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Fire Equipment Storage and Refurbishing Standards

Prepared by:

National Fire Equipment System
Refurbishment Standards Task Group

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PREFACE

NFES
STORAGE AND REFURBISHMENT STANDARDS
DEVELOPMENT HISTORY

In 1989, the NFES Refurbishment Standard Committee established a Task Group to look at the development of a set of storage and refurbishment standards for fire equipment that is part of the NFES National Cache System. This task group was made up of several of the National Interagency Support Cache Managers and a select group of interested individuals from around the nation. The group met and established a standard outline for the Storage and Refurbishment Standards, and also identified all of the individual equipment items that should have standards. This list was then divided among the national and local caches and the two Forest Service Technology & Development Centers for the development of the standards.

Bill Russell, Forest Service Region 3, Aviation and Fire Management Staff, served as the first Task Group leader and editor of the standards. As standards were developed, they were shared among the Cache Managers. Suggested changes were incorporated and shared again. A final package of standards was available for the NFES Committee meeting in Lexington, KY, in the spring of 1991, and was published in July 1992.

The 1998 edition contains the results of a total review of the existing standards and incorporates 41 additional Refurbishment Standards and an appendix section that contains specific direction for refurbishment of items stocked within the National Cache System.

As new items are introduced into the National Cache System, there is a requirement, established by NFES, that the developer or proponent of the item provide a Storage and Refurbishment Standard. These must be in the same format as the current standards for ease of incorporation into future editions.

RAY R. GUARDADO
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ITEM: ADAPTER* - 1-INCH **NFES #0003, 0004**
ADAPTER* - 1-1/2 INCH **#0006, 0007**

A. Initial Inspection/Disposal Criteria

1. Check for obvious damage
2. Check for burrs.
3. Check tail gasket.
4. Check for fire damage. May cause failure in the future.
5. Check hose coupling threads for damage.

B. Tests

None.

C. Refurbishing Procedures

Replace tail gasket if missing, cracked, or stiff.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean in dishwashing detergent with a brush or scouring pad.
2. Rinse thoroughly and let dry.

F. Repackaging

Local cache option for carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: APPLICATOR, WATER, 1 PIECE* **NFES #0734**
APPLICATOR, WATER, 2 PIECE* **NFES #0720**

A. Initial Inspection/Disposal Criteria

1. Check for burns.
2. Check for bad threads.
3. Check for cracks.

B. Tests

1. Attach to hose.
2. Check for leaks.

C. Refurbishing Procedures

Wash and remove dirt and grime.

D. Retesting Criteria

1. Attach to hose.
2. Check for leaks.

E. Cleaning Procedures

1. All items will be washed and cleaned of foreign matter, such as mud, dirt, and grease. Clean in a dishwashing detergent brush or scouring pad as needed.
2. Rinse thoroughly and let dry.

F. Repackaging

Local cache option.

G. Storage and Shelf Life Checks

None at this time.

ITEM: BAG, BACKPACK PUMP NFES #1197

A. Initial Inspection/Disposal Criteria

1. Fabric and webbing.
   a. Any holes, cuts, tears, burns, or torn seams that are not economically repairable.
   b. Any hook and pile fastener missing or that does not provide adequate closure.
   c. Unsightly dirt or fuel stain that laundering cannot eliminate.
2. Hardware.
   Check all plastic hardware for dirt, cracks, breaks, and proper function.
3. Replaceable Liner.
   Replace all used liners.

B. Tests

Open and close hook and pile fastener to determine if closure is adequate.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, and broken seams.
2. Replace missing or nonfunctioning hook and pile fastener.
3. Replace nonfunctioning hardware.
4. Replace, insert extra plastic liners in pouch, if required. (See Sections A and B.)
5. Install "O" rings on cap, if needed, to prevent leakage.

D. Retesting Criteria

Test replacement hook and pile fastener after sewing in place, as specified in Section B.

E. Cleaning Procedures

1. Allow mud and loose dirt to dry, then remove with a stiff bristle brush. If stains remain, wash as recommended below.
2. To remove heavy oil, as well as stubborn dirt and stains.
   a. treat first with a dry cleaning solvent like perchloroethylene. Follow with a spray cleaner or detergent and water. Brush with a bristle brush. Rinse thoroughly in warm water. Hang to dry.
   b. Or, steam clean and hang to dry.

3. DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.

F. Repackaging

1. Local cache option. Suggested carton is NFES #0554 (NSN 8815-00-079-8879).
   Quantity 6 each
2. Package as NFES #1197.

G. Storage and Shelf Life Checks

None.

ITEM: BAG, BACKPACK PUMP (OLD STYLE) NFES # Not Assigned

NOTE: When available stock is depleted, this item will be no longer be available.

A. Initial Inspection/Disposal Criteria

1. Check for.
   a. Rips, holes.
   b. Caps.
   c. Straps (make sure they are all there & in good condition).
   d. Pump and hose. (Refer to pump, single action NFES #0151.)
2. Items that will determine disposal.
   a. Bad seams and deterioration of adhesive.
   b. Tears larger that one inch.
   c. Depending on condition of bag, two to five patches.
   d. Hand held pump that does not provide adequate pressure. See procedure for testing pumps.
   e. Inoperative quick connection points.

B. Tests

1. Testing Bags.
   a. Fill bag with air, four pounds.
   b. Dip in water to check for leaks.
   c. Patch leaks.
   d. Check quick connections on bladder bags for proper seating.
2. Testing Straps.
   a. Check buckles and "D" rings on straps for serviceability.
   b. Check to see if strap attachments are coming unglued from bag. If needed, reglue.
   NOTE: See Gluing Procedure.
   c. Pull test strap patch on bag to 45 pounds at 180º F pull from bag.

C. Refurbishing Procedures

1. Wash unit.
   a. Wash with soap and water, or steam clean.
   b. Rinse in clear water.
   c. Drain and let air dry.
2. Patching.
   a. Gluing.

IMPORTANT NOTE: Most adhesives and thinners are flammable. Keep away from fire. Use in well ventilated space. Avoid prolonged contact with skin as well as breathing vapors. Cleanse hands thoroughly after contact. Read manufacturer's instructions and recommendations for adhesives and thinners before use.

b. Patching procedure.
   (1) Clean both surfaces to be bonded.
   (2) Use abrasive strip or wire wheel to rough both surfaces before application of adhesive. Clean both surfaces again after roughing.
   (3) Apply adhesive to both surfaces and let dry (15 to 25 minutes). Check for dryness by lightly touching surface with finger tip. Dry adhesive will feel tacky, but will not transfer to finger tip. If adhesive is allowed to dry more than 3 hours, apply a second coat of adhesive to both surfaces.
   (4) Press the adhesive coated surfaces together and use the roller to press the parts together. Use heavy pressure.
   (5) For best results bonded surfaces should be cured for 72 hours.

c. For Strap Attachments.

(1) All "old glue" residues should be removed from strap. Sand or wire wheel a two inch area on each strap, rough on both sides.

(2) All "old glue" should be removed from attachment patch. Sand or wire wheel the back side of the patch. If the detached patch is not available, make patch of proper dimensions from salvaged bag material of same color. Clean using sandpaper or wire wheel to lightly roughen surface for adhesive.

(3) Check appearance of the patch. There should be a slit in the upper portion of the patch. If no slit exists, use a razor blade or sharp knife to add one.

(4) Locate the portion of the bag where the patch came from. All old glue should be removed. Sand or wire wheel an area larger than the patch originally covered.

(5) IMPORTANT: All surfaces to be glued should be thoroughly sanded. Residue must be removed and surface cleaned. Check manufactures recommendations for proper glueing and cleaning procedures. Failure to do this will adversely affect the strength of the adhesive.

(6) Assembling strap to patch: See Section B.

(a) Slide D-ring on strap.

(b) Apply adhesive to sanded side of patch (just enough to cover where the strap will go) and on mating side of strap.

(c) Slide strap through the slit in the patch.

(d) Press together.

(e) Use a roller to ensure a good bond.

– **NOTE: For best results, repaired bag should be held for seven days at not less than 65° F and not more than 70 percent humidity before bag is used.**

D. Repackaging

1. Rolled bag to be packaged similar to packaging of manufacturer. This is to prevent damage to bag in storage, transfer, handling and ozone damage.
2. Pack 6-each in Carton NFES #0554, (NSN 8115-00-079-8879).

E. Storage and Shelf Life Checks

None at this time.

ITEM: BAG, DRINKING WATER, NYLON DUCK, 4 QUART NFES #1551

A. Initial Inspection/Disposal Criteria

1. Fabric and webbing.
   a. Any holes, cuts, tears, burns, or torn seams that are not economically repairable.
   b. Any hook and pile fastener missing or that does not provide adequate closure.
   c. Unsightly dirt or fuel stain that laundering cannot eliminate.
2. Hardware.
   Check all plastic hardware for dirt, cracks, breaks, and proper function.
3. Replaceable liner.
   Dispose of used plastic bag with spout and rubber spigot.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

Open and close hook and pile fastener to determine if closure is adequate.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, and broken seams.
2. Replace missing or nonfunctioning hook and pile fastener.
3. Replace nonfunctioning hardware.
4. Replace mylar or plastic liner (NFES #1552).
5. Replace styrofoam liner if needed, replace with gray sleeping pad material.

D. Retesting Criteria

Test replacement hook and pile fastener after sewing in place, as specified in Section B.

E. Cleaning Procedures

1. Allow mud and loose dirt to dry, then remove with a stiff bristle brush. If stains remain, wash as recommended below.
2. To remove heavy oil, as well as stubborn dirt and stains, treat first with a dry cleaning solvent such as perchloroethylene. Steam clean or follow with a spray cleaner or detergent and water. Brush with a bristle brush. Rinse thoroughly in warm water. Hang to dry.
3. **DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.**

F. Repackaging

Pack 40 water bags in carton NFES #2006 (NSN 8118-00-139-0722).

G. Storage and Shelf Life Checks

None at this time.

ITEM: BAG, DRINKING WATER, 55 GALLON NFES #0435

A. Initial Inspection/Disposal Criteria

1. Nylon outer bag.
   a. Any holes, cuts, tears, burns, or torn seams that are not economically repairable.
   b. Any zipper that does not close properly.
   c. Unsightly dirt or fuel stain that cleaning cannot eliminate.
   d. Any buckle that does not function properly.
2. Fill and drain hardware.
   Any part missing or damaged.
3. Liners.
   a. Replace old liner and make sure plugs are tightly threaded onto fitment caps to keep new liner sanitary.
   b. Check condition of spare liner. Unless the integrity of the liner is in question, do not remove from the sealed bag to make this inspection.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Test fill and drain fittings for proper function and tight seal. The fill fitting is the special hardware that keeps dirt and bacteria out of the liner.
2 . Test buckles by fastening and unfastening. They should function easily with little force applied and no difficulty in the release.
3. Test zippers by opening and closing. Zipper should operate smoothly over its full length.

C. Refurbishing Criteria

1. Repair holes, cuts, tears, and broken seams.
2. Replace non-functioning buckles.
3. Replace non-functioning zipper.
4. Replace used liners (NFES #0436).
5. Replace missing or damaged fitting parts.

D. Retesting Criteria

Test any replacement buckle, zipper, or fitting as specified in Section C.

E. Cleaning Procedures

1. Nylon outer bag.
   a. Allow mud and loose dirt to dry, then remove with a stiff bristle brush. If stains remain, clean as recommended in E.1.b.
   b. To remove heavy oil, as well as stubborn dirt and stains, treat first with a dry cleaning solvent such as perchloroethylene. Follow with a spray cleaner or detergent and water. Brush with a bristle brush. Rinse thoroughly in warm water. Hang to dry.
   c. Or steam clean and hang to dry.

DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.

2. Filling and draining hardware.
   a. Wash thoroughly in a solution of chlorine bleach, consisting of one ounce bleach per gallon of water. Rinse in potable water and dry completely.
   b. Once hose and fittings are sanitized and dried, reseal in the plastic storage bag provided and put in zipper pocket.

F. Repackaging

Local cache option. Suggested carton is 18" x 15" x 10" (NSN 8115-00-190-5007).
Printed instruction information and parts list should be packaged with bag.

G. Storage and Shelf Life Checks

None at this time.

ITEM: BAG, SLEEPING, FIREFIGHTERS, M-1981 NFES #1062

A. Initial Inspection/Disposal Criteria

1. Any hole, cut, tear, abrasion, or torn seam.
2. Unsightly dirt or stain that laundering cannot eliminate.
3. Polyester batting in hard clumps or lofting inadequate.
4. Head tie(s) loose or missing.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

None.

C. Refurbishing Procedures

1. Repair any hole, cut, tear, abrasion, or open seam. See note in Section A.
2. Remove unsightly dirt or stains.
3. Check loft of batting in bags that have been laundered more than three times.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Remove all contents not part of the bag before laundering.
2. Launder bags in front-loading machine. Use mild soap in water of no more than 130˚F. Bags shall undergo six wash and rinse cycles in an alternating combination, i.e., three washes and three rinses.
3. Sterilize bag by dry tumbling with vacuum extraction of loosened dirt and soil particles, with a controlled heat application. Heat shall be held at an average of 130˚ F for a minimum of 20 minutes. The dryer shall be of the reverse-action type. All bags shall be unfolded and shall tumble free. (obtain average temperature by testing temperature every five minutes and averaging the findings.)
4. Lay out each dry bag flat and fold in half lengthwise. Tightly roll bag from head to foot and tie in the middle with a suitable cord.

F. Repackaging

1. Package bags in carton NFES #0513 (NSN 8115-01-290-9543). Quantity 10 each.
2. Local Cache option to package in plastic bag prior to final packaging.

G. Storage and Shelf Life Checks

None at this time.

ITEM: BAG, SLEEPING, GENERAL PURPOSE M-1980 NFES #0022

A. Initial Inspection/ Disposal Criteria

1. Any hole, cut, tear, abrasion, or torn seam that cannot be repaired economically.
2. Unsightly dirt or stain that laundering cannot eliminate.
3. Missing slider, damaged chain, or other defects that make zipper unusable.
4. Polyester batting in hard clumps or inadequate lofting.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Check spring lock to ensure spring works properly and that the cord passes freely through when the lock is disengaged.
2. Close zipper to ensure it provides a smooth and secure closure the full length of the bag opening.
3. Open and close the hook and pile fastener to ensure closure is adequate.

C. Refurbishing Procedures

1. Repair any hole, cut, tear, abrasion, or open seam. See note in Section A.
2. Remove unsightly dirt or stains.
3 Replace any zipper that has damaged chain and replace any missing slider. See note in Section A.
4. Check loft of batting in bags prior to sending for laundering.

D. Retesting Criteria

Retest all replacement hardware.

E. Cleaning Procedures

1. Remove all contents not part of the bag and zip closed before laundering.
2. Launder bags in front-loading machine. Use mild soap in water of no more than 130˚ F. Bags shall undergo six wash and rinse cycles in an alternating combination, i.e., three washes and three rinses.
3. With bag unzipped, sterilize by dry tumbling with vacuum extraction of loosened dirt and soil particles, with a controlled heat application. The heat shall be held at an average of 130˚ F for a minimum of 20 minutes. The dryer unit shall be of the reverse-action type. All bags shall be unfolded and shall tumble free. (To obtain the average temperature, test the temperature every five minutes and average the findings.)
4. After drying, zip bags closed.

F. Repackaging

Package 5 bags in carton NFES #0644 (NSN 8115-00-139-0691).

G. Storage and Shelf Life Checks

None at this time.

ITEM: BAG, SLINGABLE, WATER, 72 GALLON, NON-POTABLE — NFES #0426
BAG, SLINGABLE, WATER, 250 GALLON, NON-POTABLE — NFES #6017
BAG, SLINGABLE, WATER, 360 GALLON, NON-POTABLE — NFES #6021

A. Initial Inspection/Disposal Criteria

1. Separate by NFES#.
2. Visual inspection to determine if any components are missing or need repair such as: straps, hoses, spigot, cap and gasket.

B. Tests

1. Fill with air or clean water (NFES #0426) checking for obvious leaks and mark leaks (drain water). Check for bad seams and deterioration of adhesives (previous patches).
2. Visually inspect bags for rips, tears or obvious defects. (NFES #6017, #6021)

C. Refurbishing Procedures

1. Clean area around damaged spot with lacquer thinner or other suitable cleaner. Caution: Utilize well ventilated area. Apply suitable glue (manufacturer's recommendation) to both surfaces (patch and tank). Let dry until tacky. Place patch on damaged area and apply pressure with roller or suitable device for at least one minute.
2. Repair or replace any damaged components. Clean exterior of tank thoroughly (with filler cap attached).
3. Support or hang tank with spigot closed, remove cap and fill with water to rinse out tank. Replace cap. Shake tank vigorously until all foreign matter is removed. Drain tank completely through hose and spigot.
4. Invert tank after removing cap, open spigot and empty as much water as possible. Let dry inverted for one hour in sun, if possible.

D. Retesting Criteria

1. Recheck any patches or repairs.
2. Replace cap and close spigot.

E. Repackaging

1. Ensure that tank is stenciled visibly with the words "NON-POTABLE" or "SUPPRESSION USE ONLY" and proper NFES# is stenciled on tank.
2. Local cache option for carton.

F. Storage and Shelf Life Checks

None at this time

ITEM: BAG, SLINGABLE WATER, 72 GALLON, POTABLE (BLUE OR WHITE) NFES #0425

A. Initial Inspection/Disposal Criteria

1. Separate by NFES#.
2. Visual inspection to determine if any components are missing or need repair such as: straps, hoses, spigot, cap and gasket.

B. Tests

Fill with air or clean water checking for obvious leaks and mark leaks (drain water). Check for bad seams and deterioration of adhesives (previous patches).

C. Refurbishing Procedures

1. Clean area around damaged spot with lacquer thinner or other suitable cleaner. Caution: Utilize well ventilated area. Apply suitable glue (manufacturer's recommendation) to both surfaces (patch and tank). Let dry until tacky. Place patch on damaged area and apply pressure with roller or suitable device for at least one minute.
2. Repair or replace any damaged components.
3. Clean exterior of tank thoroughly (with filler cap attached). Cleaning solution should be any mild to strong detergent or use steam cleaner.
4. Sterilize inside of tank with a solution of unscented chlorine bleach (i.e. Purex®) and water.
   a. Mix 1 cup unscented chlorine bleach (i.e. Purex®) to 50 gallons of water, let solution stand in container for minimum of 4 hours, drain and hang to air dry with cap off.
   b. Mix 1 cup unscented chloring bleach (i.e. Purex®) to 5 gallons of water, rinse inside of container with solution, drain and hang to air dry with cap off.

D. Retesting Criteria

1. Recheck any patches or repairs.
2. Replace cap and close spigot.

E. Cleaning Procedures

See Section C.

