VECTOR CONTROL EQUIPMENT PERFORMANCE CHECK LIST

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Navy Environmental and Preventive Medicine Unit FIVE,
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PREFACE

The first edition of the “Vector Control Equipment Performance Check List (PCL),” developed in the early to mid-1980’s at the Navy Disease Vector Ecology and Control Center (NDVECC), Alameda, was intended to provide a sampling of representative types of pesticide dispersal equipment, to be used primarily as a training tool for active duty and civilian DoD Pesticide Applicators.

The second edition, published in 1993 at the NDVECC, Alameda, continued with this same philosophy and added many new pesticide sprayers to the list.

This third edition, begun at the NDVECC, Bangor in 2001, has survived in draft form until this current May 2006 published edition by the Navy Environmental and Preventive Medicine Unit Five (NEPMU-5). During this period, many new sprayers, driven by innovative technologies, have also been added. Although some sprayers from previous editions of this pocket guide are no longer assigned a current National Stock Number (NSN), they have, nevertheless, been included, as active duty personnel deployed throughout the world may, under various circumstances, depend on those still available in the field. The intent of this latest version continues to reinforce the need to enhance all DoD pesticide applicator disease vector/pest training platforms with the highest quality support materials and “hands-on” performance-based field exercises and to best prepare PMT’s and other active duty personnel charged with global Force Health Protection.

The following individuals are gratefully acknowledged for their efforts in compiling this third edition of the “Vector Control Equipment Performance Check List”:

Foremost, Mr. Nelson E. Desormier, whose years of dedication and expertise were critical in transcribing and updating selected content from instruction manuals, adding critical missing steps, and simplifying pesticide dispersal equipment procedures contained in this check list. It was he who initiated, contributed and/or assisted in the completion of the first, second and third editions.

Dr. W. Tozer, served as formal editor for the 1993 and 2005 editions, and was responsible for chapter content, design layout, organization, formatting and all digital enhancements, composites, or modifications of photos and illustrations.

For earlier first drafts of the 2005 version, HM1 K. Compton, HM1 M. Elam, and HM3 J. Church provided valuable technical assistance, methodically “beta testing” the “Check List” over a period of weeks with Mr. Desormier. HM1 M. Elam was responsible for volunteering to retype and transcribe the first draft of the 2005 version from the 1993 version. The current version has been updated May 2006.

Credits: fig. 1, Curtis Dyna-Fog, Ltd.; figs. 2, 50 (Insert), 51 through 60; Clarke Mosquito Control Products, Inc.; figs. 3-7, HM1 M. Elam (retired), NDVECC, Bangor, WA; figs. 8, 48 through 50, NDVECC Bangor, WA; fig. 9 through 35, Stihl Inc.; figs. 36 through 47, Solo; fig. 62, CDR M.

Medina, NEPMU5, San Diego, CA; fig. 63, Honda Motor Co., Inc.

DISCLAIMER

At the date of publication, every effort has been made to ensure the accuracy of its content. This publication was intended for educational purposes only. Trade names are used in this check list to provide specific information and do not imply endorsement of the products named or criticism of similar ones not mentioned. Mention of trade names does not constitute a guarantee or warranty of the products by the Navy Environmental and Preventive Medicine Unit Five, San Diego, the Military Services or the Department of Defense (DoD).

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PERFORMANCE CHECKLIST FOR THE
B AND G HAND COMPRESSED SPRAYER
MODEL 124CC

SET-UP PROCEDURES

□ 1. Unscrew and gently remove the rod/piston assembly from the cylinder.

□ 2. Examine the leather piston cup to ensure that it is pliable and not cracking. Lubricate the piston cup with a small amount of oil (engine oil, mineral oil, etc.), if necessary. Some cups are now made of plastic rendering this step unnecessary.

□ 3. Remove the cylinder from the tank.

□ 4. Examine the gasket located under the lip of the cylinder. Replace the gasket if it is worn (i.e., chipped or torn).

□ 5. Examine the cylinder check valve located at the bottom of the cylinder. Replace it when necessary.

□ 6. Examine the pesticide hose. Be sure that the connection sites at the tank and the spray wand are not worn.

□ 7. Unscrew the wand where it connects to the pesticide line and pull out the inline filter. Clean the filter in solvent as required. Screw the unit back together.

□ 8. Select the required nozzle and screw onto the tip of the wand. If using a Multi-jet nozzle, loosen the retaining collar on the nozzle and rotate it to the desired setting, making sure that the aperture is directly over the pesticide exit hole in the wand.

□ 9. Check for proper pressurization and the possibility of leaks in the system by adding water to the tank. Leave approximately 1/3 of the tank empty for air.

□ 10. Replace the rod/piston assembly to the cylinder by placing the piston cup at a 45-degree angle and pushing the piston gently into the cylinder. Ensure that the piston cup does not crimp or buckle or a good seal will not develop.

□ 11. To properly pressurize the tank, pump the unit 6-10 times. Depress the trigger on the wand. Check for water and air leaks in the tubing and various seals.

OPERATING PROCEDURES

□ 12. Discontinue spraying the water and SLOWLY twist the handle to allow the pressurized air to escape.

□ 13. Remove the cylinder and dump out the water.

□ 14. Put on all personal protective gear.

□ 15. Calculate the exact amount of pesticide concentrate required for the operation.

- ☐ 16. Add the calculated amount of carrier first and then add the pesticide, through a 60-mesh screen filter, to bring the solution up to the label's recommendation.

- ☐ 17. Screw the pump cylinder back in.

- ☐ 18. Gently agitate the tank to allow proper mixing of the pesticide.

- ☐ 19. Pump the sprayer 4-5 times (for pin stream applications) or approximately 20 times, or until it becomes more difficult to pump (for fan spray applications). The optimum pressure for fan spraying is approximately 40 psi, which is about 20 pumps.

- ☐ 20. Dispense the pesticide by depressing the wand's trigger. For crack and crevice or pin stream applications, the nozzle should be placed as close as possible against the area to be sprayed, or inserted directly into a crack or crevice when using an insertion tip. For fan spraying, the nozzle should be kept 18-24 inches away from the target area.

- ☐ 21. Keep the tank pressure up by pumping air into the tank as required.

- ☐ 22. FOR SAFETY REASONS, NEVER RAISE THE WAND ABOVE YOUR HEAD.

TERMINATING PROCEDURES

- ☐ 23. Gently unscrew the cylinder from the tank until all of the pressurized air inside the tank has been released and then remove the cylinder.
- ☐ 24. Transfer any remaining pesticide into a LABELED, NONBREAKABLE CONTAINER.
- ☐ 25. Clean the sprayer thoroughly using a detergent that will remove the pesticide. Replace the cylinder and pressurize the tank.
- ☐ 26. Depress the wand trigger to allow the cleaning solution through the wand assembly and nozzle.
- ☐ 27. Triple-rinse the tank and wand assembly with water by repeating the described procedure.
- ☐ 28. Store the sprayer with the tank open and inverted to allow for proper drying.

PERFORMANCE CHECKLIST FOR THE CURTIS HAND COMPRESSED SPRAYER MODEL 2981 PCC (NSN 3740-00-191-3677)

SET-UP PROCEDURES

- ☐ 1. Unscrew and gently remove the rod/piston assembly from the tank.
- ☐ 2. Unscrew the cylinder from the pump handle. Examine the O ring at the bottom of the rod and lubricate as needed with a small amount of oil.
- ☐ 3. Examine the cylinder check valve located at the bottom of the cylinder. Check the O ring at the top of the cylinder. Reassemble the cylinder and pump handle rod.
- ☐ 4. Examine the pesticide hose for wear/cracks etc. Make sure all hose connection sites at the tank and the spray wand are not worn.
- ☐ 5. Unscrew the wand where it connects to the pesticide hose and pull out the inline filter. Clean the filter as required. Screw the unit back together.
- ☐ 6. Select the required (TeeJet) nozzle required for the spray mission and screw onto the tip of the wand.

7. Check for proper pressurization and the possibility of leaks in the system by adding water to the tank. Leave approximately 1/3 of the tank empty for an air gap.

8. Replace the rod/piston assembly cylinder back into the tank.

9. To properly pressurize the tank, pump the unit 6-10 times. Depress the trigger on the wand. Check for water and air leaks in the hose, tubing, wand and tank seals. Repair all leaks.

10. Discontinue spraying the water and slowly relieve the tank pressure by turning knurled nut counterclockwise where hose connects to the top of the tank.

11. Remove the pump assembly and dump out the water.

OPERATING PROCEDURES

12. Put on all personal protective gear.

13. Calculate the exact amount of pesticide needed for the operation.

14. Add the calculated amount of carrier first and then add the pesticide through a 60-mesh screen filter, to bring the solution up to the label's recommendation.

15. Screw the pump assembly back in.

16. Gently agitate the tank to allow proper mixing of the pesticide and carrier (as needed).

17. Pump the sprayer 4-5 times (for pin stream applications) or approximately 20 times, or until it becomes harder to pump (for fan spray applications). The optimum pressure for fan spraying is approximately 40 psi.

18. Dispense the pesticide by depressing the wand's trigger. For crack and crevice or pin stream applications, the nozzle should be placed as close as possible against the area to be sprayed, or inserted firmly into a crack or crevice when using an insertion tip. For fan spraying, the nozzle should be kept 18-24 inches away from the target area.

19. Keep the tank pressure up by pumping air into the tank as required.

20. FOR SAFETY REASONS, NEVER RAISE THE WAND ABOVE YOUR HEAD.

TERMINATING PROCEDURES

21. Gently/slowly unscrew the knurled knob where the hose connects to tank to relieve the pressure remaining in the tank. The remove the tank pump assembly.

- ☐ 22. Transfer any remaining pesticide into a LABELED, NON-BREAKABLE CONTAINER.

- ☐ 23. Clean the sprayer thoroughly at this time by adding liquid detergent/water mixture. Replace pump assembly and re-pressurize the entire system.

- ☐ 24. Depress the wand trigger and flush cleaning solution through hose and wand assembly.

- ☐ 25. Triple-rinse the tank and wand/hose assembly with water by repeating steps 23 and 24.

- ☐ 26. Store the sprayer with the tank open and inverted to allow to properly air dry. Remember to hold up wand, depress trigger to bleed all liquid out of wand, trigger and hose.

PERFORMANCE CHECKLIST FOR THE HUDSON TEK HAND COMPRESSED SPRAYER MODEL 67132

SET-UP PROCEDURES

- ☐ 1. Rotate the handle on the tank and remove the cover.
- ☐ 2. Examine the gasket on the tank cover and replace it if it is worn.
- ☐ 3. Unscrew and gently remove the rod / piston assembly from the cylinder.
- ☐ 4. Remove the cylinder from the tank and examine the gasket located at the top of the cylinder and replace if worn.
- ☐ 5. Examine the cylinder check valve located at the bottom of the cylinder. If worn, replace the check valve.
- ☐ 6. Examine the leather piston cup on the bottom of the piston to ensure that it is still pliable and not cracking. If necessary, lubricate the cup with a small amount of oil (any type of oil will do: engine, mineral, etc.).
- ☐ 7. Return the cylinder to the tank with the extended lip pointed toward the outer rim of the tank.

- 8. Return the rod / piston assembly to the cylinder by placing the piston cup at a 45 degree angle and then gently pushing the piston into the cylinder. Make sure that the piston cup does not crimp or buckle -- or a good seal will not develop.

- 9. Examine the pesticide hose. Be sure that the connection sites at the tank and the spray wand are not worn.

- 10. Unscrew the wand where it connects to the pesticide line and pull out the inline filter. Clean the filter in solvent as required. Screw the unit back together.

- 11. Select the proper spray flow by loosening the retaining collar on the nozzle and rotating the nozzle to the desired setting. Screw the collar back on making sure that the selected aperture is directly over the pesticide exit hole in the wand.

- 12. Check for proper pressurization and for of leaks in the system by adding water to the tank. To properly pressurize the tank, fill only about 2/3 full, leaving about 1/3 of the tank empty for air. Replace the tank cover and pump the unit 6-10 times. Depress the trigger on the wand. Check for water and air leaks in the tubing and all seals.

13. Discontinue spraying the water and release the pressure inside the tank by depressing the air release valve, located on the tank cover.

14. Remove the tank cover and dump out the water.

15. Put on all personal protective gear.

16. Calculate the amount of pesticide concentrate required for the operation.

17. Add the calculated amount of carrier first and then add the pesticide, through a 60-mesh screen filter, to bring the solution up to the label's recommendation.

18. Replace the tank cover and gently agitate the tank to allow proper mixing of the pesticide.

19. For pin stream applications, pump the sprayer 4-5 times. For fan spray applications, pump the sprayer about 20 times, or until it becomes hard to pump. (The optimum pressure for fan spraying is approximately 40 psi, which is about 20 pump strokes.)

20. Dispense the pesticide by depressing the wand's trigger. For crack and crevice, or pin stream applications, the nozzle should be placed as close as possible up against the area to be sprayed.

For fan spraying, the nozzle should be kept 18-24 inches away from the target area.

□ 21. Keep the tank pressure up by pumping air into the tank as required.

□ 22. FOR SAFETY REASONS, NEVER RAISE THE WAND ABOVE YOUR HEAD.

TERMINATING PROCEDURES

□ 23. Release the pressure from the tank using the air release valve and remove the tank cover.

□ 24. Transfer any remaining pesticide into a LABELLED, NONBREAKABLE CONTAINER.

□ 25. Clean the sprayer thoroughly using a detergent that will remove the pesticide. Replace the tank cover and pressurize the tank.

□ 26. Depress the wand trigger to allow the cleaning solution through the wand assembly and nozzle.

□ 27. Triple-rinse the tank and wand assembly with water by repeating the described procedure.

□ 28. Store the sprayer with the tank open and inverted to allow for proper drying.

PERFORMANCE CHECKLIST FOR THE CENTROBULB BULB DUSTER - MODEL B (NSN: 3740-01-441-5250)

SET-UP PROCEDURES

□ 1. Unscrew the metal tip nozzle from the housing.

□ 2. To avoid spillage of the material, use a funnel to pour the pesticide (REMEMBER, ONLY DUSTS AND POWDERS) into the rubber housing.

□ 3. Screw the nozzle back onto the housing.

OPERATING PROCEDURES

□ 4. Place the tip of the nozzle so that it is parallel with the surface to be treated and squeeze the rubber bulb GENTLY to produce fine puffs of pesticide dust, which LIGHTLY cover the target surface. Avoid excessive clumping, as arthropods are less likely to walk through mounds of powder.

□ 5. Rotate unit periodically while spraying to prevent pesticide from clumping near base of the nozzle.

TERMINATING PROCEDURES

□ 6. It is not necessary to return the unused portion of the pesticide to its original container. Cover the nozzle tip using some type of material (e.g., cork,

aluminum foil, to prevent the pesticide from being accidentally expelled.

7. Store the unit in a dry area.

PERFORMANCE CHECKLIST FOR THE CHAPIN DUSTER MODEL 599

SET-UP PROCEDURES

□ 1. Apply a small amount of lubricating oil of medium viscosity to the four (4) bearings designated by "OIL" stamped at each of the bearings. This should be done at least once a day during the operating season.

□ 2. Check the gear case, located directly below the handle, and fill it with at least 2 tablespoons of light, graphite grease.

□ 3. Put on your personal protective gear.

□ 4. Pull open the top of the duster and add the dust. Ensure that the pesticide is thoroughly dry and free of foreign material. Replace the tank cover.

□ 5. Strap the duster onto your shoulders and adjust it so that the brace rests comfortably on your waist.

□ 6. Add the extender wand to the flow outlet. The fan shaped tip can be removed as needed.

OPERATING PROCEDURES

□ 7. Rotate the crank at the desired speed to achieve the optimum flow rate.

□ 8. Adjust the pesticide flow rate by pulling the slide bar located on the discharge tube directly below the tank. To increase the flow, pull the bar, and to decrease the flow, push the bar back into its housing.

TERMINATING PROCEDURES

□ 9. Remove the duster from your shoulders and empty the remaining dust back into the original container.

□ 10. Triple-rinse the duster and make sure that no dust remains in the tank, the beater tube, the fan case, or the discharge tubes.

□ 11. Air-dry the tank before you store the unit in a dry area.

PERFORMANCE CHECKLIST FOR THE CURTIS DYNA-FOG THERMAL FOGGER, MODEL 2610E (NSN: 3740-00-818-6648)

Fig. 1. Curtis-Dyna-Fog Model 2610.

A. General Uses: Outdoor/Indoor for control of flying insects.

B. Formulations: Oil base insecticides only.

C. Specifications:

- Hand portable thermal aerosol fog generator.
- Resonant pulse-jet engine
- Insecticide output: 0 –9 gallons/hour
- Thumb trigger formulation control
- Air volume at nozzle: 250 cubic ft/min
- Air velocity at nozzle: 50 mph
- Fog particle size: 0.5 – 50 microns
- Fuel tank capacity: 0.85 quarts
- Insecticide tank capacity: 1 gallon

- Engine: 30 HP, 0.5 GPH
- Power supply:
  - 8 – “1.5V, D” Cell batteries
  - 12-volt plug (cigarette lighter)
- Weight empty: 19 lbs; filled 27 lbs

D. Description: The fog generator employs the resonant pulse principle (pulse-jet) to generate hot gases flowing at high velocity. The high velocity gases atomize the formulation instantly. The machine is intended for outdoors use and for enclosed spaces with volumes of more than 500 cubic feet. Use in more confined spaces may create a fire or explosion hazard.

E. Working Principles:

1. The engine is essentially a hollow tube with an intake valve and a means of supplying a combustible mixture of fuel and air at one end (intake), and a clear opening at the other (exhaust). Close to the intake end is an expanded section of the tube, which acts as a combustion chamber.

2. An air pump is used to force a mixture of fuel (gasoline) and air into the combustion chamber. The fuel mixture is initially ignited by a spark plug, which is powered by an electronic ignition system. After the initial ignition, the repeated cycles are then sustained by a glow-coil. A series of pulse explosions occur in the combustion chamber resulting in a positive pressure pushing the hot gases (1800°F) out through the exhaust tube. As the spent fuel exits the combustion chamber a negative pressure is formed which opens the fuel/air valves and draws another appropriate amount of fuel mixture into the combustion chamber.

3. The fog is generated by injecting the pesticide (oil base only) into the exhaust tube at the proper point where it is then broken down by the high velocity, cyclic flow of the hot gases. At this point the pesticide is vaporized into fine particles and ejected out the exhaust.

PRE-OPERATION OF THE CURTIS DYNA-FOG MODEL 2610 (Fig. 1)

1. Fuel: filtered (#60 mesh size) regular unleaded gas only. Never try to refuel a machine that is hot.

2. Batteries: (8) 1.5V “D” Duracell

3. Insecticide: oil base only, filtered through a 100-mesh screen

STARTING/STOPPING PROCEDURES

4. Lift then press down the “ON/OFF” control knob to the “ON” position.

5. Depress and release the “primer bulb” repeatedly until fuel is visible in the “primer bulb”.

6. Once fuel has reached the “primer bulb”, depress and release the bulb 3 times for a cold engine/1 time for restarting a hot engine.

7. Simultaneously depress “ignition” and “air” buttons until engine begins to start, then release the “air” button and continue depressing the “ignition” button until engine runs smoothly (CAUTION. HEARING PROTECTION REQUIRED).

8. If engine has not started within 40 seconds, repeat steps 3 and 4.

 9. To stop the engine, lift the control knob to the “off” position.

FOGGING

 10. Verify that the formulation and fuel tank caps are tight.

 11. Start engine as specified in the above section.

 12. Allow engine 1-2 minutes running time to warm up to operating temperature.

 13. Set formulation-metering valve (flow rate) to desired fog quality.

 14. Push formulation valve button (thumb trigger) to fog.

 15. Close metering valve immediately after fogging; allow any pesticide remaining in lines to flush, before shutting engine off.

MAINTENANCE

 16. After each use, drain any unused formulation from the tank into its original container for proper storage by removing 7/16” plug at bottom of the formulation tank.

 17. Flush out machine with approved flushing solvent after draining out formulation tank.

□ 18. After 4-hours of operation, clean exhaust tailpipe with clean-out brush provided with the unit.

□ 19 After 8-hours of Operation:

□ (a) Remove spark plug and scrape loose carbon in engine neck.

□ (b) Spark plug gap is .060 inches. Install hand tight only with rubber O-ring installed on plug.

□ (c) Remove and clean formulation filter.

□ 20. After 12 hours of operation:

□ (a) Check fuel filter located inside housing unit near engine.

□ (b) Remove and clean formulation injection orifice located in-line, midway under the exhaust tube. Use aerosol carburetor cleaner or approved solvent.

□ 21. Always remove batteries prior to storage.

□ 22. After cooling down with a general purpose cleaner (i.e., Spray On-Wipe Off or equivalent), wash off exterior of machine.

PERFORMANCE CHECKLIST FOR THE HUDSON ADMIRAL DUSTER MODEL 6766

SET-UP PROCEDURES:

- ☐ 1. Unscrew the top of the unit and remove the plunger.
- ☐ 2. Examine the piston cup and lubricate the plunger with either flake or powder graphite as necessary.
- ☐ 3. Carefully return the plunger to the duster and tighten the cap.
- ☐ 4. Unscrew the cap at the discharge end of the barrel.
- ☐ 5. Fill the opened pesticide compartment 3/4 full. Ensure that the dust is dry and free from lumps. Secure the cap.

OPERATING PROCEDURES:

- ☐ 6. Point the nozzle in the intended direction and push the plunger in short, easy strokes, which will send out a well mixed discharge of dust that gives uniform coverage and lightly covers the target surface. Excessive clumping of the pesticide should be avoided, as arthropods are less likely to walk through mounds of powder.

7. Attach the long extension wand if required. The adjustable nozzle allows the dust to be dispensed up, down, or sideways, and to treat hard to reach areas.

TERMINATING PROCEDURES

8. Return the unused portion of the pesticide to its original container.

9. Depress the plunger several more times to clear out the system.

10. Store the unit in a dry area.

PERFORMANCE CHECKLIST FOR THE MICRON ULVA FAN MK II SPRAYER (NSN: 3740-01-206-9636)

TESTING OF ENVIRONMENTAL CONDITIONS FOR ULV APPLICATION

A. Check the weather conditions expected during the spray operations, REMEMBER, YOU SHOULD NOT CONDUCT ULV OPERATIONS IN THE RAIN OR IN STRONG WINDS.

B. Check for a temperature inversion. A temperature inversion has occurred when the air temperature at six feet above the ground is at least one degree warmer than the ground temperature (This situation usually occurs in the early morning and late evening hours).

C. Check the wind speed by using a wind-measuring device. The indicated wind speed should fall between 4-6 MPH and should be blowing across the intended target area.

SET-UP PROCEDURES

□ 1. Plug the battery charger into the gel-cell battery. Charge the battery following a 2 hours on: 2 hours off schedule until the battery has at least an 80% charge. DO NOT FOLLOW THE RECHARGING INSTRUCTIONS IN THE OPERATOR'S MANUAL OR THE LIFESPAN OF THE BATTERY WILL BE DRASTICALLY REDUCED.

□ 2. Remove the ULVA fan from its case and open the unit at its hinge.

□ 3. Ensure that all of the electrical connections are clean, tight, and fit properly.

□ 4. Select the appropriate color coded feed nozzle (read the pesticide label); holding the unit right side up, drop the nozzle into the motor housing, located at the front of the machine, which also contains the revolving atomizer disc.

□ 5. Put on all personal protective gear (respirator).

□ 6. Choose an appropriate ULV pesticide concentrate (read the label) and pour the pesticide into one of the 1/2 liter bottles, provided and label it.

□ 7. Invert the machine and screw the $^{1}/_{2}$ liter bottle into the motor housing.

□ 8. Keep the bottle right side up until the spraying operation is ready to proceed.

□ 9. Remove the plastic protective cover from the atomizer disc.

OPERATING PROCEDURES

□ 10. Before actually starting operations, check the wind's speed and direction with an anemometer. Make sure that the pesticide is sprayed DOWNWIND.

11. Put on the battery using the shoulder strap provided.

12. Plug the ULVA FAN into the battery. Ensure that the battery switch is ON. You are now ready for ULV application.

13. REMEMBER TO WALK UPWIND WHILE SPRAYING. OTHERWISE, YOU WILL BE WALKING INTO THE PESTICIDE.

14. Grab the lower handle and turn the unit upside down so that the pesticide is flowing from the bottle into the disc and blowing out.

15. To stop for short periods of time, turn off the mist by simply inverting the machine (the bottle will now be right side up and below the unit).

16. For long delays, invert the machine (bottle right side up) and unplug the unit from the battery.

TERMINATING PROCEDURES

17. Invert the machine (bottle right side up), unscrew the bottle and replace it with another 1/2 liter bottle filled with an approved flushing solution. CAP THE PESTICIDE BOTTLE IMMEDIATELY.

18. Resume the operation and run the unit for approximately 2 minutes.

- 19. Disconnect the unit from the battery.
- 20. Invert the machine (bottle down) and remove the bottle and feed nozzle.
    a. Wipe off any excess pesticide from the unit. Don't wash/steam clean or get any water near the unit.
- 21. Secure the ULVA FAN and its separate parts into the case.
- 22. Recharge the battery after each use following the 2 on/2 off schedule described in STEP 1. Note: the battery will hold its charge for a longer period of time when stored in a freezer or refrigerator

PERFORMANCE CHECKLIST FOR THE CLARKE (LECO) MODEL P-1 (NSN: 3740-01-456-2623)

Fig. 2. LECO P-1 ULV Sprayer

TESTING OF ENVIRONMENTAL CONDITIONS FOR ULV

A. Check the weather conditions expected during the spray operations, REMEMBER, YOU SHOULD NOT CONDUCT ULV OPERATIONS IN THE RAIN OR IN STRONG WINDS.

