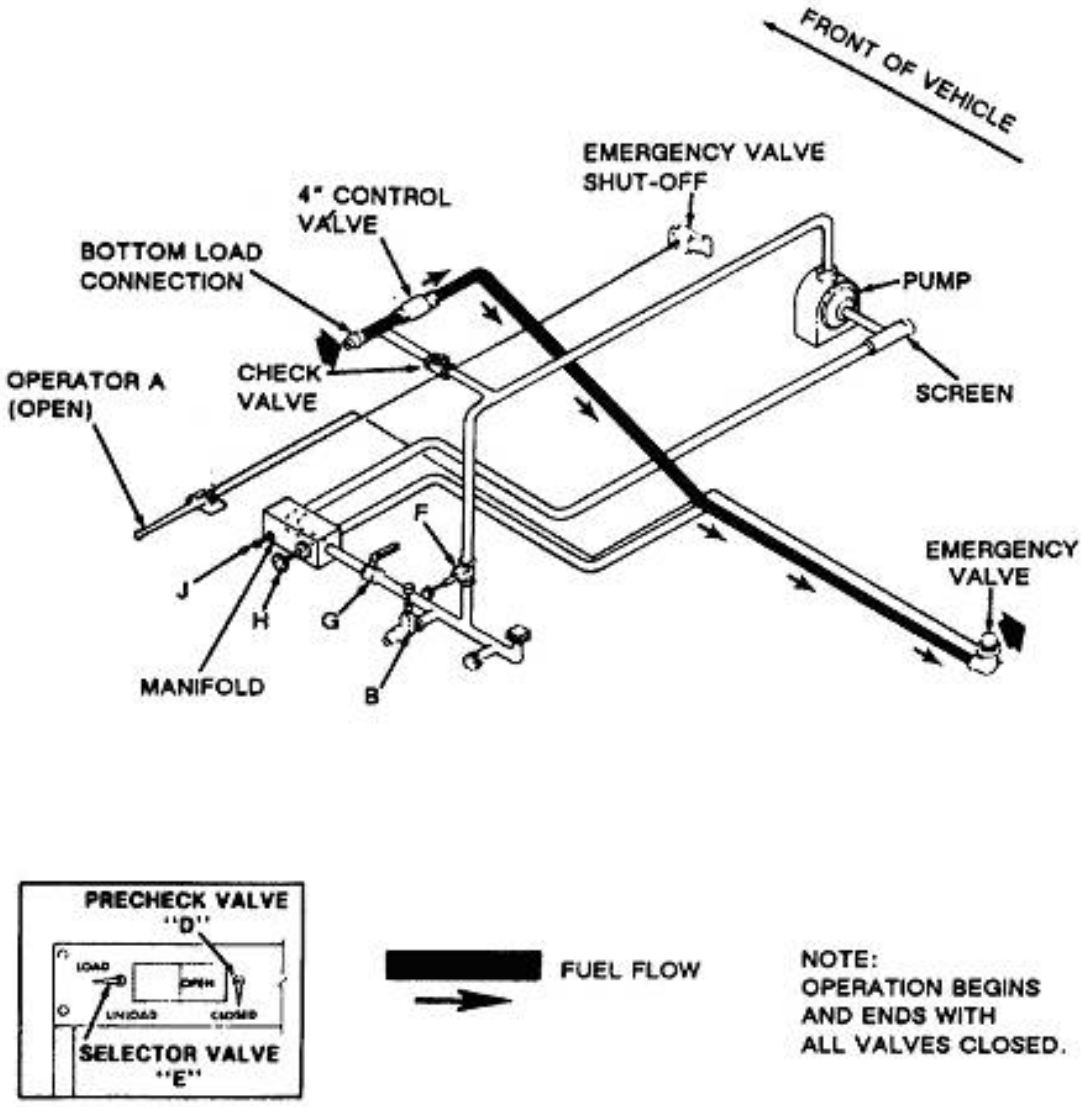

Figure 3-35.
Self-Load Flow Diagram

a. Top Loading (the product is not filtered or metered by the vehicle).

(1) Ensure all valves are closed.

(2) Ground and bond the semitrailer before opening the fill cover.