F. Repackaging

1. Ensure that tank is stenciled visibly with the words "POTABLE-DRINKING WATER ONLY" and NFES #0425.
2. Local cache option for carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: BAG, SUPPRESSION WATER, 55 GALLON NFES #0437

A. Initial Inspection/Disposal Criteria

1. Nylon outer bag.
   a. Any holes, cuts, tears, burns, or torn seams that are not economically repairable.
   b. Any zipper that does not close properly.
   c. Unsightly dirt or fuel stain that cleaning cannot eliminate.
   d. Any buckle that does not function properly.
2. Fill and drain hardware.
   Any part missing or damaged.
3. Liners.
   a. Replace old liner and make sure plugs are tightly threaded onto fitment caps to keep new liner sanitary.
   b. Check condition of spare liner. Unless the integrity of the liner is in question, do not remove from the sealed bag to make this inspection.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Test fill and drain fittings for proper function and tight seal. The fill fitting is the special hardware which keeps dirt and bacteria out of the liner.
2. Test buckles by fastening and unfastening. They should function easily with little force applied and no difficulty in the release.
3. Test zippers by opening and closing. Zipper should operate smoothly over its full length.

C. Refurbishing Criteria

1. Repair holes, cuts, tears, and broken seams.
2. Replace non-functioning buckles.
3. Replace non-functioning zipper.
4. Replace used liners (NFES #0438).
5. Replace missing or damaged fitting parts.

D. Retesting Criteria

Test any replacement buckle, zipper, or fitting as specified in Section C.

E. Cleaning Procedures

1. Nylon outer bag.
   a. Allow mud and loose dirt to dry, then remove with a stiff bristle brush. If stains remain, clean as recommended in E.l.b.
   b. To remove heavy oil, as well as stubborn dirt and stains, treat first with a dry cleaning solvent such as perchloroethylene. Follow with a spray cleaner or detergent and water. Brush with a bristle brush. Rinse thoroughly in warm water. Hang to dry.
   c. Or steam clean and hang to dry.

DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.

2. Filling and draining hardware.
   a. Wash thoroughly in a solution of chlorine bleach, consisting of one ounce bleach per gallon of water. Rinse in potable water and dry completely.
   b. Once hose and fittings are sanitized and dried, reseal in the plastic storage bag provided and put in zipper pocket.

F. Repackaging

Local cache option. Suggested carton is 18" x 15" x 10" (NSN 8115-00-190-5007).
Printed instruction information and parts list should be packaged with bag.

G. Storage and Shelf Life Checks

None at this time.

ITEM: BATTERY FOR HAND HELD RADIOS

NFES #0293, 1203, 1231, #1255, 1264, 1520, 1538

A. Initial Inspection/Disposal Criteria

Established by the National Radio Cache, Boise, ID, March 2, 1990.

1. Visual inspection of package--if package opened, return credit will not be given.
2. Batteries may be used by the agency ordering the batteries if package opened.
3. All unopened boxes of batteries that have not reached their expiration date will be returned for credit.

B. Tests

None at this time.

C. Refurbishing Procedures

None at this time.

D. Retesting Criteria

None at this time.

E. Cleaning Procedures

None at this time.

F. Repackaging

None at this time.

G. Storage and Shelf Life Checks

Not to exceed expiration date.

ITEM: BLANKET, WOOL — NFES #0441

A. Initial Inspection/Disposal Criteria

1. Check for visible rips, burns, or tears.
2. Check for possible mildew.

B. Tests

None.

C Refurbishment Procedures

1. To be DRY CLEANED ONLY.

2. Have small rips or holes sewn by laundry (up to one-inch rip or hole).

D. Retesting Criteria

None.

E. Cleaning Procedures

Wool blankets must be DRY CLEANED by laundry.

F. Repackaging

1. Individually pack in plastic if possible.
2. Pack 15 per carton using carton NFES #0644 (33" x 16" x 22"--NSN 8115-00-139-00691).

G. Storage and Shelf Life Checks

None at this time.

ITEM: BUCKET, HELICOPTER, FIBERGLASS OR SLINGABLE (COLLAPSIBLE) NFES #0157, #6011, 6012, 6013

A. Initial Inspection/Disposal Criteria

1. Visual inspection indicating use or missing parts (fill caps, etc.)
2. Structural damage preventing repair--dispose (salvage usable parts).
3. If used they need to be inspected to ensure serviceability.
4. Clean and forward to qualified inspector.

B. Tests

1. Have tests conducted on specific bucket by certified inspector.
2. On NFES #6012 inspector is manufacturer:

SEI Industries
7400 Wilson Avenue
Delta, BC, Canada V4G 1E5
Phone: (604) 946-3131

Manufacturers authorized U.S. overhaul facility: (NFES #6012)
Field Support Services
2001 Flightway Drive
Atlanta, Georgia 30341
Phone: 770-454-1130

3. On other buckets, area inspectors can be used, such as:

Aero Accessory Service
612 S. Scott
Boise, Idaho 83705
Phone 208-344-6461

C. Refurbishing Procedures

Completed in Sections A and B.

D. Retesting Criteria

Completed in Section B.

E. Cleaning Procedures

Completed in Section A.

F. Repackaging

Local cache options.

G. Storage and Shelf Life Checks

None at this time.

ITEM: CAN, GAS, VARIOUS
CONTAINER, FUEL/OIL

NFES #0036,0085,0265, 0350, 0741, 1175, 1290, 1291

A. Initial inspection/Disposal Criteria

1. Check for fuel and dispose of properly.

NOTE: Dispose of contaminated fuel according to hazardous material regulations in your area.

2. Check for leaks or separation along seams.
3. Check all threads on nozzles for serviceability.

B. Tests

Visible checks only. Dispose of unserviceable cans including those with unidentifiable contents.

C. Refurbishing Procedures

1. Drain all existing fuel.
2. Use a rag and air hose to dry the interior of the container.
3. Turn upside down with lids off or open to dry.
4. Inspect vent hole to ensure it is clean and serviceable.
5. Visually verify that no rust exists inside container.
6. Wipe down outside of container and repaint if necessary.
7. Purge can.

D. Retesting Criteria

None.

E. Cleaning Procedures

See Section C.

F. Repackaging

Local cache option.

G. Storage and Shelf Life Checks

Annual visual inspection for rust.

ITEM: CHAIN SAW **NFES #0159**

A. Initial Inspection/Disposal Criteria

1. Evidence of use (dust, oil, fuel and starter seal broken).
2. Return to stock if not used and run up within the last 12 months.
3. Evidence of damage.
4. Accountable property tags should be checked and remarked/replaced if necessary.

B. Tests

NOTE: See Refurbishing Procedures (Section C).

1. Repair to recommended manufacturer's standards using local repair procedures.
2. Test for performance.
3. Drain fuel and purge.
4. Tie off starter rope to handle to determine field use. Use plastic snap seal.
5. In event the saw is not economically repairable, it shall be disposed of per local policies.

C. Refurbishing Procedures

1. Refurbish to manufacturer's specifications and tolerances.
2. Check for broken seal to verify if saw was used, even if seal is intact, look for exterior damage. If used, disassemble and clean complete saw, removing chain, bar, sprocket cover, sprocket, clutch drum clutch, worm gear, air filter cover, air filter, cylinder cover, sparkplug, starter cover, pawls, rope rotor and muffler.
3. Clean all parts, inspecting each part as reassembling.
4. Filters should be cleaned with warm soap and water. New filter material (flocking) degrades quickly with solvent washing. Replace if holes appear in flocking.
5. If there are any doubts about the sparkplug, replace it. Inspect sparkplug boot and high tension lead.
6. Lubricate starter spring. Check rope for fraying. Replace if frayed.
7. Clean muffler of excess carbon. Check spark arrestor screen for build up. Bead blast and repair if necessary.
8. Replace sprocket or star drum if the wear is deep enough to catch a fingernail.
9. Sharpen chain, using manufacturer's procedures after each use. Regularly check and adjust raker depth with a depth gauge. Replace chain if: cutters are of unequal length on opposing sides; two (2) or more cutters are broken; tie straps are worn down to rivets; if stretched beyond tensioning abilities; or when side plate is filed back to rear attaching rivet.
10. Service bar after each use. This includes checking groove depth and width; trueing and filing rails; and checking for bends. Replace if rails are cracked, chipped, burnt or have a dip deeper than 1/16 inch. Check sprocket tip for wear and looseness. Lubricate tip if grease type.
11. Inspect clutch shoes and springs. Replace if burnt or missing. Replace clutch drum if badly burnt (discolored).
12. Test run. Set oiler to full open and check function, test brake function. Set RMS's with a digital tach, between 12,500 and 13,000 (or manufacturer's specifications). Make a test cut.
13. If saw runs properly, purge fuel, wipe sawdust and oil off saw, seal starter rope and tag it with the date and a signature.
14. If a probelm is exposed on run-up, use Stihl 15-minute engine analysis to trouble shoot.

D. Retesting Criteria

Completed in Section B.

E. Cleaning Procedures

Completed in Sections B and C.

F. Repacking

1. Place bar cover over chain saw bar for safety.
2. If to be packaged in kit form, assemble in carton NFES #0353 with other component items.

G. Storage and Shelf Life Checks

Retest annually when used.

ITEM: CHAPS, PROTECTIVE

NFES #0044, 0045, #0078, 0150

A. Initial Inspection/Disposal Criteria

1. Fabric and webbing.
   a. Any hole, cut, tear, or burn that cannot, be repaired economically.
   b. Any area of abrasion that has weakened fabric beyond repair.
   c. Any webbing that is cut, burned, or abraded beyond economical repair.
   d. Either leg has more than five patches.
   e. Any cut exceeds seven inches.
   f. All layers have been cut through.
2. Hardware.
   Check all plastic and metal hardware for dirt, cracks, breaks, and proper function. See Section B.

NOTE: The cache manager shall determine when repair is economical. This decision will be based on available repair facilities.

B. Tests

See Appendix A

Test hardware by fastening and unfastening. The hardware should function easily with little force being applied and no difficulty in the release.

C. Refurbishing Procedures.

1. Repair burn holes and cuts. Repair techniques vary depending on whether damage is restricted to the outer layer of green nylon duck or involves the yellow Kevlar also. If only the nylon is burned or cut through make a nylon patch that extends at least two inches beyond the edges of the damage. Fold the patch under one-half inch and hand stitch this folded edge to the nylon. When hand stitching the patch to the nylon, make sure no stitches are sewn into the Kevlar. Deeper cuts that involve the Kevlar material must be repaired with a patch equal to the number of layers cut and must be machine sewn. If three layers are cut, the patch must contain these three layers. Make the patch large enough to extend one inch beyond the damaged area. Insert the patch under the nylon, then sew on all four sides and along the cut in the nylon shell. Obtain patch materials from a pair of previously damaged chaps.
2. Replace burned, abraded, or cut webbing with like items.
3. Replace broken or nonfunctioning hardware.
4. Reference: *Inspection and Repairing Your Chainsaw Chaps*, MTDC Publication 8267 2505.

D. Retesting Criteria

Retest all replaced hardware as specified in Section B.

E. Cleaning Procedures

1. Allow any mud or loose dirt to dry, then remove using a stiff bristle brush. If stains remain, wash as recommended below.
2. Clean to remove heavy oil, as well as stubborn dirt and stains. Treat first with a dry cleaning solvent such as perchloroethylene. Follow with a spray cleaner or detergent and water. Brush with a bristle brush. Rinse thoroughly in warm water. Hang to dry.
3. Or steam clean and hang to dry.

DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.

F. Repackaging

Local cache option. Recommended carton is 16" x 14" x 12" (NSN 8115-00-183-9484).
Pack 10 pair of chaps of the same size in carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: CONNECTOR, PIGTAIL — NFES #0398

A. Initial Inspection/Disposal Criteria

1. Inspect wire and connections for damage.
2. Broken wires (electrical cord).
3. Bent or distorted electrical connections.
4. Cuts, tears or frayed electrical wires

B. Tests

Check electrical connections per drawing FS/OAS A-16 ACCESSORY CONNECTOR PIN ASSIGNMENTS: SIMPLEX HELITORCH, BAMBI BUCKET, REMOTE HOOK, AND SEEDERS (2-wire). Electrical pin connections can be checked per the above drawing with an ohm meter.

C. Refurbishing Procedures

Repair if economically feasible.

D. Retesting Criteria

See Section B.

E. Cleaning Procedures

Electrical connections may be cleaned with electrical cleaner and wiped or blown dry.

F. Repackaging

Local cache option.

G. Storage and Shelf Life Checks

None at this time.

FS/OAS A-16 ACCESSORY CONNECTOR PIN ASSIGNMENTS

GRIFFITH BUCKET (7-wire)

	MS 3101E-24-11S (HELICOPTER)	MS 3107B-24-11P (BUCKET)	
PIN	FUNCTION	FUNCTION	
A	Up limit relay coil	Up limit switch	(Green)
B	Up switch	Up limit switch	(White #16)
F	28VDC/Ground (up)	28VDC/Ground (up)	(White #12)
G	Down limit relay coil	Down limit switch	(Red #16)
H	Ground/28VDC (down)	Ground/28VDC (Down)	(Black #12)
I	Down switch	Down limit switch	(Black #16)

SIMS BUCKET (3-wire)

	MS 3101E-24-11S (HELICOPTER)	MS 3107B-24-11P (BUCKET)	
PIN	FUNCTION	FUNCTION	
B	28VDC/Ground	28VDC/Ground	(Green)
G	Ground (close)	Ground (close)	(White)
I	28VDC (open)	28VDC (open)	(Black)

SIMS BUCKET (8-wire)

MS 3101E-24-11S (HELICOPTER)		MS 3107B-24-11P (BUCKET)	
PIN	FUNCTION	FUNCTION	
A	28VDC Open	28VDC Open	(White/Black)
D	Ground	System Ground	(Blue/Green)
F	28VDC	System Power	(White, Red, Black)
H	Indicator light	Indicator light return	(Red/Black)
I	28VDC Close	28VDC Close	(Orange)

CHADWICK BUCKET (2-wire)

MS 3101E-24-11S (HELICOPTER)		MS 3107B-24-11P (BUCKET)
PIN	FUNCTION	FUNCTION
B	28VDC/Ground Open	28VDC/Ground Open
H	Ground/28VDC Close	Ground/28VDC Close

BRACKETT CAROUSEL/CHADWICK BUCKET (3-wire)

MS 3101E-24-11S (HELICOPTER)		MS 3107B-24-11P (BUCKET)
PIN	FUNCTION	FUNCTION
C	28VDC Reset/bucket close	28VDC Reset/bucket close
D	Airframe Ground	System Ground
E	28VDC Hook/bucket open	28VDC Hook/bucket open

***SIMPLEX HELITORCH, BAMBI BUCKET, REMOTE HOOK, AND SEEDERS (2-wire)**

MS 3101E-24-11S (HELICOPTER)		MS 3107B-24-11P (BUCKET)
PIN	FUNCTION	FUNCTION
D	Airframe Ground	System Ground
E	28VDC (bucket open)	28VDC Bucket/Hook Open-Torch/Seeder on

ITEM: CORD, MULTI-LIGHT SOCKETS* NFES #0563

A. Initial Inspection/Disposal Criteria

1. Bent or missing bulb guards.
2. Missing or broken bulbs.
3. Bent plug.
4. Dispose of if:
   a. Cracked and/or broken light sockets.
   b. Broken plugs (deliberate alterations).
   c. Broken, frayed or burned cords.
   d. Validate cord is a UL approved with a 12-gauge minimum wire.

B. Tests

1. Install new bulbs in all sockets.
2. Plug into110 volt outlet.
3. Test cord with a Ground Fault Interrupter (GFI) testing device.

Test 110 volt outlet first, then plug cord into outlet and check cord by plugging GFI testing device into end of cord.

C. Refurbishing Procedures

1. Replace blown and/or broken bulbs.
2. Replace missing bulb guards.

D. Retesting Criteria

Retest if bulbs were replaced.

E. Cleaning Procedures

1. Damp wipe with mild detergent solution to remove mud, dirt and grease.
2. Clean guards with soapy water, brush & scouring pad
3. Do NOT soak.
4. Dry completely before use (due to possible electric shock).

F. Repackaging

Local cache option for coiling and repacking.

G. Storage and Shelf Life Checks

None at this time.

ITEM: CORDS, EXTENSION, 3-WIRE* NFES #0560, 1172

A. Initial Inspection/Disposal Criteria

1.Visual inspection for broken plugs, cracked or damaged cord.
2. Field modified cords should be discarded immediately if not economically feasible to repair.
3. Ensure neutral grounding prong is intact.
4. Validate cord is a UL approved with a 12-gauge minimum wire.

B. Tests

Test cord with a Ground Fault Interrupter (GFI) testing device. Test 110 volt outlet first, then plug cord into outlet and check cord by plugging GFI testing device into end of cord.

C. Refurbishing Procedures

Wipe down cord with damp cloth to remove foreign material.

D. Retesting Criteria

Check visually before issue to ensure damage has not occurred during storage or that someone possibly placed a defective cord in storage location.

E. Cleaning Procedures

Completed in Section C.

F. Repackaging

1. Roll up cord (approximately 12-to 14-inch loop). Tie off with wire ties or strappex banding (minimum of 2 per cord).
2. Tag cord with proper NFES number and nomenclature.
3. Repack in carton 18" x 15" x 5˚" (NSN 8115-00-290-3386).
   a. NFES #0560- 3 each per carton.
   b. NFES #1172- 2 each per carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: COT, FOLDING — NFES #0053

A. Initial Inspection/Disposal Criteria

1. Visual inspection for tears in cover, soiled cover, missing parts, and loose nuts and bolts.
2. Structural damage to frame.
3. Broken wooden framed cots—dispose (salvage usable parts when feasible).

B. Tests

Assemble to check for weakness or nonvisual damage.

C. Refurbishing Procedures

1. If cover is torn or its seam is separated, replace the cover. See parts list Section C.4.a.
2. Replace damaged rail rubbing pieces. See parts list Section C.4.b.
3. If plug for cot ends are missing replace them with the appropriate plug. See parts list, Section C.4.c, d, e.
4. Parts list for cot parts available from Department of Defense-S9G.
   a. Cover, Nylon 7105-00-935-1845
   b. Rail End Tubing 7105-00-935-0424
   c. Plug (Dowel) 7105-00-935-0433
   d. Plug (Spacing) 7105-00-935-0344
   e. Plug (End) 7105-00-935-0435
5. Soiled covers can be steam cleaned and left to dry.
   Assemble cot before steam cleaning covers.

D. Resting Criteria

Reassemble to ensure completeness and all parts fitting properly.

E. Cleaning Procedures

Completed in Section C.

F. Repackaging

1. Refold and seal with nylon tie wrap or band. Therefore, when it is returned from the next incident, visual inspection can readily determine if it is used. If still sealed, it will not need rechecking.
2. Local cache option for repackaging.

G. Storage and Shelf Life Checks

None at this time.