B. Check for a temperature inversion. A temperature inversion has occurred when the air temperature at six feet above the ground is at least one degree warmer than the ground temperature. (This situation usually occurs in the early morning and late evening hours).

C. Check the wind speed by using a wind-measuring device. The indicated wind speed should fall between 4-6 mph and should be blowing across the intended target area.

SET-UP PROCEDURES FOR THE LECO P-1 ULV SPRAYER (Fig. 2).

□ 1. Examine the fuel level in the gasoline tank. Fuel note: For the first 20 hours of operation of a new machine mix 8 oz of 2-cycle oil with 1 gallon of unleaded gasoline. Use a mixture of 6 oz of 2-cycle oil with 1 gallon of unleaded gasoline thereafter.

□ 2. DO NOT MIX GASOLINE AND OIL DIRECTLY IN THE ENGINE FUEL TANK.

- 3. Check engine operation before filling the pesticide tank. Place the throttle lever in the fully closed position ("idle lever" down).
- 4. Push the primer button to feed the fuel to the carburetor until fuel overflows from the carburetor (primer button located at bottom of carburetor).
- 5 Close the choke by pushing the lever up (Omit this step if engine is already warm.)
- 6. Firmly pull the starter rope until the engine starts. CAUTION: HEARING PROTECTION REQUIRED. Return the rope to the engine in one motion (i.e., do not let go of the rope).
- 7. After starting the engine, gradually open the choke by turning the choke lever down and finally keep it fully opened.
- 8. Let the engine warm up by running it at a low RPM (slow speed) for approximately one or two minutes.

STOPPING THE ENGINE

- 9. Reduce the engine RPM to idle.
- 10. Stop the engine by pushing the stop button (located between starter rope and carburetor).

OPERATING PROCEDURES

11. Put on all personal protective gear.

12. Lay sprayer on its side to fill the pesticide tank (we recommend the use of a funnel with at least 60 mesh screen to fill tank). Fill the insecticide tank to within 1/2" of the top. When replacing the tank cap, be sure that the O-ring is in place.

13. Restart the engine, and then depress the throttle level (pull up) to full rpm's. Open the control valve to start the flow of insecticide. The engine should always be running at its fastest speed when discharging insecticide.

TERMINATING PROCEDURES

14. ALWAYS close the control valve first! This stops the flow of insecticide.

15. Release the throttle to reduce the engine RPM to idle. NOTE: It is ABSOLUTELY NECESSARY to close the control valve before reducing the engine speed. If the control valve is left open with the engine idling, the insecticide will not be atomized and will drip from the nozzle.

CALIBRATION

16. Fill the insecticide tank with a known measure of insecticide.

□ 17. Set the control valve at a specific stop. NOTE: The valve has four adjustable stops for the flow rate setting. To change the flow rate simply relocate the setscrew stop. (Figure 2, page 8)

FLOW RATES

□ 18. Knob forward (OFF).

□ 19. First hole 1/4 flow rate turn counter clockwise.

□ 20. Second hole 1/2 flow rate turn counter- clockwise.

□ 21. Third hole $^{3}/_{4}$ flow rate turn counter clockwise.

□ 22. Fourth hole full flow rate turn counter clock-wise.

□ 23. Spray for a specific time. The longer this time period, the more accurate the calibration will be.

□ 24. Remove the remaining insecticide from the tank and measure. The difference in the starting and ending measurement will be the usage for the specific time spraying took place.

MAINTENANCE

□ 25. Always flush out ULV sprayer with a recommended flushing solvent. For "field" use, you may use transmission fluid.

26. Clean and re-gap sparkplug every 15 hours. For two-cycle engines, gap plug from 0.6 to 0.7mm (0.024" - 0.028"). Magneto: gap between coil and the flywheel should be 0.4 to 0.5 mm.

PERFORMANCE CHECKLIST FOR THE WHITMIRE PT SYSTEM III HANDHELD SPRAYER (NSN: 3740-01-338-5390)

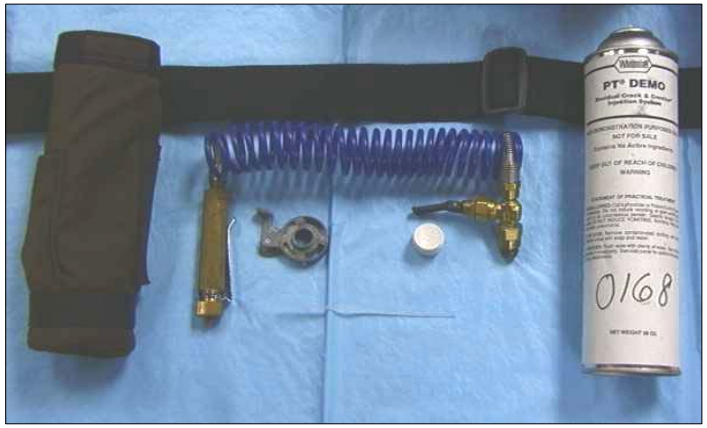

Fig. 3. Whitmire System III

SET-UP PROCEDURES FOR THE WHITMIRE SYSTEM III (Fig. 3)

☐ 1. Set aerosol can on a flat surface and place “Can Clamp” (Fig. 4) in the disengaged position over the lip of insecticide demonstration can.

☐ 2. Turn handle to the engaged position, ensuring that the valve stem on the insecticide demo can is centered in the screw hole opening of the “Can Clamp”

- 3. Hold sprayer assembly (including Spray Gun, Coiled Hose, Shut-Off Valve, and Valve-Clamp Adapter) in one hand and insecticide demo can (with “Can Clamp” attached) in the other hand.
- 4. Center sprayer assembly in Can Clamp and screw to hand tight by rotating can counterclockwise.
- 5. Attach void injector to the spray gun (Fig. 5).
- 6. Put on belt and pouch.
- 7. Insert PT System III can into pouch.

OPERATION PROCEDURES

- 10. Put on proper PPE.
- 11. Open Shut-off Valve (Fig. 6) and begin “crack-and crevice application.”

TO DISASSEMBLE

- 12. To change pressurized insecticide can, first close shut-off valve (Fig. 7).
- 13. Unscrew can and Can Clamp from the sprayer assembly. CAUTION: Do not disengage Can Clamp without first unscrewing and detaching sprayer assembly.

Fig. 4. Can Clamp

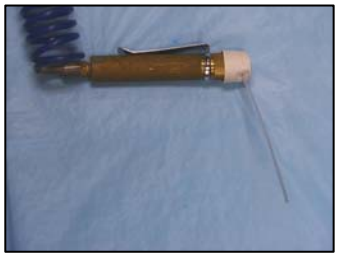

Fig. 5. Gun Assembly

Fig. 6. Shut-Off Valve open.

Fig. 7. Shut-Off Valve closed.

TO CHANGE THE HOSE:

□ 14. Work Hose Spring Guards away from fittings.

□ 15. Unscrew hose fittings from Spray Gun and Shut-Off Valve.

□ 16. Replace with new hose and fittings. Be sure to use Teflon tape on both joints.

ATTACHMENT TO CYLINDER

□ 17. To attach PT System III to 15-lb. Whitmire cylinder, use 15-lb. Adapter Fitting No. 14-0375.

TROUBLESHOOTING: IF THE GUN DOES NOT SPRAY

□ 18. Make sure the shut-off valve is in the vertical “Open” position (Fig. 6)

□ 19. The insecticide can may be empty. Change PT System III sprayer assembly to a new can.

□ 20. The Valve Stem may be clogged in the gun.

□ a. Unscrew can and can clamp from Spray Assembly.

□ b. Point Shut-off Valve downward away from you in a well-ventilated area, and empty Hose and Gun by opening shut-off Valve. CAUTION: Never spray toward plastic or painted surfaces.

c. Unscrew Spray Gun Cap, replace with new Stem, Gasket and spring. Or clean plastic Valve Stem by removing Gasket, and cleaning orifice on the side of the small part of the Valve Stem using a safety pin or other small sharp object.

d. Replace gasket, spring and stem into gun and hand-tighten spray gun cap.

21. The Valve-Clamp Adapter may not be tightly attached to Clamp and Can. Hand Tighten.

22. If spray comes from beneath the knurled brass Spray Gun Cap, the cap may be loose.

a. Hand Tighten.

b. The small black Gasket in the Gun may need replacing. To replace, follow Trouble-Shooting Procedure 3 above.

23. If leaking occurs between Valve-Clamp Adapter and can, replace Valve Clamp adapter.

24. If Shut-Off Valve leaks, the O-ring may need replacing.

a. Unscrew the Valve Stem Housing from the Valve Body.

b. Replace O-ring by sliding it over Shut-Off Valve stem and into groove. If Shut-Off Valve still leaks, it should be replaced.

SAFETY TIPS

25. Remember: close Shut-Off Valve between jobs; empty hose after last job.

26. Do not attempt to use the PT System III equipment on products not designed for PT System III. It will cause the can valve to leak and damage the equipment.

27. Do not remove hose and gun from Pressurized Insecticide Can after operation without first closing the Shut-Off Valve.

SECTION II
BACKPACK SPRAYERS

PERFORMANCE CHECKLIST FOR THE KIORITZ BACK PACK MODEL ECHO DM-9 (2-CYCLE ENGINE)

SET-UP PROCEDURES FOR MIST SPRAYING OPERATIONS (EXCLUDING ULV)

☐ 1. a. Remove the pesticide tank cover and ensure that the inside of the tank is clean.

☐ b. Examine the bottom of the tank to ensure that (1) the pesticide line is secured to its metal fitting (which is welded onto the solid plate), (2) that the other end of the line exits the tank, and (3) that it is secured to the unit with the plastic nut provided. NOTE: If the solid plate at the base of the pesticide tank and the pesticide line are absent, they can be installed only after the tank has been removed.

☐ (1) Using the tools provided, remove the pesticide tank by loosening the two red plastic nuts located outside and underneath the tank.

☐ (2) Simultaneously, pull the nuts outward and lift the tank away.

- (3) Add the solid metal plate, which is provided with the unit, to the top of the grooved plate, and ensure that there is a good seal by pressing the rubber edges of the plates down, until they are flush with each other.

- (4) Secure the tank back to the unit ensuring that both plastic tank nuts are tightened equally.

- (5) Secure the pesticide line.

- c. Secure the air pressurization line that runs from the top of the blower to the base of the pesticide tank.

- d. Connect the outer pesticide feed line to the base of the tank, along the top of the discharge tube, through the inline cutoff valve, to the nozzle.

- e. With the engine off (remember that the pesticide flow is gravity fed), examine the system for leaks as follows: (1) add about 1 quart of water to the tank (2) open the inline flow valve, located midway along the discharge tube, and (3) open the volume control cock located on top of the nozzle. Tighten all leaking areas as required and then drain any remaining water from the system. BE SURE TO PURGE THE WATER FROM THE PESTICIDE LINE.

SET-UP PROCEDURES FOR ULV OPERATIONS

To conduct ULV operations, you must purchase a special ULV nozzle system. The system is no longer available in the National Stock System (no current NSN), but may still be encountered during deployments.

□ 2. a. Set up the unit into the mist spray configuration as described above.

□ b. Remove the mist spray nozzle and replace it with the ULV nozzle.

□ c. Remove the ULV pesticide container and ensure that the gasket, located inside of the housing, is in place.

□ d. Ensure that the ULV pesticide volume control knob is in the OFF position.

□ e. If the operation will require a large amount of ULV solution, remove small bottle from under nozzle, disconnect pickup tube and screen, and reinstall tubing from tank to under volume control cock. Then connect the mist spray pesticide line, and conduct the operation in the same manner as a mist spray.

SET-UP PROCEDURES FOR DUSTS AND GRANULES

Start this procedure with the assumption that the unit is in the mist spray configuration.

- ☐ 3. a. Disconnect and remove the air pressurization line that runs from the top of the blower to the base of the pesticide tank. Plug the openings with the attached stoppers.
- ☐ b. Disconnect and remove the entire outer pesticide feed line and the nozzle.
- ☐ c. Remove the pesticide tank cover and ensure that the inside of the tank is clean and dry.
- ☐ d. Disconnect and remove the pesticide feed line from inside of the tank and plug the pesticide line exit hole with the stopper provided.
- ☐ e. Using the tools provided, remove the pesticide tank by loosening the two plastic nuts located outside and underneath the tank.
- ☐ f. Simultaneously pull the nuts outward and lift the tank away.
- ☐ g. Remove the solid metal plate from the base of the unit.
- ☐ h. Ensure that the dust volume control lever, located on the bottom left side of the frame and inside of the throttle control lever, is off (all the way down).

i. Examine the granule metal plate. With the pesticide control lever still in the "OFF" position, the gates should be closed. If this is not the case, reset the plate properly making sure that the rubber gasket is flush with the unit. REMEMBER TO FOLLOW THE GUIDE MARK DRAWN ON THE PLATE.

j. Open the pesticide control lever all the way. In this position, the gates should also be completely open.

k. Secure the tank back to the unit ensuring that both plastic tank nuts are tightened equally.

PRE-START PROCEDURES

4. Put on all personal protective gear.

5. Check the fuel level in the gasoline tank. Fill the tank as needed with unleaded gasoline mixed with 2-cycle oil at a ratio of 6 oz. of oil mixed with 1 gallon of gasoline.

6. Open the gasoline flow valve, located on the front of the carburetor.

7. Place the choke lever in the "CHOKE" position (lever up). The lever is located behind the air filter on the carburetor. IF THE ENGINE IS ALREADY WARM, PLACE THE LEVER IN THE "RUN" POSITION (LEVER DOWN).

□ 8. Set the engine throttle (the outside lever), located on the bottom left side of the frame, up approximately halfway.

□ 9. Ensure that the pesticide flow is off. For dusts and granules, close (push down) the pesticide control lever all the way. For mist spray and ULV operations, turn off the pesticide control lever located halfway along discharge tube.

□ 10. Add the pesticide to the appropriate container. (Add the pesticide to the ULV container if using the unit for ULV, or to the pesticide tank if conducting mist- spray, dust and granules, or large scale ULV operations.)

START-UP PROCEDURES

□ 11. Firmly pull the starter rope until the engine starts. **CAUTION: HEARING PROTECTION REQUIRED.** Return the rope to the engine in one motion (i.e., do not let go of the rope).

□ 12. If the engine does not start, repeat STEPS 5-8 and try again. NOTE: If it still does not start, check the point gap (0.3-0.4mm) and the spark plug gap (0.6-0.7mm).

□ 13. As the engine warms up, slowly move the choke lever to the "RUN" position (lever down).

OPERATING PROCEDURES: MIST SPRAY AND ULV

☐ 14. a. Set the engine throttle at half speed, and after the engine is operating smoothly, open up the inline flow valve (mist spray and large ULV operations), and the volume control cock.

☐ b. Calibrate the system. (The liquid must pass through the metering system and must be separate from the air flow.)

☐ c. For adjusting the liquid flow rate to the label and application specifications, use the volume control cock.

☐ d. The spray pattern may be adjusted between pin stream and fan spray by loosening the collar tightening nut, located at the end of the nozzle, and moving the mist collar out (pin stream) or in (fan spray).

DUSTS AND GRANULES

15. a. Set the engine throttle halfway and after the engine is running smoothly, open the pesticide control lever all the way. (With the engine set at half throttle and the pesticide control lever open all the way, the unit will put out about 5 kg/min.)

b. For adjusting the dust and granule dispersal rate, use the pesticide control lever.

c. DO NOT BEND THE NECK OF THE HOSE DURING SPRAY OPERATIONS. The dust can blow back into the blower and soil or damage the unit.

16. REMEMBER THAT WHEN CONDUCTING SPRAY OPERATIONS WITH BACKPACKS, YOU SHOULD ALWAYS BE UPWIND OF YOUR TARGET AREA.

17. When stopping spray operations for a short period of time, turn off the pesticide flow by closing the volume control cock (liquids) or by moving the pesticide control lever down (dusts and granules).

18. For longer delays in operations, turn off the pesticide flow and then turn the engine throttle to idle.

TERMINATING PROCEDURES

□ 19. With the engine throttle at idle, drain the liquid pesticide into its original container.

□ 20. For dusts and granules, close the pesticide control lever, stop the engine by turning off the throttle, and shake any remaining material back into the original container.

ULV OPERATIONS

□ 21. a. Add an approved flushing solution to the empty pesticide tank (such as BEECO Pro-Flush).

□ b. Resume operations at half engine speed and reset the volume control cock to maximum. Run until all of the flushing solution has been expelled. (Be aware that this process may cause a sudsing effect in the pesticide tank.)

□ 22. Fill the empty pesticide tank with detergent and water and run until the spray is clear, there are no more suds, and there is no longer any water inside of the tank.

□ 23. Allow the machine to cool down by running it at idle for at least 2 minutes.

□ 24. Close the gasoline control valve located under the gas tank.

□ 25. After use, wash off the exterior of the sprayer.

- 26. For long-term storage, drain the gasoline tank by turning off the gasoline flow valve and then running the engine; this will burn off all of the fuel in the carburetor. Remove the fuel line at the carburetor and drain the fuel into an approved gasoline storage container.

- 27. Store the backpack in a clean and dry storage area. Cover with a 30-gallon plastic trash bag.

PERFORMANCE CHECKLIST FOR THE SOLO BACKPACK MODEL 423 (2-CYCLE ENGINE) (NSN: 3740-01-157-4000)*

Fig. 8. Solo Backpack Sprayer, Model 423

SET-UP PROCEDURES FOR MIST SPRAY OPERATIONS (EXCLUDING ULV) (Fig. 8)

☐ 1. a. Remove the pesticide tank cover and ensure that the inside of the tank is clean. On inside of lid check gasket for wear – could leak. Check filter.

☐ b. Secure the air pressurization line that runs from the top of the blower to the base of the pesticide tank.

- c. Connect the outer pesticide feed line to the base of the tank, along the top of the discharge tube, through the inline cutoff valve, to the nozzle.

- d. With the engine off, (remember that the pesticide flow is gravity fed), examine the system for leaks by adding approximately 1 quart of water to the tank and opening the inline flow valve, located midway along the discharge tube, and the volume control cock located on top of the nozzle. Tighten all leaking areas as required and then drain any remaining water from the system. BE SURE TO PURGE THE WATER FROM THE PESTICIDE LINE.

SET-UP PROCEDURES FOR ULV OPERATIONS

To conduct ULV operations, you must purchase a special ULV nozzle system.

2. a. Set up the unit into the mist spray configuration as described above.

- b. Remove the mist spray nozzle and replace it with the ULV nozzle and slide bar.

- c. Ensure that the ULV pesticide volume control knob is in the off position.

SET-UP PROCEDURES FOR DUST AND GRANULAR OPERATIONS

□ 3. a. Assuming that the unit is in the mist spray configuration, disconnect and remove the air pressurization line that runs from the top of the blower to the base of the pesticide tank.

□ b. Disconnect and remove the entire outer pesticide feed line and the nozzle.

□ c. Remove the pesticide tank cover and ensure that the inside of the tank is clean and dry.

□ d. Disconnect and remove the air pressurization line and strainer from the inside of the tank. Install the ventilation distributor attachment into the left side of the tank and the top of the blower.

□ e. Remove the plastic discharge blower elbow and replace it with the special dust discharge elbow. This elbow has an additional ribbed hose coming off of it.

□ f. Connect the ribbed hose to the base of the pesticide tank.

PRE-START PROCEDURES

□ 4. Put on all of your protective gear.

□ 5. Check the fuel level in the gasoline tank. Fill the tank as needed with unleaded gasoline mixed with 2-cycle oil at a ratio of 2.6 ounces of oil mixed in with 1 gallon of gasoline.

□ 6. Open the inline gasoline flow valve, located at the base of the gasoline tank. Push primer button located right rear of carburetor 4 to 5 times.

□ 7. Place the choke lever in the "CHOKE" position (lever down). The lever is located behind the air filter on the carburetor. IF THE ENGINE IS ALREADY WARM, PLACE THE LEVER IN THE "RUN" POSITION (LEVER UP).

□ 8. Set the engine throttle lever in the middle position. The lever is located on the left side of the frame.

□ 9. Ensure that the pesticide flow is off. For dusts and granules, twist the pesticide discharge tube all the way to the vertical position (Handle up). For mist spray and ULV operations, turn off the pesticide control lever located halfway along the discharge tube at the top of the control handle.

□ 10. Add the pesticide to the pesticide tank.

START-UP PROCEDURES

□ 11. Firmly pull the starter rope until the engine starts. CAUTION: HEARING PROTECTION REQUIRED. Return the rope to the engine in one motion; do not let go of the rope.

□ 12. If the engine does not start, repeat STEPS 5 - 8 and try again. If it still does not start, check the spark plug gap (0.020mm). Because it has an electronic ignition, there are no points to gap.

□ 13. As the engine warms up, slowly move the choke lever to the "RUN" position (lever up).

OPERATING PROCEDURES: MIST SPRAY AND ULV

□ 14. a. Set the engine throttle at half speed, and after the engine is operating smoothly, open up the inline flow valve (mist spray and large ULV operations), and the volume control cock.

□ b. Calibrate the system (The liquid must pass through the metering system and must be separate from the air flow).

□ c. For adjusting the liquid flow rate to the label and application specifications, use the volume control cock (mist spray) or slide bar (ULV).

DUSTS AND GRANULES

□ 15. a. Set the engine throttle halfway and after the engine is running smoothly, twist the plastic discharge tubing where the pesticide feed hose connects to it. (With the engine set at half throttle and the pesticide discharge tube open all the way; the unit will put out approximately 5 kg/min).

b. DO NOT BEND THE NECK OF THE HOSE DURING SPRAY OPERATIONS. The dust can blow back into the blower and soil or damage the unit.

16. REMEMBER THAT WHEN CONDUCTING SPRAY OPERATIONS WITH BACKPACKS, YOU SHOULD ALWAYS BE UPWIND OF YOUR TARGET AREA.

17. When stopping spray operations for a short period of time, turn off the pesticide flow by closing the volume control cock (liquids) or by twisting the plastic pesticide discharge tube (dusts and granules).

18. For longer delays in operations, turn off the pesticide flow and then turn the engine throttle to idle.

TERMINATING PROCEDURES:

19. With the engine throttle at idle, drain the liquid pesticide through the pesticide feed line (located behind the volume control valve on the nozzle) into its original container.

20. For dusts and granules, close the discharge tube, stop the engine by turning off the throttle, and shake any remaining material back into the original container.

ULV OPERATIONS

21. a. Add an approved flushing solution to the empty pesticide tank.

b. Resume operations at half engine speed and reset the volume control slide bar to maximum. Run until all of the flushing solution has been expelled (Be aware that this process may cause a sudsing effect in the pesticide tank).

MIST SPRAY, DUST AND GRANULAR OPERATIONS

22. Fill the empty pesticide tank with detergent and water and run until the spray is clear, there are no more suds, and there is no longer any water inside of the tank.

23. Allow the machine to cool down by running it at idle for at least 2 minutes.

24. Close the gasoline control valve located under the gas tank.

25. For long-term storage, drain the gasoline tank by turning off the gasoline flow valve and then running the engine; this will burn off all of the fuel in the carburetor. Remove the fuel line at the carburetor and drain the fuel into an approved gasoline storage container.

26. If possible, store the backpack in a clean and dry storage area. Cover with a 30-gallon plastic trash bag.

PERFORMANCE CHECKLIST FOR THE
STIHL BACKPACK MODEL SR400 (2-CYCLE ENGINE)
(NSN: 3740-01-463-0147)

Fig. 9. Stihl Backpack Sprayer, Model SR400.

SET-UP PROCEDURES FOR MIST-SPRAY OPERATION
(EXCLUDING ULV) (Figs. 9, 10)

☐ 1. a. Remove the pesticide tank cover and ensure that the inside of the tank is clean.

☐ b. Secure the air pressurization line that runs from the tank basket filter to the base of the pesticide tank fitting (left side).

☐ c. Connect the outer pesticide feed line to the base of the tank (right side), along the top of the discharge tube through two brackets through the inline cut-off valve, to the nozzle using two metal clamps.

☐ d. With the engine off, (remember the pesticide flow is gravity fed), examine the system for leaks by adding approximately 1 quart of water to the tank and opening the inline flow valve, located midway along the discharge tube, and the metering knob located on top of the nozzle is set on a number. Tighten all leaking area as required and then drain any remaining water from the system. BE SURE TO PURGE THE WATER FROM THE PESTICIDE LINE.

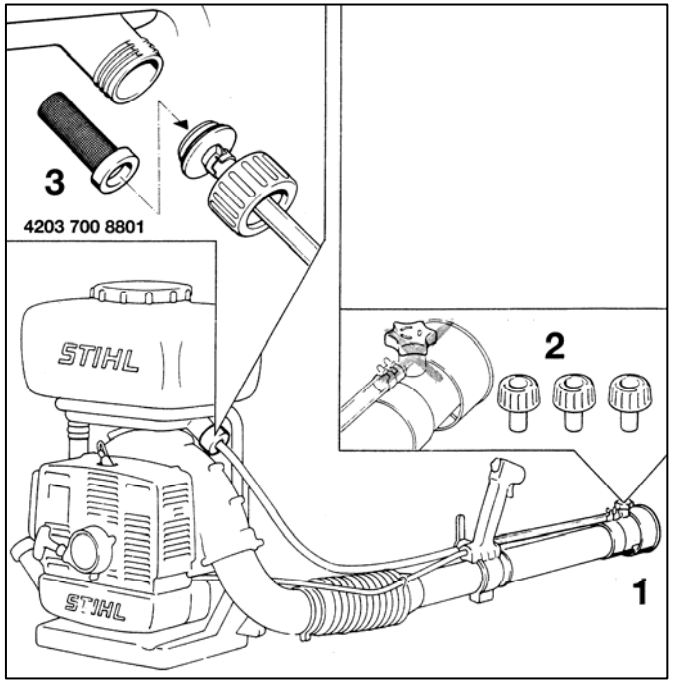

Fig. 10. Stihl Backpack Sprayer.