(3) Place fire extinguishers at point of operation.

(4) Slowly open fill cover. Insert hose far enough to keep the end of the hose in contact with the bottom of the tank.

(5) Slowly begin the flow and fill the tank no further than to the bottom of the capacity indicator (one person at storage tank valve or other fuel source and other holding fill tube into semitrailer).

(6) Remove fill hose. Close and secure the manhole cover.

(7) Drain accumulated water. Close all valves. Put the container under the manifold drain in the piping control cabinet. Open the emergency operator valve. Slowly open the system drain valves.

(8) Remove the grounding wires and store fire extinguishers.

b. Bottom loading (the product is not filtered or metered by the vehicle).

(1) Ensure all valves are closed.

(2) Ground and bond the vehicle.

(3) Remove cover from the bottom loading connection and connect the bottom loading hose to the bottom loading connection.

(4) Remove the fire extinguishers and bring to point of operation.

(5) On the M967, put the selector valve in the LOAD position.

(6) Open the emergency valve operator.

WARNING

WARNING
WHEN FILLING THE TANKS BY MEANS OF BOTTOM LOADING, A TEST OF THE PRE-CHECK VALVE IS MANDATORY. IF THIS SYSTEM IS NOT FUNCTIONING, STOP ALL OPERATIONS. DETERMINE THE PROBLEM AND HAVE IT CORRECTED BY A QUALIFIED TECHNICIAN. FAILURE OF AUTOMATIC SHUT-OFF TO FUNCTION MAY RESULT IN UNCONTROLLED FUEL SPILLAGE AND DANGER OF FIRE AND EXPLOSION.

(7) Begin the flow from the outside source.

(8) After the flow has begun, open the pre-check valve to pre-check the shutoff float. Flow should stop after about 20 to 25 seconds to indicate that the float is functional. If it is not working, stop all operations and notify higher maintenance.

(9) Close the pre-check valve. The flow will resume in about 20 seconds. Be prepared to stop the fuel supply at the loading facility in event of shut-off float malfunction, if leaks are apparent, or other unusual conditions are seen.

(10) When tank is full, the flow should stop automatically. Close all valves, replace all covers, and disconnect the hoses.

(11) Drain the accumulated water in the same manner as stated in 1a(8) above for top loading.

(12) Remove the grounding wires.

(13) Stow fire extinguishers.

c. Self-loading using vehicle engine and pump (see Figure 3-32). Product is not filtered.

(1) Ensure all valves are closed.

(2) Ground and bond the vehicle.

(3) Remove fire extinguishers and bring to point of operation.

(4) Start the engine and pump (see item 1 as necessary).

(5) Adjust idle speed on pump to 1,000 to 1,200 rpm.

(6) Remove the 4-inch bulk fuel hose from the hose trough. Do this by disconnecting the spring pins and turning the hose trough bars out of the way.

(7) Remove dust cap from the fuel outlets. Connect one end of the bulk fuel hose to the outlet and the other end to the storage facility.

(8) Place the selector valve in the LOAD position.

(9) Open the operator valve, fuel outlet valve, and the manifold outlet valve.

(10) Shortly after the flow has started, open the pre-check valve to pre-check the shutoff float. After about 20 to 25 seconds, the flow should stop to let you know the float is working properly. If it is not working, stop all operations and notify higher maintenance.

(11) Close the pre-check valve. Flow will resume in about 20 seconds.

WARNING

WARNING
IN AN EMERGENCY, CLOSE THE OPERATOR'S VALVE OR PULL THE EMERGENCY VALVE SHUTOFF ON THE OPPOSITE SIDE OF THE SEMITRAILER.

(12) When tank is full, the flow should stop automatically.

(13) At the end of operation, idle down the engine.

(14) Close all valves (see Figures 3-33a, 3-33b, and 3-34).

(15) Disconnect the 4-inch bulk fuel hose and put in the hose trough. Secure the hose trough latches.

(16) Stop the engine.

(17) Drain accumulated water in the same manner as with top loading.

(18) Remove the ground wires.

(19) Recover and stow fire extinguishers.