ITEM: COUPLINGS *

NFES #0710, 0855, 0856 #0857, 0916

A. Initial Inspection/Disposal Criteria

1. Visual checks on male couplings.
   a. Check for worn or damaged threads.
   b. Check coupling to ensure it has not been smashed, bent, or cracked.
   c. Ensure rocker lugs are not stripped.
2. Visual checks on female couplings.
   a. Check for worn or damaged threads.
   b. Check coupling to ensure it has not been smashed, bent, or cracked.
   c. Check for gaskets.
   d. Ensure swivel operates properly.
   e. Ensure rocker lugs are not stripped.

B. Tests

1. Male coupling.
   Attach to female coupling to ensure threads operate smoothly.
2. Female coupling.
   Ensure threads operate smoothly.

C. Refurbishing Procedures

1. Male coupling.
   None.
2. Female coupling.
   a. Replace gaskets if necessary.
   b. Lubricate with a dry lubricant, i.e. Graphite.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Wash and clean of foreign matter, such as mud, dirt, and grease.
2. Clean with a scrub brush in water with dishwashing detergent.
3. Rinse thoroughly and let dry.

F. Repackaging

Local cache option for carton.
Pack to standard pack of 10 each per carton or 60 each per carton.

G. Storage and Shelf life Checks

None at this time.

ITEM: EXTINGUISHER, FIRE, DRY CHEMICAL 20 POUND * — NFES #0307
EXTINGUISHER, FIRE, DRY CHEMICAL 10 POUND — #0319
EXTINGUISHER, FIRE DRY CHEMICAL 2-B:C — #1033
EXTINGUISHER, FIRE DRY CHEMICAL 5 POUND — #2143

A. Initial Inspection/Disposal Criteria

1. Visual inspection indicating use (discharge).
2. Check for missing parts.
   a. Safety pin.
   b. Inspection card.

B. Tests

Testing and filling performed by authorized service representatives only.

C. Refurbishing Procedures

Completed in Sections A and B.

D. Retesting Criteria

Completed in Section B.

E. Cleaning Procedures

Completed in Section B.

F. Repackaging

Local cache option.

G. Storage and Shelf Life Checks

Yearly inspection by authorized service representative.

ITEM: FENCE, BARRICADE, PLASTIC, 4' X 50' Roll* NFES #0608

A. Initial Inspection/Disposal Criteria.

1. Check for damage.
2. Check for length.
3. Check for grease, oil or paint.

B. Tests.

Measure to ensure correct length of 50 foot. If short, splice as required.

C. Refurbishing Procedures.

Replace damage barricade section by splicing. Splice using small cable ties or small hog rings one top, one bottom and one every six inches to ensure splice security, only one splice per each barricade fence.

D. Retesting Criteria.

Measure to ensure the correct length of roll, 50 foot.

E. Cleaning Procedures

Wash with soap water to remove dirt, grease. Air dry.

F. Repackaging

Reroll and band.

G. Storage and Shelf Life Checks

None at this time.

ITEM: FLIGHT SUIT*

NFES #0501, 0507, 0508, 0509
#0514, 0517, 0518, 0519
#0521, 0525, 0527, 0539
#0545, 0546, 0547, 0548
#0567, 0572, 0574, 0576

A. Initial Inspection/Disposal Criteria

1. Any holes, cuts, tears, burns, or torn seams that cannot be repaired economically.
2. Any hook and pile fastener missing or that does not provide adequate closure.
3. Any zipper broken or missing a slider.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Open and close the hook and pile fasteners to ensure that they provide an adequate and secure closure.
2. Open and close zipper to ensure smooth operation and a secure closure.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, burns, and torn seams by darning, patching, or by duplicating original construction (see note in Section A).
2. Replace damaged hook and pile fastener tape, with tape of the same length, width, and quality as the original (see note in Section A).
3. Replace damaged zippers with the same type, length, and quality as the original (see note in Section A).
4. Use Nomex (aramid) thread for all repairs.

D. Retesting Criteria

Test all replacement hook and pile fasteners and zippers after sewing in place, as specified in Section B.

E. Cleaning Procedures

See Appendix B

1. Follow the cleaning procedures described in the publication, "Nomex - Aramid -Laundering Guide(2/97)". The publication can be obtained by calling DuPont at 1-800-453-8527 or by writing:

DuPont Company
Aramids Inquiry Center
Chestnut Run Plaza
Laurel Run Building
Wilmington, DE 19880-0705

2.Washing procedures from above publication:

a. "Tests show that (commercial and industrial detergent) formulations designed for use at a temperature of 140°F (60° C) or less adequately clean NOMEX® and provide the best fabric color retention."
b. "Garments of NOMEX® must be adequately rinsed to remove residual wash chemicals."
c. "In some instances, tumble dry conditioning is the only finishing necessary for garments of NOMEX®."

3. In addition to these guidelines:

a. Select temperatures to maintain color fastness except as necessary to clean heavily soiled items.
b. The use of commercial cold water process may be used in remote an filed locations as necessary.
c. Garments heavily soiled with petroleum products may require dry-cleaning with perchloroethylene.

F. Repackaging

1. Close zipper and pocket flaps. With inseams meeting, fold flight suit lengthwise toward the collar.
2. Repack per local cache options. Standard pack is 20 each (same size) in carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: FLY, SUNSCREEN* NFES #6131

A. Initial Inspection/Disposal Criteria

1. Nonstandard item.
2. Rips and tears (uneconomical to repair).
3. Stained with petroleum products.
4. Mildew present.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

None.

C. Refurbishing Procedures

1. Completely unfold fly on clean, dry floor or work area so that any defects (tears, burns, mildew, etc.) will be visible. Dry fly at this time if necessary.
2. Sweep off entire fly with stiff bristle broom.
3. Repair any rips, tears, or any other defects at this time (if possible). If repairs cannot be made easily and cost effectively, continue to clean fly and tag it for repair. Replace missing or damaged guy ropes or grommets. Grommets are 5/8 inch.

D. Retest Criteria

None.

E. Cleaning Procedures

See Section C.

F. Repackaging

1. Utilize flat, clean surface greater that 14' x 16'. Fold lengthwise one, fold lengthwise again, sweep after each fold until fly is in a neat, tight package approximately 16" x 24".
2. Secure fly with 1/4 inch manila or similar rope and place in canvas case (if available), use carton NFES #2006 (NSN 8115-00-139-0722), or band.
3. Tag finished product with proper NFES# and nomenclature.

G. Storage and Shelf Life Checks

None at this time.

ITEM: FLY, TENT 16' X 24' **NFES #0070**
KIT, FLY TENT **NFES #0960**

A. Initial Inspection/Disposal Criteria

1. Check for rips and tears. If uneconomical to repair or if repaired size will be less than 16' x 22', dispose.
2. Check for mildew.

B. Tests

None.

C. Refurbishing Procedures

1. Wash with soapy water and rinse with clean water (use a mild degreasing soap).
2. Air dry.
3. Replace missing or damaged grommets.
   a. Ridge grommets are number four spur, brass.
   b. Guy line grommets are number two spur, brass.
4. Repair rips and tears.
5. Replace missing or damaged guy ropes with a 25 foot line, (1/4 inch manila rope with a hardwood slider 3/4 inch x 4 inch with 7/16 inch hole 3/4 inch from each end).

D. Retesting Criteria

None.

E. Cleaning Procedures

See Section C.

F. Repackaging

1. Utilize flat surface greater than 16' x 24'. Fold neatly lengthwise until approximately 19 inches wide, then roll up tightly or fold with all guy and eve lines tucked inside. (Conduct final sweeping as rolling/folding is done.)
2. Repackage one in each carton 16˚" x 12" x 10" (NSN 8115-00-079-8697). Enclose 6 each stakes, tent, metal (NFES #0825) for Kit, Fly Tent, NFES #0960.

G. Storage and Shelf Life Checks

None at this time.

ITEM: FLY, TENT, TYPE II, 9' x 10'* **NFES #1521**

A. Initial Inspection/Disposal Criteria

1. Non-standard item.
2. Rips and tears.
3. Mold or mildew.
4. Missing or loose grommets.

B. Tests

None.

C. Refurbishing Procedures

1. Wash with soapy water and rinse with clean water (use a mild degreasing soap).
2. Air dry.
3. Replace missing or damaged grommets.
   a. Ridge grommets are number four spur, brass.
   b. Guy line grommets are number two spur, brass.
4. Repair rips and tears.
5. Replace missing or damaged guy ropes with a 25 foot line, (1/4 inch manila rope with a hardwood slider 3/4 inch x 4 inch with 7/16 inch hole 3/4 inch from each end).

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Wash with water and mild degreaser detergent.
2. Rinse to remove all soap residue.
3. Air dry.

F. Repackaging

Local cache option for carton
Standard pack is 20 each per carton.

G. Storage and Shelf Life Checks

None at this time

ITEM: FOOD, (Meals, Ready-to-Eat) MRE * **NFES #1842**

A. Initial Inspection/Disposal Criteria

1. Receipt inspection: Verify shipping container for marking of MRE meals. The container must show the following data.

   NSN (Military Stock Number)
   Item Nomenclature
   Wt. _____ Cu_____
   Contract No. _____ Lot No._____
   Name and Address of Ration Assembly Contractor
   Date packed
   ITD Inspection test date _____
   Subsistence Symbol

2. Disposal of MRE Meals, (Ready-to-Eat) will be based on official food service inspection documentation, or based on MRE item manager disposal authority.
   a. MRE meals will be disposed of if the meal storage pouch is open.
   b. That meal will be removed from its container and rendered unusable and placed in a wet garbage container.
   c. The water activated heater, for heating the MRE entree will be removed from the meal and held at the cache.
   d. The storage cache will advise the SZ Cache of the number of heating units held.
   e. SZ Cache will provide disposition instruction for MRE heating unit.

B. Tests

None. Requires food service inspection.

C. Refurbishing Procedures

See Appendix C.

None. Dispose of all loose, partial, or open MRE meals, and all unmarked MRE meals, and MRE meals in unmarked shipping containers, i.e. not in original shipping containers.

D. Retesting Restock Criteria

Inspect container for proper marking, look for container damage, look for insect, rodent damage, look for product leakage and foul odor. If damage found follow Section A. If no damage found mark case/pallet with next inspection test date.

E. Cleaning Procedures

Dust case, look for damage as noted in Section D.

F. Repackaging

Label with appropriate labels and store accordingly.

G. Storage and Shelf Life Checks

Ensure shelf life records for MRE cache stock are maintained. The inspection date is established at time of cache receipt. Ensure that pallets and loose casees are marked with the next inspection test date.

ITEM: GENERATOR, GASOLINE ENGINE 3-6 KW **NFES #0709**
GASOLINE ENGINE OVER 6 KW **#0704**
GENERATOR, GASOLINE ENGINE UP TO 3 KW **#0106**

A. Initial Inspection/Disposal Criteria

1. Inspect generator for any obvious damage to body, frame, or shock absorbing system.
2. Inspect for oil leaks, dirty air filters, and condition of spark plug.

B. Tests

1. Check oil level, fuel level, condition of gas and oil, and condition of spark plug and air filter. Do all this before starting.
2. See operator's manual for specified generator. Start generator, look for items that need repair.
   a. Engine smoking, running rough, missing.
   b. Not starting.
   c. Leaking fuel lines.
3. Turn on generator.
   a. Use test meter to check voltage output.
   b. Plug in an electric tool to check the generator under load.

SAFETY NOTES:

1. Make sure generator is grounded properly to prevent electrical shock.
2. Attach noise labels on generators to warn operator.
3. Do not fuel generator when hot. Watch out for hot mufflers.
4. Check operation of Ground Fault Interrupter (GFI).
5. Check to be sure there is a 12-gauge GFI at generator.

C. Refurbishing Procedures

A generator should be able to run properly and put out the proper amount of voltage (See Operator's Manual). If the generator does not meet this criteria, refer to the operator's manual and trouble shooting guide, or send it out to a local repair shop to be repaired. Ensure the shop has the operator's manual and trouble shooting guide.

D. Retesting Criteria

1. Start generator to make sure it is operating properly.
2. Use a test meter to check for proper voltage output.

E. Cleaning Procedures

Clean off dirt and oil (using degreaser if necessary). Allow generator to dry.

F. Repackaging

1. Drain fuel from tank and fuel lines.
2. Purge gas tank using NFES #0700 Purge.
3. Ensure that all identification is on the generator: Property No's, Serial No's, Cache Identification.
4. Tie off starter rope to handle to determine field use. Use plastic snap seal.

G. Storage and Shelf Life Checks

Shelf life checks should be made once or twice a year to ensure proper operating conditions. This is necessary if they are not shipped out during the year.

ITEM: HEADLAMP, 4-CELL **NFES #0110**
HEADLAMP, SINGLE CELL **# 0713**

A. Initial Inspection/Disposal Criteria

1. Broken wires.
2. Rust or corrosion on any metal part.
3. Cracked case or lens cover.

B. Tests

1. Test unit with new batteries.
2. Test both bulbs, if defective, replace.
3. Test elasticity of headband, if defective, replace.
4. If cracks in insulation are less than three inches from termination point, cut out bad section and rewire or throw away.

C. Refurbishing Procedures

1. Install test batteries.
2. Test and clean entire unit, install new bulbs and headband if required.
3. Remove test batteries.
4. Validate "O" rings are present. (Lens and battery compartment)

D. Retesting Criteria

None.

E. Cleaning Procedures

Wipe entire unit clean to include lamp housing, battery cam, and both sides of lens.

F. Repackaging

1. Individually pack in carton NSN 8115-00-079-8700.
2. Do not wrap cord or strap around battery case (when applicable).

NOTE: Items 1 & 2 are optional—may be placed in box without individual packaging.

4. Package 48 individual headlamps in 20" x 20" x 20" carton (NSN 8115-00-428-4158).
5. CAUTION—Do not repack units with batteries.

G. Storage and Shelf Life Checks

None at this time.

ITEM: HEATER, PROPANE, 20# TANK MOUNTED* NFES #6139
HEATER, PROPANE, OUTDOOR, 360° RADIANT HEAT* NFES #6187

A. Initial Inspection/Disposal Criteria

1. Visual inspection indicating use or missing parts (guards, knobs, etc.).
2. Structural damage preventing repair-dispose (salvage usable parts).
3. Torn or cut heater element.
4. Damaged hose connections.
5. Damaged built in regulators.

B. Tests

1. Check to see if cost effective to repair.
2. Check hoses for cracks, checking for breaks by flexing.
3. Check for out-of-round fittings by screwing regulator into tank POL fitting.
4. Check "O" rings on supply hose and replace if needed.
5. Mount or install heater unit.
6. Test for leaks with soapy water or gas detector before trying to ignite.

CAUTION: Do not check by using a match or any other type of flame

7. When assured that there are no leaks, light heater. If heater does not ignite within five seconds, extinguish flame and shut off gas valve.
8. If it fails, repair and retest.
9. Check auto shut off valve is in working condition by tipping unit over.

C. Refurbishing Procedures

1. Replace regulator if there is any damage to the regulator or threads do not properly seat.
2. Replace or straighten any damaged or bent parts.
3. Check hose or valve for foreign material that might cause a blocked line.
4. Repair or replace auto shut off valve if not working properly.
5. Replace "O" ring on feeder hose if necessary.
6. Wipe unit clean.

D. Retesting Criteria

Follow procedures in Section B.

E. Cleaning Procedures

Wipe entire unit clean.

F. Repackaging

Repack in original carton if possible, or pack to local cache requirements.

G. Storage and Shelf Life Checks

None at this time.

ITEM: HELMET, FLIGHT, SPH-4C , SPH-5TPL,* **NFES #1314, 1315, 1214, 1215**
HELMET, FLIGHT, SPH-5C* **NFES #2313, 2314, 2315**

A. Initial Inspection/Disposal Criteria

1. Visual inspection indicating use or missing parts (screws, visors, worn cords etc.).
2. Structural damage (cracked shell, visor housing, booms etc.).
3. Structural damage preventing repair and refurbishment (cracked helmet shell, salvage useable part and dispose of helmet shell).
4. Flight helmets must meet requirements in Instruction Memo No. 96-2006 (In reply refer to: 9400 (FA-100).
5. See Appendix E.

B. Tests

1. All testing and refurbishment will be conducted by qualified personnel.
2. Concerns and questions about flight helmet testing and refurbishment procedures may be directed to:

National Interagency Fire Center
Ramp Services
3833 S. Development Ave.
Boise, Idaho 83705
Phone: 208-387-5529
Fax: 208-387-5785

C. Refurbishing Procedures

1. Test avionics.
   a. earphones.
   b. microphone.
   c. cord assembly.
   d. microphone cable assembly.
2. Clean flight helmet thoroughly.
3. Replace missing or damaged parts.
4. Launder or replace TPL (Thermoplastic Liner) in SPH-5 TPL only.
   a. Size Regular - NFES #3063.
   b. Size XL - —— NFES #3064.
   c. Size Small— NFES #3065.
   Contact address above for further information.

D. Retesting Criteria

Retest avionics if necessary.

E. Cleaning Procedures

Use general purpose cleaner (DO NOT USE BLEACH, PAINT REMOVER, THINNER OR ACETONE ON FLIGHT HELMET SHELL, MAY CAUSE DAMAGE).

F. Repackaging

Package in 12" x 12" x 12" carton (NSN 8115-00-079-8680).

G. Storage and Shelf Life Checks

None at this time.

ITEM: HELMET, SAFETY, PLASTIC NFES #0109

A. Initial Inspection/Disposal Criteria

1. Cracks/chips in shell.
2. All attachment clips present (chin strap, headlamp, liner).
3. Non-removable markings.

B. Tests

See Appendix D.

C. Refurbishing Procedures

1. Wash with soap and water and air dry.
2. Replace with new liner and new chin strap.
3. Add or replace reflective strips.

D. Retesting Criteria

None.

E. Cleaning Procedures

Wash entire shell with soap and water.

F. Repackaging

1. Pack in carton NFES #2007 (NSN 8115-00-292-0123).
2. Place 20 helmets per carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: HOOK, CARGO, ELECTRIC W/BRUSH GUARD NFES #0243

A. Initial Inspection/Disposal Criteria

1. Check for structural damage.
2. Ensure safety latch is not bent.

B. Tests

No local testing is recommended.

C. Refurbishing Procedures

Repair of corrosion of the cargo hook must be authorized by an approved government maintenance inspector, FAA certified Airframe Mechanic or FAA Repair Station.

D. Retesting Criteria

1. The hook assembly shall be functionally tested each five years.
2. The hook can be functionally tested by:

Aero Accessory Service
612 S. Scott
Boise, Idaho 83705
Phone 208-344-6461

Field Support Services
2001 Flightway Drive
Atlanta, Georgia 30341
Phone: 770-454-1130

Boise Rigging Supply
106 West 32nd St.
Garden City, Idaho 83714
Phone: (208) 342-8919; 800-342-7673
FAX: 208-342-8919

E. Cleaning Procedures

The hook assembly may be cleaned with hot water. A light water displacement oil (such as WD 40) may be used to displace water on the hook assembly. Any use of degreasing products during cleaning of the hook assembly will require the hook to be lubricated in accordance with the hook manufacturer's recommendations.

F. Repackaging

Local cache option.

G. Storage and Shelf Life Checks

None at this time.