SETUP PROCEDURES FOR ULV OPERATIONS

☐ 2. a. Setup the unit into the mist-spray configuration as described above.

☐ b. Remove the mist-spray nozzle and replace it with the ULV nozzle (Fig. 10-1).

☐ c. Install one of the three optional metering nozzles Gray in color (0.5/0.65/0.8 mm Dai.) by removing orange colored metering knob (Fig. 10-2).

☐ d. A strainer is fitted in the discharge tube at the base of the pesticide tank to ensure trouble - free operation of the ULV nozzle (Fig. 10-3).

☐ e. Ensure that the ULV metering nozzle is in the OFF position.

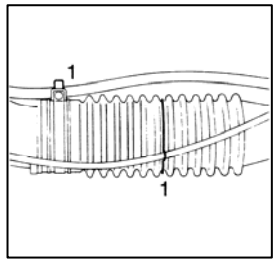

Fig. 11. Stihl Backpack

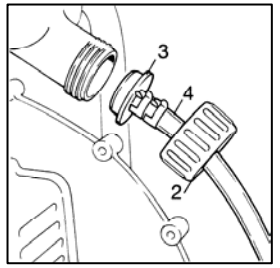

Fig. 12. Stihl Backpack

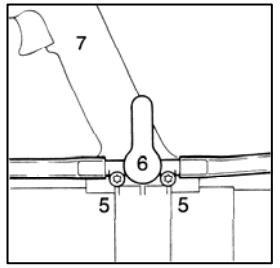

Fig. 13. Stihl Backpack

SET-UP PROCEDURES FOR DUSTS AND GRANULES

☐ 3. a. Assuming that the unit is in the mist-spray configuration, remove retainers (Fig-11-1) from the pleated hose to release the outer pesticide feed line.

☐ b. Unscrew the union nut (Fig 12-2) and pull out the reducer (Fig. 12-3) with hose (line) (Fig 12-4).

☐ c. Release and remove screws (Fig-13-5) take the shut-off valve (Fig.13-6) off the control handle (Fig-13-7).

☐ d. Remove nozzle with the first straight black tube and pesticide feed line after loosening screw at the base of the control handle.

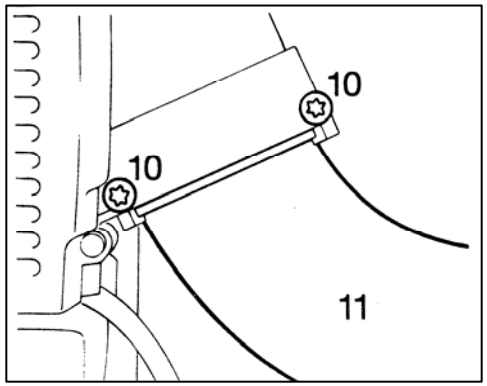

Fig. 14. DUSTS & GRANULAR SET-UP

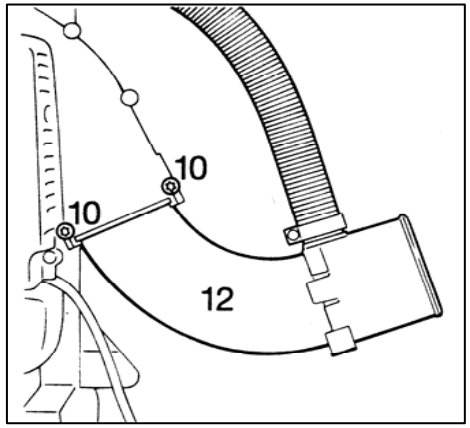

Fig. 15. DUSTS & GRANULAR SET-UP

- ☐ e. Connect the 3 interlocking tubes and attach them to the control handle. Retighten the screw at the base of the control handle.

- ☐ f. Release and remove spline screws (Fig. 14-10), pull the elbow (Fig. 14-11) downward and out of the fan housing.

- ☐ g. Push the assembled elbow (Fig. 15-12) supplied with the attachment into the fan housing as far as it will go.

- ☐ h. Refit the spline screws (Fig. 15-10) and tighten them moderately (Elbow must still turn freely).

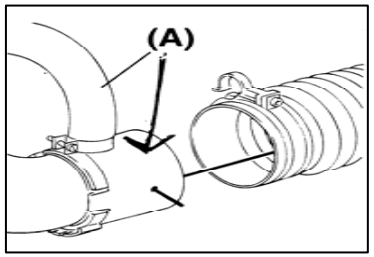

Fig 16. Copper wire assembly.

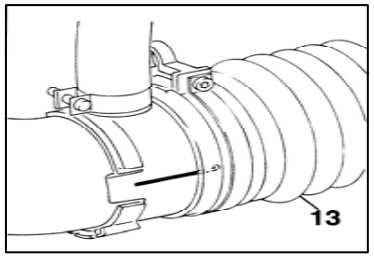

Fig 17. Copper wire assembly.

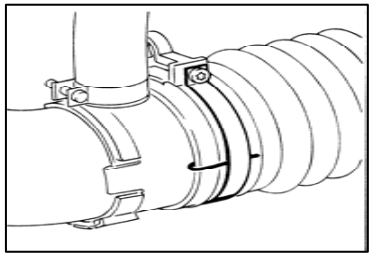

Fig 18. Copper wire assembly.

- ☐ i. Attach the copper wire into hole on the right side of elbow outlet (Fig. 16-A). Push pleated hose (Fig-17-13) over the elbow outlet as far as it will go. Copper wire is bent over as you push the pleated hose (Fig. 17-13) into position.

- ☐ j. Bend the copper wire flat forward so that the hose clamp fits over it. (Fig. 18)

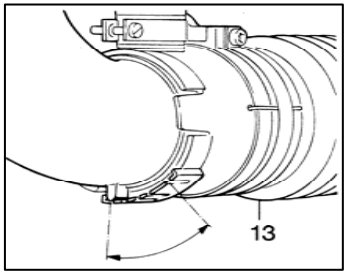

Fig. 19. Hose assembly.

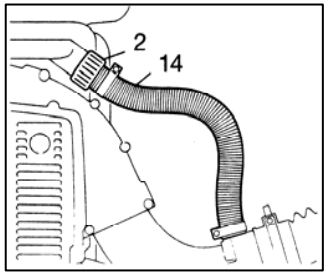

Fig. 20. Hose assembly.

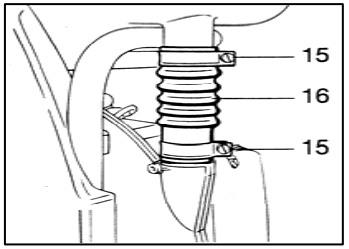

Fig. 21. Removing Bellows

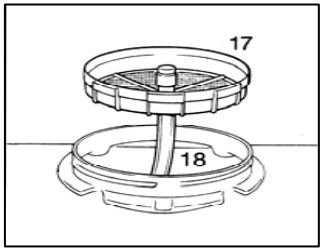

Fig. 22. Removing strainer.

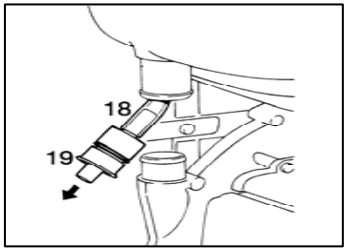

Fig. 23. Removing reducer & hose.

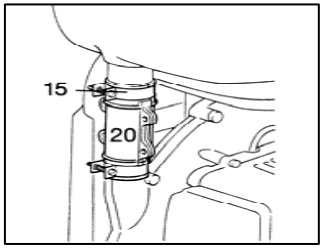

Fig. 24. Securing half shells.

☐ k. Rotate the pleated hose (Fig. 19-13) so the marks are in the positions shown in the illustration. With the pleated hose in this position, make sure the control handle is vertical and tighten it down firmly. Push the stub (Fig.20-14) into the tank base. Fit the union nut (Fig. 20-2) and screw it in tightly.

☐ l. Unscrew the hose clamps (Fig. 21-15) and remove the bellows (Fig. 21-16) (hose clamps are used again). Unscrew the tank cap. Pull the strainer (Fig. 22-17) off of the hose (Fig. 22-18), push the reducer (Fig. 23-19) out of the tank from the inside and remove it together with the hose (Fig. 23-18).

☐ m. Join up the two half-shells (Fig. 24-20) and secure them to the tank and fan housing with the hose clamps (Figs. 21-15, 24-15). [IMPORTANT NOTE: The completed shell is larger in diameter at the top compared to the bottom. Use the larger hose clamp on top and the smaller hose clamp on the bottom (Fig. 21-15, top and Fig. 21-15, bottom.)]

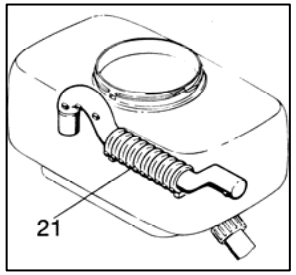

Fig. 25. Air-agitator tube.

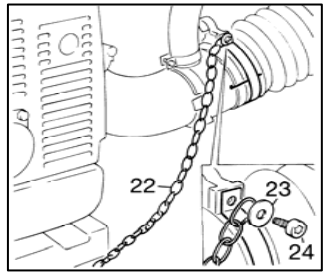

Fig. 26. Securing chain.

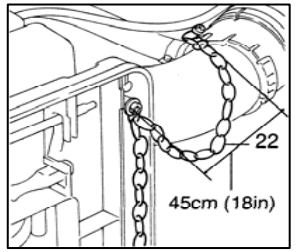

Fig. 27. Securing chain.

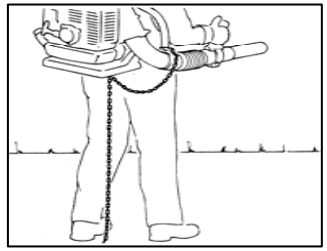

Fig. 28. Securing chain.

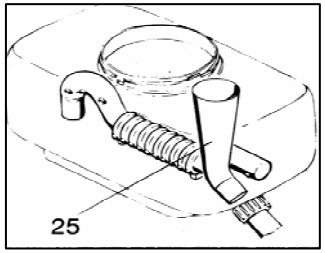

Fig. 29. Dust Applications.

- ☐ n. Fit the air agitator tube (Fig. 25-21) into the tank.

- ☐ o. Take out the fastening screw (Fig. 26-24). Fit the washer (Fig. 26-23) on the screw and secure the chain (Fig. 26-22) to the elbow. NOTE: The chain is an important safety feature to protect against static electricity.

- ☐ p. Secure the chain (Fig.27-22) to the backpack support frame with the fastening screw located under the base near the TORX screwdriver mount. NOTE: The chain MUST touch the ground (Fig. 28).

- ☐ q. The funnel (Fig. 29-25) must be fitted into the tank at the outlet to achieve extra fine distribution for dust applications. Remove the funnel before filling the tank with granule material. Replace tank cap.

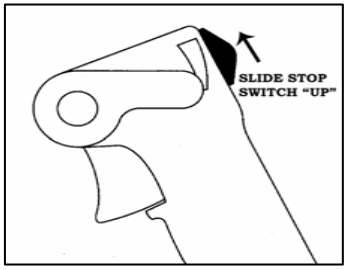

Fig. 30. Stop Switch position.

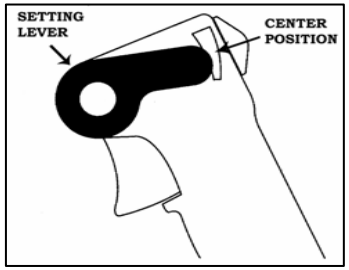

Fig. 31. Setting Lever position.

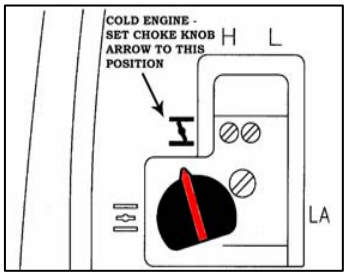

Fig. 32. Choke position - cold engine.

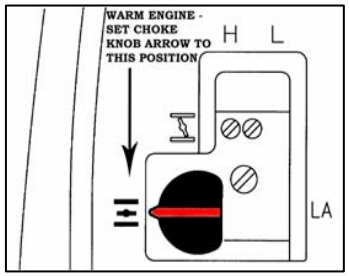

Fig. 33. Choke position - warm engine.

PRE-START PROCEDURES

☐ 4. Check the fuel level in the gasoline tank. Fill the tank as needed with unleaded gasoline mixed with two-cycle oil at a ratio of 2.6 ounces of oil mixed in 1 gallon of gasoline.

☐ 5. Slide the Stop switch (Fig. 30) to I "UP" located on the rear of the control handle. Move the setting lever (left side of handle) (Fig. 31) to the center position. STARTING THROTTLE POSITION.

☐ 6. If the engine is COLD, turn the choke knob to I choke "UP" located above the starter rope (Fig. 32). If the engine is ALREADY WARM, place the choke knob down to the open position (Fig. 33).

START UP PROCEDURES

☐ 7. Put the unit on the ground. Check that bystanders are well clear of the general work area and the nozzle. Make sure you have a firm footing. CAUTION. HEARING PROTECTION REQUIRED.

☐ 8. Hold the unit with your left hand on the housing (Tank Top) and put one foot against the base plate to prevent it from slipping. Pull the starter grip slowly with your right hand until you feel it engage and then give it a firm strong pull. (NOTE: Do not pull the rope to its full extension as it might otherwise break. Do not let the starter grip snap back.)

WHEN THE ENGINE BEGINS TO FIRE

☐ 9. If engine is “COLD” turn choke to <open> and continue cranking until engine runs. If engine is “WARM,” continue cranking until engine runs.

AS SOON AS ENGINE RUNS

☐ 10. Move the setting lever ((Fig. 34) downwards to its lower position so that the engine settles down to idle speed.

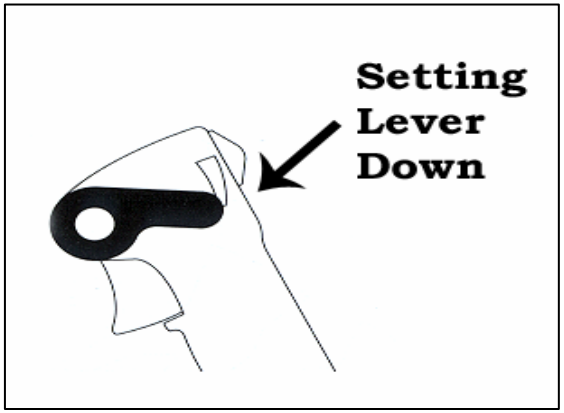

Fig. 34. Setting lever “down” to idle speed.

☐ 11. If engine fails to start:

☐ a. Ensure spark plug gap is 0.020 inches.

☐ b. Check spark plug for proper operation by touching plug to engine metal while pulling cord slowly.

TO SHUT-DOWN THE ENGINE

☐ 12. To stop the engine, slide the stop switch “downwards” (Fig. 35).

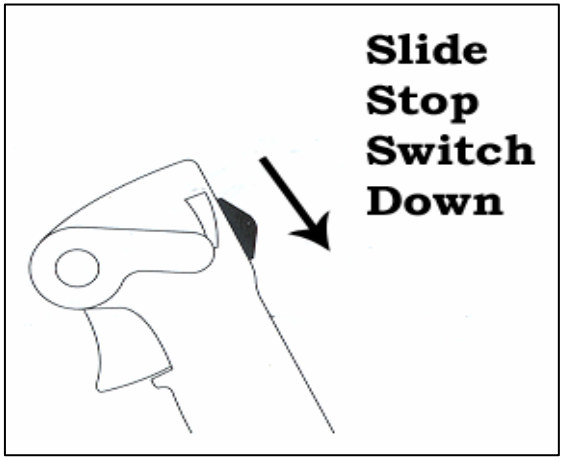

Fig. 35. Stop engine: Stop switch to “down” position.

TO OPERATE THROTTLE WHILE SPRAYING

☐ 13. Squeeze the trigger on the control handle.

OPERATING PROCEDURES: MISTS, SPRAYS AND ULV

☐ 14. Ensure that the pesticide flow is off. Mist/Sprays/ULV - turn the inline flow valve located on control handle off (knob up). Dusts/Granules - twist the control handle to close off discharge tube.

☐ 15. Add the pesticide to the pesticide tank.

☐ 16. a. Set the throttle at half speed on the control handle and after the engine is operating smoothly, open up the inline flow and the metering knob (Spray/Mist), metering nozzle (ULV) (on handle).

☐ b. Calibrate the system (the liquid must pass through the metering system).

☐ c. For adjusting the liquid flow rate to the label and application specifications, set the metering knob (Mist-Spray), located on top of the nozzle, to a different number (#1-6), or choose one of the three optional metering nozzles (gray) for ULV. You may make minor flow adjustments by throttling the engine up or down.

DUSTS AND GRANULES

☐ 17. Set the engine throttle halfway and after the engine is running smoothly, twist the control handle to the left to increase the flow rate and turn to the right to shut down flow. (Off is control handle in vertical position.)

☐ 18. REMEMBER: That when conducting spray operations with backpacks, you should always be upwind of your target area.

☐ 19. When stopping spray operations for a short period of time, turn off the pesticide flow by closing the inline flow valve (liquids) on control handle, or by twisting the control handle to the right (vertical position). Dust/Granules.

☐ 20. REMEMBER: When ending spray operations ALWAYS TURN OFF PESTICIDE FLOW FIRST. Then stop the engine slide the stop switch to o/off.

TERMINATING PROCEDURES

☐ 21. Drain any remaining liquid pesticide into its original or proper container.

☐ 22. Dust or Granules: Shake any remaining material back into the original container.

ULV OPERATIONS

☐ 23. a. Add an approved flushing solution to the empty tank.

☐ b. Resume operation at half throttle and spray solution through entire system.

MIST-SPRAY, DUST AND GRANULAR OPERATIONS

☐ 24. Fill the empty pesticide tank with detergent and water and run until the spray is clear, there are no more suds, and there is no longer any water inside of the tank.

☐ 25. Allow the machine to cool down after spray operation by running it at idle for at least 2 minutes.

☐ 26. Drain any remaining gasoline into an approved container (Pour it out).

☐ 27. Always restart the engine after washing off the outside of the machine to burn off all the fuel in the carburetor prior to storage.

☐ 28. If possible, store the backpack in a clean and dry storage area. (Cover it with a large plastic trash bag.)

PERFORMANCE CHECKLIST FOR THE
SOLO 475 BACKPACK SPRAYER (DIAPHRAGM PUMP)
(NSN: 3740-01-496-9306)

Fig. 36. Solo 475 Backpack Sprayer (diaphragm pump).

A. Specifications:

- Formulations - Liquids, wettable powders.
- Dry Weight: 9.5 - 10.1 lbs.
- Output: 0.8 U.S. Gallon/min.
- Nozzle, wand & Shut-off Valve (28’ Overall Length).
- PVC Hose (4’ length).
- Spray Tank - Capacity: 4-gallons (15 liters).
- Nozzles: Different types for spot, narrow, wide angle, and short/long distance spraying (Fig. 37).

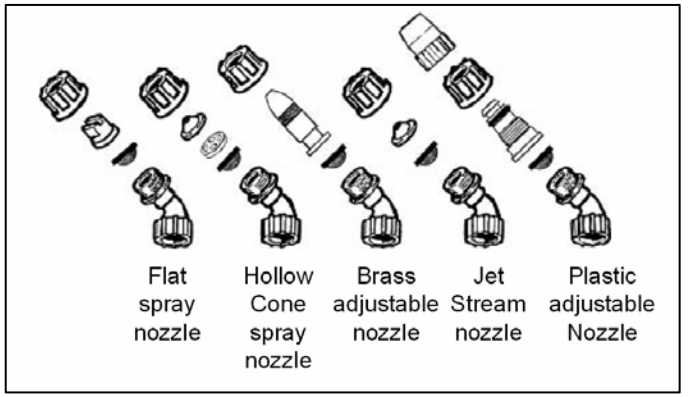

Fig. 37. Solo 475 spray nozzles.

SET-UP PROCEDURES FOR THE SOLO 475 (Fig. 36)

☐ 1. Removing Plastic Adjustable Nozzle (Fig. 38-1 to Fig. 38-5).

☐ a. Unscrew the nozzle cap (Fig. 38-1) from the nozzle body (Fig. 38-3). This is best accomplished while the retaining nut (Fig. 38-2) is fastened tightly to the elbow (Fig. 38-5).

☐ b. Unscrew the retaining nut (Fig. 38-2). Push the nozzle body (Fig. 38-3) out of the retaining nut (Fig. 38-2). The filter with gasket (Fig. 38-4) will come out with the body. To reinstall the nozzle, reverse the above instructions.

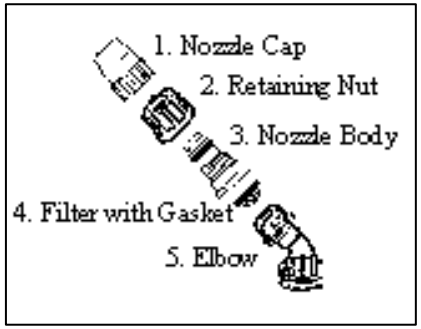

Fig. 38. Removing Nozzle.

☐ 2. Wand Assembly.

☐ a. Insert wand into shut-off valve as shown (Fig. 39).

☐ b. Tighten the screw cap clockwise onto the shut-off valve (Fig. 39).

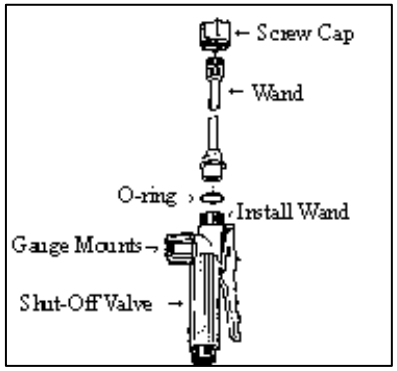

Fig. 39. Wand Assembly.

☐ 3. Pump Lever

☐ a. Place lever handle (Fig. 40-C) onto the shaft (Fig. 40-A). Align bolt holes and install the two bolts (Fig. 40-E) and washers (Fig. 40-F); then tighten. To install pump lever on the opposite side, remove the stop plate (Fig. 40-D) and washer, install the pump lever as above. The stop plate (Fig. 40-D) should be mounted on the inner bolt hole, with the closed end of the stop plate pointing downward on the opposite side of the pump shaft.

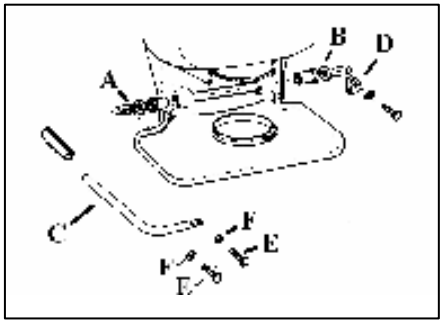

Fig. 40. Pump Lever Assembly.

☐ 4. Fold Away Pump Handle

☐ a. .Remove bolt and nut (Fig. 41-A) from pump rod (Fig. 41-B).

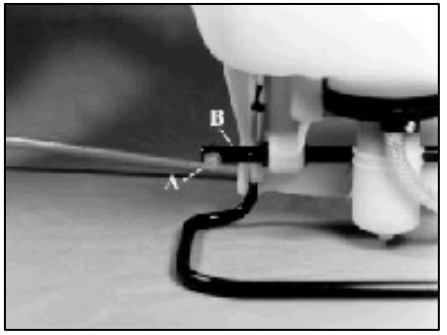

Fig. 41. Pump handle assembly.

☐ b. Slide handle-assembly over the pump rod and align the holes so that the rear (elbow) portion of the handle points up and slightly forward and away from the Solo logo. Reinstall bolt and locknut. Pump handle can be installed on the opposite side of the sprayer for right hand pumping (Stop plate will need to be relocated to the left side) (Fig. 42).

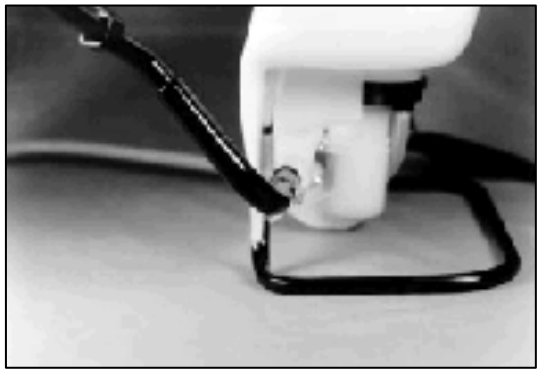

Fig. 42. Pump handle assembly.

☐ c. The handle can be rotated to either down (pumping) or up (storage) positions. Note: The handle swings away from the sprayer, then up or down as desired. The spray wand attaches to the clamps on the handle assembly for storage (does not apply to the brass wand) (Fig. 43).