4. Gauge petroleum tank vehicles.

a. Position tank vehicle.

b. Position fire extinguishers within 5 to 10 feet of operation.

c. Review shipping document to verify the type of fuel in the tank vehicle.

d. Ground and bond the vehicle.

e. Ground self from static electricity.

f. Open the manhole cover with the wind at your back to avoid breathing fuel vapor.

g. Insert thermometer as soon as each hatch is opened to measure the temperature.

h. Gauge the compartment using the tank vehicle gauge stick provided with the tank vehicle.

i. Repeat gauging procedure until two readings that are the same are obtained to ensure gauge is accurate and record on the gauge worksheet.

j. Remove the thermometer after the required time and record the temperature on the gauge worksheet.

(Asterisks indicates a leader performance step.)

Evaluation Guidance: Score the soldier GO if all performance measures are passed. Score the soldier NO-GO if any performance measure is failed. If any performance measure is failed, tell the soldier what was done wrong and how to do it correctly.

Evaluation Preparation: Setup: Brief Soldier on Task specifications.

PERFORMANCE MEASURES	GO	NO-GO	N/A
1. Applied risk management procedures.			
a. Referred to ATP 5-19 and local SOP for guidelines applicable to this procedure. Ensured all aspects of these operations are assessed for the risk involved.			
b. Filled out the risk assessment worksheet. Notified chain-of-command if assessment determines requirement for approval from higher authority.			
2. Performed before-operation preparations.			
a. Prior to starting engine.			
(1) Ensured all manually operated valves are closed. This is a must before either starting or ending any fuel servicing operations.			
(2) To prevent collapse of tank when filling or emptying tank, ensured that the top vent is working properly.			
(3) Grounded and bonded vehicle.			
(4) Removed fire extinguishers and bring them to the point of operation.			
(5) Ensured engine fuel tank has enough fuel for operation.			
(6) Removed engine dipstick and check oil level. Refilled as needed.			
(7) Checked air cleaner restriction indicator. Cleaned or replaced filter element as needed.			
b. Starting the engine.			
(1) Rotated engine switch to RUN.			
(2) Rotated pre-heater switch to ON for about one minute. Ensured indicator light has illuminated.			
(3) After one minute, continued to hold pre-heater switch and rotated starter switch to START.			
(4) Released both starter and pre-heater switches after engine started.			
(5) Checked the gauges for correct indication. Stopped the engine if a system malfunction was indicated.			
c. Stopping engine (if not used for refueling operations).			
(1) Released throttle to low idle.			
(2) Rotated engine switch to STOP.			
d. Engine operation - High temperature.			
(1) Saw that nothing obstructed the air flow to and from the engine oil cooler and the cylinder cooling fins.			
(2) Saw that shrouds are properly installed and in good condition.			
e. Engine operation - Low temperature.			
(1) Ensured that engine has the proper oil and fuel for the existing temperatures.			
(2) Kept batteries fully charged.			
(3) When temperatures are below 30 degrees F, performed the following:			
(a) Pulled throttle about half way out.			
(b) Engaged pre-heater switch and left turned on until engine started, approximately five minutes at coldest temperature.			
(c) After 1 ¾ minutes, moved engine switch to RUN position. Waited 15 seconds, then engaged starter switch to START position and cranked engine for 15 seconds. Disengaged starter switch.			
(4) Waited one minute and engaged starter switch. Cranked for one minute, or until running. Engine should be firing. Disengaged starter switch.			
(5) If engine still has not started, engaged starter switch and crank for one minute. Engine should be firing. Disengaged starter switch when engine is increasing speed.			
(6) Turned off pre-heater switch.			
3. Conducted basic haul and fuel services (operation NOT involving engine and pump).			
a. Top Loading (the product is not filtered or metered by the vehicle).			
(1) Ensured all valves are closed.			