For further information on this subject, see copy of Office of Aircraft Services Memorandum, dated December 14, 1989 (or later revision) on this subject.

ITEM: HOSE, GARDEN, SYNTHETIC, 3/4" NH x 50' NFES #1016

A. Initial Inspection/Disposal Criteria

1. Visually inspect for burns, cuts, damaged fittings, and gasket.
2. Recycle brass fittings from discarded hose.

B. Tests

1. Start pump.
2. Test hose at 150 psi.
3. Check hose for leaks.
4. Shut down pump.
5. Drain excess water from hose.

C. Refurbishing Procedures

Replace gasket if necessary.

D. Retesting Criteria

None required.

E. Cleaning Procedures

1. Remove excess dirt from hose.
2. Wash hose with clean water or clean water with mild detergent.
3. If detergent is used, rinse with clean water.
4. Allow hose to dry thoroughly.

F. Repackaging

1. Roll hose in single-roll configuration, male fitting in center of roll.
2. Secure role with band, string, etc.
3. Local cache option for carton.
4. Standard pack is 20 each per carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: HOSE, LINED **NFES #0964, 0965, 0966, 0967 #1238, 1239**

A. Initial Inspection/Disposal

1. Segregate by NFES number.
2. Check for obvious burns, cuts, damaged couplings, worn or defective gaskets.

B. Tests

1. Replace gasket if necessary.
2. Connect female end of hose to pump or manifold (confirm not out of round and no damaged threads).
   All 1-1/2 inch hose should be NH threads.
   All 1-inch hose should be NPSH threads
3. See Water Handling Guide, February 1997, page 27, for hose testing procedures.
4. When hose is under pressure, walk the length of hose checking for the following whichwill indicate a need for repair or disposal: leaks between hose and couplings, and atswivel portion of female coupling.
5. Pressure Test
   a. Start pump.
   b. Make sure nozzles are open. Let all air escape from hose. Shut nozzles.
   c. Time for three minutes after reaching 250 psi.
   d. Walk the length of the hose two or three times looking for burns or cuts.
   e. After three minutes, turn off pump water.
   f. Female and male couplings.
      (1) Check for leaks where hose goes into coupling.
      (2) Check for crooked coupling (easier to see when hose is charged).
   g. Remove hose.
   h. Stretch out good hose to drain.

C. Refurbishing Procedures

1. Refurbished hose shall result in lengths that are a minimum of 90 percent of original length.
2. Good couplings shall be salvaged from discarded hose.
3. Re-coupling procedures.
   a. Remove old expansion ring and coupling from hose.
   b. Remove unserviceable portion of hose, squaring end to be re-coupled.
   c. Utilize expander machine to insert new expander and coupling. Follow specific machine operation instructions.
4. Refurbished hose shall result in hoses that are 45-50 foot or 90-100 foot in length.

D. Retesting Criteria

1. None required unless re-coupling has occurred.
2. Following re-coupling, follow test procedures as outlined in Section B.5.

E. Cleaning procedures

1. Clean excess dirt from hose.
2. Run hose through hose washer using other clean water or clean water with a mild detergent.
3. If detergent is used, rinse with clean water.
4. Allow jacket to dry thoroughly.

F. Repackaging

1. Roll in a single roll configuration-male coupling in center of roll.
2. Secure roll (rubber or plastic band, string)
3. Local cache option for storage.

G. Storage and Shelf Life Checks

None at this time.

ITEM: HOSE, LINEN AND SYNTHETIC WEEPING — NFES #0111, 0112, 1873, 0334

A. Initial Inspection/Disposal

1. Segregate by NFES number.
2. Check for obvious burns, cuts, damaged couplings, worn or defective gaskets.

B. Tests

1. Replace gasket if necessary.
2. Connect female end of hose to pump or manifold (confirm not out of round and no damaged threads).
   All 1-1/2 inch hose should NH threads.
   All 1-inch hose should be NPSH threads.
3. See Water Handling Guide, February 1997, page 27, for hose testing procedures.
4. For linen hose, begin pressure test with a 5 minute wet soak at 50 psi prior to applying full test pressure.
5. When hose is under pressure, walk the length of hose checking for the following which will indicate a need for repair or disposal: leaks between hose and couplings, and at swivel portion of female coupling.
6. Pressure test.
   a. Start pump.
   b. Time for three minutes after reaching 250 psi.
   c. Walk the length of the hose two or three times looking for burns or cuts.
   d. After three minutes, turn off pump water.
   e. Female and male couplings.
      (1) Check for leaks where hose goes into coupling.
      (2) Check for crooked coupling (easier to see when hose is charged).
   f. Remove hose.
   g. Stretch out good hose to drain.

   NOTE: Items 6.c and 6.e require special attention with synthetic hose.

C. Refurbishing Procedures

1. Refurbished hose shall result in lengths that are a minimum of 90 percent of original length.
2. Good couplings shall be salvaged from discarded hose.
3. Re-coupling procedures:
   a. Remove old expansion ring and coupling from hose.
   b. Remove unserviceable portion of hose, squaring end to be re-coupled.
   c. Utilize expander machine to insert new expander and coupling. Follow specific machine operation instructions.

D. Retesting Criteria

1. None required unless re-coupling has occurred.
2. Following re-coupling, follow test procedures as outlined in Section B.6.

E. Cleaning procedures

1. Clean excess dirt from hose.
2. Run hose through hose washer using other clean water or clean water with a mild detergent.
3. If detergent is used, rinse with clean water.
4. Dry linen hose immediately after testing and washing to avoid mildew. Allow synthetic hose to dry thoroughly before rolling.
   a. A 50-foot hose is hung from the middle with couplings off the ground.
   b. A 100-foot hose is hung from the middle and left to drain for four hours.
   c. After four hours, double hose again, with couplings off the ground..

F. Repackaging

1. Roll in a single roll configuration-male coupling in center of roll.
2. Secure roll (rubber or plastic band, string)
3. Local cache option for storage.

G. Storage and Shelf Life Checks

Linen hose should be checked periodically for mildew or rot, and should be retested after three years on the shelf, regardless of appearance.

ITEM: HOSE ROLLER, electric or gas (ELECTRIC ONLY) NFES #0633

A. Initial Inspection/Disposal Criteria

1. Check for missing parts, foot pedal/switch, cracks in frame structure power cord and motor.
2. Verify protective guards are on any and all moving parts. (i.e. pulleys and etc.).

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

Plug in and test motor and moving parts.

C. Refurbishing Procedures

1. Blow dust and dirt out of electric motor
2. If needed wash with high pressure washer (cover electric motor).
3. Let dry.
4. Repair cracks in frame as needed.
5. Tie-wrap power cord and control switch (foot pedal) to frame.

D. Retesting Criteria

Plug and test motor and moving parts.

E. Cleaning Procedures

Covered in Section C.

F. Repackaging

None.

G. Storage and Shelf Life Checks

None at this time.

ITEM: HOSE ROLLER, electric or gas (GAS ONLY)* NFES #0633

A. Initial Inspection/Disposal Criteria

1. Pressure wash hose roller.
2. Inspect hose roller for any obvious damage to body or frame.
3. Inspect motor for:
   a. Oil leaks.
   b. Dirty air filters.
   c. Condition of spark plug.
4. Check all belts.
5. Inspect all cables and accessories.
6. Verify protective guards are on any and all moving parts. (i.e. pulleys and etc.).

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Try to start engine and check for:
   a. Hard starting.
   b. Smoking Engine.
   c. Running rough.
   d. Missing.
   e. Adjust carburetor as needed to run smoothly. (Refer to the engines Owner's Manual and trouble shooting guide for specifications.)
2. Worn or loose belts.
3. Leaking fuel lines.
4. Worn pulleys.

C. Refurbishing Procedures

1. Engine should be properly adjusted to obtain the standard idle speed. (Refer to engines owners manual and trouble shooting guide for proper adjustments.)
2. Replace any worn belts, worn pulleys and replace fuel line if it leaks.
3. Tighten all loose belts.
4 Adjust carburetor as needed. (Refer to engine Owner's Guide and trouble shooting guide for specifications.
5. Drain fuel from tank and fuel line. Start engine to ensure all gas has been run out of unit.
6. Use clean rag to rid fuel tank of any excess fuel and then purge fuel tank.
7. Ensure all identification labels are on unit. i.e.:property numbers, serial numbers on engines. If lost, reapply to unit.
8. Use plastic TY-RIP to tie off starter rope (gas units) to determine field use.
9. Lubricate wheels on hose roller.

D. Retesting Criteria

If unit has not been run in past 12 months, start hose roller and complete Section C.

E. Cleaning Procedures

Clean dirt and oil off unit using a degreaser if necessary.

F. Repackaging

Place back in stock area.

G. Storage and Shelf Life Checks

See Section D.

Refer to specific engine Owner's Manual and trouble shooting guide for all needed specifications on gas engine.

ITEM: HOSE, SUCTION* **NFES #0115, 0652 #0914, 1808**

A. Initial Inspection/Disposal Criteria

Visually inspect for cracks, cuts, damaged couplings, and gasket.

B. Tests

1. Service Pressure Test.
   a. Start pump.
   b. Test for three minutes at 50 psi.
   c. Check hose for leaks.
   d. Shut down pump.
   e. Drain hose completely.
2. Dry Vacuum Test.

See Wildland Fire Hose Guide, February 1997, page 27, and Appendix J for complete annual testing procedures.

C. Refurbishing Procedures

Replace gasket if necessary.

D. Retesting Criteria

None required.

E. Cleaning Procedures

1. Remove excess dirt from hose.
2. Clean with damp rag.
3. Apply a rubber protectant to prevent drying and cracking.

F. Repackaging

1. Local cache option.
2. No special repack requirements.
3. Protect male coupling threads.

G. Storage and Shelf Life Checks

None at this time.

ITEM: INCREASERS* NFES #0416, 0854, 2235

A. Initial Inspection/Disposal Criteria

1. Check for obvious damage.
2. Cracks.
3. Bad threads.
4. Tail gaskets.

B. Tests

None.

C. Refurbishing Procedures

Replace tail gasket if stiff, missing or cracked.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean in a dishwashing detergent with a brush or scouring pad.
2. Rinse thoroughly.
3. Stand upright to drain and dry.

F. Repackaging

1. Local cache option for carton.
2. Standard pack is 10 each per carton or 60 each per carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: JEANS, FLAME RESISTANT
MENS AND WOMENS

NFES #0503 to 0506
#0581 to 0585
#2010 to 2024
#2117

A. Initial Inspection/Disposal Criteria

1. Any holes, cuts, tears, burns, or torn seams that cannot be repaired economically.
2. Any alterations "staging" of jeans which can not be repaired to a minimum 30-inch inseam.
3. Any buttonholes with frayed or broken stitching.
4. Any missing or tack buttons.
5. Any hook and pile fastener missing or that does not provide adequate closure.
6. Any zipper broken or missing a slider.
7. Any belt loops missing or broken.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Open and close the hook and pile fasteners to ensure that they provide an adequate and secure closure.
2. Open and close zipper to ensure smooth operation and a secure closure.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, burns, and torn seams by darning, patching, or by duplicating original construction (see note in Section A).
2. Re-stitch frayed buttonholes using a buttonhole or zig zag stitch that has 50 to 60 stitches per buttonhole.
3. Replace damaged hook and pile fastener tape, with tape of the same length, width, and quality as the original (see note in Section A).
4. Replace damaged zippers with the same type, length, and quality as the original (see note in Section A).
5. Replace damaged belt loops with loops of the same material and construction as the original (see note in Section A).
6. Use Nomex (aramid) thread for all repairs.

D. Retesting Criteria

Test all replacement hook and pile fasteners and zippers after sewing in place, as specified in Section B.

E. Cleaning Procedures

See Appendix B

1. Follow the cleaning procedures described in the publication, "Nomex - Aramid -Laundering Guide, (2/97)". The publication can be obtained by calling DuPont at 1-800-453-8527 or by writing:

   DuPont Company
   Aramids Inquiry Center
   Chestnut Run Plaza
   Laurel Run Building
   Wilmington, DE 19880-0705

2. Washing procedures from above publication:
   a."Tests show that (commercial and industrial detergent) formulations designed for use at a temperature of 140°F (60° C) or less adequately clean NOMEX® and provide the best fabric color retention".
   b. "Garments of NOMEX® must be adequately rinsed to remove residual wash chemicals."

c. “In some instances, tumble dry conditioning is the only finishing necessary for garments of Nomex®”.

3. In addition to these guidelines:
   a. Select temperatures to maintain color fastness except as necessary to clean heavily soiled items.
   b. The use of commercial cold water process may be used in remote or fleld locations as necessary.
   c. Garments heavily soiled with petroleum products may require dry-cleaning with perchloroethylene.

F. Repackaging

1. Close fly and pocket flaps. With inseams meeting, fold jeans from the leg bottom up toward the waist band to an overall length of about 23 inches.
2. Pack 30 pairs of the same size jeans in carton NFES #2030 (NSN 8115-00-183-9481).

G. Storage and Shelf Life Checks

None at this time.

ITEM: JUG, INSULATED 5 GALLON* **NFES #0943**
JUG, VACUUM 10 GALLON* **#0827**

A. Initial Inspection/Disposal Criteria

1. Check for damage.
2. Dents interior and exterior.
3. Check interior for warping.
4. Holes.
5. Spigots.
6. Lids.

B. Tests

1. Fill with water, check for leaks.
2. Check lid for secure fit.
3. Check spigot, seals properly, no leaks.
4. Check spigot gasket.

C. Refurbishing Procedures

1. Replace spigot and spigot gaskets if necessary.
2. Vacuum jugs may need gasket replaced on lid.

D. Retesting Criteria

If spigots or gaskets were replaced, retest according to Section B.

E. Cleaning Procedures

1. Clean outside with a mild to strong detergent solution and rinse.
2. Clean vent hole and sterilize lid.
3. Sterilize inside of jug with a solution of unscented chlorine bleach (i.e. Purex®) and water using either of these options:.
   a. Mix 1 cup unscented chlorine bleach (i.e. Purex®) to 50 gallons of water, let solution stand in container for minimum of 4 hours, drain and air dry with lid off.
   b. Mix 1 cup unscented chlorine bleach (i.e.. Purex®) to 5 gallons of water, rinse inside of container with solution, drain and air dry with lid off.

F. Repackaging

1. Local cache option for carton.
2. Suggested repack carton is NFES #0943, 20" x 16" x 16" (NSN 8115-00-275-5777).

G. Storage and Shelf Life Checks

None at this time.

ITEM: KIT, FIRST AID, 10-PERSON, BELT **NFES #1143**
KIT, FIRST AID, 10-PERSON, BOX* **#0068**
KIT, FIRST AID, 24-PERSON, BOX* **#1604**

A. Initial Inspection/Disposal Criteria

1. Case is checked for excessive wear and cleanliness. Check belt and buckles for serviceability.
2. Open case and check contents. Standard updated packing slip should be utilized while inventorying contents.
3. Empty contents and check expiration dates.
4. Check any items that require sanitary package for tears or other damage.

B. Tests

None required.

C. Refurbishing Procedures

Clean, repair, or replace container as needed.

D. Retesting Criteria

None required.

E. Cleaning Procedures

Clean as necessary.

F. Repackaging

1. Utilizing packing slip, replace items in elastic retainers inside container.
2. Secure all three metal snaps.
3. Hook belt buckles together and fold against back of container.
4. Secure belt to container by wrapping 3/4- or one-inch masking tape. Wrap around middle of entire kit, writing date packed or checked (month and day) on tape.
5. Package 10 per carton in 18" x 14" x 18" (NSN 8115-001179-0580).

G. Storage and Shelf Life Checks

Check expiration dates of contents annually.

ITEM: KIT, COFFEE HEATING NFES #0480

A. Initial Inspection/Disposal Criteria

1. Visually inspect kit components.
2. Dispose of bad hose lines, badly bent stove, urn, lid and broken faucets.

B. Tests

1. Connect stove and all fittings to propane source.
2. Turn on tank with valve in off position at burner.
3. Check connections for leaks.
4. Light burner and make sure it is operable.
5. Check and test propane regulator.
6. Confirm test date on propane tank. (must be recertified, [hydrostatic testing]12 years from manufacture date and every 5 years after the first recertification).

C. Refurbishing Procedures

1. Clean heater components.
2. Clean with soap and water and disinfect urn, lid, and faucets.

D. Retesting Criteria

Concerns and questions about propane fittings, regulators and propane tanks should be directed to an authorized service representative.

E. Cleaning Procedures

1. Use soap, water, and disinfectant to clean coffee urn, lid, and faucets.
2. Clean heater components.

F. Repackaging

Local cache option for repackaging.

G. Storage and Shelf Life

None at this time.

ITEM: KIT, FOAM PROPORTIONER (FLOW-MIX MODEL 500) NFES #0626

A. Initial Inspection/Disposal Criteria

1. Remove proportioner from kit box, clean by rinsing off with water.
2. Check all lines, fittings, and alien bolts for wear and tightness.

B. Tests

1. Fill unit with a small amount of foam (1/2 gallon).
   a. Set selector valve to "REFILL" (D, F-l).
   b. Connect foam wand to pump opening (E, F-l).
   c. Put wand into foam bucket and pump. As foam is pumped into the unit, water should come out at the water discharge tube (I, F-l).
   d. Set selector valve to "FOAM" (D, F-l).
   e. Set metering valve to 1.0 percent (C, F-l).
   f. Connect fire hoses (use a foam nozzle).
   g. Open hydrant valve to fire hose, turn on foam nozzle.
2. Foam concentrate should be seen flowing through the clear plastic tube (G, F-l) into the differential valve. It should only take a few seconds for the concentrate to enter the hose line and come out the nozzle as white foam. (Use as short a piece of hose as possible from proportioner unit to nozzle).
3. If foam is not being produced, see Trouble Shooting Section of the Model 500 Operation Manual enclosed in the kit. (The selector, metering and differential valves may have to be serviced.)
4. Test the short 1-1/2 inch piece of standard fire hose that is in the kit to fire hose testing specifications. If bad, replace the hose.

C. Refurbishing Procedures

1. Flush the unit.
   a. Disconnect lines (F&G, F-l) on the differential valve.
   b. Set selector valve to "FOAM" (D, F-l).
   c. Set metering valve (C, F-l) to 1.0%.
   d. Place an air line in line F to blow foam concentrate from the bladder. Do not use a very high air pressure, only enough to do the job. Collect the foam from line G. (Continue until foam stops coming out of line G.)
   e. Open drain cock (H, F-l). Continue blowing air until air is coming out of drain cock: tilt unit for complete draining.
   f. Disconnect foam hose from refill pump at (A, F-l).
   g. Disconnect foam hose from bladder fitting on tank (B, F-l).
   h. Hold water hose to open end of foam line (B, F-l) and turn on water to flush—about two minutes.
   i. Turn selector valve (D, F-l) to refill and continue to flush—about two minutes.
   j. Hold water hose to pump opening (E, F-l) and flush pump.
   k. Blow with low pressure air into line B. Move selector valve setting from "FOAM" to "REFILL" and back about one minute of air at each setting. Blow air into the foam fill pump opening (E, F-l) and into the end of line F with the selector valve set for FOAM. Air will come out at drain cock. This will help dry lines, pump, and valves.
   l. Reassemble hoses.
2. Return metering and selector valves to "On" and "Off" positions, and close drain cock.
3. Let dry.