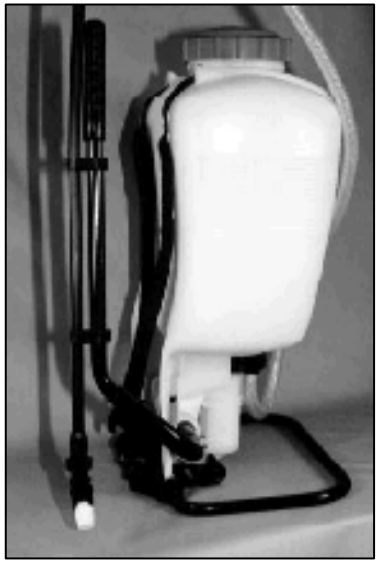

Fig. 43. Pump handle assembly.

☐ 5. Shoulder Strap Installation. The top of each shoulder strap is pre-attached to the sprayer by means of a buckle. The lower end of the straps are attached by fastening the strap hooks to the metal frame between where frame exits the plastic tank and makes a bend.

☐ 6. Regulating Pressure. The Solo backpack sprayer is equipped with a built-in regulator to control output pressure. This regulator is operator adjustable. Make adjustments prior to filling tank.

☐ a. To adjust the regulator, remove the tank cap and the filter basket. Look inside the spray tank; you will see the top of the regulator. There are 4 fingers on the regulator knob. The finger farthest to the right is #1; to the left is #4.

☐ b. To increase the pressure, choose the higher number. They are numbered 1, 2, 3, 4. 1 = 15 psi, 2 = 30 psi, 3 = 45 psi, 4 = 60 psi. The higher the pressure, the more pesticide applied from the sprayer in a given amount of time, but the droplets will be smaller with more drift (Fig. 44).

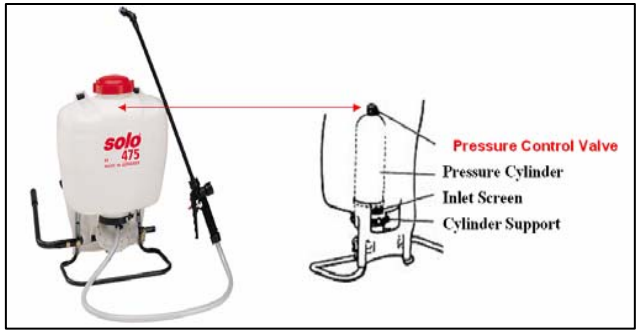

Fig. 44. Pressure Control Valve.

☐ c. To change the spray pressure, excess pressure in the pressure cylinder must be released back into the tank through the spray tube. To adjust, push down on the knob and rotate to align the desired number with the alignment pin. Note: maximum pressure for Solo Backpack Sprayer - Model 475 is 60 psi.

☐ 7. Filling the Spray Tank.

☐ a. Mix the spray formula and the proper volume of water in a separate container. Pour the mix through the filter basket in the tank opening. This keeps debris from entering sprayer.

☐ b. To fill the sprayer to its full 4-gallon capacity, set the pressure control valve to the 3 or 4 setting.

☐ c. Add 2 or 3 gallons of pesticide mix, pump the sprayer handle to prime the pump, and fill the pressure cylinder. The volume of liquid in formula the pesticide mix tank will appear to decrease as the pressure cylinder is filled. Liquid will flow through the top of the pressure regulator when the cylinder is completely full.

☐ d. Add the remaining formula mix to the tank. Remember that it's not necessary to completely fill the spray tank each time. Mix only the amount needed to get the job done.

☐ 8. Prime the pump with rapid pump strokes. When you feel very firm resistance, the pressure chamber is filling with liquid. With repeated piston strokes, the air in the pressure chamber is slowly compressed. By pressing the hand lever, the valve opens, and liquid is forced through the nozzle. The shut-off valve has a retaining clip, which keeps the valve in the "OPEN" position for continuous operation. Pump using the end of the pump handle, as it is less fatiguing. The volume of pesticide delivered varies with the working pressure. The working pressure should be as high as needed to ensure an adequate spray pattern for each individual application. The well-designed lever action greatly reduces the pumping effort. The pressure cylinder within the tank has a hydraulic effect. YOU DO NOT NEED TO CONSTANTLY PUMP THE PUMP LEVER TO PRODUCE A STEADY STREAM OF PESTICIDE. Liquid from the pump compresses air in the pressure chamber, which allows irregular pumping action, yet results in steady spray at the nozzle.

☐ 9. Should the pressure drop very quickly, drain the tank completely and pump without liquid. By this procedure, the air chamber is refilled with the required volume of air. It is advisable to pump the tank completely empty from time to time.

CLEANING

☐ 10. After spraying, clean the tank thoroughly. If some spray liquid is left inside, drain tank completely.

☐ 11. Pumping causes air to be taken in and the remaining liquid to be discharged. Pump until liquid and air are coming out through the nozzle.

☐ 12. Refill tank with a few quarts of clean water and pump the water out as explained above (if necessary, repeat this procedure several times).

☐ 13. If the shut-off valve is removed, the pump can be flushed quickly. Improper spray distribution is the result of a clogged nozzle, which is easily removed and cleaned.

☐ 14. Soap and water may also be used to clean tank. Do not use aggressive cleaning agents or abrasives. Follow the recommendations of the chemical manufacturer for disposal of waste-water and chemicals. Activated charcoal in liquid or other form may be used to absorb chemicals in tanks or spills.

MAINTENANCE AND STORAGE

☐ 15. Refill To protect the piston, cylinder and Viton® collar, a fine mesh, stainless steel screen is located on the pressure cylinder inlet. If you find that your sprayer will not empty the formula tank, check for a clogged inlet screen (Fig. 45). The inlet screen is located at the bottom of the pressure cylinder on the

side that faces your back. One indication that it needs cleaning is that when you let go of the pump handle, it "springs" to the down position. The screen can be cleaned with a small bristle brush or a discarded toothbrush.

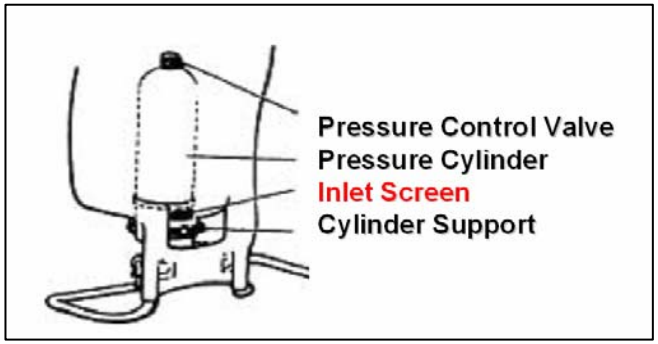

Fig. 45. Solo 475 Backpack Sprayer - Inlet Screen.

☐ 16. After operation, the sprayer should be stored away from direct sunlight to prevent UV damage.

☐ 17. After removing the pump or when mounting a new Viton® collar, treat both the collar and the piston with water-resistant grease (Solo Superior Grease (#9850). Petroleum jelly may also be used).

☐ 18. Regularly inspect hose, wand, pump, tank and shut-off valve for wear, damage or leaks. Repair promptly.

☐ 19. Before winter, drain all liquid in tank, lines and air chamber. Leave shut-off valve locked in the "open" position.

CALIBRATION

☐ 20. The output of the sprayer should be checked by collecting and measuring the pesticide emitted during one minute. Maintain steady pumping on the pump handle while measuring. Having determined the output from the nozzle in gallons/minute, the rate per unit area treated can be calculated knowing the swath width and walking speed.

☐ 21. Determine the nozzle's rated capacity. See instruction manual or Solo website: http://www.solousa.com for all nozzle ratings. Get the capacity in gallons/minute at the desired pressure. Test the delivery of the nozzle. Spray for one minute and collect the spray Fig. 46).

$$\frac{\text{Gallons/minute} = \text{oz collected/minute}}{128 \text{ oz} = 1 \text{ gallon}}$$

Fig. 46. Calibration - pesticide spray per minute.

☐ 22. Compute the area covered in square feet per minute. Select a comfortable walking speed and figure how many feet per minute you walk. A convenient fast walk for some is 2.5 mph, but this

may vary. One mile per hour equals 88 feet per minute. An easy way to calculate is to simply measure the distance you walk in one minute.

☐ 23. Compute gallons of pesticide per acre (Fig. 47).

$$\text{Gal/acre} = \frac{(\text{Gal/min of nozzle}) \times 43560 \text{ Sq ft/acre}}{\text{(Sq ft/min.)}}$$

Note: Gal./min. for standard nozzles

4074263	Flat Spray Nozzle	15 PSI = .22 Gal/min 29 PSI = .33 Gal/min 44 PSI = .40 Gal/min
4074755 & 4074756	Hollow Cone Nozzle	15 PSI = .17 Gal/min 29 PSI = .24 Gal/min 44 PSI = .29 Gal/min
4900527	Plastic Adj. Nozzle	40 PSI = .4 straight stream 40 PSI = .2 hollow cone

Sq. ft. / min. = speed (ft./min.) x swath width (ft.)

Fig. 47. Calibration - pesticide spray per acre.

REPAIRS

☐ 24. For piston pump, diaphragm pump, pressure cylinder, shut-off valve, and wand repair see instruction manual or Solo website: http://www.solousa.com.

SECTION III
HYDRAULIC SPRAYERS

PERFORMANCE CHECKLIST FOR THE FARM TEC MODELATE-20: 20-GALLON HYDRAULIC SPRAYER

Fig. 48. FARM-TEC ATE 20 Hydraulic Sprayer.

SET-UP PROCEDURES FOR THE FARM TEC ATE-20 (Fig. 48)

□ 1. Charge up deep-cycle battery overnight with EXUDE battery charger (12-volt, 6 amp) provided with sprayer. This should be done the day before spray operation or every six months of sprayer storage. Fully charged battery will provide for eight hours of spray operation.

□ 2. Check the entire sprayer thoroughly prior to use for wear areas, tight and clean battery cables

(maintenance free battery), cracks in tank, hoses, pump, filter housing, frame, all hose clamps, etc.

□ 3. Disconnect and unplug battery charger when green light is on indicating the battery is fully charged.

□ 4. Put 2-3 gallons of water in tank. Connect spray wand to hose and connect other end of hose (male end) next to battery case in front of tank.

□ 5. Select proper TeeJet nozzle required for spray operation. Turn on toggle switch located on left side of tank, below the pressure gauge. Immediately check for leaks. Correct as needed.

OPERATING PROCEDURES

□ 6. Adjust the working pressure by adjusting T-handle on top of pump (must loosen lock nut below T-handle first). The proper pressure should be 40 psi. Sprayer should be calibrated to check the flow rate.

□ 7. **Put on all Personal Protective Gear**.

□ 8. Fill the tank with half of the diluent needed. Calculate the amount of pesticide needed and add to the tank. Then add the remainder of the diluent. (Kerosene or diesel may be added to prevent foaming of the pesticide).

☐ 9. You are now ready to spray! Turn on switch and re-check the working pressure. Pull the spray wand trigger to spray.

Terminating Procedures

☐ 10. Drain any remaining pesticide into the proper container through spray wand or hose located next to the battery case. NEVER STORE PESTICIDE IN THE TANK!!!

☐ 11. Flush out tank, hose, and wand by adding 3-5 gallons of water/detergent mixture. This should be done on spray operation site when possible.

☐ 12. Rinse out system with water. Wash off the exterior of the sprayer. Air-dry the tank and exterior prior to storage.

PERFORMANCE CHECKLIST FOR THE HUDSON MODEL 47200 DL SPRAYER

SETUP PROCEDURES

□ 1. Secure the unit to the truck for towing.

□ 2. Check the gasoline tank, located on top of the engine through the hole in the hood, and fill with regular gas as needed.

□ 3. Check the oil level by reading the dipstick, located at the rear of the engine, and fill with 30-weight oil as needed.

□ 4. Check the oil level in the pump plug, located on the right side of the pump, and fill to the threads with 30-weight oil as needed.

□ 5. Check the belt tension, underneath the machine, midway between the engine and the pump. A properly maintained belt should deflect $^{1}/_{2}$ to $^{3}/_{4}$ inches. (NEVER ATTEMPT TO CHECK THE BELT TENSION WHILE THE ENGINE IS RUNNING.)

□ 6. Grease the fitting at the end of the agitator shaft, located underneath the belt guard, as needed.

□ 7. Ensure that the inline ratchet type flow valve, located on top of the surge tank, is parallel to the ground.

□ 8. Open the gasoline valve located underneath the gasoline tank.

□ 9. Using the spray gun, select the proper nozzle disc (read the pesticide label) and secure it to the spray gun at the nozzle cap. (Remember: the flow rate of the disc cannot exceed the capacity of the pump).

□ 10. Open the pesticide tank cover and clean the basket filter as needed.

□ 11. Close the choke, located behind the air filter cover, by pulling the lever towards the cover. (Omit this step if the engine is already warm.)

□ 12. Pull the starter rope firmly until the engine starts. **CAUTION: HEARING PROTECTION REQUIRED.** Return the rope in one smooth motion (i.e., do not let go of the rope).

□ 13. As the engine warms up, slowly open the choke.

□ 14. Put on all personal protective gear.

□ 15. Fill the pesticide tank with half of the carrier needed (read the pesticide label), then add the measured amount of pesticide to bring the solution up to the label's recommendation and then add the remainder of the carrier (Adding the pesticide while the engine is running aids in the mixing of the material). If using a wettable powder, add 1 pint of kerosene to every 100 gallons of liquid to inhibit foaming.

16. Keep track of the pesticide level inside of the tank by occasionally examining the clear tubing at the back of the tank.

OPERATING PROCEDURES

17. Turn the ratchet type flow valve, located on top of the surge tank, to pressurize the hose and gun.

18. Adjust the pressure on the gauge to 200 psi by turning the locking nut, located under the large spring next to the pump, clockwise.

19. Unwind the hose from the spindle and examine it and the connection for leaks.

20. Point the gun at the intended target area and pull the trigger. You can adjust the spray pattern by turning the adjuster located behind the trigger.

TERMINATING PROCEDURES

21. Discontinue spraying by releasing the spray gun trigger.

22. Release the pressure in the hose and spray gun by turning the ratchet type valve located on top of the surge tank. Be sure to pull the trigger again to expel any material that is still in the hose.

23. Drain remaining pesticide from the tank through the drain line, located at the bottom, rear of the tank, into an approved holding tank.

- [ ] 24. a. If using water-based pesticides, refill the tank with enough water and detergent to cleanse the machinery (not less than 10 gallons). Re-pressurize the system and flush the material through the spray gun.

- [ ] b. If using oil-based pesticides, refill the tank with an approved flushing solution, and follow the procedure in step 24a.

- [ ] 25. Secure the hose and spray gun assembly.

- [ ] 26. Close the inline gasoline flow valve, located underneath the gasoline tank, and let run until engine dies. This burns the gas out of the carburetor. There is also a kill button located on the engine below the carburetor.

- [ ] 27. Prepare the machine for storage by draining off any excess water or flushing solution from the pesticide tank and washing down the machine's exterior.

PERFORMANCE CHECKLIST FOR
JOHN BEAN HYDRAULIC POWER SPRAYER
MODEL DM10E 150
(NSN: 3740-00-925-9598)

Fig. 49. John Bean Hydraulic Sprayer, Model DM10E 150.

SET-UP PROCEDURES FOR THE JOHN BEAN MODEL DM10E 150 HYDRAULIC SPRAYER (Fig. 49).

□ 1. Secure the unit to a truck for towing, safety chain installed.

□ 2. Check the gasoline level and fill with regular unleaded gas as needed.

☐ 3. Check the oil level with the engine dipstick located at rear of engine and fill to full mark on dipstick with 30-weight HD oil.

☐ 4. Check the oil level in the pump, plug located at right side base of pump and fill to bottom of plug threads with 30-weight oil.

☐ 5. Check the belt tension midway between the engine and pump. Properly maintained belts should deflect $^{1}/_{2}$ to $^{3}/_{4}$ inches. NEVER ATTEMPT TO CHECK THE BELTS WHILE THE ENGINE IS RUNNING.

☐ 6. Grease the two agitator bearing fittings located at the rear of tank and the right front of tank next to the pump. Use multipurpose lithium based grease in a hand operated-gun.

☐ 7. Unscrew and examine the star screen filter and clean as needed. The filter housing is located between the engine and pump.

☐ 8. Ensure that the three “inline” valves, located at the base of the surge tank, adjacent to pressure relief valve, and on hose reef spindle (yellow handled lever), are in the OFF position.

☐ 9. Ensure that the pressure relief valve, located adjacent to the star screen filter housing, is backed out and then tightened slightly so that it will not fall out.

- 10. Open gasoline valve located under the gasoline tank; right side of the engine.
- 11. Close the choke by moving the choke lever up. (Omit this step if the engine is already warm.)
- 12. On a cold engine: place the throttle control midway between the slow and fast positions.
- 13. Pull the starter rope firmly until the engine starts. CAUTION: HEARING PROTECTION REQUIRED. Return the rope in one smooth motion, i.e., do not let go of the rope!!!
- 14. As the engine warms up, slowly open the choke.
- 15. Put on all personal protective equipment (PPE).
- 16. Fill the tank with the carrier needed, read the pesticide label and then add the measured amount of pesticide/herbicide to bring the formulation up to the label's recommendations. (Adding the pesticide/herbicide, while engine is running, aids with mixing.) If using wettable powders, add 1 pint of kerosene to every 100 gallons of formulation in the tank to inhibit foaming.
- 17. Keep track of the level in the tank by occasionally examining the clear tubing at the left front of the tank.

□ 18. Using the Spray Gun Assembly

□ a. Close the pressure relief valve, located until 200 psi reads on the pressure gauge.

□ b. Unwind the hose from the spindle and examine it for possible leaks.

□ c. Open all three inline flow valves to the gun.

□ d. Point the gun at the intended target area and pull the trigger. Adjust spray pattern as needed.

□ 19. Using The Boom Assembly

□ a. Unhook and GENTLY let down the boom, or booms (depending on what is required for the operation).

□ b. Ensure that both spray gun's inline flow valves are closed.

□ c. Select the proper setting on large valve located on left front of tank to boom or booms needed (i.e., center-left-right or left-center-right).

□ d. Turn the pressure relief valve until the pressure gauge on the boom selector valve reads 40 psi. This is to be done after turning on the (two) inline valves located behind the pressure relief valve at the right front of tank. (i.e., pull top rope forward

to turn on pressure and pull bottom rope forward to turn off).

- e. You must lift the lever on front of boom selector valve to the horizontal position to pressurize the booms.

- f. The two ropes are there to allow operations to be conducted from the towing vehicle.

TERMINATING PROCEDURES

20. Discontinue spraying by either releasing the trigger on spray gun or pulling the bottom rope toward the front of the sprayer or tow vehicle.
21. Open the pressure relief valve to release the system's pressure.

22. Drain the pesticide into a holding tank by way of the drainpipe located to the front and side of the machine.

CLEANING PROCEDURES

23. Refill the tank with at least 10 gallons of water and add some liquid detergent.

24. Re-pressurize the entire system. Flush out all spray hose, gun, and nozzle. Flush out entire boom system through nozzle.

25. Open the pressure relief valve after all cleaning solution is used up. Drain all lines. Close all inline

valves and place boom selector valve to the A position (i.e., in front of gauge).

☐ 26. Secure the spray gun into pipe holder, wind-up hose reel. Secure the boom assembly into bracket provided.

☐ 27. Close the inline fuel valve located under engine gas tank.

☐ 28. Drain off any excess water from the tank and let it air dry.

PERFORMANCE CHECKLIST FOR THE JOHN BEAN PLC MODEL DP05E/30 PRB HYDRAULIC SPRAYER

SETUP PROCEDURES

□ 1. Check the entire sprayer thoroughly for any wear areas, loose parts, and any items, which could cause problems during operation.

□ 2. Check oil level in engine, pump, and gearbox. Fill all three with 30W oil as needed. Fill engine fuel tank (regular unleaded).

□ 3. Inspect the tank, filler basket, and suction strainer for foreign materials. Clean or repair as necessary.

□ 4. Inspect all hose and piping connections for loose connections or damage. Repair as necessary.

□ 5. Check spray gun nozzle disc size for required flow rate at selected pressure (Check the "pesticide label" for required flow rate).

□ 6. Put on all personal protective gear.

□ 7. Fill the tank with half the diluent needed, calculate the amount of pesticide required and add to the tank. Then add the remainder of the diluent.

□ 8. Secure the pesticide tank cover.

OPERATING PROCEDURES

9. Turn the pressure relief valve lever, located on the left side of the pump, clockwise (up) to the non-pressure position.

10. Close the choke, located on the carburetor (under the air filter) by lifting the lever. Open the choke as the engine warms up. (Omit this step if the engine is already warm).

11. Remove the spark plug ground; pull the starter rope firmly until engine starts. CAUTION: HEARING PROTECTION REQUIRED. Throttle lever (located under the air filter) square rod must be pulled all the way out.

12. Turn pressure relief valve down, (counter-clockwise). Adjust the pressure- (0-450 psi) when using hose/spray-gun at 200 psi normally. Open both inline valves to pressurize.

13. Conduct the spray operation by pulling the spray gun trigger. The spray pattern can be adjusted behind trigger lever.

TERMINATING PROCEDURES

14. After ceasing spray operations, close both inline valves first. Release pressure adjusting valve turn clockwise up to release all pressure. Drain all pressure out of spray hose. Push sparkplug ground against sparkplug.

- [ ] 15. Drain any excess pesticide from the tank using the tank drain (center front of tank bottom). Never use the pesticide tank as a holding vessel!!!

- [ ] 16. Replace the drain plug, add water (5 gallons) and a detergent to the tank, restart, pressurize, and resume spraying through the spray gun.

- [ ] 17. Rinse out with clear water, wash off exterior of sprayer and air-dry tank and exterior.

PERFORMANCE CHECKLIST FOR THE SMITHCO MODEL 6911 100-GALLON HYDRAULIC SPRAYER

SET-UP PROCEDURES

☐ 1. Secure the unit to a truck for towing, safety chain installed.

☐ 2. Check the gasoline level of the gas tank located on the left side of the engine and fill with regular unleaded gas as needed.

☐ 3. Check the engine oil level. The plug is located at rear of engine. Fill to the bottom of the threads with 30-weight HD oil.

☐ 4. Check the oil level in the pump; the clear plastic site tube located at the front of the pump should be filled to half full with 30-weight oil.

☐ 5. Be sure to check charge in pulsation damper located on top of pump dome. Damper should be charged with compressed air up to 10% of operating pressure (200 psi). This ensures smooth operating pressure of the pump.

☐ 6. Check the belt tension midway between the engine and pump. Properly maintained belts should deflect $^{1}/_{2}$ to $^{3}/_{4}$ inches. NEVER ATTEMPT TO CHECK THE BELTS WHILE THE ENGINE IS RUNNING.

☐ 7. Grease the agitator shaft fitting located at the agitator shaft flange at the rear of spray tank behind the pulleys. Use multi-purpose lithium based grease in a hand-operated gun.

☐ 8. Unscrew and examine the in-line jar-type filter and clean as needed. The filter housing is located on the right side of the pump.

☐ 9. Ensure that in-line valves located at the base of the pump and on the right front part of the tank are in the OFF position (handle is in cross-line position).

☐ 10. Ensure that the pressure relief valve, located adjacent to the pump dome, is backed out with the handle up.

☐ 11. Close the choke by moving the choke lever over to the CHOKE CLOSE position (Omit this step if the engine is already warm).

☐ 12. On a cold engine: place the throttle control midway between the slow and fast positions.

☐ 13. Pull the starter rope firmly until the engine starts. CAUTION: HEARING PROTECTION REQUIRED. Return the rope in one smooth motion; DO NOT LET GO OF THE ROPE!

☐ 14. As the engine warms up, slowly open the choke.

☐ 15. Put on all personal protective equipment (PPE).

☐ 16. Fill the tank with the carrier needed, read the pesticide label and then add the measured amount of pesticide/herbicide to bring the formulation up to the label's recommendations (Adding the pesticide/ herbicide, while engine is running, aids with mixing.) If using wettable powders, ADD 1 PINT OF KEROSENE TO EVERY 100 GALLONS OF FORMULATION IN THE TANK TO INHIBIT FOAMING.

☐ 17. Keep track of the level in the tank by occasionally examining the clear tube at the left front of the tank.

OPERATING PROCEDURES:
USING THE SPRAY GUN ASSEMBLY

☐ 18. The Locking Clip on the Pressure Control Unit may be positioned in one of 4 notches in the housing. This provides 4 different pressure settings when the lever is pushed down. Select the setting that provides the correct pressure for your use.

☐ 19. Ensure the pressure gauge reads 200 psi. For fine adjustments, lift the wire clip off and turn the knurled thumbnut on the plunger stem. Turn clockwise to decrease pressure, counter-clockwise to increase pressure. Engage the lever into one of the 4 available positions in the housing.

☐ 20. Unwind the hose from the spindle and examine it for possible leaks.

☐ 21. Open the inline flow valve to the hose reel. One is located on the left side of the pump and the other is on the right, at the front of the spray tank.

☐ 22 Point the gun at the intended target area and pull the trigger. Adjust spray pattern as needed.

TERMINATING PROCEDURES

☐ 23. Discontinue spraying by releasing the trigger on spray gun.

☐ 24. Open the pressure relief valve by releasing the wire clip on the Pressure Control Unit.

☐ 25. Drain the pesticide into a holding tank by way of the drainpipe located at the rear of the sprayer below the pump. The drainpipe is attached to the frame.

CLEANING PROCEDURES:

☐ 26. Refill the tank with at least 10 gallons of water and add liquid detergent.