(2) Grounded and bonded the semitrailer before opening the fill cover.			
(3) Placed fire extinguishers at point of operation.			
(4) Slowly opened fill cover. Inserted hose far enough to keep the end of the hose in contact with the bottom of the tank.			
(5) Slowly began the flow and filled the tank no further than to the bottom of the capacity indicator. (One person at storage tank valve or other fuel source, and other holding fill tube into semitrailer.)			
(6) Removed fill hose. Closed and secured the manhole cover.			
(7) Drained accumulated water. Closed all valves. Put the container under the manifold drain in the piping control cabinet. Opened the emergency operator valve. Slowly opened the system drain valves.			
(8) Removed the grounding wires and store fire extinguishers.			
b. Bottom loading (the product is not filtered or metered by the vehicle).			
(1) Ensured all valves are closed.			
(2) Grounded and bonded the vehicle.			
(3) Removed cover from the bottom loading connection and connected the bottom loading hose to the bottom loading connection.			
(4) Removed the fire extinguishers and brought to point of operation.			
(5) On the M967, put the selector valve in the LOAD position.			
(6) Opened the emergency valve operator.			
(7) Began the flow from the outside source.			
(8) After the flow has begun, opened the pre-check valve to pre-check the shutoff float. Flow stopped after about 20 to 25 seconds to indicate that the float is functional. If it is not working, stop all operations and notify higher maintenance.			
(9) Closed the pre-check valve. The flow will resume in about 20 seconds.			
(10) When tank was full, the flow stopped automatically. Closed all valves, replaced all covers, and disconnected the hoses.			
(11) Drained the accumulated water in the same manner as stated in 1a(8) above for top loading.			
(12) Removed the grounding wires.			
(13) Stowed fire extinguishers.			
c. Self-loading using vehicle engine and pump. Product is not filtered.			
(1) Ensured all valves are closed.			
(2) Grounded and bonded the vehicle.			
(3) Removed fire extinguishers and brought to point of operation.			
(4) Started the engine and pump (see item 1 as necessary).			
(5) Adjusted idle speed on pump to 1000 to 1200 rpm.			
(6) Removed the 4-inch bulk fuel hose from the hose trough. Did this by disconnecting the spring pins and turning the hose trough bars out of the way.			
(7) Removed dust cap from the fuel outlets. Connected one end of the bulk fuel hose to the outlet and the other end to the storage facility.			
(8) Placed the selector valve in the LOAD position.			
(9) Opened the operator valve, fuel outlet valve, and the manifold outlet valve.			
(10) Shortly after the flow had started, opened the pre-check valve to pre-check the shutoff float. After about 20 to 25 seconds, the flow stopped to let you know the float was working properly. If it was not working, stopped all operations and notified higher.			
(11) Closed the pre-check valve. Flow resumed in about 20 seconds.			
(12) When tank was full, the flow stopped automatically.			
(13) At the end of operation, idled down the engine.			
(14) Closed all valves.			
(15) Disconnected the 4-inch bulk fuel hose and put in the hose trough. Secured the hose trough latches.			
(16) Stopped the engine.			
(17) Drained accumulated water in the same manner as with top loading.			
(18) Removed the ground wires.			

(19) Recovered and stowed fire extinguishers.			
4. Gauged petroleum tank vehicles.			
a. Positioned tank vehicle.			
b. Positioned fire extinguishers within 5 to 10 feet of operation.			
c. Reviewed shipping document to verify the type of fuel in the tank vehicle.			
d. Grounded and bonded the vehicle.			
e. Grounded self from static electricity.			
f. Open the manhole cover with the wind at your back to avoid breathing fuel vapor.			
g. Inserted thermometer as soon as each hatch was opened to measure the temperature.			
h. Gauged the compartment using the tank vehicle gauge stick provided with the tank vehicle.			
i. Repeated gauging procedure until two readings the same were obtained to ensure gauge is accurate, and recorded on the gauge worksheet.			
j. Remove the thermometer after the required time and record the temperature on the gauge worksheet.			