D. Retesting Criteria

Retest (same as B above) if a new bladder was installed, or the valves needed to be serviced, otherwise no retest is needed.

E. Cleaning Procedures

1. Remove all equipment from kit box and clean each item and box.
2. Check equipment against inventory list and replace missing items.

F. Repackaging

Replace all equipment in kit box.

G. Storage and Shelf Life Checks

None at this time.

ITEM: KIT, LONGLINE WITH REMOTE HOOK NFES #1309

A. Initial Inspection/Disposal Criteria

1. Inspect for structural damage:
   a. Broken wires (electrical cord).
   b. Severe kinksin wire rope (bad line cable).
   c. Ballooning of cable wires (bad line cable).
   d. Collapsed hooks and rings (bad line cable ends and hook assembly).
   e. Distorted hook, rings and wire rope eyes.
   f. Missing or broken nylon tie raps.
   g. Bent or squashed or distorted electrical connections.
   h. Cuts, tears or frayed electrical wires.
2. Inspect longline wire rope
   a. Wearing gloves, run a dry rag over the entire length of the wire rope.
   b. Snags indicate broken wires—replace wire rope if broken cable wires are discovered.
3. Repair of corrosion of the wire rope, ring, or cargo hook must be authorized by an approved government maintenance inspector, FAA certified Airframe Mechanic or FAA Repair Station.

B. Tests

The wire rope can be proof tested by a certified wire rope rigging company, such as:

Boise Rigging Supply
106 West 32nd St.
Garden City, Idaho 83714
Phone: (208) 342-8919; 800-342-7673
FAX: 208-342-8919

The wire rope and hook assembly can be functionally tested by:

Aero Accessory Service
612 S. Scott
Boise, Idaho 83705
Phone 208-344-6461

Field Support Services
2001 Flightway Drive
Atlanta, Georgia 30341
Phone: 770-454-1130

C. Refurbishing Procedures

1. Replace missing or broken nylon tie raps.
2. Other repairs should be completed by qualified testing personnel, see Section B.
3. Replace unserviceable sections if possible to maintain a serviceable unit.
4. Damaged sections of the wire rope may be repaired provided the repaired section does not reduce the length of the section by more than 10 percent. The minimum length of a 50-foot section shall be at least 45 foot.

D. Retesting Criteria

1. Repaired sections shall be tested at twice the rated working load prior to being returned to the available stores system.
2. The wire rope and hook assembly shall be proof and functionally tested each five years. Completed in Section B.

E. Cleaning Procedures

The cable and hook assembly may be cleaned with hot water. A light water displacement oil (such as WD 40) maybe used to displace water on the hook assembly. Any use of degreasing products during cleaning of the hook assembly will require the hook to be lubricated in accordance with the hook manufacturers recommendations.

F. Repackaging
Local cache option.

G. Storage and Shelf Life Checks
None.

For further information on this subject, see copy of Office of Aircraft Services Memorandum, dated December 14, 1989 (or later revision) on this subject.

ITEM: KIT, SHELTER, 15' X 27' **NFES #0430**
KIT, SHELTER, 16' OCTAGON **NFES #0550**
KIT, SHELTER, 18' OCTAGON **NFES #0540**
KIT, SHELTER, 20' OCTAGON* **NFES #0549**

A. Initial Inspection/Disposal Criteria

1. Check packing list and instructions. Assemble the main frame and components according to instructions. All locking pins and flex joints should move easily. Check for burrs on all components of main frame, even bars and base bars.
2. Loosen flex joints and remove burrs as needed.
3. Install door; should open and close easily.
4. Install shelves and desk, making sure the proper clamps are used.
5. Repair or replace any part of the main frame as needed. When dismantling, wipe all component parts with a damp cloth and return to proper container.
6. Check roof and wall panels for any tears or rips and repair as needed. Repair as per instructions. Clean the roof and wall panels with a mild soap and water solution using a brush to remove hard dirt and grime. Check windows and screens in wall panels. Be sure the Velcro is dry on all panels before folding and replacing in proper container.

B. Tests

None.

C. Refurbishing Procedures

1. Repair or replace any part of the main frame as needed.
2. Check roof and wall panels for any holes, tears or rips, repair as needed.
3. Ensure all locking buttons snap into place.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. When dismantling, wipe all component parts with a damp cloth.
2. Clean the roof and wall panels with a mild soap and water solution, using a brush to remove hard dirt and grime. Be sure the Velcro is dry on all panels before folding and replacing in proper container.

F. Repackaging

Repack as per manufacturer's instructions and local cache standards.

G. Storage and Shelf Life Checks

None at this time.

ITEM: LADDER, STEP 8' WOOD/FIBERGLASS NFES #0586

A. Initial Inspection/Disposal Criteria

1. Wood ladder has an UL duty rate of 250 pounds.
2. Check for damage, (wooden ladders) i.e.. “dings”, nicks, gouges or broken parts, replace unit.
3. Check for paint; if covered with large amount dispose.
4. Check foot pads, if missing replace with matching set.
5. Check steps for damage; if missing dispose.
6. Check legs for damage.
7. Check pail platform for damage.
8. Check ladder for cracks or breaks.
9. Check ladder for oil and grease.
10. Check ladder hinge supports and cross supports for damage.
11. Check ladder for missing cross supports.

B. Tests

Visual inspection of all ladder steps, ladder legs and ladder cross supports.

C. Refurbishing Procedures

1. Replace worn or missing foot pads with match set, and lubricate cross supports and hinges as required .
2. Replace all damaged wooden ladders with fiberglass step ladders.

D. Retesting Criteria

Visually inspect ladder steps, ladder legs, ladder foot pads, and ladder cross supports.

E. Cleaning Procedures

1. Wood ladders.
   a. Remove all oil, grease and paint.
   b. Clean ladder with soap and water.
   c. Air dry.
   d. Rub woodsurface with wood preservative (linseed oil).
2. Fiberglass.
   a. Remove all oil and grease.
   b. Clean with soap and water.
   c. Air dry.

F. Repackaging

Local cache option for storage.

G. Storage and Shelf Life Checks

If stored upright, must be securely strapped to prevent falling.
Ladders must be stored horizontally if laid down.

ITEM: LANTERN, PORTABLE, ELECTRIC, 6-VOLT* NFES #0127
LANTERN, CAMP, ELECTRIC, FLUORESCENT* NFES #2501

A. Initial Inspection/Disposal Criteria
Check for broken lens, cracked cases, missing bulbs, broken switch.

B. Tests
Install batteries to test operation of switch and bulbs.

C. Refurbishing Procedures
Clean as necessary, remove batteries and repair as needed.

D. Retesting Criteria
Only if needed.

E. Cleaning Procedures
Use soft cloth to clean lens and battery compartment.

F. Repackaging
Local cache options.

G. Storage and Shelf Life Checks
None at this time.

ITEM: LANTERN, MANTLE, GAS WITH SPARK LIGHTER NFES #0125

A. Initial Inspection/Disposal Criteria

1. Check for usage, fuel in tank, burned mantles, etc.
2. Inspect for missing or damaged parts.
   a. Glass broken, handle missing, mantles missing.
   b. Rust in fuel or found on the tank seams—dispose.
3. Dirty.
4. Broken frame—dispose.

B. Tests

1. Ensure lantern has working mantle(s).
2. Fill tank with fuel and charge with air.
3. Light mantles and test for proper burning.
4. Replace with new mantles at conclusion of test.

C. Refurbishing Procedures

1. Drain fuel and purge.
2. Clean and paint.

D. Retesting Criteria

See Section B.

E. Cleaning Procedures

See Section C.

F. Repackaging

1. Package in 8" x 8" x 16"carton (NSN 8115-00-079-8693) or manufacturer's travel case.
2. Place one lantern in each carton with packing to keep it from rattling loose in the carton and possibly breaking.

G. Storage and Shelf Life Checks

Check oil plunger assembly yearly to prevent drying.

NOTE: When stock is depleted this item will no longer be available.

ITEM: LEAD LINE, HELICOPTER, EXTERNAL LOADS, 6000 POUNDS **NFES #0380,**
LEAD LINE, HELICOPTER, EXTERNAL LOADS, 3000 POUNDS **#0528**

A. Initial Inspection/Disposal Criteria

1. The lead line/hook shall be inspected for damage each time it is received into the cache.
2. Make sure there is a proof tag on the lead line. If not, send it out to a rigging house to be proofed to twice the rated working load and re-tagged.
3. Measure all lead lines, swivels, rings, and hooks (length and diameter) to make sure they meet Forest Service 5100-500 Standard.
4. Inspect the lead line; wearing gloves. Run a dry rag over the entire length of the line. Snags indicate broken wires; dispose of or repair (see number 8 below) if broken cable wires are discovered.
5. Look at cable to make sure it has no basketing or kinks; dispose of or repair if basketing is discovered.
6. Look to see that the swedge has not slipped and that it is painted. If it has slipped, have it replaced, painted red and proof tested. (With a painted swedge and cable, if the swedge has moved, you will see an unpainted space on the cable.)
7. If the lead line is plastic coated, and the coating is scratched down to the steel, it is OK; provided there are no broken strands.
8. If the lead line is damaged, the cable can be cut and reswedged into shorter lengths: 12, 25, or 50 foot lengths only. (See 5100-500 Standard.)
9. Safety gates (keepers or latches) that are bent or distorted shall be replaced.
10. Always make sure the spring will force the hatch against the tip of the hook.
11. A replacement latch kit may be ordered from the original manufacturer. One manufacturer is Crosby Group,Tulsa, OK. Parts may be ordered from any Crosby distributor.

NOTE: For numbers 9 to 11 above, see 5700 Aviation Tech Tips. July 1993, 9357 1304-SDTDC.

A suspension cable is not a lead line. A lead line is not the same as a suspension cable. A suspension cable section is part of the remote hook system and is larger in diameter and stiffer, so that it will not rotate. (If it rotates,the electri cal cable attached to it will twist around the suspension cable.)

B. Tests

The lead line assembly can be tested by any certified rigging company; i.e.:

Boise Rigging Supply
106 West 32nd St.
Garden City, Idaho 83714
Phone: (208) 342-8919; 800-342-7673
FAX: 208-342-8919

C. Refurbishing Procedures

1. Repairs should be completed by qualified rigging personnel, See Section B.
2. Spray paint swedge, if needed, before testing.

D. Retesting Criteria

The wire rope and hook assembly shall be proof and functionally tested each five years. See Section B.

E. Cleaning Procedures

1. Remove dirt using water only—no soap, which can cause corrosion.
2. Thoroughly dry and lubricate all exposed steel parts before storing.
3. Remove grease by using petroleum solvent.

F. Repackaging

1. NFES #0528 package in carton NSN 8115-00-417-9378, 5 each per carton.
2. NFES #0380 package, commercial carton Style RSC, Type CF, class domestic, grade 275, size 17" x 17" x 4“.

G. Storage and Shelf Life Checks

None

FOR FURTHER INFORMATION ON LEAD LINES, HOOKS, RINGS, SWIVELS, AND LINKS, SEE FOREST SERVICE STANDARD 5100-500, WITH AMENDMENTS.

ITEM: LITTER, S.K.E.D.* NFES #1670

A. Initial Inspection/Disposal Criteria

1. If blood stained, alert supervisor for further instructions.
2. Visual inspection for cuts or tears in plastic surface, soiled surface, missing parts such as straps or fasteners.
3. Structural damage such as grommets pulled out.
4. All straps, handles (web gear) are intact and functional.

B. Tests

Check for weakness or non-visible damage.

C. Refurbishing Procedures

1. If plastic is cut or torn and cannot be economically repaired, remove from service. Retain all serviceable components for replacement on other litters.
2. Wash S.K.E.D. with mild soap and warm water.Wash with power washer and hang to dry.
3. Replace worn or damaged straps or fasteners.
4. See Appendix

D. Retesting Criteria

Reassemble to ensure completeness and all parts are fitting properly.

E. Cleaning Procedures

Completed in Section C.

F. Repackaging

Roll up S.K.E.D (using rubber gloves for better grip) small enough to fit into case. Fasten retaining strap tightly so S.K.E.D can be easily extracted.

G. Storage and Shelf Life Checks

None at this time.

ITEM: LONGLINE, CABLE 50' W/NEMA PLUGS NFES #0849

A. Initial Inspection/Disposal Criteria

1. Inspect for structural damage.
   a. Broken wires (electrical cord).
   b. Severe kinks in wire rope (bad line cable).
   c. Ballooning of cable wires (bad line cable).
   d. Distorted hook, rings and wire rope eyes.
   e. Missing nylon tie raps.
   f. Bent or distorted electrical connections.
   g. Cuts, tears or frayed electrical wires.
   h. Inspect longline wire rope cable, wearing gloves, run a dry rag over the entire length of the wire rope. Snags indicate broken wires—dispose if replace wire rope if broken cable wires are discovered.

B. Tests

The wire rope can be proof tested by any certified rigging company, such as:

Boise Rigging Supply
106 West 32nd St.
Garden City, Idaho 83714
Phone: (208) 342-8919; 800-342-7673
FAX: 208-342-8919

C. Refurbishing Procedures

1. Replace missing or broken nylon tie raps.
2. Other repairs should be completed by qualified testing personnel, i.e., Section B.
3. Replace unserviceable sections if possible to maintain a serviceable unit.
4. Damaged sections of the wire rope may be repaired provided the repaired section does not reduce the length of the section by more than 10 percent. The minimum length of a 50 foot section shall be at least 45 foot.

D. Retesting Criteria

1. Repaired sections shall be tested at twice the rated working load prior to being returned to the available stores system.
2. The wire rope shall be proof tested each five years.

E. Cleaning Procedures

The wire rope may be cleaned with hot water.

F. Repackaging

Local cache option.

G. Storage and Shelf Life Checks

None.

For further information on this subject, see copy of Office of Aircraft Services Memorandum, dated December 14, 1989 (or later revision) on this subject.

ITEM: NET, CARGO, 12' x 12' **NFES #0531**
NET, CARGO, 15' x 15' **#0458**

A. Initial Inspection/Disposal Criteria

1. Any fraying or deterioration of lines. (More than 10 percent of strands in any two adjacent cycles of the net are broken see. Equip Tips 8657 1304 5700-Aviation Oct 1986)

NOTE: Before disposal, consider cost effectiveness of repair by manufacturer.

2. Any netting has contamination by fuel oils or other liquids considered degenerative to netting.
3. Verify certification tag is attached to net. (3000 or 6000 pounds)

B. Tests

1. Brittleness: Test by bending several areas of the nets rope 180 degrees back on itself. If more than 2 strands break per bend, dispose of net or return to manufacturer for repair. (See Equip Tips 8657 1304 5700-Aviation Oct 1986.)

C. Refurbishing Procedures

1. Lay out net and inspect all ropes for fraying, burns, or wear points.
2. Clean all dirt from netting.
3. Remove all flagging, string and rope.

NOTE: On some heavy cargo nets, the mesh intersections are fixed with molded plastic crosses. These should be visually inspected for cracks and missing parts whenever the loop thimbles are inspected.

D. Retesting Criteria

None.

E. Cleaning Procedures

Hang or stack polypropylene nets and clean with water from high-pressure hose.

E. Repackaging

Local cache option for cartons.
Suggested cartons are:

1. NFES #0531 net, package in carton NFES #2006, 23" x 19" x 10" (NSN 8115-00-139-0722).
2. NFES #0458 net, package in carton NFES #2007. 24" x 16" x 16" (NSN 8115-00-292-0123).

G. Storage and Shelf Life Checks

None at this time.

ITEM: NOZZLE, FIRE FOAM, PLASTIC* **NFES #0627, 0628, 0629**

A. Initial Inspection/Disposal Criteria

1. Check for worn or damaged threads.
2. Check for gasket.
3. Ensure nozzle barrel has no cracks in plastic.

B. Tests

None required.

C. Refurbishing Procedures

Replace gasket if necessary.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Wash and clean of foreign matter, such as mud, dirt, and grease.
2. Clean with scrub brush in water with dishwashing detergent.
3. Rinse thoroughly.
4. Stand upright and allow to dry.

F. Repackaging

Local cache option for repacking.

G. Storage and Shelf Life Checks

None at this time.

ITEM: NOZZLE, GARDEN HOSE — NFES #0136

A. Initial Inspection/Disposal Criteria

1. Check for burrs.
2. Check for washer.
3. Check for bad threads.

B. Test

Test at hose bib pressure.

C. Refurbishing Procedures

Replace missing or cracked gaskets.

D. Retesting Procedures

Test at 100 psi, if hose leaks, throw away.

E. Cleaning Procedures

1. Wash and clean of foreign matter, such as mud, dirt, and grease.
2. Clean in a dishwashing detergent with brush or scouring pad.
3. Rinse thoroughly.
4. Stand upright to drain water and dry.

F. Repackaging

Local cache option for repacking.
Standard pack is 10 each per carton or 100 each per carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: NOZZLE, SHUTOFF, COMBINATION, BARREL **NFES #1081, 1082**
NOZZLE, SHUTOFF, COMBINATION, BARREL, PLASTIC* **NFES #0137, 0138**

A. Initial Inspection/Disposal Criteria

1. Check for obvious damage:
   a. Check for burrs and cracks.
   b. Check tail gasket. Replace if missing, cracked, or stiff.
   c. Check screw or washer.
   d. Must turn freely.
   e. Check for fire damage. May cause failure in the future.
   f. Check hose coupling threads for damage.
   g. Old Style KK: check threads inside of barrel, if they show dispose.

B. Tests

1. Pressure testing:
   a. Turn on pump to 250 psi.
   b. Check for leaks:
      (1) Around the tail gasket.
      (2) Behind the barrel.
      (3) The tip of the barrel.
      (4) If plastic nozzle is found defective, dispose (NFES #0137, #0138).

C. Refurbishing Procedures

Replace tip, screw, and "0" ring, if needed (NFES #1081, #1082).

D. Retesting Criteria

Retest according to Section B.

E. Cleaning Procedures

1. All items will be washed and cleaned of foreign matter, such as mud, dirt, and grease. Clean in a dishwashing detergent with brush or scouring pad as needed. Do not soak for extended periods of time or the detergent will corrode the metal.
2. Rinse thoroughly.
3. Stand upright with barrel in open position to drain water and dry.
4. Lubricate threads on back of the barrel with appropriate dry lubricant (graphite).

F. Repackaging

Package 20 each in carton 10' x 8" x 5" (NSN 8115-00-080-1025).

G. Storage and Shelf Life Checks

None at this time.