☐ 27. Re-pressurize the entire system. Flush out the spray hose, gun, and nozzle.

☐ 28. Open the pressure relief valve after all cleaning solution is used up. Drain all lines. Close all in-line valves.

☐ 29. Wind up the hose and secure the spray gun.

☐ 30. Drain off excess water from the tank and allow the spray tank to air dry for several days.

SECTION IV
VEHICLE MOUNTED
ULV SPRAYERS

PERFORMANCE CHECKLIST FOR THE BEECO PRO-MIST 15MP ULV SPRAYER (NSN: 3740-01-206-9635)

Fig. 50. BEECO Pro-Mist ULV Sprayer & ATV.

TESTING OF ENVIRONMENTAL CONDITIONS FOR ULV APPLICATIONS

A. Check the weather conditions expected during the spray operation. REMEMBER, YOU SHOULD NOT CONDUCT OPERATIONS IN THE RAIN OR IN STRONG WINDS!

B. Check for a temperature inversion. A temperature inversion has occurred when the air temperature at

six feet above the ground is at least one degree warmer than the ground temperature. (This situation usually occurs in the early morning and late evening hours.)

C. Check the wind speed by using a wind-measuring device. The indicated wind speed should fall between 4-6 mph and should be blowing across the intended target area.

SET-UP PROCEDURES FOR THE BEECO PRO-MIST ULV SPRAYER (Fig. 50)

□ 1. Mount the spray unit in the rear of a pickup truck, flat bed (slightly behind the tailgate) or trailer hitched to an “All Terrain Vehicle” (ATV; Fig. 33.). (Dry weight of sprayer is less than battery, approximately 75 lbs.)

□ 2. Ensure the sprayer is secured to the vehicle by nuts, bolts and lock washers at all four corners of mounting beams.

□ 3. Ensure that the flushing solution tank (smaller tank location on left side of spray head) is filled with an approved flushing solution.

OPERATING THE UNIT FROM A VEHICLE'S ELECTRICAL SYSTEM

□ 4. a. Verify that the vehicle's alternator rates between 60-80 amperes (amps). This ensures that the sprayer will maintain a constant speed.

b. Ensure sprayer's power-cable lead to the vehicle's battery is #10 wire. Main system and motors are protected by circuit breakers; no fuses are used.

c. CAUTION: Most “tactical vehicles” are 24-volt systems. Verify cables are only connected to 12-volts, not 24-volts.

d. Connect the power cable to the battery (positive RED CLIP FIRST, negative black clip (ground) second; use a 12-volt vehicle battery only. Higher rated 24-volt batteries will cause permanent damage to the BEECO sprayer.

OPERATING THE UNIT FROM A BATTERY

5. a. Install a 12-volt battery of at least 70-amp hours capacity (We strongly recommend the use of a deep-cycle RV/marine battery with at least 165-180 minutes reserve capacity).

(1) The space within the machine's super structure, under the blower HOUSING, is designed to hold any size 12-volt battery.

b. Install marine battery terminal onto battery.

c. Hook white wire to positive terminal first, then black wire to negative terminal; then tighten wing nuts.

(1) A fully charged 12volt deep-cycle battery will provide 3-4 hours of continuous operation.

SETUP PROCEDURES

□ 6. FIRST, ENSURE ALL SWITCHES ARE OFF BOTH INSIDE AND OUTSIDE OF ELECTRICAL BOX!! Plug the control cable into the back of the operator control box at one end, and into the bottom of the breaker module inside the electrical control box.

□ 7. Check:

□ a. All electrical cables and connections are secure and clean.

□ b. The battery is in good condition.

□ c. Charge the vehicle's alternator between 13.8 and 14.8 volts (if you are going to connect the sprayer to the vehicle’s electrical system).

□ d. The insecticide delivery system to ensure that all tubing is securely connected, the filter is tight, and quick-fittings are latched.

□ e. Ensure that the end of the pickup tube in the insecticide tank extends to the bottom of the insecticide tank.

□ 8. Put on all personal protective equipment.

□ 9. Add liquid to the insecticide tank. Use the 5-gallon polyethylene plastic tank strapped down behind the spray head assembly. Use EPA approved ULV concentrates only. Cautionary Note: No insecticide spraying should be performed until the pump has been calibrated.

CALIBRATION PROCEDURES

□ 10. Disconnect the insecticide tube at the spray head, just below the blower housing, and place the tube into an empty container.

□ 11. Slightly loosen the two knurled knob lock nuts that secure the pump's pointer, located next to the electrical box.

□ 12. Set the pointer at an arbitrary number of 0-10 in the direction of flow, by rotating the black knob, located next to the pump numbers.

□ 13. Turn on the main breaker located on the outside of the electrical box on the left side. Also turn on the pump circuit breaker located inside the box.

□ 14. Depress and hold down the calibration button inside the electrical box until the insecticide flows without air bubbles in the line. Release the button and hold the tube up.

□ 15. a. Hold the open end of the insecticide tube above the graduated cylinder.

- b. Depress the calibration button.
- c. Put tube into graduated cylinder at the same time.
- d. Hold for one minute.
- e. Check the flow rate and adjust the pump as needed. (Flow rate is found on the pesticide label.)
- f. Recheck for one minute.

16. Turn on all switches.

    a. First turn on circuit breaker located on the outside of the electrical control box. (Located next to the hour meter.)

    b. Blower Circuit breakers for the blower, spray head, and pump are located inside of the electrical control box.

17. Depress the power switch, located on remote control panel.

    a. The switch indicator light will illuminate and the fan and spray head will start. The spray head will run at idle speed (about 15,000 rpm).

    b. The spray head will accelerate to its spraying speed and the blower will start.

□ 18. Check volt lights located on the remote control panel. Ensure 12volt green light is on. If not, recheck cable hookup at battery.

□ 19. YOU ARE NOW READY FOR SPRAYING.

□ 20. Depress spray switch and the pump will deliver the insecticide.

□ 21. Check volt and alert lights on remote control box for proper operation (Green light for volts, and no lights on for alert).

a. If at any time during operation the sleeve does not rotate fast enough to properly spray, the controller will automatically prevent the pump from operating.

b. AVOID TURNING ON ANY OTHER ELECTRICAL PULLS (LIGHTS, RADIO, ETC.) CONNECTED TO THE VEHICLE'S BATTERY.

TERMINATING PROCEDURES

□ 22. Depress the spray switch.

a. The pump will stop.

b. The blower and spray head will continue to operate.

23. Allow the sleeve to spin at idle speed for a minute or so after the pump is shut off to remove the remaining insecticide.

24. For emergency shutoff, depress "off" button on remote panel to trip main circuit breaker. To restart, turn the main breaker back on.

FLUSHING

□ 25. It is recommended that you begin flushing the tank during your final spray run AT THE JOB SITE.

□ 26. Depress power switch.

□ 27. Depress flush switch.

a. An audible alarm will sound to indicate flushing has begun.

□ 28. Run the system for 5 minutes at a flow rate of 3 oz per minute.

□ 29. After the lines are free of insecticide, turn the pump flow rate to 12-15 oz per minute and run the flushing solvent through the system for one minute.

□ 30. Turn off the flush switch and power switch.

CLEANING PROCEDURES

□ 31. BEFORE CLEANING: Disconnect the negative battery cable from the sprayer. Cover the ceramic spray head sleeve with a plastic bag and rubber band.

□ 32. Completely wipe down the exterior of the machine with a spray on/wipe off cleaning solution (GP Cleaner, 409, or Isopropyl Alcohol).

- 33. Avoid getting any water on the electrical connections and sleeve assembly.
- 34. When you are done cleaning, dry off the system. (Compressed air on all electrical terminals works best.)
- 35. Turn the pump pointer so that the pesticide flow is reversed-going INTO the pesticide tank.
- 36. Depress power and spray button. This will dry the sleeve and suck pesticide from lines into pesticide tank.
- 37. Depress power and spray button to shut off.
- 38. Reset pump pointer to "0".
- 39. Remove the pickup line from the pesticide tank and secure any remaining pesticide into its original container.
- 40. Turn all switches off, both inside and outside of electrical box.
- 41. Store the unit under proper cover, keep dry.

PERFORMANCE CHECKLIST FOR THE CURTIS MODEL 2740 ULV SPRAYER (NSN: 3740-01-141-2557)

TESTING OF ENVIRONMENTAL CONDITIONS FOR ULV APPLICATIONS

A. Check the weather conditions expected during the spray operations. REMEMBER, YOU SHOULD NOT CONDUCT ULV OPERATIONS IN THE RAIN OR IN STRONG WINDS.

B. Check for a temperature inversion. A temperature inversion has occurred when the air temperature at six feet above the ground is at least one degree warmer than the ground temperature. This situation usually occurs in the early morning and late evening hours.

C. Check the wind speed by using a wind-measuring device. The ideal indicated wind speed should fall between 4-6 mph and should be blowing across the intended target area. No spraying if wind is 10 mph or greater.

SET-UP PROCEDURES

☐ 1. Place the ULV unit in a pickup truck or on a trailer and secure it for towing.

☐ 2. Check the fuel level of the Fuel Tank. Add regular unleaded gas as needed. Fuel Tank is located on right side of engine (black polyethylene tank).

- ☐ 3. Check the engine Oil Level using the dipstick located on left side of engine below the Air Filter (It is marked “Oil”). Add SAE 30-weight detergent oil as needed.

- ☐ 4. Check the Blower Oil level. The plug is located on the side closest to the drain plug. Fill through the Breather Plug at the top, until the oil runs out of the overflow hole at the side of the blower; close with plug. You must use 40-weight NON-DETERGENT oil as needed.

- ☐ 5. Periodically grease the two fittings, located on Blower behind the engine.

- ☐ 6. Check the battery water level. Add water to the proper level. Periodically, charge the battery.

- ☐ 7. Ensure that the sprayer Battery Cables are clean and tight.

- ☐ 8. Check the Flushing Solution level in the one-gallon tank mounted on the Formulation Tank bracket and fill the tank with an approved flushing solution. Diesel fuel or transmission fluid can be used as alternatives.

- ☐ 9. Close the Choke located under the Air Filter Housing (front of engine) by pulling out the ring. Omit this step if engine is warm.

- ☐ 10. Note: OPEN Choke as needed AFTER engine starts.

□ 11. The Engine Speed Control Slide Ring is located under the Air Filter Housing on the left side of engine. Pull ring halfway out.

□ 12. Ensure all Remote Control switches are in the “OFF” position.

□ 13. Plug one end of the Remote Control Cable into the back side of the Pump Assembly.

□ 14. Plug the other end of the Remote Control Cable into the base of the Remote Control Box.

□ 15. a. The Starter Solenoid Switch is located on the right side of the engine. Place it into the ON position.

□ b. Place the Machine Switch on the Control Box into the “On” position.

□ c. Push the Start Switch on the Control Box for a maximum of 15 seconds. CAUTION: HEARING PROTECTION REQUIRED. Note: optional Starter Button located on the right side of the Engine Air Filter can also be used.

□ 16. Engine starts.

□ 17. The Boom Pressure Gauge is located between the Engine and the Blower. Pressure should read 6 psi. (pressure may vary slightly due to viscosity of formulation)

□ 18. Adjust Air Pressure by pulling OUT or pushing IN the Engine Speed Control Ring on left side of engine.

□ 19. Put on all Personal Protective Equipment.

□ 20. Add the calculated amount of pesticide to the 12-gallon polyethylene tank located on the right rear of the unit. (Remember, Ultra Low Volume (ULV) and Ultra Low Density (ULD) machines use only concentrated liquid formulations).

□ 21. a. Place Function Select Dial on the Remote Control Box to #1-#4 position as required. (See page 23 of Owners Manual)

□ b. Unlock Flow Rate Knob locking ring and adjust to desired flow rate IAW Pesticide Label.

□ c. “High-Low” Range Control Switch on the side of Pump Assembly is in the High position (See page 23 of Owners Manual).

□ 22. You are now ready for ULV spraying.

□ 23. The rate of vehicle speed during the spray operation is 5 OR 10 mph. The correct speed for each type pesticide is indicated on the Pesticide Label.

24. When stopping for a short period of time, turn the Remote Control Output Switch to the OFF position.

25. After completing spray operation, with the engine still running, turn the Flush/Spray Solenoid Switch on the Remote Control Box to “FLUSH” for two (2) minutes at 10 ounces per minute.

26. Place the Output Switch on the Remote Control Box in the “OFF” Position.

27. Turn all switches on the Remote Control Box to “OFF” position. (i.e. Machine and Output)

CALIBRATION PROCEDURES

28. For ULV calibration, carry out steps 1-22.

29. Place Function Selector Dial in the #2 position. Adjust flow rate to desired flow (4 oz, 6 oz, 8 oz, etc.).

30. Place Solenoid Switch on Remote Control Box to “SPRAY” position.

31. Place HIGH/LOW Selector Switch in the “HIGH” position.

32. Disconnect ¼ inch formulation line from the “T” on the Spray Boom and place into a “pesticide only” receptacle. Always use a suitable collection container for pesticide measurement.

33. Place the Output Switch on the Remote Control in the “ON” position (fluid will begin to flow).

34. Adjust the Flow Rate Knob on the Remote Control Box to the desired rate.

35. The timing person signals the beginning and the end of the one (1) minute collection period.

36. Collect sample and compare actual output with desired output indicated by Remote Control Box digital read-out.

37. If sample is NOT within 20% of the volume given by the Remote Control Box digital read-out, contact manufacturer or NDVECC, Bangor.

TERMINATING PROCEDURES

38. After flushing entire system, wash or steam clean outside of ULV machine with liquid soap and water. Note: get no water on Remote Control Box.

39. Break connection at Fuel Tank/Fuel Line junction and restart Engine to drain the Carburetor prior to storage.

40. Keep sprayer under suitable cover and out of weather.

PERFORMANCE CHECKLIST FOR THE CURTIS MODEL 2742 ULV SPRAYER

TESTING OF ENVIRONMENTAL CONDITIONS FOR ULV APPLICATIONS:

A. Check the weather conditions expected during the spray operations. REMEMBER, YOU SHOULD NOT CONDUCT ULV OPERATIONS IN THE RAIN OR IN STRONG WINDS.

B. Check for a temperature inversion. A temperature inversion has occurred when the air temperature at six feet above the ground is at least one degree warmer than the ground temperature. This situation usually occurs in the early morning and late evening hours.

C. Check the wind speed by using a wind-measuring device. The ideal indicated wind speed should fall between 4-6 MPH and should be blowing across the intended target area. No spraying if wind is 10 mph or greater

SET-UP PROCEDURES:

□ 1. Place the ULV unit in a pickup truck or on a trailer and secure it for towing.

□ 2. Check the fuel level of the Fuel Tank. Add enough gasoline (approx 1 gal) to submerge the pick up tube.

- 3. Check the engine Oil Level using the dipstick located on left side of engine below the Air Filter (It is marked “Oil”). Add SAE 30 weight detergent oil as needed.

- 4. Check the Blower Oil level. The plug is located on the side closest to the drain plug. Fill through the Breather Plug at the top, until the oil runs out of the overflow hole at the side of the blower; close with plug. You must use 40-weight NON-DETERGENT oil as needed. (9150-01-293-2773).

- 5. Periodically grease the two fittings, located on Blower behind the engine.

- 6. Check the Battery water level. Add water to the proper level. Periodically charge the Battery.

- 7. Ensure that the sprayer Battery Cables are clean and tight.

- 8. Check the flushing solution level in the one-gallon tank mounted on the gas tank bracket and fill the tank with an approved flushing solution. Diesel fuel or transmission fluid can be used as alternatives.

- 9. Close the Choke located under the Air Filter Housing (front of engine) by pulling out the ring. Omit this step if engine is warm.

- 10. Note: OPEN Choke as needed AFTER engine starts.

□ 11. The Engine Speed Control Slide Ring is located under the Air Filter Housing on the left side of engine. Pull ring halfway out.

□ 12. Ensure all Remote Control Box switches are in the "OFF" position.

□ 13. Plug one end of the Remote Control Cable into the side of the Pump Assembly.

□ 14. Plug the other end of the Remote Control Cable into the base of the Remote Control Box.

□ 15. a. The Starter Solenoid Switch is located on the right side of the engine. Place it into the ON position.

□ b. Place the Machine Switch on the Control Box into the ON position.

□ c. Push the Start Switch on the Control Box for a maximum of 15 seconds. CAUTION: HEARING PROTECTION REQUIRED. Optional: Starter Button located right side of Engine below Air Filter can also be used.

□ 16. Engine starts.

□ 17. The Boom Pressure Gauge is located between the Engine and the Blower. Pressure should read 6 psi (pressure may vary slightly due to viscosity of formulation).

- ☐ 18. Adjust Air Pressure by pulling OUT or pushing IN the Engine Speed Control Ring on left side of engine.
- ☐ 19. Put on all Personal Protective Equipment.
- ☐ 20. Add the calculated amount of pesticide to the 12-gallon polyethylene tank located on the right rear of the unit. (Remember, ULV/ULD machines use only concentrated liquid formulations).
- ☐ 21. Place Function Select Dial on the Remote Control Box to #1 - #4 position as required. (See page 23 of Owners Manual)
- ☐ 22. You are now ready for ULV spraying.
- ☐ 23. The rate of vehicle speed during the spray operation is 5 OR 10 mph. The correct speed for each type pesticide is indicated on the Pesticide Label.
- ☐ 24. When stopping for a short period of time, turn the Remote Control Output Switch to the OFF position.
- ☐ 25. After completing spray operation, with the engine still running, turn the Flush/Spray Solenoid Switch on the Remote Control Box to “FLUSH” for two (2) minutes at 10 ounces per minute.

□ 26. Place the Output Switch on the Remote Control Box in the “OFF” Position.

□ 27. Turn all switches on the Remote Control Box to “OFF” position. (i.e. Machine and Output)

CALIBRATION PROCEDURES

□ 28. For ULV calibration, carry out steps 1-22.

□ 29. Place Function Selector Dial in the #2 position. Adjust flow rate to desired flow (4 oz, 6 oz, 8 oz, etc.).

□ 30. Place Solenoid Switch on Remote Control Box to “SPRAY” position.

□ 31. Place HIGH/LOW Selector Switch in the “HIGH” position.

□ 32. Disconnect ¼ inch formulation line from the “T” on the Spray Boom and place into a “pesticide only” receptacle. Always use a suitable collection container for pesticide measurement.

□ 33. Place the Output Switch on the Remote Control in the “ON” position (fluid will begin to flow).

□ 34. Adjust the Flow Rate Knob on the Remote Control Box to the desired rate.

□ 35. The timing person signals the beginning and the end of the one (1) minute collection period.

□ 36. Collect sample and compare actual output with desired output indicated by Remote Control Box digital read-out.

□ 37. If sample is NOT within 20% of the volume given by the Remote Control Box digital read-out, contact manufacturer or NDVECC, Bangor.

TERMINATING PROCEDURES

□ 1. After flushing entire system, wash or steam clean outside of ULV machine with liquid soap and water. NOTE: Don't get any water on the Remote Control Box.

□ 2. Break connection at Fuel Tank/Fuel Line junction and restart Engine to drain the Carburetor prior to storage.

□ 3. Keep sprayer under suitable cover and out of weather.

PERFORMANCE CHECKLIST FOR THE CURTIS MODEL 2952 ULV SPRAYER

TESTING OF ENVIRONMENTAL CONDITIONS FOR ULV APPLICATIONS

A. Check the weather conditions expected during the spray operations. REMEMBER, YOU SHOULD NOT CONDUCT ULV OPERATIONS IN THE RAIN OR IN STRONG WINDS.

B. Check for a temperature inversion. A temperature in- version has occurred when the air temperature at six feet above the ground is at least one degree warmer than the ground temperature (This situation usually occurs in the early morning and late evening hours).

C. Check the wind speed by using a wind-measuring device. The indicated wind speed should fall between 4-6 mph and should be blowing across the intended target area.

SETUP PROCEDURES

□ 1. Place the ULV on a truck or trailer and secure it for towing.

□ 2. Check the fuel level. Add regular unleaded gas as needed to the large red polyethylene tank.

- [ ] 3. Check the engine oil level using the dipstick, located at the rear of the engine, near the top. Add 30W oil, as needed.

- [ ] 4. Check the blower oil level. Plug is located on the left side closest to the drain plug. Fill through the breather plug on the top, until the oil reaches the bottom of the overflow outlet. (Do not remove the upper plug on the side near the breather plug.) Add 40W non-detergent oil, as needed.

- [ ] 5. Periodically, grease the two fittings, located behind the blower and above the driver shaft. Regular chassis grease can be used.

- [ ] 6. Check the battery fluid level. Add water to cover the cells, continuing to fill to a level where the fluid reaches the plastic at the opening.

- [ ] 7. Ensure battery cables are clean and tightly connected.

- [ ] 8. Check the flushing solution level in the one-gallon tank, located on the right side of the battery. Fill as needed.

- [ ] 9. Open the air vent, located on top of the fuel tank near the gas gauge.

- [ ] 10. Close the choke, located under the engine air filter, by pulling out the knob. (Omit this step if the engine is already warm.)

- 11. Place remote control unit in an area where it will not be damaged by the vibration of the motor, and yet will be accessible to the operator.

- 12. Ensure that the engine ignition switch, formulation control switch, and remote control switches are in the “OFF” position.

- 13. Plug the remote control line into the right side of the pump control box. Plug the other end of the cable into the base of the remote control box.

- 14. Put on all personal protective equipment.

- 15. Add the calculated amount of pesticide to the 12-gallon polyethylene tank, located on the right rear of the unit. (Remember, Ultra Low Volume (ULV) and Ultra Low Density (ULD) machines use only concentrated liquid formulations.)

START-UP PROCEDURES

- 16. Place the "MACHINE" switch on the remote control box in the ON position.

- 17. Place the ON/OFF switch on the top of the engine in the “ON” position.

- 18. Press the starter button located between the engine and the battery. (Hold until the motor turns over, not more than 15 seconds.) CAUTION: HEARING PROTECTION REQUIRED.

□ 19. As the engine starts, gradually push in choke. (Omit this step if the engine is already warm.)

OPERATING PROCEDURES

□ 20. Check the boom pressure gauge located below the formulation selector valve. (Should be at 10 psi for standard use.)

□ 21. Adjust air pressure by increasing or decreasing engine speed with the manual friction slide control lever located beneath the choke knob.

□ 22. Place formulation selector switch on the control box to "SPRAY."

□ 23. Turn formulation selector valve to "SPRAY."

□ 24. Place the output switch on the remote control in the "ON" position.

□ 25. Select pesticide output, using the pesticide label, with coarse flow rate knob on control box. Numbered 1-4.

□ 26. Loosen lock nut below fine flow rate knob on control box.

□ 27. Set precise pesticide flow rate.

□ 28. Tighten lock nut.

□ 29. You are now ready for ULV spraying.

30. The rate of vehicle speed during the spray operation is generally 5 or 10 mph. The correct speed for each type of pesticide is indicated on the pesticide label.

31. When stopping for a short period of time, turn the remote control output switch to the OFF position.

TERMINATING PROCEDURES

32. After completing your spray operation, with the engine still running, turn the formulation selector valve, located below the flushing solution tank, to the "FLUSH" position.

33. Place the switch on the remote control in the "FLUSH" position.

34. Place the output switch on the remote control in the "ON" position.

35. Set the flow rate on the remote control digital read-out to 10 oz/min and flush system for 2-3 min.

36. Turn all switches to the "OFF" position (Ignition, formulation valve, and remote control switches).

CALIBRATION PROCEDURES

37. For ULV calibration, carry out steps 1-22.

38. Move the formulation selector valve, located below the solution tank, to the "SPRAY" position.

- ☐ 39. Move the high/low selector switch (near the remote cable hookup point) to the "HIGH" position.
- ☐ 40. Disconnect $^{1}/_{4}$ inch formulation line from the "T" on the spray boom and place into a "pesticide only" bucket. Use a suitable collection container for actual pesticide measurement.
- ☐ 41. Move the function select switch on the remote control to the "#2" position.
- ☐ 42. Place the mode switch on the remote control in the "SPRAY" position.
- ☐ 43. Place the output switch on the remote control in the "ON" position (fluid will begin to flow).
- ☐ 44. Adjust the flow rate knob on the remote control to the desired level.
- ☐ 45. Have the timing person signal the beginning and the end of the one-minute collection period.
- ☐ 46. Collect sample and compare actual output with output indicated by remote control digital readout.
- ☐ 47. If the sample is not within 20% of the volume given by the remote control digital readout, then contact the manufacturer, NDVECC or a NEPMU.

PERFORMANCE CHECKLIST FOR THE CLARKE (LECO) GRIZZLY ULV SPRAYER (NSN: 3740-00-375-9154)

Fig. 51. Clarke (LECO) Grizzly ULV Sprayer.

TESTING OF ENVIRONMENTAL CONDITIONS FOR ULV APPLICATIONS

A. Check the weather conditions expected during the spray operations. REMEMBER, YOU SHOULD NOT CONDUCT ULV OPERATIONS IN THE RAIN OR IN STRONG WINDS.

B. Check for a temperature inversion. A temperature inversion has occurred when the air temperature at six feet above the ground is at least one degree warmer than the ground

temperature. This situation usually occurs in the early morning and late evening hours.

C. Check the wind speed by using a wind-measuring device. The ideal indicated wind speed should fall between 4-6 mph and should be blowing across the intended target area. No spraying if wind is 10 mph or greater.

D. Before attempting to operate the unit for the first time, study the complete Instruction Manual carefully and identify all of the components in Figs. 51, 52.