Supporting Reference(s):

Step Number	Reference ID	Reference Name	Required	Primary
	ATP 5-19 (Change 001 09/08/2014 78 Pages)	RISK MANAGEMENT http://armypubs.army.mil/doctrine/DR_pubs/dr_a/pdf/atp5_19.pdf	Yes	No
	FM 10-67-1	CONCEPTS AND EQUIPMENT OF PETROLEUM OPERATIONS	No	No
	TM 9-2320-366-10-1	OPERATORS INSTRUCTIONS MANUAL FOR M1083 SERIES, 5-TON, 6X6, MEDIUM TACTICAL VEHICLES (MTV) VOLUME NO. 1 OF 2 TRK, CAR., MTV, M1083 W/WN (NSN 2320-01-360-1895) (EIC: BT3) W/O WN (2320-01-354-3386) (EIC: B	Yes	No
	TM 9-2320-366-10-2	OPERATORS INSTRUCTIONS MANUAL FOR M1083 SERIES, 5-TON, 6X6, MEDIUM TACTICAL VEHICLES (MTV) VOLUME NO. 2 OF 2 TRK, CAR., MTV, M1083 W/WN (2320-01-360-1895) (EIC: BT3) W/O WN (2320-01-354-3386) (EIC: BR2)	Yes	No
	TM 9-2330-356-14	OPERATORS, UNIT, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL FOR SEMITRAILER, TANK: 5000 GALLON, BULK HAUL, SELF-LOAD/ UNLOAD M967 (NSN 2330-01-050-5632) M967A1 (2330-01-155-0046) SEMITRAILER,	Yes	No

Environment: Environmental protection is not just the law but the right thing to do. It is a continual process and starts with deliberate planning. Always be alert to ways to protect our environment during training and missions. In doing so, you will contribute to the sustainment of our training resources while protecting people and the environment from harmful effects. Refer to FM 3-34.5 Environmental Considerations and GTA 05-08-002 ENVIRONMENTAL-RELATED RISK ASSESSMENT. Every effort should be made to minimize or prevent a fuel spillage. If this occurs quick action by vehicle operators can minimize the contamination of the surrounding area and reduce the chance of fire of explosion. Operators must have on hand materials that can be used to recover any fuel spillage. In the event of a large fuel spillage, the unit must have standard operating procedures to act upon in case of emergencies. All refueling vehicle operators should be trained in handling fuel and posses a fuel handlers card.

Possibility of fuel spillage exists, ensure spillage kit items are properly placed prior to beginning refueling operations. Ensure any spillage is contained and chain-of-command is notified if required.

Safety: In a training environment, leaders must perform a risk assessment in accordance with ATP 5-19, Risk Management. Leaders will complete the current Deliberate Risk Assessment Worksheet in accordance with the TRADOC Safety Officer during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection, FM 3-11.5, Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Decontamination. Ground and bond vehicle prior to start of gauging procedures. Place fire extinguishers 5-10 feet from point of operation.
Loosen or remove field gear according to field conditions or commander guidance. Vehicle operator should self-ground themselves by touching tank body being gauged. Open the tank hatch from the upwind side to prevent breathing fuel vapors.

There are many safety hazards concerning fuel handling. Some are listed below.

Fuel vapors: Ensure operators are aware of procedures to minimize fuel vapors or how to position themselves away from breathing fuel vapors.

Fire: Heat sources, such as static electricity, pump engine heat, flame producing items, to name a few, are all direct causes of fuel fires. Strict vigilance is needed on the part of all fuel handlers to prevent fuel fires at their source. Explosion. As well as fire hazards, the same heat sources may cause an explosion. The same strict vigilance should be maintained for prevention purposes.

WARNING

Frequent inspection of equipment, safety devices, and working areas must be performed to ensure personal and operational safety and to correct potential or actual hazards.

The semitrailer must not be operated if any of the following conditions exist.

· Fuel leaks

· Damage to lighting fixtures, wiring or electrical conduits, or lights inoperative.

· Damage to towing vehicle or semitrailer

· Primary or parking brake systems inoperative

· Vents plugged, inoperative, or removed. Pressure, vacuum, and fusible vents are installed to meet code requirements and to protect the semitrailer from damage. A plugged or inoperative vent can cause extensive shell damage if design pressure or vacuum is exceeded. The fusible vents are designed to operate at high temperatures. If these vents are coated with paint, dirt, or other foreign material, the temperature, when relief occurs, may be greatly increased.

Prerequisite Individual Tasks : None

Supporting Individual Tasks : None

Supported Individual Tasks : None

Supported Collective Tasks : None