ITEM: NOZZLE TIPS, STRAIGHT-STREAM AND SPRAY

NFES #0635, 0636, 0637, 0638
#0903*, 0094*, 0737

A. Initial Inspection/Disposal Criteria

1. Check for obvious damage:
   a. Check for burrs.
   b. Check for tail gasket (correct or not correct). Replace if needed.
   c. Check for cracks.
   d. Check for bad threads.
   e. Look through tip, if clogged, clean out. Take out disk to clean out on spray tips.

B. Tests

1. Attach to hose.
2. Turn on water and ensure adequate flow and pattern are attained.

C. Refurbishing Procedures

None.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. All items will be washed and cleaned of foreign matter, such as mud, dirt, and grease. Clean in a dishwashing detergent with brush or scouring pad as needed. Do not soak for extended periods of time or the detergent will corrode the metal.
2. Rinse thoroughly.
3. Stand upright to drain water and dry.

F. Repackaging

1. Package in 6" x 4" x 4" carton (NSN 8115-00-576-8428).
2. Standard pack is 24 each per carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: NOZZLE, TWIN TIP SHUTOFF, ONE-INCH BASE NFES #0024

A. Initial Inspection/Disposal Criteria

1. Check for obvious damage:
   a. Check for burrs.
   b. Check for tail gasket and screen.
   c. Check handle for damage or missing screw. Is handle in right position?
   d. Does handle turn freely in proper position?
   e. Check for fire damage. May cause failure in the future.
   f. Check hose coupling threads for damage.

B. Tests

1. Install on pump.
2. Open handle on nozzle.
3. Turn on water.
4. Check pattern on fog-tip to see if clogged-CLEAN OUT.
5. Close handle.
6. Turn on pump to 250 psi.
7. Check for leaks:
   a. Tail gasket.
   b. Under the handle.
   c. At both tips.

C. Refurbishing Procedures

1. Replace handle and ball with a new kit if needed.
2. Replace tail gasket and/or screen if missing, cracked, or stiff.

D. Retesting Criteria

See Section B.

E. Cleaning Procedures

1. Clean in a diswashing detergent with brush or scouring pad as needed. Do not soak for extended periods of time or the detergent will corrode the metal.
2. Rinse thoroughly, stand upright with handle in open position to allow to dry.
3. Lubricate with appropriate dry lubricant such as Graphite.

F. Repackaging

1. Package in units containing nozzle body with a 3/16" straight stream tip and 2-4 gpm fog-tip.
2. Package 20 each in carton 12" x 9" x 10" (NSN 8115-01-012-5504).

G. Storage and Shelf Life Checks

None at this time.

ITEM: PACK, FIREFIGHTER'S FIELD NFES #1372

A. Initial Inspection/Disposal Criteria

1. Fabric and webbing.
   a. Any hole, cut, tear, fray, or burn that cannot be repaired economically.
   b. Any area of abrasion that has weakened the fabric beyond repair.
   c. Any webbing that is cut, burned, or abraded beyond economical repair.
2. Hardware.
   Check all plastic and metal hardware for dirt, cracks, breaks, and proper function. See Section B.
3. Zippers.
   Check all zippers for broken coils, missing or broken sliders and for proper function. See Section B.
4. Any writing, drawings, etc. on pack; dispose of unit.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Test hardware by fastening and unfastening. The hardware should function easily with little force being applied and no difficulty in the release.
2. Open and close to test zippers. The zipper should operate smoothly through its full length.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, and broken seams.
2. Replace nonfunctioning zipper.
3. Replace nonfunctioning hardware.

D. Retesting Criteria

Retest all replacement hardware. See Section B.

E. Cleaning Procedures

1. Allow any mud and loose dirt to dry, then remove using a stiff bristle brush.
2. Remove light oil using a solution of warm water and mild detergent and a brush. Rinse with clear water, let dry.
3. Remove heavy oil by degreasing with perchloroethylene; brush with spray cleaners or detergent and water solution; rinse with clean water; hang to dry.
4. Or steam clean and hang to dry.
5. **DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.**

F. Repackaging

Store 10 packs in carton NFES #2007, 24" x 16" x 16" (NSN 8115-00-292-0123).

G. Storage and Shelf Life Checks

None at this time.

ITEM: PACK, PERSONAL GEAR* NFES #1855

A. Initial Inspection/Disposal Criteria

1. Fabric and webbing.
   a. Any hole, cut, tear, fray, or burn that cannot be repaired economically.
   b. Any area of abrasion that was weakened the fabric beyond repair.
   c. Any webbing that is cut, burned, or abraded beyond economical repair.
2. Hardware.
   Check all plastic and metal hardware for dirt, cracks, breaks, and proper function. See Section B.
3. Zippers.
   Check all zippers for broken coils, missing or broken sliders and for proper function. See Section B.
4. Any writing, drawings or etc. on pack; dispose of unit.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Test hardware by fastening and unfastening the item at least three times. The hardware should function easily with little force being applied and no difficulty in the release.
2. Open and close zipper to test. The zipper should operate smoothly through its full length.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, and broken seams.
2. Replace nonfunctioning zipper.
3. Replace nonfunctioning hardware.

D. Retesting Criteria

Retest all replacement hardware as specified in Section B.

E. Cleaning Procedures

1. Allow any mud and loose dirt to dry, then remove using a stiff bristle brush.
2. Remove light oil using a solution of warm water and mild detergent and a brush. Rinse with clear water, let dry.
3. Remove heavy oil by degreasing with perchloroethylene; brush with spray cleaners or detergent and water solution; rinse with clean water and hang to dry.
4. Or steam clean and hang to dry.
5. **DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.**

F. Repackaging

Store 10 packs in carton NFES #2007, 24" x 16" x 16" (NSN 8115-00-292-0123).

G. Storage and Shelf Life Checks

None at this time.

ITEM: PACKBOARD, MOLDED PLYWOOD W/SHOULDER STRAPS* NFES #0140

A. Initial Inspection/Disposal Criteria

1. Check for obvious damage.
2. Check for cracks in plywood.
3. Check shoulder straps and buckles.
4. Check rope and grommets.
5. Check fabric for cuts, tears, holes, burns, etc.
6. Check for broken or damaged tie down hooks.

B. Tests

None.

C. Refurbishing Procedures

1. Sand and paint chipped and rough spots in plywood.
2. Replace ropes, straps, or other defects.
3. Replace tie down rope if bad or missing. (50 foot)

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Packboard should be washed and cleaned of foreign matter such as mud, dirt and grease.
2. Hang or set aside until packboard is completely dry.

F. Repackaging

1. Local cache option for repackaging.
2. Pack 10 packboards per carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: PACKSACK, NYLON, W/STRAPS* NFES #0744

A. Initial Inspection/Disposal Criteria

1. Fabric and Webbing.
   a. Any hole, cut, tear, fray, or burn that can not be repaired economically.
   b. Any area of abrasion that has weakened the fabric beyond repair.
   c. Any webbing that is cut, burned, or abraded beyond repair.
2. Hardware.
   Check all plastic and metal hardware for dirt, cracks, breaks, and proper function.
3. Zippers.
   Check zipper (new style) for broken coils, missing or broken sliders and proper function.

B. Tests

1. Test hardware by fastening and unfastening.The hardware should function easily with little force being applied and release with ease.
2. Open and close zipper to test. The zipper should operate smoothly through its full length.
3. To test spring lock (new style) make sure spring works properly and cord passes through spring lock with ease.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, and broken seams.
2. Replace nonfunctioning zipper.
3. Replace nonfunctioning hardware.

D. Retesting Criteria

Retest any zipper or hardware that has been replaced.

E. Cleaning Procedures

1. Allow any mud and loose dirt to dry, then remove using a stiff bristle brush.
2. Remove light oil using a solution of warm water and mild detergent and a brush. Rinse with clear water, let dry.
3. Remove heavy oil by degreasing with perchloroethylene; brush with spray cleaners or detergent and water solution; rinse with clean water and hang to dry.
4. Or may steam cleaned and hang to dry.
5. Old style may be washed in a commercial washing machine.
6. **DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.**

F. Repackaging

1. Local cache option for repackaging.
2. Standard pack is 20 each per carton.

G. Storage and Shelf life Checks

None at this time.

ITEM: PAD, SLEEPING, GRAY 3/8" x 23" x 75" NFES #1566

A. Initial Inspection/Disposal Criteria

1. Check for rips, cuts, stains, mildew, dampness.
2. Determine if cost effective to refurbish.

B. Tests

None.

C. Refurbishing Procedures

See Section E.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. If pad is wet, expose to sun or other heat source until dry.
2. Brush with stiff bristle brush to eliminate dirt or other foreign matter.
3. Blow off remaining dust or fine dirt particles with high pressure air hose or use vacuum.

F. Repackaging

Repack 50 each in original carton if serviceable or use NFES #0134 carton, sleeping pad. 76" x 22˚" x 20˚" (NSN 8115-01-381-6529).

G. Storage and Shelf Life Checks

None at this time.

ITEM: POLE, RIDGE, 10' X 12' TENT **NFES #0082**
POLE, RIDGE, 14' X 16' TENT **#0089**

A. Initial Inspection/Disposal Criteria

1. Visual inspection indicating use or broken and/or missing parts. NFES #0082 consists of four parts and NFES #0089 consists of six parts per pole.
2. Structural failure, bent pole—dispose of damaged pieces (salvage usable parts).

B. Tests

Put together to make sure all pieces fit properly and there is no unseen damage.

C. Refurbishing Procedures

1. Replace missing or damaged parts.
2. Clean if dirty.
3. Repaint if necessary.

D. Retesting Criteria

Assemble again to ensure all pieces fit correctly.

E. Cleaning Procedures

Completed in Section C.

F. Repackaging

Package in commercial carton, Style RSC, Type CF, class domestic, grade 275, size 4-1/2" x 6-1/2" x 42-1/2".

G. Storage and Shelf Life Checks

None at this time.

ITEM: POLE, UPRIGHT NFES #0083

A. Initial Inspection/Disposal Criteria

1. Visual inspection indicating use or broken and/or missing parts.
2. Structural damage, bent pole—dispose after salvaging usable parts.

B. Tests

Extend pole to see if pole telescopes freely.

C. Refurbishing Procedures

1. If top pin is bent or broken, replace with a steel pin.
2. Replace adjuster pins and cables when missing.
3. Clean if necessary.
4. Repaint if necessary to prevent rust or corrosion.

D. Retesting Criteria

Inspect to see that all parts function correctly once refurbishing is complete.

E. Cleaning Procedures

See Section C.

F. Repackaging

Package six each in commercial carton, Style RSC, Type CF, class domestic, grade 275,size 4-1/2" x 6-1/2" x 42-1/2".

G. Storage and Shelf Life Checks

None at this time.

ITEM: PUMP, BACKPACK, OUTFIT, COMPLETE — NFES #1149

A. Initial Inspection/Disposal Criteria

1. See Refurbishing Standards for Bag, Backpack Pump (Old Style)
2. See Refurbishing Standards for Bag, Backpack Pump; NFES #1197.
3. See Refurbishing Standards for Pump, Single Action; NFES #0151.

NOTE: Combine 1 each NFES #1197 or 1 each of the old style bag and 1 each of NFES #0151 to make 1 complete unit of NFES #1149.

B. Tests

Connect and disconnect male and female hose connectors to verify they are working properly.

C. Refurbishing Procedures

1. See Section A for applicable standard(s).
2. Replace male and/or female hose connectors if not functioning properly.

D. Retesting Criteria

If either male or female hose connector was replaced, see Section C.

E. Cleaning Procedures

See Section A.

F. Repackaging

1. Pack 6 each NFES #1197 (Bag, Backpack Pump) and 6 each NFES #0151 (Pump, Single Action) in NFES #2007 (24" x 16" x 16"—NSN 8815-00-292-0123) carton. Label as NFES #1149.
2. Pack 6 each Old Style Bag and 6 each Pump, Single Action in NFES #2007 (24" x 16" x 16"—NSN 8815-00-292-0123) carton. Label as NFES #1149.

G. Storage and Shelf Life Checks

None at this time.

ITEM: PUMP, MARK III — NFES #0148

A. Initial Inspection/Disposal Criteria

1. Evidence of use (dust, oil, starter seal broken).
2. Evidence of damage.
3. Return to stock if not used and date last tested (DLT) does not exceed 12 months.
4. Ensure inspection tag is current.

B. Tests

See Section C.

1. Repair to recommended manufacturer's standard, using local repair procedures.
2. Test for performance.
3. Clear fuel from fuel line.
4. Tie off starter rope to handle to determine field use. Use plastic snap seal.
5. In event that the pump is not economically repairable, it shall be disposed of using local policies.

C. Refurbishing Procedures

1. Rubber plugs and bumpers on all starters.
2. Test pumps at 1/4 inch nozzle and at shutoff. MK III should be a minimum of 230 psi.
3. Use loss of prime method to test over speed.
4. Keep decals legible.
5. Do not paint frame on Mark III.
6. Paint over speed reset button yellow.
7. Replace muffler if neck is cracked.
8. Affix hearing protection mandatory stickers.
9. Paint exposed metal on cowling and pump.
10. Check buffer and buffer coupling holes, replace if needed
11. Check head and piston for carbon buildup regularly.
12. Replace head or cylinder if two or more fins are broken.
13. Cracks in cowling overhead are okay.
14. Replace spark plug protector ("sparky") if ripped or there is a hole in the top.
15. Each pump should have fuel mix sticker and a cache owner sticker.
16. See refurbishing standards for: Tank, Gasoline, Five Gallon, Pump Adapted, NFES #0218.

D. Retesting Criteria

Completed in Sections B and C.

E. Cleaning Procedures

Local cache option.

F. Repackaging

1. Make sure pump is drained of water.
2. Local cache option.

G. Storage and Shelf Life Checks

Ensure date last tested (DLT) does not exceed 12 months.

ITEM: PUMP, FIRE, LIGHTWEIGHT — NFES #0124, 0253

A. Initial Inspection/Disposal Criteria

1. Evidence of use (dust, oil, starter seal broken).
2. Evidence of damage.
3. Return to stock if not used and date last tested (DLT) does not exceed 12 months.

B. Tests

1. Repair to recommended manufacturer's standard, using local repair procedures.
2. Test for performance.
3. Clear fuel from fuel line.
4. Tie off starter rope to handle to determine field use. Use plastic snap seal.
5. If pump is not economically repairable, it should be disposed of using agency policies.

C. Refurbishing Procedures

1. Refurbished pumps should run and meet the pump performance standards set by the operator's manual and should be in good condition, i.e., no leaks, cracks, or broken parts. If not, send to an established repair shop ensuring the shop has the refurbishing standards and appropriate repair and instruction manual.
   a. Clean off dirt, oil and grease. (Use degreaser if needed.)
   b. Check for identification marking, property and serial numbers, cache identification sticker and any other required stickers.
   c. Make sure water and dirt are removed from inside pump.
   d. Grease pump as necessary.
   e. Allow pump to dry.

D. Retesting Criteria

1. After the pump is repaired, it should be run tested to ensure that it meets performance standards.
   a. Start engine to check for proper operation.
   b. Check pump for proper performance output.

E. Cleaning Procedures

Completed in Section C.

F. Repackaging

1. Make sure pump is drained of water.
2. Local cache option.

G. Storage and Shelf Life Checks

Ensure date last tested (DLT) does not exceed 12 months.

ITEM: PUMP, SINGLE ACTION NFES #0151

A. Initial Inspection/Disposal Criteria

1. Check fort obvious damage.
2.Check for burrs.
3. Check for cracks.
4. Bad threads.

B. Tests

Place hose in water and pump handle to validate the pump works properly. If it is defective, check supply hose on pump assembly for obstructions and tight connections, bent push rods, and clogged tips.

C. Refurbishing Procedures

1. If pump pressure is still not sufficient, remove pump unit and replace “0” rings.
2. Check quick connection on pump for proper seating.
3. Check hose connection to pump for tightness; if loose, put on a hose clamp.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. All items will be washed and cleaned of foreign matter, such as mud, dirt, and grease. Clean in a dishwashing detergent with brush or scouring pad as needed.
2. Rinse thoroughly.
3. Lubricate slide with appropriate lubricant.

F. Repackaging

Local cache option for repackaging.

G. Storage and Shelf Life Checks

None at this time.

ITEM: PUMP, VOLUME, TRASH **NFES #0683, 1222**

A. Initial Inspection/Disposal Criteria

1. Pressure wash pump. Use a degreaser if necessary.
2. Inspect unit for obvious damage to body or frame.
3. Inspect for oil leaks, dirty air filters and condition of spark plug.

NOTE: Dispose of contaminated fuel according to hazardous materials regulations in your area.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Before starting pump.
   a. Change engine oil.
   b. Clean air filter.
   c. Fill pump with water.
2. Start pump and look for items that need repair.

NOTE: See the owner's manual for specified pump.

   a. Engine smoking.
   b. Running rough.
   c. Missing.
   d. Adjust carburetor as needed.

C. Refurbishing Procedures

1. Pump should run properly and discharge a specified amount of water.

NOTE: See appropriate owner's manual for specifications and trouble shooting guide relating to your specific unit.

If taken to local repair shop, be sure they have the appropriate owner's manual and trouble shooting guide.

2. Drain fuel from tank and fuel lines. Start pump to ensure all fuel has been run out of unit.
3. Check to make sure all identification (serial numbers, property numbers or other cache identification numbers) are securely fastened to pump.

D. Retesting Criteria

If pump has not been run in past 12 months, pump must be started and run to ensure pump is working properly. (See Section C.)

E. Cleaning Procedures

Clean off dirt and oil. Use degreaser if needed.

F. Repackaging

Use nylon tie rap to tie off starter rope to determine field use.

G. Storage and Shelf Life Checks

See Section D if unit has been stored for 12 months.

ITEM: REDUCERS

NFES #0009, 0010, 0417, 0418 #0733, 2229, 2230

A. Initial Inspection/Disposal Criteria

Check for obvious damage.

1. Cracks.
2. Bad threads.
3. Tail gaskets, stiff, damaged or missing.

B. Tests

None.

C. Refurbishing Procedures

Replace tail gaskets if stiff, damaged, or missing.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean in a dishwashing detergent with a brush or scouring pad.
2. Rinse thoroughly.
3. Stand upright to drain and dry.

F. Repackaging

1. Package 10 each (NFES # 0009, 0010, 0418, & 0733) in 8" x 4" x 4" carton (NSN 8115-00-290-3365).
2. Package 10 each (NFES #0417, 2229, and 2230) per local cache options.

G. Storage and Shelf Life Checks

None at this time.

ITEM: REGULATOR, PROPANE* NFES #0930

A. Initial Inspection/Disposal Criteria

1. Visual inspection for loose, defective fittings.
2. Check regulating handle to ensure tightness and smooth operation.
3. Ensure screws holding halves together are present and tight.

B. Tests

1. Connect to air line adapter and activate air.
2. Turn regulator control from “off” to “on” position to ensure proper functioning.

C. Refurbishing Procedures

1. Wipe off dirt with damp cloth or blow off with air compressor.
2. Clean fitting threads with wire brush.
3. Replace fittings if worn or missing.

D. Retesting Criteria

None.