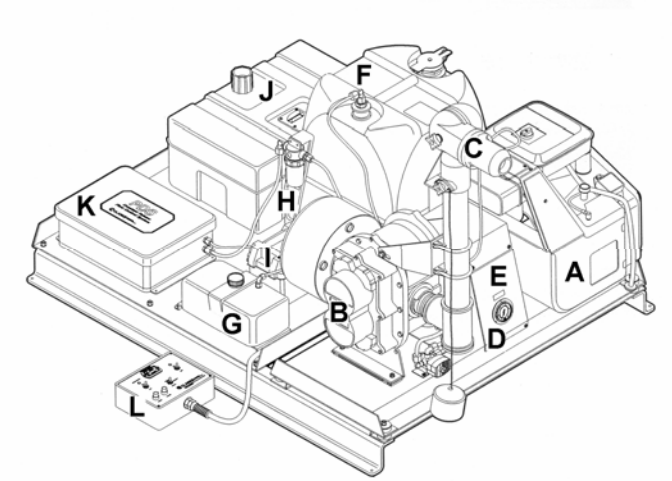

Fig. 52. Clarke (LECO) Grizzly ULV Sprayer.

A: ENGINE
B: BLOWER
C: NOZZLE
D: PRESSURE GUAGE
E: HOUR METER
F: INSECTICIDE TANK
G: FLUSH TANK
H: FILTER SYSTEM
I: 12-V BATTERY
J: FUEL TANK
K: FLOW CONTROL BOX
L: REMOTE CONTROL STATION

SET-UP PROCEDURES FOR THE
CLARKE (LECO) GRIZZLY ULV SPRAYER (Fig. 51).

☐ 1. Plug the Remote Control Station Cable Plug into the socket located on the rear Coupling Cover Panel, right rear of engine. Be sure to hand tighten the knurled locking cap onto the socket. (ALL SWITCHES IN THE OFF POSITION) (Fig. 53).

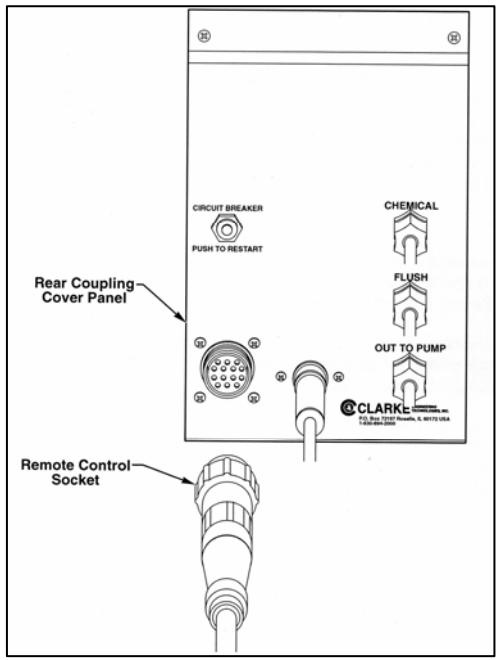

Fig. 53. Remote Control Station Cable Plug.

2. Mount the Grizzly ULV Fog Generator into a vehicle or onto a trailer. Unit should be secured to the bed of the Vehicle.

3. Remote Control Station - contains a number of components for controlling the unit (Fig. 54).

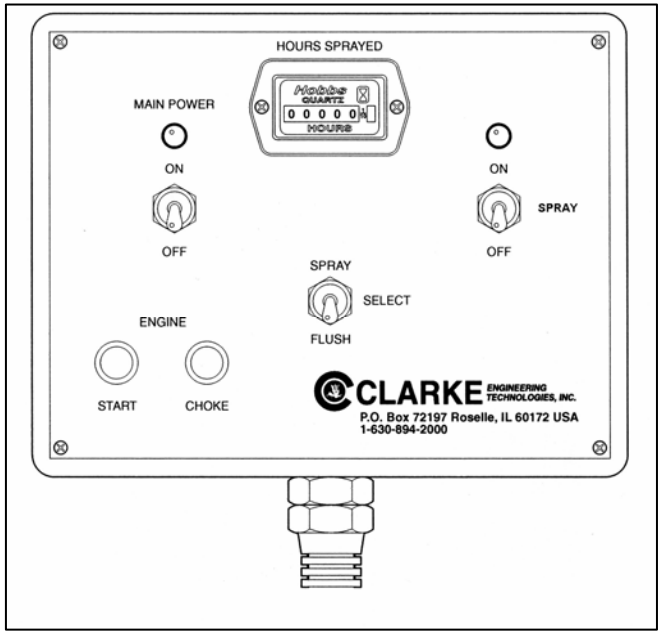

Fig. 54. Remote Control Station.

☐ 4. Make sure that all switches are in the OFF position.

☐ 5. Verify that the battery cable connections are correct and tight. Red to positive/black to negative. Check battery water level if not a maintenance free battery.

☐ 6. Verify that no foreign objects or tools have been left in or about the fog generator.

☐ 7. Check the oil level in the engine using the dipstick located on the left side of the engine below the air filter. Add SAE 30 weight detergent oil (Fig. 55).

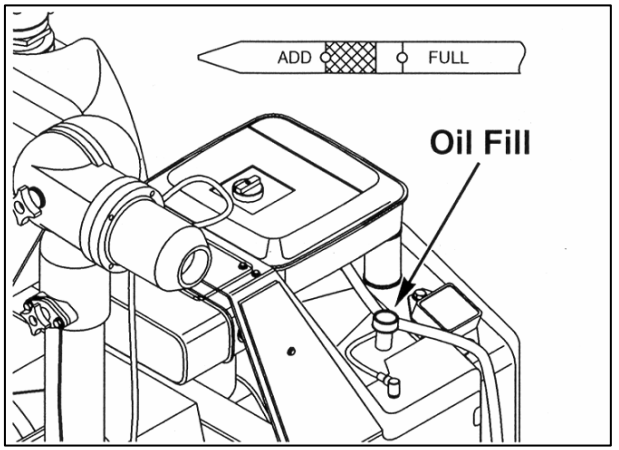

Fig. 55. Engine oil level check & fill.

 8. Check the blower oil level at the oil overflow plug. The plug is located on the left side closest to the drain plug. Fill through the “breather plug” at the top, until the oil runs out the oil overflow hole at the side of the blower and then reinstall the plug. You must use M-S type SAE 40 weight heavy-duty type from 30 degrees Fahrenheit to 90 degrees Fahrenheit ambient temperature. DO NOT USE MULTIPLE VISCOSITY OILS, (Fig. 56).

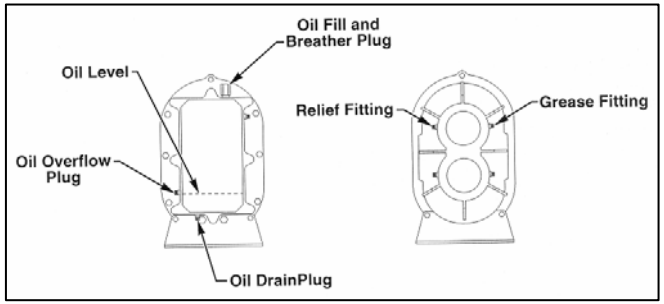

Fig. 56. Blower oil level check & fill.

 9. Periodically grease the two fittings on the engine side of the blower, every 50 hours.

☐ 10. Check the fuel level in the red, nine gallon FUEL TANK, (Fig. 57). Add regular unleaded fuel as needed, making sure you cover the pick-up tube.

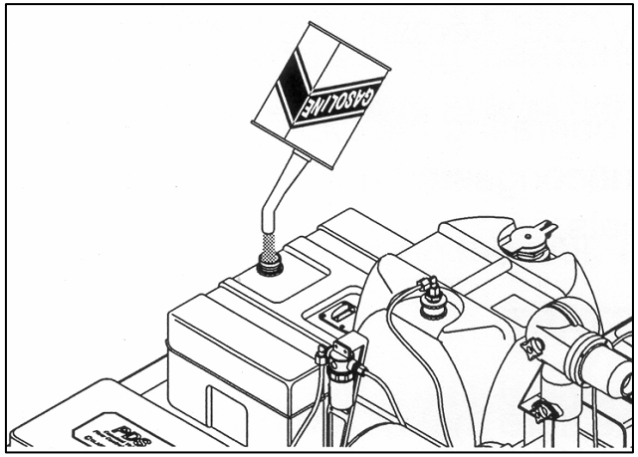

Fig. 57. Fuel level check & fill.

☐ 11. PUT ON ALL PERSONAL PROTECTIVE EQUIPMENT. Use a screened funnel.

☐ 12. Add the proper amount of pesticide to the 15 gallon, black polyethylene tank located between the engine and gas tank, (Fig. 58) (Remember to use ULV/ULD machine labeled concentrates ONLY).

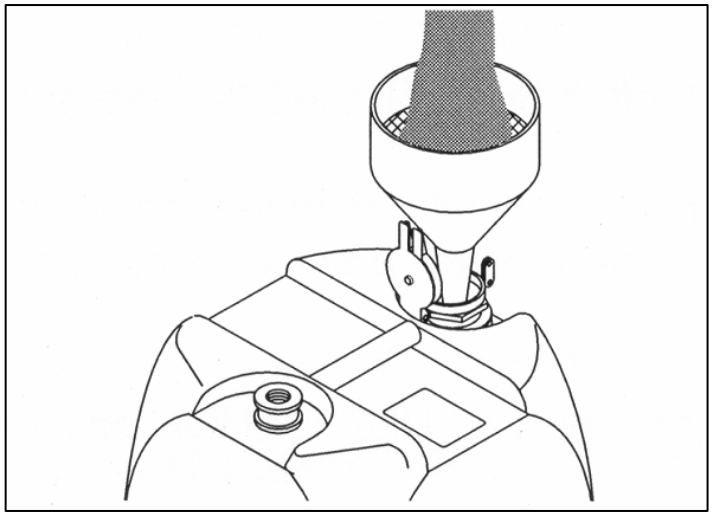

Fig. 58. Adding pesticide.

13. Place flushing solution in the clear plastic 1-gallon tank located on the base plate between the blower and the PDS flow control box. Diesel fuel or transmission fluid can be used as alternatives, (Fig. 59).

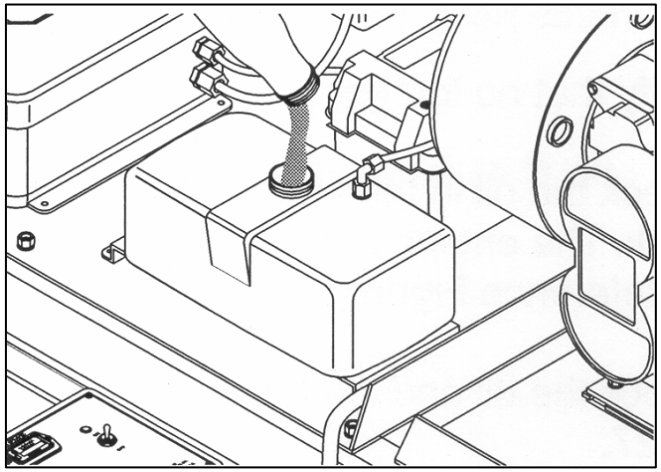

Fig. 59. Adding flushing solution.

14. Verify that the Remote Control Station is within easy reach of the operator. Make sure control cable is routed away from moving or hot parts to avoid damage.

☐ 15. Verify that the nozzle is in the correct position for spraying (0^{O} - 45^{O}F) (Fig. 60).

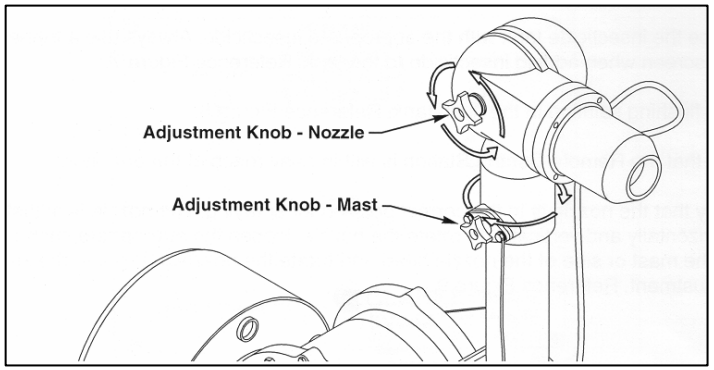

Fig. 60. Adjusting spray-head angle.

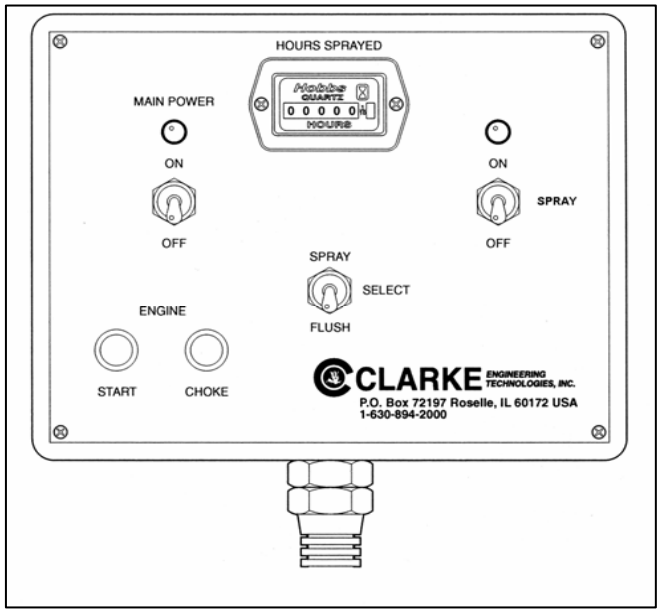

Fig. 61. Remote Control Station.

16. On the Remote Control Station (Fig. 59):

    a. Turn the Main Power switch to the ON position.

    b. Set the spray on/off switch to the OFF position.

    c. Set the spray/flush switch to spray.

d. For a cold engine, on the Remote Station, depress the choke button and starter button at the same time, until the engine fires. Do not push buttons for more than a maximum of 15 seconds/minute. CAUTION: HEARING PROTECTION REQUIRED.

e. For a hot engine, depress the starter button until the engine fires.

f. When the engine fires release the choke and starter buttons (Note: Pressing the starter button on the engine will also start the engine. The main power switch on the Remote Control Station must be in the “ON” position for the engine to be started).

HOUR METERS

17. The hour meter (on the Fog Generator) mounted above the pressure gauge between engine and blower records the engine-blower RPM when the engine is running and the total engine-blower run time for service/maintenance and security when the engine is not running.

18. The hour meter mounted on the Remote Control Station records the time the ULV spray nozzle is turned on.

OPERATING INSTRUCTIONS:
THE PRESSURE GAUGE

19. The unit is equipped with a glycerin filled pressure gauge to read the nozzle air pressure and is mounted on the fog generator coupling guard between the engine and blower.

ADJUSTING THE NOZZLE AIR PRESSURE

20. Nozzle air pressure is one of the main criteria for good particle size. Changing the speed of the engine adjusts this pressure. The nozzle air pressure can be adjusted by checking the pressure gauge as the engine speed is increased or decreased using the large silver hex nut under the carburetor air filter. This large hex nut adjusts the governor control and should be turned in small amounts only after the engine has reached normal operation temperature. NORMAL AIR PRESSURE is 6 psi.

LOW-PRESSURE CUT-OFF

21. The Clarke Grizzly Cold Aerosol Fog Generator is equipped with an air low-pressure cut-off switch. If, for some reason, the nozzle air pressure drops below 1 psi, the Flow Control will cut off. This prevents the blower from being filled with insecticide because of insufficient air blast. Because of this, the engine on the fog generator must be running when setting the flow rate.

□ 22. The air low-pressure cut-off switch is located inside the coupling guard and is mounted on the rear of the pressure gauge. If necessary, this switch can be adjusted in the field by removing the rubber plug from the tip of the switch and then using a 7/32" Allen wrench, turn the adjustment screw in about ½ turn increments. Turning clockwise increases the air pressure cut-off point. Turning counter-clockwise decreases the air pressure cut-off point.

SETTING THE FLOW RATE

□ 23. With the engine running, open the cover of the flow control box.

□ 24. Loosen the pump pointer locking plate by loosening the two round knurled knobs, one on each side of the locking plate. Loosen only enough to move the pointer. The pointer should be moved against a slight pressure.

□ 25. Turn the black knob on the side of the pump to increase or decrease the flow setting. The flow scale is an arbitrary scale and is marked from 0-10 (zero to ten), which represents 0-100% of flow rate.

□ 26. Set the flow rate by following the instructions in the CALIBRATION section on page 19 of the instruction manual. The correct flow rate, along with correct nozzle pressure, is one of the main criteria for good particle size. Always retighten the knurled knobs before checking the flow rate, as a loose pointer will

affect the pump accuracy. This procedure is necessary only on the initial setting of a flow rate.

27. NOTE: Unit should be calibrated upon first time set up of the machine, beginning of each spray season, when changing insecticides, every 25 hours of operation, and after conducting any major overhaul.

AUTOMATIC ENGINE IDLE-BACK

28. The CLARKE Grizzly Cold Aerosol Fog Generator is equipped with engine idle-back. This device reduces the engine speed to idle when not spraying. When the Spray switch is turned on, the engine speed increases to produce the pre-set pressure at the nozzle.

29. NOTE: Allow the engine to warm up before turning the Spray switch ON. A cold engine may stall when the Spray switch is turned ON.

SPRAYING

30. To turn spray on:

    a. On the Remote Control Station, move the Select Spray/Flush switch to SPRAY.

    b. Move the spray switch to ON position. Note that the red indicator light will be on when the spray is turned on and the engine speed will increase.

31. With the unit spraying, check to make sure the nozzle air pressure is within the preset pressure range. The Clarke Grizzly Cold Aerosol Fog Generator is preset at the factory at 6 psi. If a different nozzle pressure is required, change the engine speed by adjusting the engine throttle.

32. To turn spray off:

    a. On the Remote Control Station, turn the spray off by moving the spray switch to the OFF position. The red light will go out and the engine speed will reduce to idle.

33. NOTE: On the initial start, it may take several seconds for the insecticide to move from the insecticide tank, fill the lines and start spraying. This is normal.

FLUSHING

34. It is absolutely necessary to use a flushing solution that will cut your insecticide. Do NOT use diesel oil as a flushing solution.

35. It is a simple matter to flush the system as follows:

    a. If the engine is not running, start the engine as explained in the START-UP section.

    b. On the Remote Control Station, set Select Spray/Flush switch to FLUSH.

c. Turn the Spray switch ON. When the flushing solution starts spraying from the nozzle, spray for 2 to 3 minutes. This is ample time to flush the system.

d. Turn the Spray switch OFF. It is highly recommended that the fog generator be shut down immediately after flushing to prevent insecticide from being accidentally drawn into the system.

SHUT-DOWN

36. Before shutting down the engine, be sure the spray is turned off as explained in the SPRAYING section.

37. To stop the engine, on the Remote Control Station, move the Main Power switch to the OFF position.

38. After stopping the engine, place the Select Spray/Flush switch on the Remote Control Station to Spray.

39. The fog generator is now ready for spraying the next time it is used. Depressing the emergency stop switch on the engine will also stop the engine.

PERFORMANCE CHECKLIST FOR THE LECO MODEL 800 ULV SPRAYER

TESTING OF ENVIRONMENTAL CONDITIONS FOR ULV APPLICATIONS

A. Check the weather conditions expected during the spray operations. REMEMBER, YOU SHOULD NOT CONDUCT ULV OPERATIONS IN THE RAIN OR IN STRONG WINDS.

B. Check for a temperature inversion. A temperature inversion has occurred when the air temperature at six feet above the ground is at least one degree warmer than the ground temperature. This situation usually occurs in the early morning and late evening hours.

C. Check the wind speed by using a wind-measuring device. The indicated wind speed should fall between 4-6 MPH and should be blowing across the intended target area.

SET-UP PROCEDURES

☐ 1. Place the ULV unit in a pickup truck or on a trailer and secure it for towing.

☐ 2. Check the fuel level of the gas tank, mounted on the engine. Add regular unleaded gas as needed.

- ☐ 3. Check the engine oil level using the dipstick located at the rear of the engine. Add SAE 30 weight detergent oil as needed.

- ☐ 4. Check the blower oil level. The plug is located on the side closest to the drain plug. Fill through the breather plug at the top, until the oil runs out of the overflow hole at the side of the blower; close with the oil plug. You must use 40-weight NON-DETERGENT oil as needed.

- ☐ 5. Periodically grease the two fittings, located behind the engine, with chassis grease on the blower.

- ☐ 6. Check the battery water level. Add water to the proper level. Periodically charge the battery.

- ☐ 7. Ensure that the sprayer battery cables are clean and tightly connected.

- ☐ 8. Check the flushing solution level and fill the tank as needed with an approved flushing solution. This clear plastic tank has a one-gallon capacity and is located behind the lab pump (gray box).

- ☐ 9. Open the in-line gasoline control valve located under the gasoline tank.

- ☐ 10. Close the choke, located to the left of the fan shroud and to the right of the air filter, by moving the lever to the choke position (to the left). Omit this step if the engine is already warm.

□ 11. Move the throttle lever located below the choke lever to the fast position (UP).

□ 12. Turn both the light and fog switches located on the front of the pump box to the OFF positions. Move the toggle switch located on the remote operator's station to the OFF position.

□ 13. Put on all personal protective gear.

□ 14. Add the calculated amount of pesticide to the 15-gallon black polyethylene insecticide tank located behind the pump box and to the right of the engine. REMEMBER, ULV/ULD machines use only ULV concentrated liquid formulations.

□ 15. Place the toggle switch located on the frame below the front of the engine to the on position (UP).

□ 16. Push the starter button located next to the #15 toggle for a maximum 15 seconds/minute or until the engine starts. CAUTION: HEARING PROTECTION REQUIRED.

□ 17. As the engine warms up, slowly open the choke (to the Right).

OPERATING PROCEDURES

□ 18. Check the blower pressure gauge located on the right side of the flow control (pump box) system by temporarily holding your finger over the opening in the plastic fitting to the right of the air gauge.

Pressure should read 6 psi. If not, readjust the engine RPM by moving the throttle lever up or down. Check the RPM meter located on the frame below the throttle lever.

- 19. Turn the FLUID SELECTOR VALVE to the FOG position.

- 20. YOU ARE NOW READY FOR THE ULV APPLICATION.

- 21. Before attempting to calibrate, remove the pesticide line at the nozzle and place it into a suitable empty container. With your PPE on, turn on the main toggle switch located below the engine. Turn the fog switch, located on the front of the pump box, to the “ON” position and collect fluid for one minute.

- 22. To calibrate, set the blue pointer on the right side of the pump to an arbitrary scale setting of 0-10. To change the flow, move the pointer up or down.

- 23. CAUTION: BEFORE MOVING THE POINTER, loosen the knurled knobs with your fingers and turn the wheel by the pointer. “Hand-tighten” the knurled knobs when the calibration is done.

- 24. The rate of speed during the spray operation is generally 5 or 10 MPH. The correct speed for each type of pesticide is written on the pesticide label.

□ 25. When stopping for a short period of time, turn off the fog switch on the remote control box.

TERMINATING PROCEDURES

□ 26. After completing your spray operation, turn the FLUID SELECTOR VALVE to the “FLUSH” position.

□ 27. Resume operation flushing the entire system through the nozzle. REMEMBER to loosen the knurled knob first.

□ 28. Turn the toggle switch on the remote control box to the OFF position.

□ 29. Turn off the gasoline valve located under the gas tank to drain the carburetor, then turn the ignition toggle switch to the down position to turn off the machine.

PERFORMANCE CHECKLIST FOR THE LECO MODEL HD 1600 ULV SPRAYER

TESTING OF ENVIRONMENTAL CONDITIONS FOR ULV APPLICATIONS

A. Check the weather conditions expected during the spray operations, REMEMBER, YOU SHOULD NOT CONDUCT ULV OPERATIONS IN THE RAIN OR IN STRONG WINDS.

B. Check for a temperature inversion. A temperature inversion has occurred when the air temperature at six feet above the ground is at least one degree warmer than the ground temperature. (This situation usually occurs in the early morning and late evening hours.)

C. Check the wind speed by using a wind-measuring device. The indicated wind speed should fall between 4-6 MPH and should be blowing across the intended target area.

SETUP PROCEDURES

□ 1. Place the ULV unit in a pickup truck or on a trailer and secure it for towing.

□ 2. Check the fuel level. Add regular unleaded gas as needed to the 5 gallon green gas tank next to the engine.

- ☐ 3. Check the engine oil level using the dipstick on the left side of the engine below the fuel filter. Use 30W oil for the engine.

- ☐ 4. Check the blower oil level. The plug is located on the side closest to the drain plug. Fill through the breather plug at the top until it reaches the bottom of the overflow hole. (Do not remove the upper plug nearest the breather plug.) Use 40W non-detergent oil for the blower.

- ☐ 5. Periodically grease the two fittings, located behind the blower above the drive shaft from the engine, with chassis grease.

- ☐ 6. Check the battery water level. Add water to the proper level.

- ☐ 7. Ensure that the sprayer battery cables are clean and tightly connected.

- ☐ 8. Check the flushing solution level and fill the container as needed. This tank is located behind the constant volume control panel (plastic tank).

- ☐ 9. Open the gasoline control valve located under the center of the gasoline tank.

- ☐ 10. Close the choke located under the engine air filter by pulling out the ring. (Omit this step if the engine is already warm.)