E. Cleaning Procedures

See Section C.

F. Repackaging

Local cache option for repackaging.

G. Storage and Shelf Life Check

None at this time.

ITEM: SHELTER, FIRE, PRACTICE NFES #2407

A. Initial Inspection/Disposal Criteria

1. Inspect seams of polyvinyl plastic bag for thread breaks and polyvinyl material for any breaks, tears, or holes.
2. Verify red pull tabs are unbroken and securely attached to hook and pile fastener tape.
3. Verify that NOT FOR FIRE USE labels are firmly stitched to hook and pile fastener tape.
4. Remove shelter from polyvinyl bag, unfold, and inspect for tears or other signs of wear.
5. Check attachment of tie down straps to the shelter cloth.

B. Tests

Open and close hook and pile fastener tape. It should be free of foreign matter and provide a secure closure for the practice fire shelter in its polyvinyl bag.

C. Refurbishing Procedures

1. See Appendix F.
2. If one or both red pull tabs on fastener tape are broken, or if polyvinyl has breaks, tears, or holes, replace with a new polyvinyl bag (NFES #2409).
3. If the shelter is undamaged and tie down straps are securely in place, refold shelter, place in polyvinyl bag, and reattach fastener tape. If cloth is torn or otherwise in a condition that makes it unusable as atraining tool, replace it with a new practice fire shelter (NFES #2408).
4. Validate user's instructions are in pocket.

D. Retesting Criteria

None.

E. Cleaning Procedures

The only cleaning necessary will be to the practice fire shelter carrying case (NFES #2410).

1. Allow any mud or loose dirt to dry, then remove with a stiff bristle brush.
2. Remove light oil with a solution of warm water and mild detergent and brush. Rinse with clear water and let dry.
3. Remove heavy oil by degreasing with perchloroethylene, using spray cleaners, or with a detergent and water solution. Rinse with clean water and let dry. **DO NOT use bleach!**

F. Repackaging

Pack 10 refurbished practice fire shelters in a close fitting commercial carton, Style RSC, Type, I class domestic, grade 275, size 16"x10"x12".

G. Storage and Shelf Life Checks

Do not store in same area as Shelter, Fire, NFES #0169.

ITEM: SHELTER, FIRE NFES #0169

A. Initial Inspection/Disposal Criteria

1. Inspect outer vinyl plastic bag for cuts, punctures, dents.
2. Verify quick-opening strip is unbroken and tab or tabs are intact.
3. Look for tears along folded edges and aluminum particles present that have turned the vinyl bag gray. If either condition exists, remove the shelter from service.
4. If unsure of the condition of a shelter, cut-open vinyl bag for inspection of shelter. There should not be holes, cuts or tears in vinyl bag, other than air hole at top of bag.
5. Inspect for presence of plastic liner in the carrying case. If not present, replace the liner before replacing the shelter.
6. Inspect fire shelter case for cuts, tears, missing or malfunctioning snaps as well as missing or loose threads on Velcro fastener.
7. Ensure deployment instruction sheet is included in fire shelter case.
8. Check for belt clips on fire shelter case and ensure they are in good working condition.

B. Tests

None.

C. Refurbishing Procedures

1. See Appendix G.
2. If the shelter is undamaged, replace in clean plastic liner and carrying case.
3. If the quick-opening tear strip has been broken, replace vinyl bag or reseal with durable tape. Durable tape is plastic type tape with durable sticky surfaces such as fiberglass tape, but notmasking tape or scotch tape.
4. **If in doubt about a shelter condition, REMOVE FROM SERVICE.**
5. Replace deployment instructions if missing, torn or illegible.
6. Replace belt clips if missing or damaged.
7. Replace fire shelter case if defective.
8. Replace shelter liner if cracked or damaged.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean the carrying case.
   a. Allow any mud or loose dirt to dry, then remove using a stiff bristle brush.
   b. Remove light oil with a warm water and mild detergent solution and brush. Rinse with clean water and let dry.
   c. Remove heavy oil by degreasing with perchloroethylene, brush and spray cleaners, or a detergent and water solution; rinse with clear water and let dry or steam clean and hang to dry.

   DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH.
2. Clean plastic liner with damp rag.

F. Repackaging

Pack 10 refurbished shelters in a commercial carton, Style RSC, Type CF, class domestic, grade 275, size 16" x 10" x 12".

G. Storage and Shelf Life Checks.

None at this time.

ITEM: SHIRTS, FLAME RESISTANT **NFES #0511*, 0512*, 0522, #0569*, 0570* #0577 to 0580 #2078, 2079**

A. Initial Inspection/Disposal Criteria

1. Any holes, cuts, tears, or torn seams not economical to repair.
2. Any buttonholes with frayed or broken stitching.
3. Any missing or tack buttons.
4. Any hook and pile fastener on sleeves and pockets that does not provide adequate closure.

NOTE: The cache manager shall determine when repair is economical. The decision will depend on available repair facilities.

B. Tests

Open and close hook and pile fasteners. They should provide an adequate and secure closure.

C. Refurbishing Procedures

1. Repair any hole, cut, tear, or torn seam by darning, patching, or duplicating the original construction. See note in Section A.
2. Over stitch any frayed buttonhole using a buttonhole or zig-zag stitch that has 50 to 60 stitches per buttonhole.
3. Replace damaged hook and pile fastener tape with tape of the same length, width, and quality as the original. See note in Section A.
4. Use Nomex (aramid) thread for all repairs.

D. Retesting Criteria

Test all replacement hook and pile fasteners after sewing in place, as specified in Section B.

E. Cleaning Procedures

See Appendix B.

Follow the cleaning procedures described in the publication, "Nomex - Aramid -Laundering Guide, (2/97)". The publication can be obtained by calling DuPont at 1-800-453-8527 or by writing:

DuPont Company
Aramids Inquiry Center
Chestnut Run Plaza
Laurel Run Building
Wilmington, DE 19880-0705

Washing procedures from above publication:

1."Tests show that (commercial and industrial detergent) formulations designed for use at a temperature of 140°F (60° C) or less adequately clean NOMEX® and provide the best fabric color retention".
2. "Garments of NOMEX® must be adequately rinsed to remove residual wash chemicals."
3. "In some instances, tumble dry conditioning is the only finishing necessary for garments of NOMEX®".

In addition to these guidelines:

1. Select temperatures to maintain color fastness except as necessary to clean heavily soiled items.
2. The use of commercial cold water process may be used in remote or in field locations as necessary.
3. Garments heavily soiled with petroleum products may require dry-cleaning with perchloroethylene.

F. Repackaging

Package 50 each of same size in carton NFES #2007, 24" x 16" x 16" (NSN 8115-00-292-0123).

G. Storage and Shelf Life Checks

None at this time.

ITEM: SPOUT, GAS, FLEXIBLE, 16", STEEL NFES #0210

A. Initial Inspection/Disposal Criteria

1. Visual inspection for obvious damage.
   a. Bent or crushed sections in flexible portion, dispose of unit.
   b. Missing, cracked or stiff tail gasket on bottom of spout.
   c. Missing screen on pouring end.
2. Visual inspection of spout for obstructions.
3. Check locking flange to ensure it is in working condition. If not, dispose of unit.

B. Tests

Using a solvent, check spout for leaks

C. Refurbishing Procedures

1. If possible, replace tail gasket if missing, cracked or stiff.
2. If possible, replace screen. (Try to salvage screens from disposed items.)
   If unable to replace screen, dispose of unit.
3. Remove any obstructions which may be in spout.
4. Clean screen and threads on screen cap.
5. Can be washed using a pressure washer.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean completely with a solvent. (Use in a well ventilated area.)
2. Stand on end or lay unit down to drain and dry.
3. Make sure spout is completely dry before repacking.

F. Repackaging

1. Local cache option for carton.
2. Pack 10 each in carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: SWIVEL, CARGO, 3000 POUND CAPACITY **NFES #0526**
SWIVEL, CARGO, 6000 POUND CAPACITY **#0286**

A. Initial Inspection/Disposal Criteria

1. Review for structural damage.
2. Inspect hook and latch before storage.
3. Ensure that latch is not distorted or bent. Safety gates (latches or keepers) that have become bent or distorted no longer help the sling load from inadvertently coming off the hook.
4. Inspect for cracks, nicks, wear, gouges and deformation.

B. Tests

1. See Appendix H.
2. Make sure the spring will force the latch against the tip of the hook .
3. Excessive lateral movement of the swivel hook may indicate bearing wear. Return to manufacturer for inspection.

C. Refurbishing Procedures

1. If safety gate (latch or keeper) is bent or distorted, replace the damaged latch with hook latch replacement kit.
2. Inspect ring/pear ring for binding, ensure nut is secure with pin in place.
3. Remove from service and return to manufacturer for inspection any swivel whose rotating swivelbody or hook shows any cracks or gouges.
4. Lubricate with a lithium-base grease of medium consistency.

NOTE: Never repair, alter, rework or reshape a hook or swivel. Return to the manufacturer for repair.

D. Retesting Criteria

None.

E. Cleaning Procedures

Wipe clean, paint as needed.

F. Repackaging

1. Local cache option for carton.
2. Pack 10 each per carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: TABLE, MESS 4 PERSON W/BENCHES* NFES #1390
TABLE, FOLDING* NFES #2698

A. Initial Inspection/Disposal Criteria

1. Check for table surface damage.
2. Check for broken or bent legs.
3. Check for rough cutting surface edges.
4. Check for missing items and supports.
   a. If suitcase table; and the damaged area can not be repaired, dispose of the table.
   b. If it is a wood plywood table; dispose of the damaged section and fabricate the replacement section by using 3/4 inch birch plywood and refinish surface.

c. If folding table and legs or top can not be repaired, dispose of unit.

B. Tests

None.

C. Refurbishing Procedures

1. For plywood mess table; replace any missing or broken parts with 3/4 inch birch plywood and refinish.
2. For metal/plastic suitcase mess table; repair damage area by welding, pop riveting or by gluing.
3. Folding table; try to repair legs and top and if possible straighten any dents and miscellaneous damage to metal folding tables.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Wipe tables with household cleaner suitable for the table surface.
2. Remove any foreign matter on tables, such as gum.
3. Let table stand to dry.

F. Repackaging

For wood tables; band table and place in proper location.
For suitcase mess table; band case and place in proper location.
For folding tables; collapse and place in proper location.

G. Storage and Shelf Life Checks

None at this time.

ITEM: TANK, GASOLINE, FIVE GALLON, PUMP ADAPTED NFES #0218

A. Initial Inspection/Disposal Criteria

1. Check for fuel and dispose of properly.

NOTE: Dispose of contaminated fuel according to hazardous material regulations in your area.

2. Check for leaks or separation along seams.
3. Check all threads on connector for serviceability.
4. Check gasket on cap. Replace if missing, cracked or stiff.

B. Tests

Visual checks only.

C. Refurbishing Procedures

1. Drain all existing fuel and purge.
2. Use an air hose to dry the interior of the container and verify that no grit and or dirt material has dried within female opening of quick disconnect coupling.
3. Turn upside down with lids off or open to dry.
4. Inspect vent hole to ensure it is clean and serviceable.
5. Visually verify that no rust exists inside container.
6. Wipe down outside of container and repaint if necessary.

D. Retesting Criteria

None.

E. Cleaning Procedures

See Section C.

F. Repackaging

Local cache option for repackaging.

G. Storage and Shelf Life Checks

None at this time.

ITEM:		NFES #
	TANK, COLLAPSIBLE, 1000 GALLON	0588
	TANK, COLLAPSIBLE, 1200 GALLON	0090
	TANK, COLLAPSIBLE, 1500 GALLON	0589
	TANK, COLLAPSIBLE, 1800 GALLON	0668
	TANK, COLLAPSIBLE, 3000 GALLON	0568
	TANK, COLLAPSIBLE, 4800 GALLON	6030
	TANK, COLLAPSIBLE, 6000 GALLON	6031

A. Initial Inspection/Disposal Criteria

1. Segregate by NFES #.
2. Check for obvious punctures, cuts, burns, damaged hose couplings, drain plugs, etc.

B. Tests

1. Determine that all plugs are present and in good serviceable condition.
2 .Mark all punctures, cuts, etc., while tank is suspended by forklift or hoist of some manner, enabling light to be seen through any obvious problem areas.

C. Refurbishing Procedures

1. Repair or replace any damaged plugs or couplings.
. Clean entire tank with soapy water inside and out. Rinse well with clear water from high pressure washer.
3. Allow to air dry on both sides.
4. Patch or repair any damaged areas previously noticed.

D. Retesting Criteria

1. Suspend tank again so that any holes can be spotted while looking towards light.
2. Refer to Section C if holes are found (patch and recheck).

E. Cleaning Procedures

See Section C.

F. Repackaging

1. Fold or roll tank as tightly as possible, secure with plastic banding or rope to keep from unrolling.
2. Local cache option for repackaging and labeling.

G. Storage and Shelf Life Checks

None at this time.

ITEM: TANK, FOLDING, 1000 GALLON & 1500 GALLON **NFES #0661**
TANK, FOLDING, 1500 GALLON **# 0664**

A. Initial Inspection/Disposal Criteria

1. Frame broken or bent beyond repair. Dispose of frame.
2. Liner seam has separation. Dispose of liner.
3. Liner has tears larger than three inches. Dispose of liner.
4. More than 12 patches on liner. Dispose of liner.
5. If two or more grommets are missing in succession and new grommets cannot be used, due to damage of area. Dispose of liner.

B. Tests

Verify hinges operate smoothly.

C. Refurbishing Procedures

1. Straighten frame.
2. Check welds for cracks and separation. Repair as needed.
3. Remove rust, paint as needed.
4. Lubricate hinges with appropriate lubricant.
5. Check liner seam to verify no separations exist.
6. Check for holes and tears, patch or shoe goo small holes.
7. Check liner to ensure that it is properly attached to frame through each grommet. The use of cable ties or 1/4 inch nylon rope is recommended. Ensure ties and ropes are secure. No damage or fraying. Replace or tighten as necessary. When using cable ties, use one per grommet and utilize large cable ties at cornerand midpoints. Use smaller ties in all other grommets. When using rope, secure one end to frame. Then using a lacing motion, go through grommet, then over frame and back through next grommet. Continue this motion until entire liner is attached to frame. Secure end.
8. Fold tank ensuring that liner is not pinched during process. Only a minimum, if any, amount of liner is to extend outside the metal frame.

D. Retesting Criteria

None.

E. Cleaning Procedures

Using warm soapy water, clean frame and liner, using scrub brushes. Steam cleaner can be used inconjunction with brushes.

F. Repackaging

1. Once folded and stenciled:
   a. Band 1000 gallon tank near both ends.
   b. Band 1500 gallon tank in middle and at both ends.

G. Storage and Shelf Life Checks

None at this time.

ITEM: TANK, PROPANE, FUEL, LPG, 20# TANK (5 GALLON)* NFES #0491

A. Initial Inspection/Disposal Criteria

1. Visual inspection for rust, dents, punctures, broken valves and valve handle. Look for weak or broken handle.
2. Confirm test date on propane tank. (must be recertified, [hydrostatic testing] 12 years from manufacturer date and every 5 years after the first recertification).

B. Tests

1. Apply soapy water to valve area.
2. Watch for bubbles indicating leaks.
3. Tag immediately for repair or remove from service.

C. Refurbishing Procedures

1.Repair or replace defective valves, and broken handles.
2.Power wash tank, let dry and repaint if necessary.
3.Ensure warning labels are visible and replace if necessary.
4.Install plastic plug in valve opening if missing.
5.All repairs will be done by an authorized facility.
6. Ensure valve is in off position before packaging.

D. Retesting Criteria

Check valve to ensure it is in off position before issuing.

E. Cleaning Procedures

Completed in section C.

F. Repackaging

Place on pallets and shrink wrap or tie with cord to ensure tanks do not fall or tip over.

G. Storage and Shelf Life Checks

Refer to Health & Safety Handbook, OSHA, NFPA and local direction.

ITEM: TANK, PORTABLE, 3000 GALLON **NFES#0220**
TANK, PYRAMID, LIQUID STORAGE **NFES #0221**

A. Initial Inspection/Disposal Criteria

1. Rips or holes greater than 3 inches.
2. Separating of seams.

B. Tests

Fill with water and check for leaks.

C. Refurbishing Procedures

1. Fill with water and check for leaks.
2. If leaks are observed, glue and patch area, then refill after glue dries.
3. Clean with soapy water and air dry.

D. Retesting Criteria

Refill with water after patching to ensure patch is secure.

E. Cleaning Procedures

Clean with soapy water then air dry.

F. Repackaging

1. Ensure that tank is dry.
2. Package one each in carton NFES #2006 23" x 19" x 10" (NSN 8115-00-139-0722).

G. Storage and Shelf Life Checks

None at this time.

ITEM: TEES, HOSELINE, ALL — NFES #0230, 0731, 1809, 2240

A. Initial Inspection/Disposal Criteria

1. Check for obvious damage.
2. Check for burrs.
3. Check tail gasket.
4. Ensure one-inch valve seated properly (NFES #0230).

B. Tests

None.

C. Refurbishing Procedures

Replace gasket if missing, cracked or stiff.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean in dishwashing detergent with a brush or scouring pad.
2. Rinse thoroughly.
3. Stand upright to dry.

F. Repackaging

1. Local cache option for carton.
2. Pack 10 each per carton or pack 60 each per carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: TENT, 2 PERSON NFES #0077

A. Initial Inspection/Disposal Criteria

CHECK TENTS IMMEDIATELY UPON RECEIPT AT CACHE FOR MOISTURE.
WET TENTS WILL MOLD QUICKLY, SOME MOLD SMELLS ARE IMPOSSIBLE TO REMOVE.

1. Tent body and fly.
   a. Any tears, holes, burns, or unraveled seams that are not economically repairable.
   b. Any mold or other stains.
   c. Any zipper that does not provide adequate closure.
   d. Any missing stretch cords or plastic hooks missing on rain fly.
2. Poles and Stakes.
   a. Cracked or broken poles.
   b. Cracked or broken hinge joints.
   c. Bent, broken, or mushroomed tops of stakes.

Note: The cache manager will determine when repair is economical. This decision will depend on available repair facilities, and replacement parts.

B. Tests

1. Set up the tent with the fly; check hinge joints for smooth operation.
2. Open and close all zippers ensuring adequate closure.
3. Check stretch cords and plastic clips for cracks and frays.

C. Refurbishing Procedures

1. Repair holes, tears, and seams.
2. Replace damaged zippers.
3. Replace non-functioning hardware.
4. Remove dirt from stakes with wire brush, straighten and file off burrs.

D. Retesting Criteria

1. Set up tent with the fly. Check hinge joints for smooth operation.
2. Open and close all zippers ensuring adequate closure.

E. Cleaning Procedure

1. For dirt and light stains, use warm soapy water. Wipe or brush out stain, rinse with clean water and air dry.
2. For heavy stains, machine wash warm, permanent press. Air dry. A steam cleaner on low will also work.