- 11. Turn both switches located on the right side of the flow control panel OFF, (i.e., light and fog switch). Place the toggle switch located on the remote operator's station in the center position.

- 12. Put on all personal protective gear.

- 13. Add the calculated amount of pesticide to the insecticide tank located in the rack behind the flow control panel. REMEMBER, ULV/ULD machines use only concentrated liquid formulations.

- 14. Place the toggle switch located at the rear of the frame between the engine and blower in the ON position.

- 15. Push the starter button located next to the switch for a maximum of 30 seconds, or until the engine starts. CAUTION: HEARING PROTECTION REQUIRED.

- 16. As the engine warms up, slowly open the choke.

OPERATING PROCEDURES

- 17. Check the blower pressure gauge, located on the right side of the Constant Volume (CV) flow control panel, by temporarily holding your finger over the hole in the plastic fitting to the right of the air gauge. Pressure should read 6 psi. If not, readjust the engine RPM by turning the idle speed adjusting screw, located on the left side of the carburetor below the gas line.

18. YOU ARE NOW READY FOR ULV APPLICATION.

19. Before attempting to calibrate, remove the pesticide line at the nozzle and place it into a suitable container, i.e., a 3-gallon formulation bucket. Turn on the CV warm-up by moving the toggle switch located on the remote operator's station to the fog position.

20. To calibrate the machine set the flow rate on the digital readout by adjusting flow rate screws. First set "course" flow rate (after loosening knurled knob), then set "fine" adjustment. (to convert to "pesticide label" requirements use, approximately 30 ml = 1 oz.)

21. The rate of speed during the spray operation is generally 5 or 10 MPH. The correct speed for each type of pesticide is written on the pesticide label.

22. When stopping for a short period of time, turn off the "fogging" switch, found at the remote operator's station.

TERMINATING PROCEDURES

23. After completing your spray operation, turn the toggle switch on the remote operator's to the flush position.

24. Resume operation and reset the course spray to 290 ml/min for a minimum of two minutes, flushing the entire system through the nozzle. REMEMBER to loosen the knurled knob first.

25. Turn the toggle switch on the remote operator's station to the center position.

26. Turn off the gasoline valve located under the gas tank to drain the carburetor, then turn the ignition toggle switch in the downward position to turn off the machine.

PERFORMANCE CHECKLIST FOR THE LONDON AIRE XK ULV SPRAYER

TESTING OF ENVIRONMENTAL CONDITIONS FOR ULV APPLICATIONS

A. Check the weather conditions expected during the spray operations, REMEMBER, YOU SHOULD NOT CONDUCT ULV OPERATIONS IN THE RAIN OR IN STRONG WINDS.

B. Check for a temperature inversion. A temperature inversion has occurred when the air temperature at six feet above the ground is at least one degree warmer than the ground temperature. (This situation usually occurs in the early morning and late evening hours.)

C. Check the wind speed by using a wind-measuring device. The indicated wind speed should fall between 4-6 MPH and should be blowing across the intended target area.

SETUP PROCEDURES

□ 1. Place the ULV unit in a pickup truck or on a trailer and secure it or prepare for towing.

□ 2. Check the fuel level. Add regular unleaded as needed.

☐ 3. Check the engine oil level. Oil plug/dipstick is located to the right and rear part of the engine. Add 30W oil, as needed.

☐ 4. Check the air compressor oil level. Oil dipstick is located in the rear of air compressor. Add 40W non-detergent oil, as needed.

☐ 5. Check the battery water level. Add water to the proper level. Ensure that the sprayer battery cables are tightly connected and clean.

☐ 6. Check the belt tension by pressing down on the belts between the engine and the air pump with your finger. A properly maintained belt should deflect between $^{1}/_{2}$ and $^{3}/_{4}$ inches. NEVER ATTEMPT TO CHECK THE BELTS WHILE THE ENGINE IS RUNNING.

☐ 7. Open the gasoline shutoff valve located underneath the gasoline tank.

☐ 8. Close the choke lever by moving lever toward the carburetor air cleaner. Open the choke as the engine warms up (Omit this step if engine is already warm).

☐ 9. Set the remote flow control panel toggle switch to the OFF position. Plug remote control electrical plug and airline into machine on left front of engine.

- 10. Turn the ignition switch to the ON position. The switch is located on the right front side of engine.

- 11. Push the started button in to start. The starter button is located to the left of the ignition switch. Push until the engine starts, but no longer than 30 seconds. CAUTION: HEARING PROTECTION REQUIRED.

- 12. As the engine warms up, open the choke.

- 13. Check the nozzle tip air pressure indicated, or remote control panel air pressure gauge. Pressure should read 75-85 psi. Adjust the air pressure by adjusting engine's carburetor rpm's. It may be necessary to periodically remove and clean spray tip (use acetone). Check all connections for air leaks.

- 14. Shut down system after checking for leaks and proper operation.

- 15. Put on all personal protective gear.

- 16. Add the calculated amount of pesticide to the large, black, polyethylene plastic tank. (Remember, ULV/ULD machines use only ULV/ULD labeled insecticides.)

□ 17. Set the flow rate. Remove the white cover off the pump assembly box. Set the blue pump pointer to the desired flow rate in ounces per minute. CAUTION: You must check the flow rate by collecting the fluid from the pesticide line at the nozzle/solenoid connection for one or two minutes. Readjust the flow on pump metering pointer. NOTE: Engine must be running to operate the belt driver pump.

SPRAY OPERATING PROCEDURES

□ 18. Turn on spray by moving flow control toggle switch to the ON position.

□ 19. The rate of speed during spray operation is generally 5 mph or 10 mph. The correct speed for each pesticide is indicated in the label.

□ 20. When stopping for a short period of time, turn off the pump using the toggle switch on the remote control module.

TERMINATING PROCEDURES

□ 21. Turn off the pesticide flow first.

□ 22. Then turn off engine switch.

□ 23. Drain any remaining pesticide from the pesticide tank into its original container via the pesticide tubing at the nozzle, using pump switch.

□ 24. Flush by removing the pesticide line at the top of the pesticide tank. Slide back the tightening nut. Insert the line into a container of flushing solvent. Flush the entire system for one or two minutes through the filter, pump and nozzle. It is necessary to start the engine and turn on the pump. Run until flushing solvent has permeated the system, then turn off pump switch.

□ 25. When possible, wash or steam off exterior of machine as necessary and store under suitable cover. Always dry off electrical connectors with compressed air.

□ 26. Using caution, turn off gasoline control valve and let engine run until it stops; this drains the carburetor (Caution: remember to turn off the engine ignition switch.)

PERFORMANCE CHECKLIST FOR THE LONDON FOG MEDIUM AIR GENERATOR (MAG) ULV SPRAYER

Fig. 62. London Fog MAG ULV truck-mounted sprayer.

The London Fog MAG (Fig. 62) is an ULV aerosol generator, ideal for controlling insects and mosquitoes in a medium-sized indoor or outdoor area. This unit features an orifice disc flow control system that allows fixed rate flow control. It is constructed of all metal, and is equipped with wear-resistant nozzle. The unit is rugged and lightweight and creates super high velocity, turbulent air stream that disperses the aerosol throughout the target area. The unit can be skid-mounted for use outdoors on all-terrain vehicles or other vehicles. Important specifications include a 3.5 horsepower, four-cycle engine,

1/2 gallon gas fuel tank, 2 gallon formulation container and weighs 85 pounds.

A. Source: London Fog Company, 505 Brimhall Ave., Long Lake, MN 55356 (612) 473-5366, FAX: (612) 473-5302.

B. Specifications:

- Type: Wheel or skid mounted; non-thermal, ultra low volume (ULV) cold fog aerosol generator.
- Engine: 3 HP, 4 Cycle, Recoil Start Briggs and Stratton gasoline. Fuel consumption- regular or no lead automotive- 0.24 gal/hr (0.9 liter/hr).
- Air Pump: Positive displacement: Operating Pressure = 60-90 psi.
- Formulation: Chemical flow rate 0-10 oz/min (0-295 ml/min).

- Nozzle System: Single, sonic velocity; adjustable 180 degree azimuth, 0-45 degree up elevation.
- Formulation Tank: 2 U.S. gallons (7.57 liters).
- Gasoline Tank: 0.5 U.S. Gallons (1.89 liters).
- Particle Size: 80% less than 20 microns.
- Weight Empty: 95 pounds (43 kilograms).
- Length: 29 inches (73.6 cm).
- Width: 18 inches (45.7 cm).
- Height: 19 inches (48.3 cm).

TESTING OF ENVIRONMENTAL CONDITIONS FOR ULV APPLICATIONS

A. Check the weather conditions expected during the spray operations, REMEMBER, you should not conduct ULV operations in the rain or in strong winds.

B. Check for a temperature inversion. A temperature inversion has occurred when the air temperature at six feet above the ground is at least one degree warmer than the ground temperature. (This situation usually occurs in the early morning and late evening hours).

C. Check the wind speed by using a wind-measuring device. The indicated wind speed should fall between 4-6 MPH and should be blowing across the intended target area.

SETUP PROCEDURES

□ 1. Check the fuel level in the gasoline tank (Regular Unleaded).

□ 2. Check the engine oil level; add 30W oil as needed. Oil filler plug located at rear of engine below muffler, fill to threads.

□ 3. Air compressor. Check oil level. If oil lever is low, add to base of threads. Use only London Fog Anderol 500 or Amsol Synthetic Reciprocating Compressor oil. Do not use petroleum oil, as increased nozzle cleaning and maintenance will result.

 4. Close the choke located at front of engine. Move lever to choke position (right).

 5. Move the throttle control to fast position (right). Remove engine air filter cover to check the air filter, also check choke operation.

 6. Connect the electrical power supply (remote control unit). Electrical power is required to operate the solenoid valve that controls the pesticide flow. Ensure the remote is in the off position before connecting to a 12-volt battery (12 volt battery should only be used). The power supply used can be an external rechargeable 12-volt battery or the unit can be connected to a vehicle cigarette lighter (for non-tactical vehicles).

START-UP PROCEDURES
[CAUTION: HEARING PROTECTION REQUIRED]

 7. Pull the starter rope until the engine starts. If the engine floods repeat if necessary with choke in RUN position and throttle in fast. Remove spark plug for inspection and spark. If it still won't start clean the sparkplug and ensure gap is 0.030 inches, or replace with "Champion RJ19LM."

 8. Open choke as engine warms up, then shut off engine. To shut off engine, do not move control to CHOKE to stop engine. Move throttle lever to idle or slow. Then move lever to stop position (left).

- ☐ 9. Put on required PPE.
- ☐ 10. Fill the pesticide tank with the required amount of pesticide. Replace the tank cap, ensuring that the o-ring is in place.
- ☐ 11. Ensure the pesticide remote control valve is off or the manual valve at the spray nozzle is closed.
- ☐ 12. Restart engine and allow it to warm up. Set throttle to achieve the desired air pressure (normally 60-90 PSI).
- ☐ 13. Check for improper air pressure. Air pressure is factory set with throttle control in FAST position. If air pressure is incorrect, check for air leaks at all joints between air pump and outlet of aerosol nozzle assembly. Check for loose or slipping belts, ½”-$^{3}/_{4}$” deflection. Check for proper engine RPM.
- ☐ 14. Open the pesticide control valve toggle switch on remote or manual valve at spray nozzle to start the flow of pesticide. Flow Rates – The formulation flow rate is controlled by a metering orifice located in the fitting at the top of the formulation tank. To remove or change an orifice disc, use two (2) $^{13}/_{16}$” wrenches (one to hold the tank fitting, and the other to unscrew filter/orifice chamber nuts). Note: It is easier if you first remove the pesticide line at the tank fitting.

15. Air pressure to the spray head should be 60-90 psi as indicated by the green area of the air pressure gauge.

FLOW RATES

16. Rate of formulation is controlled by a metering orifice located in the fitting at the top of the formulation tank. Additional fittings are located in a small compartment on the base of the frame behind the formulation tank.

17. Orifice disk system-The orifice disc should be placed inside the filter/orifice chamber, which is located in the outlet of the formulation tank.

18. To remove or change an orifice disc, first use (2) $^{13}/_{16}$" wrenches (one to hold the tank fitting, and the other to unscrew filter/orifice chamber nut) then remove nut and fluid line, then hold the smaller hex nut using a wrench and loosen the hex retainer nut and another 13/16" wrench to hold the tank fitting.

19. Using a smaller orifice size will reduce the formulation flow rate and using larger orifice size will increase the formulation flow rate.

CALIBRATION

20. Since the nozzle used is an external mix siphon (suction) type nozzle, calibration must be made with the machine running.

□ 21. Remove the pick up tube from the formulation tank.

□ 22. Disconnect the white nylon nut and fluid line from the nylon elbow fitting attached to the filter/orifice chamber Use two $^{13}/_{16}$" wrenches (one to hold the tank fitting and the other to unscrew filter/orifice chamber nut). Remove the orifice disc and filter screen and install in the calibration pickup tube assembly (supplied with the machine). Place an orifice disc in line #39, 4 oz minute.

□ 23. With the machine running, Run for one full minute and note the amount of fluid used. It should be 4 oz. Repeat for a second test. Try the other orifices #14, 1 oz/min, #22, 2 oz/min, #29, 3 oz/min and #51 6 oz/min.

APPLICATION

□ 24. Read and understand and follow PESTICIDE label instructions.

□ 25. Use only pesticides that are labeled for your specific application

□ 26. Always use protective clothing and a respirator that matches the pesticide and particle size being applied.

□ 27. Do NOT release the pesticide formulation flow until the proper air pressure (60-90 psi) is reached.

SHUT-DOWN PROCEDURES

□ 28. Close the chemical control valve to stop the flow of pesticide (toggle switch or manual valve).

□ 29. Let engine run until all chemicals are expelled from the nozzle (30 seconds).

□ 30. Use the STOP switch at the throttle control on engine below the air filter to stop the engine.

□ 31. Always flush out entire system through the nozzle. IAW manual, use soap and water, and dry the inside of the tank with rags, - or air dry.

PREVENTIVE MAINTENANCE

□ 32. Daily (or Before Every Use)

□ a. Air pump - Check oil level daily. Oil level must be to the top mark on the dipstick. Use only London Fog Anderol 500 or Amsoil Synthetic Reciprocating Compressor Oil. Do not use petroleum oil.

□ b. Engine - Check oil level. Oil level must be to the top of the fill hole. Pay particular attention to the engine requirement to change the oil after the initial five hours of running time.

□ c. Belt- Check drive belts which should be in perfect alignment and neither excessively tight or loose enough to slip.

- d. Insecticide/Air Discharge Nozzle-Check to see that knurled nozzle ring is finger tight and that the fluid nozzle hex is tightened properly so that the nozzle seats are tight against the Teflon gasket and nozzle body. Check for air leaks at Teflon gasket with air pump running but insecticide flow turned off.

- e. Nozzle Operating Air Pressure - Check that pressure to spray head (60-90 psi) as measured by air pressure gauge on the gauge panel.

- f. Flushing - of the lines and spray head is carried out by passing a suitable flushing fluid through the machine, just as in normal operation. To drain or clean formulation tank, remove fluid line by disconnecting line and nylon nut from elbow fitting and lift tank from tank retainer. Dispense all fluid or remove and dump formulation container and then dry inside of formulation tank with clean rag.

33. Every 25 hours

- a. Engine - Change the engine oil.

- b. Air Pump - The air intake filters in the air pump cylinder heads should be cleaned or replaced.

34. Every 100 hours

- a. Perform all daily and 25 hours maintenance functions plus change engine spark plug (Champion CJ-8 or equivalent, gap 0.030”).

PERFORMANCE CHECKLIST FOR THE MICROGEN ED2-20A ULV SPRAYER

TESTING OF ENVIRONMENTAL CONDITIONS FOR ULV APPLICATIONS

A. Check the weather conditions expected during the spray operations, REMEMBER, YOU SHOULD NOT CONDUCT ULV OPERATIONS IN THE RAIN OR IN STRONG WINDS.

B. Check for a temperature inversion. A temperature inversion has occurred when the air temperature at six feet above the ground is at least one degree warmer than the ground temperature. (This situation usually occurs in the early morning and late evening hours).

C. Check the wind speed by using a wind-measuring device. The indicated wind speed should fall between 4-6 MPH and should be blowing across the intended target area.

SET-UP PROCEDURES

□ 1. Place the ULV unit in a pickup truck or on a trailer and secure it for towing.

□ 2. Check the fuel level. Add regular leaded gas as needed.

□ 3. Check the engine oil level. Add 30W oil as needed.

- ☐ 4. Check the blower oil level. Add 40W non-detergent oil.
- ☐ 5. Check the battery water level. Add to the proper level.
- ☐ 6. Ensure that the sprayer battery cables are clean and tightly connected.
- ☐ 7. Check the belt tension by pressing down on the belt between the engine and the compressor with your finger. A properly maintained belt should deflect between $^{1}/_{2}$ and $^{3}/_{4}$ inches. NEVER ATTEMPT TO CHECK THE BELTS WHILE THE ENGINE IS RUNNING.
- ☐ 8. Check the flushing solution level and fill the container as needed.
- ☐ 9. Open the two gasoline control valves. One is located underneath the gasoline tank and the other is next to the carburetor.
- ☐ 10. Close the choke located underneath the air filter. (Omit this step if the engine is already warm.)
- ☐ 11. Connect the multi-pronged connector to the digital flow instrument panel. All switches on the instrument panel should be in the "OFF" position.
- ☐ 12. Set the bypass toggle switch, located on the machine at the control module, to the "OFF" position.

13. Turn the 4way fluid control valve, located on the control module, to the "OFF" position.

14. Put on all personal protective gear.

15. Add the calculated amount of pesticide to the pesticide tank (REMEMBER, ULV/ULD MACHINES USE ONLY CONCENTRATED LIQUIDS).

STARTING PROCEDURES

16. Set the throttle switch on the instrument panel to the "IDLE" position and flip the toggle switch, located under the gasoline tank, to the "ON" position.

17. Push the starter button, located on the instrument panel, for a maximum of 30 seconds, or until the engine starts. CAUTION: HEARING PROTECTION REQUIRED.

18. As the engine warms up, slowly open the choke and turn the throttle switch up to bring the unit to full speed. CAUTION: HEARING PROTECTION REQUIRED.

19. Set the toggle switch into the "THROTTLE" position.

- ☐ 20. Turn the 4-way valve on the control module to the "PESTICIDE" position.
- ☐ 21. Check the blower pressure gauge. If the gauge does not read between 4.5 and 6.0 psi, then adjust the engine speed by turning the throttle set screw, located on the carburetor.
- ☐ 22. YOU ARE NOW READY FOR A ULV APPLICATION
- ☐ 23. Turn on the pump at the instrument panel.
- ☐ 24. Calibrate the machine. Adjust the flow rate by removing the instrument panel cover and then gently twisting the blue pointer under the pump up or down.
- ☐ 25. Adjust the pesticide flow rate as recommended on the pesticide label by dialing the recommended ounces per minute. Monitor the setting throughout the operation through the "LED" readout on the instrument panel.
- ☐ 26. The rate of speed during the spray operation is generally 5 or 10 mph. The correct speed for each type of pesticide is specified on the pesticide label.
- ☐ 27. When stopping for a short period of time, turn off the pump at the instrument panel.

28. When there are to be longer delays in operations, FIRST turn off the pump and then switch the throttle control on the instrument panel down to "IDLE".

TERMINATING PROCEDURES

29. After completing your spray operation, turn the 4-way valve on the control module to "FLUSHING".

30. Resume operations at full engine speed and reset the "LED" readout to 10-ounces/minute, flow rate. Run the machine for a minimum of 2 minutes.

31. Turn the pump switch, on the instrument panel to "Off".

32. Run the engine at "IDLE" for 5 minutes for every hour of actual spraying time. This helps to prevent damage to the engine.

33. Close only the gasoline valve located at the carburetor and let the engine run on "IDLE" until it runs out of gas.

34. Turn the throttle control switch on the instrument panel from "IDLE" to "OFF".

PERFORMANCE CHECKLIST FOR THE MICROGEN (G-9HD) ULV SPRAYER (NSN: 3740-01-083-3570)

TESTING OF ENVIRONMENTAL CONDITIONS FOR ULV APPLICATIONS

A. Check the weather conditions expected during the spray operations. REMEMBER, YOU SHOULD NEVER CONDUCT ULV OPERATIONS IN THE RAIN OR IN STRONG WINDS.

B. Check for a temperature inversion. A temperature inversion has occurred when the air temperature at six feet above the ground is at least one degree warmer than the ground temperature (This situation usually occurs in the early morning and late evening hours).

C. Check the wind speed by using a wind-measuring device. The ideal indicated wind speed should fall between 4-6 mph and should be blowing across the intended target area. No spraying if wind is 10 mph or greater.

SET-UP PROCEDURES

□ 1. Place the ULV unit in a pickup truck or on a trailer and secure it for towing.

□ 2. Check the fuel level in the large red 5-gallon tank Add regular unleaded gas as needed.

- 3. Check the engine oil level with the dipstick, located on the rear of the engine. Add 30W oil as needed. Complete oil change requires approx. 1.5 quarts of oil.

- 4. Check the blower oil level using sight glasses located below the nozzles. Add 40W non-detergent oil as needed.

- 5. Check the battery water level. Add to the proper level according to manufacturer's specification. For "maintenance free" batteries, check indicator light.

- 6. Ensure that the sprayer battery cables are clean and tightly connected.

- 7. Check the belt tension by pressing down on the belt between the engine and the compressor with your finger. A properly maintained belt should deflect between $^{1}/_{2}$ and $^{3}/_{4}$ inches. NEVER ATTEMPT TO CHECK THE BELTS WHILE THE ENGINE IS RUNNING.

- 8. Check the flushing solution level in the small black tank located to the left of the control panel, and fill the container as needed.

- 9. Open the gasoline control valve, located in the fuel line, next to the carburetor. If equipped with an electric fuel pump toggle switch, turn the switch on/off as needed. The toggle switch is located on the frame next to the right side of battery.

10. Close the choke located underneath the air filter. (Omit this step if the engine is already warm.)

11. First, all switches on the instrument panel should be in the "OFF" position. Then, connect the multi-pronged connector to the digital flow instrument panel.

12. Turn the 4-way fluid control valve, located on the control module, to the "OFF" position.

13. Put on all personal protective gear.

14. Add the calculated amount of pesticide to the pesticide tank (REMEMBER, ULV/ULD MACHINES USE ONLY CONCENTRATED LIQUIDS).

15. To calibrate the machine, first set the flow rate on the digital remote instrument panel. To readjust the flow rate, remove the control module cover and gently turn the adjustment knob on the blue pointer located under the pump, to the left or right. The pressure bypass toggle switch, located on the machine control module, should be in the "ON" position FOR THE CALIBRATION PROCEDURE ONLY.

16. During spray operations, set the pressure bypass toggle switch, located on the machine at the control module, to the "OFF" position.

STARTING PROCEDURES

□ 17. Set the throttle switch on the instrument panel to the "IDLE" position and flip the toggle switch, located on the right side of the engine, to the "ON" position. If engine fails to start, ensure sparkplug gap is .030 thousandths of an inch. Spark plug should be resistor type, Briggs & Straton Part# 802592 or champion spark plug RJ19LM.

□ 18. Turn engine switch, located on top of the engine, to the "ON" position. Push the starter button, located on the instrument panel, for a maximum of 30 seconds, or until the engine starts. CAUTION: HEARING PROTECTION REQUIRED.

□ 19. As the engine warms up, slowly open the choke.

□ 20. Set the toggle switch into the "THROTTLE" position.

Operating Procedures:

□ 21. Turn the 4way valve on the control module to the "INSECTICIDE" position.

□ 22. Check the blower pressure gauge. If the gauge does not read between 4.5 and 6.0 psi, then adjust the engine speed by turning the silver throttle set screw located on the carburetor.

□ 23. YOU ARE NOW READY FOR A ULV APPLICATION.

□ 24. Turn on the pump at the instrument panel.

□ 25. Adjust the pesticide flow rate as recommended on the pesticide label by dialing the recommended ounces per minute onto the LED readout on the instrument panel. Monitor the setting throughout the operation.

□ 26. The rate of speed during the spray operation is generally 5 or 10 mph. The correct speed for each type of pesticide specified on the pesticide label.

□ 27. When stopping for a short period of time, turn off the pump at the instrument panel.

□ 28. When there are to be longer delays in operations, FIRST turn off the pump and then switch the throttle control on the instrument panel down to "IDLE".

TERMINATING PROCEDURES

□ 29. After completing your spray operation, turn the 4-way valve on the control module to "FLUSHING".

□ 30. Resume operations at full engine speed and reset the "LED" readout to 10 ounces per minute flow rate. Run the machine for a minimum of 2 minutes.

□ 31. Turn the pump switch, on the instrument panel to "Off".

- 32. Run the engine at "IDLE" for 5 minutes for every hour of actual spraying time. This helps to prevent damage to the engine. NOTE: After proper idle time, turn off the electric fuel pump.

- 33. Close the gasoline valve located at the carburetor and let engine run on "IDLE" until it runs out of gas.

- 34. Turn the throttle control switch on the instrument panel from "IDLE" to "OFF". Turn the engine switch to the "OFF" position.

PERFORMANCE CHECKLIST FOR THE ASSEMBLY, INSTALLATION, AND USE OF THE PESTICIDE AERIAL CARGO UNIT (PACU-9) ONBOARD A UH-1, UH-3 OR BLACKHAWK HELICOPTER
(NSN: 3740-01-206-9614)
(Note: NSN for reference only, cancelled w/o replacement)

CONSIDERATIONS DURING
PACU-9 AERIAL OPERATIONS

A. ALTITUDE/NORMAL SWATH WIDTH COMBINATIONS: Under ideal conditions, a helicopter flying at 100 feet "Above Ground Level" (AGL) gives a 400 foot swath; 150 feet AGL gives a 500 foot swath for most operations". Stack" spraying has been employed at 50 to 500 feet AGL using the wind to distribute the pesticide over the target area for distances 1000 feet and beyond.

B. AIR SPEED: Operations are usually run between 70 and 100 Knots Indicated Air Speed (KIAS). Speed may vary with the type of aircraft and control measures to be accomplished. Ground speed will be essentially the same as KIAS for most control operations. Spraying is accomplished during straight and level flight, never during turns or hovering maneuvers.

C. ACREAGE COVERED PER MINUTE: 50 - 100 acres depending upon the pesticide and the coverage desired.

D. ASSEMBLY: The PACU-9 is normally stored and transported in the manufacturer's crates. One crate contains the boom braces and attached nozzles, while the second contains the pesticide tank assembly. There are three basic steps involved in assembling the PACU-9:

- Boom Attachment
- Unit Installation
- Electrical Connections.

UNIT ASSEMBLY:
ATTACHMENT OF BOOM TO PESTICIDE TANK

□ 1. This procedure assumes that the required braces have not YET been properly adjusted.

□ 2. Level the cradle.

□ 3. Connect the outboard ends of the boom braces to the fittings provided on the boom. The bolts will be secured later in the rigging procedure.

□ 4. Loosen the jam nuts on each of the threaded fittings on the brace ends.

□ 5. Attach the boom to the cradle at the bottom bracket using the 7/16” bolt and nut provided.

□ 6. Loosen the jam nuts on the threaded fittings of the boom braces for the inboard attachment points.

7. Attach the three braces to the pesticide tank cradle fittings.

8. Each support assembly is furnished with left and right-hand threaded fittings for ease of rigging. Using a level on the boom, adjust the upper support assembly to bring it to a horizontal position. Adjust the remaining supports so the boom will extend straight out (90 degrees) from the side of the cradle. All support assemblies and the boom assembly should be straight and rigid.

9. After the rigging has been completed, tighten the jam nuts on each support assembly.

10. A $^{3}/_{8}$" tubing fitting is provided on the pesticide line from the nozzles to the pump outlet. Connect this line using a plastic sleeve (ferrule) under the hexagonal nut to prevent any leakage.

UNIT INSTALLATION:
EITHER UH-1 OR UH-3 AIRCRAFT

11. Clear the after cabin space. The left hand seats may be reinstalled after the pesticide tank has been secured.

12. Locate the floor cargo tie down fittings in the deck of the aircraft and bottom the leveling adjustment nuts. The use of a template on the tie down sites of the PACU-9 cradle is highly recommended.

□ 13. Install the floor fasteners to the tie down sites and push the sleeves to their lowest setting. Depending on the make and model of the helicopter, generally only 4 tie-down sites will line up properly.

□ 14. Place the pesticide tank into the aircraft over the tie-down fittings. For ease of handling, three people are required to lift the assembly. DO NOT USE THE BOOM TO LIFT OR MOVE THE UNIT OR IT MAY BECOME PERMANENTLY BENT AND MISALIGNED.

□ 15. Secure the pesticide tank to the tie down fittings.

□ 16. Secure the tie down straps on each of the four corners of the tank cradle assembly. Attach the other end of the straps to the floor tie-down rings provided in the aircraft. The straps can be crisscrossed. This allows for more stability.

□ 17. Check all nozzle and hose fittings to be sure they are secure.

ELECTRICAL INSTALLATION

□ 18. Main power lead installation.

□ a. UH-1 Aircraft:

□ (1) Install the two-wire main power cable.

□ (2) Route the cable on the inboard side of the left

door, just above the bottom door channel and through the access hole leading into the power distribution (relay) compartment (UNLESS A BLANKET CORD END HAS ALREADY BEEN INSTALLED ON THE POWER CORD, WHICH PLUGS INTO THE CEILING IN FRONT OF THE ENGINE COMPARTMENT).

(3) Attach the positive lead (the larger terminal) to the reverse current relay bus on either terminal.

(4) The ground lead for the unit is attached to the terminal that is provided for the main ground leads (designated K584N) in the aircraft.

(5) Instead of the circuit relay bus, some auxiliary receptacle in cabin ceiling can be used. The MEDEVAC receptacle is used by NDVECC.

. b. UH-3 Aircraft:

(1) Connect the cannon plug to the 20 ampere auxiliary power terminal located immediately forward of the rear door opening (An adapter and cannon plug assembly are provided with the unit completely assembled).

THE REMAINING ELECTRICAL INSTALLATION PROCEDURES ARE ESSENTIALLY IDENTICAL FOR EACH AIRCRAFT

19. The ground terminal may be secured on the aft cabin wall equipment tie down bracket located directly behind the tank (A separate equipment ground lead has been provided for the unit).

20. Connect the power and ground cables to the appropriate cannon plugs on the tank cradle.

21. Connect the control cable to the proper receptacle on the tank cradle.

22. BEFORE the tank is filled with pesticide, turn on the battery switch and:

    a. Check the operation of the two indicator lights on the control box.

    b. Check the operation of the liquid flow control valve, cycling it twice to ensure operation, and leave it in the "OPEN" position.

    c. MOMENTARILY operate the pump switch to check for proper motor operation.

23. If the motor does not stop when the valve is closed, or any other electrical function appears incorrect. DO NOT PROCEED UNTIL THE MALFUNCTION HAS BEEN CORRECTED.

□ 24. Install the PACU-9 unit according to the above instructions.

□ 25. HAND-check all lines and connections for tightness and leaks.

□ 26. Load a funnel and two empty 5gallon cans (with one spout or funnel) for backup to the pump.

□ 27. Have two separate containers of flushing solution with 2-3 gallons in each.

□ 28. Ensure that ALL of the safety gear, flight helmets, calibration jugs, a calibrated graduate cylinder, spare rags, a hand pump, and the appropriate tools are present.

□ 29. Put on all personal protective gear.

□ 30. Fill the pesticide tank by using a transfer pump, power or hand driven. This pump is an essential requirement for filling the tank in UH-1 aircraft. Because of greater cabin height, the UH-3 allows for filling the tank directly from cans if necessary. In either case, the most rapid and efficient method of filling is by means of a 28-volt motor driven low-pressure fuel pump operated from an auxiliary power unit.

□ 31. Add the EXACT amount of pesticide required for the mission. Plan on using all of the material

during the flight operation. For most operations, no more than 30 gallons of pesticide will be required for any one spray flight. At normal dispersal rates and flight procedures, this corresponds to 1.0 - 1.5 hours of flying time.

□ 32. Ensure that the provided overflow line on the tank extends outside of the aircraft and is secured to the boom.

□ 33. After pumping the pesticide into the tank, clean the pump by pumping flushing solution through it and into the tank.

□ 34. Check all power and control plugs for proper installation and all circuit breakers to be sure they are activated.

□ 35. Recheck the indicator lights.

□ 36. Make sure that the pesticide flow control valve is open. The valve motor switch is interlocked (series connected) with the pump switch and must be open before the spraying operation can begin. Closing the valve electronically will stop operation of the unit. The valve is left open during the mission.

□ 37. Activate the pump switch. Full flow should occur immediately when the unit is activated.

□ 38. Observe each nozzle carefully to determine proper operation (i.e., full flow). When the unit is turned off

between spraying runs, check each nozzle to determine if any leakage occurs. Should difficulty occur in any of these areas (i.e., full flow or shutoff), consult the operator's manual.

□ 39. Calibrate the system. Make sure to adjust the psi to obtain the desired rate of flow. The nozzle tips should be no larger than TeeJet 8006's.

□ 40. Attend the flight briefing if one is scheduled. If not, ensure that the pilots and crew are familiar with the mission, what is to be accomplished, altitude, speed, etc.

□ 41. Remove the flagging from the boom.

IN-FLIGHT PROCEDURES

□ 42. Conduct the spraying on a straight and level path. Slight turns and minor changes in elevation are acceptable. NEVER HOVER WHILE THE SPRAY UNIT IS OPERATING. GROSS CONTAMINATION OF THE AIRCRAFT WILL RESULT.

□ 43. Spray at right angles to the wind, starting down wing and working upwind. Spraying can be done with the boom on either the windward or leeward side of the aircraft.

□ 44. When the pesticide has been exhausted, add 5 gallons of flushing solution and spray this material in flight until depleted. Do not run the pump without fluid in the system.

☐ 45. Shutoff the unit and secure for landing.

POST FLIGHT PROCEDURES

☐ 46. After the aircraft is secured, remove the unit. Remember to not lift the unit by the boom.

☐ 47. Wash the exterior of the unit and allow it to dry.

☐ 48. Place the flagging back on the boom.

☐ 49. Remove and clean the nozzles and filter screens and reinstall.

☐ 50. Remove and clean the inline filter, located below the pesticide tank, and then reinstall it.

☐ 51. Remove the boom and place each assembly back into the manufacturer's crate.

SECTION V:
VINTAGE VECTOR CONTROL EQUIPMENT

PERFORMANCE CHECKLIST FOR THE ACME CYANOGAS FOOT PUMP MODEL 50

SETUP PROCEDURES

□ 1. Lift the bottom tabs of the cap spring and remove the piston assembly from the cylinder. TILT THE PISTON ASSEMBLY AT THE TOP SO IT CAN CLEAR THE CARRYING LOOP NUT.

□ 2. Remove any dust and dirt and then run an oily cloth (any light type of oil will do) through the cylinder and work some oil into the leather piston cup with your fingers to keep it soft and pliable. BE SURE TO REMOVE ANY EXCESS OIL BEFORE REPLACING THE PISTON ASSEMBLY.

□ 3. Unscrew the pesticide jar and ensure that it is clean and dry.

□ 4. Lay the duster on its side with the pesticide cut off lever, located at the base of the plunger, in the "dust" position (the lever should be PERPENDICULAR to the ground).

□ 5. Release the air jet nozzle by pulling out the cut off lever.

□ 6. Wipe all of the parts free of any dust and replace the nozzle. Make sure that the nozzle washer is returned to the proper position. USE NO OIL ON THIS CUT OFF MECHANISM.

7. Switch the cut off lever to the "air" position (the lever should be PARALLEL to the ground). In this position, the pump will force only a current of air.

8. Put on all of your protective gear.

9. Add the pesticide to the container and screw it back onto the unit.

OPERATING PROCEDURES

10. PRIOR TO APPLICATION, MAKE SURE THAT YOU ARE UPWIND OF THE SPRAY AREA.

11. Place the nozzle into the area to be sprayed.

12. Turn the cut off lever to the dust position (perpendicular).

13. Secure the unit to the ground by placing your foot on its base and then pump in full strokes. When operated at a speed of 1 1/2 strokes per second, the pump will deliver approximately one ounce (28.3 grams) of pesticide in 10 strokes. Slower pumping will decrease the rate of delivery.

TERMINATING PROCEDURES

- ☐ 14. Empty any remaining material from the dust container into the original container.
- ☐ 15. Clean out the dust container and operate the pump several times to clear out any remaining pesticide.
- ☐ 16. Store the unit in a dry place.

PERFORMANCE CHECKLIST FOR THE BEECO WHISPERMIST XL MODEL 200 ULV SPRAYER

TESTING OF ENVIRONMENTAL CONDITIONS FOR ULV APPLICATIONS

A. Check the weather conditions expected during the spray operations, REMEMBER, YOU SHOULDNOT CONDUCT ULV OPERATiONS IN THERAIN OR IN STRONG WINDS.

B. Check for a temperature inversion. A temperature inversion has occurred when the air temperature at six feet above the ground is at least one degree warmer than the ground temperature. (This situation usually occurs in the early morning and late evening hours.)

C. Check the wind speed by using a wind-measuring device. The indicated wind speed should fall between 4-6 MPH and should be blowing across the intended target area.

SETUP PROCEDURES

□ 1. Mount the spray head (fan assembly) onto the unit at the pipe coupling. Make sure that the sleeve (i.e., "nozzle") is pointed to the rear.

□ 2. Ensure that the flushing solution tank is filled with an approved flushing solution.

OPERATING THE UNIT FROM A VEHICLE

□ 3. a. Ensure that the vehicle's alternator rates between 30-50 amperes (amps). This ensures that the sprayer will maintain a constant speed.

□ b. Tie the unit's cable lead to the battery using #10 wire.

□ c. Ensure that a 25 - 30 amp fuse is connected to the "hot" line to prevent any possible damage to the vehicle or battery.

□ d. Connect the cable to the battery (positive pole first).

OPERATING THE UNIT DIRECTLY FROM A BATTERY

□ 4. a. Connect the battery to the unit (A fully charged 12-volt battery will provide 4-5 hours of continuous operation).

□ 5. Plug the control box cable into the control panel and control box. (The "male" end of the cable connects to the CONTROL PANEL and the "female" to the CONTROL BOX.

□ 6. Put on all personal protective gear.

□ 7. Place the original pesticide container into the pesticide housing and insert the pesticide feed line into the container. (Some sprayers may have

the optional 5-gallon pesticide tank. In that case, pour the pesticide into the tank.)

□ 8. Ensure that all electrical connections are tight and fit properly.

OPERATING PROCEDURES

□ 9. Calibrate the system. (To adjust the flow rate, remove the control module panel, and then gently twist the blue dial, located under the pump, either up or down.

□ 10. NEVER OPERATE THE UNIT WHEN IT IS STATIONARY OR MOVING BACKWARDS OR THE SPRAYHEAD WILL BECOME CONTAMINATED WITH PESTICIDE.

□ 11. Turn on the master switch on the control box.

□ 12. Turn on the sleeve/blower (SL/BL) switch on the control box and run the unit until the fan is operating at full speed (about 5 seconds).

□ 13. Turn on the pump switch on the control box. A specially designed speed module monitors the sleeve RPM. If the RPM drops below 10500, the pump is shut-off automatically and a beeping alarm will simultaneously sound off in the control box.

TERMINATING PROCEDURES

- ☐ 14. Turn off the pump switch and allow the remaining pesticide in the sleeve to be expelled.
- ☐ 15. Cut off the SL/BL and then the master switch.
- ☐ 16. IN AN EMERGENCY, THE SPRAY OPERATION CAN BE STOPPED IMMEDIATELY BY TURNING OFF THE MASTER SWITCH FIRST.
- ☐ 17. Flush the system by turning on the flush switch on the control panel and run the system for at least one minute.
- ☐ 18. Turn off the flush switch and wipe the spray head motor shaft with some additional flushing solution. To do this, first apply the solution to a cloth and then spray a small amount of lubricant (such as WD-40) on the shaft.
- ☐ 19. Remove the pesticide line from the container and then secure the container.
- ☐ 20. Store the unit in a dry area.

PERFORMANCE CHECKLIST FOR THE MICROGEN HCS1-2AA

TESTING OF ENVIRONMENTAL CONDITIONS FOR ULV APPLICATIONS

A. Check the weather conditions expected during the spray operations. REMEMBER, YOU SHOULD NOT CONDUCT ULV OPERATIONS IN THE RAIN OR IN STRONG WINDS.

B. Check for a temperature inversion. A temperature inversion has occurred when the air temperature at six feet above the ground is at least one degree warmer than the ground temperature. (This situation usually occurs in the early morning and late evening hours).

C. Check the wind speed by using a wind-measuring device. The indicated wind speed should fall between 4-6 MPH and should be blowing across the intended target area.

SETUP PROCEDURES

□ 1. Examine the fuel level in the gasoline tank. Add fuel in the ratio of 5 ounces of 2-cycle oil per gallon of regular gasoline.

□ 2. Put on your safety gear.

☐ 3. Unscrew the pesticide container, located at the base of the nozzle, and pour in the ULV/ULD concentrate.

☐ 4. Screw the container back onto the unit.

☐ 5. Ensure that the metering stem is in a horizontal position (The holes in the stem should be parallel with the ground). When the stem is in this position, the pesticide flow is off.

☐ 6. Open the gasoline cutoff valve located underneath the gasoline tank.

☐ 7. Close the choke, located on the side of the carburetor, by pushing the lever down. (Omit this step if the engine is already warm).

☐ 8. Put on all personal protective gear.

OPERATING PROCEDURES

☐ 9. Firmly pull the starter rope until the engine starts. Return the rope to the engine in one motion (i.e., do not let go of the rope).

☐ 10. As the engine warms up, slowly open the choke.

☐ 11. Ensure that the indicated operating pressure (on the pressure gauge) reads between 3.0 and 3.5 psi. To change the operating pressure, adjust the engine throttle set screw, which is located on top of the carburetor.

12. Put the unit's shoulder strap on your RIGHT shoulder.

13. Select the desired flow rate and push the stem until the correct aperture is in line with the pesticide discharge tube (the holes should be pointing to the ground). As soon as you turn the stem down, pesticide will be expelled. Make sure you have the nozzle pointed in the desired direction. A chart, depicting the various apertures' flow rates, is located on the machine's pesticide container.

14. For short delays in operation, turn off the pesticide flow by turning the metering stem 90 degrees.

TERMINATING PROCEDURES

15. Empty any remaining pesticide into a non-breakable, labeled container.

16. Fill the pesticide container with 1 pint of flushing solution and secure the container to the machine.

17. Resume operations and continue until all of the flushing solution has been expelled.

18. Turn off the pesticide flow by rotating the metering stem 90 degrees.

19. Turn off the engine by pushing the ignition button located next to the gasoline tank.

- [ ] 20. Turn off the gasoline cut off valve underneath the gasoline tank.

- [ ] 21. Store the unit in a clean, dry area.

SECTION VI
ADDITIONAL FD-PMU/AMAL
VECTOR CONTROL EQUIPMENT

PERFORMANCE CHECK LIST FOR THE
AG- SPRAYER
MODEL AG-25 SPEL
25-GALLON HYDRAULIC SPRAYER
(NSN- 370-01-454-1981)

SETUP PROCEDURES

□ 1. This sprayer runs on a 12-volt system ONLY: ATV-BEECO PRO-MIST Deep cell, HUMVEE battery (battery located on left side). Use a multi-meter to be sure of 12-volt system.

□ 2. Check the entire sprayer thoroughly, prior to use for wear areas, such as tighten and clean battery cables (maintenance free battery), cracks in tank, hoses, pump, filter housing, frame and all hose clamps, etc.

□ 3. Hook up power cable to a 12-volt battery. Hook up the RED (POS +) first and the BLACK (NEG -) last . Test pump operation by briefly turning on the switch at the rear of the pump.

□ 4. Put 2-3 gallons of water in the tank. Turn on the pump at the switch and test for leaks. Tighten all loose clamps and plastic tube fittings. These units will not pump if the pick up tube fittings are loose. You may occasionally have to fill the pick up tube with water by adding it to the filter strainer in order to create suction. Caution: The pressure is Factory Set at 60 psi. The black by-pass valve handle must be cross-linked to pressurize the hose and gun.

□ 5. Put on all Personal Protective Gear.

□ 6. Add half of the required diluent to the tank. Calculate the amount of pesticide needed and add to the spray tank. When using a wettable powder, turn on the pump and turn the black valve handle so that it is “inline” with the tubing, in order to aid in mixing. Hydraulic sprayers use Emulsions, Suspensions and Solutions ONLY. After mixing, add the remainder of the diluent. Let the pesticide mix well before spraying. NOTE: 4 oz. of Kerosene or Diesel may be added to the tank to prevent foaming. Sprayer should be calibrated to check the flow rate. Make sure the “O” ring in the lid is in place.

□ 7. You are now ready to spray. Turn on the pump at the rear of the pump. Pull the trigger of the spray gun to start spraying. The spray pattern may be adjusted by turning the knurled knob, located behind the trigger.

TERMINATING PROCEDURES

□ 8. Drain the remaining pesticide into the proper container, using the spray gun, or by removing the drain plug in the bottom of the tank. NEVER store pesticide in the tank!

□ 9. Flush out the tank, hose and the spray gun by adding 3-5 gallons of water/detergent mixture.

This should be done at the spray operation site if possible.

10. After using soapy water, rinse out the system with clean water. Wash the exterior tank, hose, and nozzle assembly. Let the sprayer air dry before storing.

PERFORMANCE CHECK LIST FOR THE HONDA ALL TERRAIN VEHICLE (ATV)

Fig. 63. Honda All Terrain Vehicle (ATV).

OPERATING INSTRUCTIONS:
SAFETY PRECAUTIONS FOR THE HONDA ATV (Fig. 61)

1. Never carry passengers.

2. Off-road use only. Never use on any paved surface.

3. Helmet use is mandatory.

4. No drug or alcohol use before or during operation of ATV.

5. Never operate at excessive speed. Always go at a speed that is proper for the operating conditions (terrain, visibility, and operators experience)

6. Never attempt wheelies, jumps, or other stunts.

7. Keep both hands on the handlebars and both feet on the foot pegs.

8. Go slowly and use extra care when operating on unfamiliar terrain. Always be alert to changing terrain conditions.

9. Never operate on excessively rough, slippery, or loose terrain until you have learned to handle the ATV on such terrain.

10. Do not turn vehicle at excessive speed.

- 11. Never operate on hills too steep for the ATV or your abilities. Shift weight forward when traveling up hill and sit back when traveling down hill.
- 12. Never open the throttle suddenly or make sudden gear changes.
- 13. Never go over the top of any hill at high speed.
- 14. Avoid going down hill at an angle; go straight down the hill when possible.
- 15. Never operate in fast moving water or in water more than ten inches deep (tires may float causing loss of traction). Always test brakes after leaving water.
- 16. Always be sure there are no obstacles or people behind you when you operate in reverse. Never brake the rear wheels abruptly when operating in reverse.
- 17. Reduce speed when carrying cargo or pulling a trailer. Allow greater distance for breaking. Never exceed rear cargo limit (133 lbs) or trailer weight limit (850 lbs).
- 18. Always conduct a pre-ride inspection on the vehicle.

19. Engine oil - dipstick is located on the right rear of engine (When possible, place vehicle on a clean piece of cardboard to check for fluid leaks).

20. Gasoline - Check gas level (4-cycle engine). Fill if needed with unleaded gas (86 octane rating or higher) use a nozzle with screen filter or screened funnel when refueling. Avoid spills or overfilling.

21. Brakes - Check brake fluid view port on master cylinder located on right handle bar. Sight glass should be full. Check brake lever for proper operation. (front brakes are hydraulic, rear brakes are mechanical).

22. Tires - Check condition of tires and wheels. Look for cuts, foreign objects, and wear. Tire pressure: Front – 4.4 psi, Rear – 2.9 psi.

23. Throttle - Thumb lever throttle is located on the right handle bar grip. Check for proper operation.

24. Lights – Headlights/auxiliary lights – check for proper operation. Auxiliary light switch located center console above reverse gear indicator light. Headlight switches located center above left handle grip. (ignition must be in the on position for lights to work)

25. Engine start/stop switch - Red switch, located on left handle bar below light switches. Run position

located center of slide. “Off” position located on right or left side of “Run” position.

- ☐ 26. Drive shaft boots - Check drive shaft boots for wear and tear. Insure clamps are installed. Front - four (located front drive axles) rear – one (located left rear of engine)

- ☐ 27. Nuts, bolts, and fasteners - Check for loose nuts, bolts, and fasteners (i.e., wheel lug nuts, shock absorbers, cargo racks, etc.)

- ☐ 28. Steering - check for proper side-to-side operation.

- ☐ 29. Cargo/equipment - Make sure all cargo/equipment is properly secured.

- ☐ 30. Underbody - Check for/remove dirt, vegetation or other debris that could be a potential fire hazard or interfere with the proper operation of the vehicle.

- ☐ 31. Air filter - Remove seat by releasing lever located under seat left side. Remove air filter cover by releasing 4 metal clamps. Inspect air filter and clean as needed.

- ☐ 32. Air cleaner case drain tube - The tube is a semi-clear pink tube approximately 3 inches long (located rear of the engine above the axle) look for any debris that has collected in the bottom of the tube. Remove and clean as needed.

33. Battery - Check 12-volt battery located under seat behind air cleaner case. Remove screws from green cover. This should be a maintenance free battery. Make sure all terminals are tight and clean. Caution: if you have to work on the battery or terminals, all rings and watches should be removed. There are two buss-type auto fuses located in the black rubber waterproof case at the front of the battery.

34. Tool kit - There is a small tool kit and tire gauge located in the cargo box in the rear, under taillight.

STARTING PROCEDURES

35. Lock parking brake by pulling brake hand lever and set parking brake (P.K.B.) lever in the direction of arrow (brake handle and parking brake lever are located on the left handle bar).

36. Vehicle must be in neutral. To do this temporarily, turn on ignition switch and depress gearshift foot lever until neutral light on center console lights up. (gearshift lever is located by the left side foot peg). Once in neutral turn off ignition.

37. Turn fuel valve, located on left side directly below fuel tank, to the on position.

38. Turn dial on the gas cap to the on position; turn ignition to the on position.

39. Position the engine stop switch to the (center) run position.

40. Set the choke lever to the halfway position.

41. Depress engine start button (located next to choke) caution do not depress longer than 5 seconds or damage to starter may result.

42. As engine warms up shut off choke.

43. This vehicle is equipped with a 12 volt “warn” winch mounted under the front end. Control lever is located on left front fender below left handle bar. CAUTION: engine should be running while operating winch as it pulls lots of amperage from the battery.

44. This vehicle is equipped with a manual kick-start located under green pop off cover right side of the engine. Push lever forward.