F. Repackaging

Local cache option for repackaging.

G. Storage and Shelf Life Checks

Check periodically for dampness.

ITEM: TENT, WALL, 10' X 12'* & 14' x 16' NFES #0223, 0084

A. Initial Inspection/Disposal Criteria

1. Nonstandard item.
2. Rips and tears (uneconomical to repair).
3. Mildew present.

Note: The cache manager will determine when repair is economical. This decision will depend on available repair facilities and replacement parts.

B. Tests

None.

C. Refurbishing Procedures

1. Completely unfold tent on clean, dry floor or work area so that any defects (tears, burns, mildew, etc.) will be visible.
2. Sweep off entire tent with stiff bristle broom.
3. Repair any rips, tears or other defects at this time if possible. If repairs cannot be made easily and cost effectively, continue to clean tent and tag it for repair. Replace missing or damaged guy ropes (1/4 inch x 8 foot manila rope) and ridge lines (1/4 inch x 12 foot manila rope) and replace missing or damaged grommets with proper size grommets.
4. Wash tent as necessary.

D. Retesting Criteria

None.

E. Cleaning Procedures

See Section C.

F. Repackaging

Local cache option to repackage in appropriate carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: TIP, APPLICATOR* - 3 GPM **NFES #0735**
TIP, APPLICATOR - 15 GPM **0736**

A. Initial Inspection/Disposal Criteria

Check for obvious damage:

1. Check for burrs.
2. Check for tail gasket (correct or not correct). Replace if needed.
3. Check for cracks.
4. Bad threads.
5. Look through tip, if clogged, clean out. Take out disk to clean out on spray tips.

B. Tests

1. Attach to hose.
2. Turn on water and ensure adequate flow and pattern are attained.

C. Refurbishing Procedures

None.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. All items will be washed and cleaned of foreign matter, such as mud, dirt, and grease.
2. Clean in a dishwashing detergent with brush or scouring pad as needed.
3. Do not soak for extended periods of time or the detergent will corrode the aluminum.
4. Rinse thoroughly.
5. Stand upright to drain water and dry.

F. Repackaging

Local cache option for repackaging.

G. Storage and Shelf Life Checks

None at this time.

ITEM: TOOL, AXE, SINGLE BIT* **NFES #0707**
TOOL, AXE, BOYS* **#0352**

A. Initial Inspection/Disposal Criteria

Obvious damage to head, cutting edges.

1. Large chips in blade.
2. Cracked head eye.
3. Dispose if any modifications to head, such as rivets through side of head to hold handle.

B. Tests

1. Head.

Blades have not been tapered or rounded to point that tool cannot be sharpened properly.

2. Handle.
   a. Twisted, bent or open grain handle.
   b. Cracks, or suspect based on sound of hammer rap on end of handle. Sharp ringing sound = good. Dull thud sound = suspect, or pressure application to side of handle.
   c. Head loose on handle.
   d. Tape residue, or other residue (tar, sap, etc.).
   e. Head is loose and/or contains metal wedges.

C. Refurbishing Procedure

1. Head.
   a. Clean head.
   b. Sharpen tool to specifications according to tool sharpening gauge.

CAUTION—Tool should never be ground to the degree that the metal temperature rises high enough to remove temper, i.e., blue or burned edges.

   c. Ensure that blade corners are square.
   d. Paint tool head with rust inhibitor.
2. Handle.
   a. Visually check handle.
   b. Sand handle if it is rough, chipped, dinged, or has any type of residue that did not come off during sanding.
   c. When replacing handle, shape eye for a snug fit. Use high impact plastic or wood-type wedges with appropriate type of epoxy.
   d. The bottom of the tool head should be within 3/8 inch to 5/8 inch of the shoulder of the handle.
   e. Cut excess off handle, flush with tool head after inserting wedge into handle.
   f. Wipe handle with rag and linseed oil.

Note: Metal wedges can be added only in the field as an emergency measure for field refurbishing.

D. Retesting Criteria

None.

E. Cleaning Procedures

See Section C.

F. Repackaging

1. For NFES #0707 (no sheath available).
Package 10 each in carton NFES #0338 37˚” x 18˚” x 8"(NSN 8115-00-139-0673).

1. For NFES #0352 install leather sheath NFES #0359.
Package 10 each in appropriate size carton (until an appropriate size is found).

G. Storage and Shelf Life Checks

Per local cache requirements to ensure proper serviceability of tools.

ITEM: TOOL, COMBINATION — NFES #1180

A. Initial Inspection/Disposal Criteria

Obvious structural damage to pick, hoe blade, or both that cannot be repaired by replacing components.

1. Pick replacement:
   a. If bent or twisted.
   b. If shorter than 4-1/2 inches long in extended position.
   c. If cracks exist around hinge bolt hole or if hinge bolt hole is enlarged.
2. Hoe blade replacement:
   a. If there are cracks or looseness in the area of the hinge leg rivets.
   b. If hinge leg bolt hole is enlarged or cracked.
   c. If shorter than 6 inches. Measure from turn step to blade tip.
3. Handle replacement:
   a. Cracked, bent, twisted, or has open grain.
   b. Has been shortened (except for detachable handle smokejumper version, which has a 4-inch shorter handle).
   c. Has a nonstandard handle. Order replacement handles from GSA; NSN 5120-01-296-3592. Use a number 6 x 1-13/16" long steel rivet that can be purchased from many well stocked retail and wholesale hardware outlets.

B. Tests

1. Extend hoe blade and pick at right angles to tool handle.
2. Tighten friction nut (wear gloves). Move blade and pick up and down and further tighten friction nut. Refer to: *Combi Tool Maintenance Instructions*, March 1989, MTDC Publication 89-9.
3. Repeat process to ensure that the blade and pick can be maintained tight by the friction nut.
4. If friction nut does not turn freely, flush with water. Blow clean with air gun (wear safety glasses).
5. If tool head cannot be tightened, check hinge leg surface contact with friction nut. Remove hinge leg bolt, grind blade or pick hinge legs as needed so they meet flush with friction nut. Refer to MTDC 89-9.
6. Replace friction nut if defective.

C. Refurbishing Procedures

1. Head.
   a. Clean head and friction nut. See Section B.
   b. Sharpen both blade and pick at 45 degree angle per hand tool.
   c. Optional finish: paint hoe blade and pick with a rust inhibitor.
2. Handle.
   a. Clean handle.
   b. Tighten handle in ferrule by peening, as described in MTDC 89-9.
   c. Sand handle if chipped, dinged, or rough or has tape or other residues.
   d. Optional finish: wipe with linseed oil.

D. Retesting Criteria

None.

E. Cleaning Procedures

See Section B.

F. Repackaging

1.Modify and install plastic sheath (NSN 8465-00-001-6474). Modification instructions are contained in Equip Tips *The Combi-A New Firefighting Hand Tool*, February 1988, available from MTDC.
Order sheaths from:

Defense Personnel Support Center
2800 South 20th St.
Philadelphia, PA 19101-8419
Route Identifier S9T.

2. Package 10 each in carton NFES #0384, (46" x 11" x 8"—NSN 8115-01-307-2951)

G. Storage and Shelf Life Checks.

Per local cache requirements to ensure proper serviceability of tools.

ITEM: TOOL, COUNCIL — NFES #1807

A. Initial Inspection/Disposal Criteria

1. Inspect handles for cracks, slivers, and warping.
2. Check cutting teeth for cracks, excessive wear.
3. Check for loose rivets.
4. Check mounting head for cracks, loose handles.

B. Tests

1. Apply pressure on handle, checking for cracks or slivers overlooked in visual inspection.
2. Hand check each cutter tooth for loose rivets.

C. Refurbishing Procedures

1. Replace broken, cracked, or slivered handles.
2. Replace broken or cracked tooth, flat surface inside.
3. Tighten loose rivets.
4. Grind on even bevel, use sickle stone.
5. Retain square point on cutter teeth.
6. DO NOT ROUND CORNERS.
7. Keep handle smooth with fine sandpaper.
8. Additional standards in Firefighter's Guide.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean head with fine wire brush.
2. Clean handle with damp cloth.

F. Repackaging

1. Oil cutting edge.
2. Sheath with NFES #1854 McLeod sheath.
3. Package 10 each in carton NFES #0305—56" x 20" x 11" (NSN 8115-00-139-0690).

G. Storage and Shelf Life Checks

Per local cache requirements to ensure proper serviceability of tools.

ITEM: TOOL, FIRE SWATTER — NFES #1868

A. Initial Inspection/Disposal Criteria

1. Inspect handle, flapper, and metal that connects the two parts.
2. Dispose of if handle is cracked or broken, flapper has large chunks missing, or is badly weathered.

B. Tests

1. Push down on handle to check for strength, cracks.
2. Look down length of handle to check for warping.
3. Ensure that connection between handle and flapper is in good condition.

C. Refurbishing Procedures

1. Check handle for roughness.
2. Sand down handle until smooth if necessary.
3. Visually inspect flapper condition.

D. Retesting Criteria

None.

E. Cleaning Procedures

Wire brush and wash any mud and residue off handle and flapper.

F. Repackaging

1. Cache option for repacking swatters in bundles of 5 or 10 and plastic wrap the handles into group.
2. Store in this condition (at this time tool is not boxed).

G. Storage and Shelf Life Checks

Per local cache requirements to ensure proper serviceability of tools.

ITEM: TOOL, HOE, ADZE — NFES #1396

A. Initial Inspection/Disposal Criteria

1. Modification to head,such as rivets through side of head to hold handle.
2. Cracked, damage or improper length of handle. Dispose of handle.
3. Nonstandard handle. Dispose of handle.
4. Tool head bent, twisted, cracked.

B. Tests

1. Heads are within specification. Not taped or rounded beyond sharpening to gauge standards.
2. Head is not twisted or bent.
3. Handle is tight. Check by pulling tool head away from handle.
4. No metal wedges in handle.

C. Refurbishing Procedures

1. Check handle tightness. If loose, drive the handle into the head using a four-pound blacksmith hammer and pound on the long planed side of tool head. Use wooden wedges between handle and tool head to provide more area of wood for proper tightness. When tight, nails will be driven into handle on underside of tool head to lock head into position. One nail to each side of handle on long plane of head. Handle is to be flush and is not to exceed 3/8 inch protrusion from tool head.
2. With head tight, the head will be sand blasted to remove all foreign objects, such as dirt, burrs, rust, etc.
3. Sharpen grubbing edge to specifications according to tool sharpening gauge. Ensure that blade corners are square. Remove all burrs by hand file. Check with templet gauge.

CAUTION: Tool should NEVER be ground to the degree that the metal temperature rises high enough to remove temper, i.e., blue or burned edges.

4. Handle will be checked for proper length, cracks and chips.
5. Sand handle if it is chipped, dinged, rough or has other residue.
6. With handle, smooth, apply linseed oil to handle only. Remove all excess oil.
7. Apply rust inhibitor to tool head.

D. Retesting Criteria

Recheck handle tightness.

E. Cleaning Procedures

1. Remove all excess linseed oil from handle.
2. Check tool head for any contaminates—dirt, metal filings, etc.

F. Repackaging

1. Apply protective sheath to blade edge. (Sheath is to be made by cache warehouse person using rejected fire hose.)
2. Package 10 each in carton NFES #0338—37˚” x 18˚” x 8" (NSN 8115-00-139-0673).

G. Storage and Self Life Checks

Per local cache requirements to ensure proper serviceability of tools.

ITEM: TOOL, McLEOD — NFES #0296

A. Initial Inspection/Disposal Criteria

1. Obvious damage to cutting edge, rake fingers, and handle.
   a. Broken blade.
   b. Loose head.
   c. Missing or severely bent fingers.
   d. Short or nonstandard handle.

B. Tests

1. Head.
   a. Blade to be at least 1-/4" wide from handle base.
   b. Handle base not tilted, bent or distorted.
   c. Blade ends have not been rounded or severely tapered so that they cannot be ground to specifications.
   d. Proper angle of cutting edge as per tool sharpening gauge NFES #0510.
2. Handle.
   a. Check that handle is straight.
   b. Check for cracks, chips or open grain.
   c. Head loose on handle (loose or missing rivets).
   d. Tape residue, or other residue (tar, sap, etc.).

C. Refurbishing Procedures

1. Head.
   a. Remove dirt and grime with wire brush or hose off head.
   b. Square up blade if necessary.
   c. Paint tool head with rust inhibitor.
   d. Sharpen cutting edge 1/8 inch wide at 50º angle. Ensure that blade corners are square.
   e. Check large nut on head and tighten or replace as needed.
2. Handle.
   a. Sand handle if it is chipped, dinged, rough, or has any type of residue.
   b. Wipe handle with rag and linseed oil.

D. Retesting

None.

E. Cleaning Procedures

See Section C.

F. Repackaging

1. Install plastic sheath NFES #1854.
2. Package 10 each in carton NFES #0305; 56" x 20" x 11"; (NSN 8115-00-139-0690).

G. Storage and Shelf Life Checks

Per local cache requirements to ensure proper serviceability of tools.

ITEM: TOOL, PULASKI NFES #0146

A. Initial Inspection/Disposal Criteria

1.Obvious structural damage to cutting edges or head.
2. Dispose of tool if modifications to head, such as rivets through side of head to hold handle.

B. Tests/Inspections

1. Head.
   a. Head is within specifications as per gauge.
   b. Grubbing end is not bent/twisted.
   c. Blade or grubbing hoe ends have not been tapered, or rounded to point the tool cannot be sharpened to meet gauge standards.
2. Handle replacement.
   a. Twisted, bent or open grain.
   b. Cracks, or suspect based on sound of hammer rap on end of handle. Sharp ringing sound = good. Dull thud sound = suspect, or pressure application to side of handle.
   c. Head is loose and/or contains metal wedges.
   d. Handle has been shortened.
   e. Nonstandard handle.

C. Refurbishing Procedures

1. Head.
   a. Clean head.
   b. Sharpen tool to specifications as per tool sharpening gauge NFES #0510. Ensure that blade corners are square.

CAUTION: Tool should NEVER be ground to the degree that the metal temperature rises high enough to remove temper, i.e., blue or burned edges.

   c. Optional finish-paint tool head with a rust inhibitor.
2. Used handles.
   a. Clean handle.
   b. Sand handle if it is chipped, dinged, rough or has tape or other residues.
   c. Optional finish-linseed handles.
3. New handles.
   Local replacement-utilize NFES #1857 handle with plastic wedge or wood wedges secured using epoxy of appropriate type.
4. Metal wedges can be added only in the field as an emergency measure for field refurbishing.

D. Retesting Criteria

None.

E. Cleaning Procedures

See Section C.

F. Repackaging

1. Install plastic sheath NFES #0257.
2. Package 10 each in carton NFES #0338; 37˚ x 18 ˚ x 8"; (NSN 8115-00-139-0673).

G. Storage and Shelf Life Checks

Per local cache requirements to ensure proper serviceability of tools.

ITEM: TOOL, SHOVEL NFES #0171

A. Initial Inspection/Disposal Criteria

1. Obvious damage to cutting head, step plate and handle.
2. Loose head, severely rounded, distorted or bent blade.
3. Blade less then 3-3/4 inch from center to edge on both sides.
4. Blade has been modified by improper grinding or filing, such as modification of step plate.
5. Short or nonstandard handle.

B. Tests/Inspections

1. Head.
   a. Blade distortion or bent.
   b. Blade to be at least 7-1/2 inch wide.
   c. Shank not bent or handle base tilted.
   d. Blade tip that has been severely rounded.
2. Handle.
   a. Check that handle is straight.
   b. Check for cracks, chips, or open grain.
   c. Tape residue, or other residue (tar, sap, etc.).

C. Refurbishing Procedures

1. Head and handle.
   a. Wash and wipe dry.
   b. Sand handle if it is rough, chipped, dinged, or has any type of residue.
   c. Sharpen cutting edge using tool sharpening gauge NFES #0510.

Caution: Tool should NEVER be ground to the degree that the metal temperature rises high enough to remove temper, i.e., blue or burned edges.

   d. Paint tool head with rust inhibitor
   e. Wipe handle with rag and linseed oil.

D. Retesting Criteria

None.

E. Cleaning Procedures

See Section C.

F. Repackaging

1. Install plastic sheath NFES #1853.
2. Package 10 each in carton NFES #0337; 55 x 12˚ x 11∫; (NSN 8115-00-139-0689).

G. Storage and Shelf Life Checks

Per local cache requirements to ensure proper serviceability of tools.

ITEM: TORCH, DRIP — NFES #0241

A. Initial Inspection/Disposal Criteria

1. Tank is dented to point leakage occurs.
2. Lock ring will not seal due to thread damage.
3. Salvage usable component parts.

B. Tests

CAUTION: Remove any residual fuel before testing.

Visually inspect tank for cracks, splits, and obvious damage which may cause tank to leak.

C. Refurbishing Procedures

1. Steam clean or wash with mild degreaser soap, rinse with clean water, check for and remove any scab deposits inside tank.
2. Replace igniter if screen is ruptured, crushed, or tiller is burned out or carbonized. Some carbonization can be cleaned with wire brush.
3. Tighten screw that holds igniter and screen in place.
4. Ensure that discharge plug and chain are attached to tank cover assembly.
5. Install discharge plug into tank cover assembly.
6. Thoroughly dry all components with clean rag and air hose.
7. Insert spout into tank and tighten lock ring.

D. Retesting Criteria

None, other than Section B, if required.

E. Cleaning Procedures

See Section C.

F. Repackaging

Package one each in 8"x8"x16" carton. (NSN 8115-00-079-8693).

G. Storage and Shelf Life Checks

None at this time.

ITEM: VALVE, AUTO CHECK & BLEEDER* NFES #0228

A. Initial Inspection/Disposal Criteria

1. Visually inspect.
2. Inspect for missing parts (valves, plugs and gasket).
3. Inspect handle.
4. Inspect threads.

B. Tests

1. Pressure testing.
   a. Install valve on test pump.
   b. Close handle.
   c. Attach caps or nozzle for testing.
   d. Test for leaks at 250 psi.
      (1) Check for leaks around female coupling.
      (2) Check for leaks around male flange.
      (3) Check for leaks under top of handle shaft.
      (4) Check for leaks on bottom end of handle shaft.
      (5) Check for leaks in casing.
      (6) If valve is found defective, repair.
      (7) Validate the check valve (flapper) is operational.

C. Refurbishing Procedures

Replace missing or damaged parts (O-ring, gasket and handle).

D. Retesting Criteria

Retest after repair.

E. Cleaning Procedures

1. All items will be washed and cleaned of foreign matter, such as mud, dirt and grease.
2. Rinse thoroughly.
3. Stand upright to drain and dry.
4. Lubricate with appropriate dry lubricant such as Graphite.
   a. Female coupling.
   b. Wipe off excess.

F. Repackaging

Local cache option for repackaging.

G. Storage and Shelf Life Check

None at this time.

ITEM: VALVE, FOOT, 1 1/2” NH-F W/STRAINER* NFES #0212
VALVE, FOOT, 2" NPSH W/STRAINER* NFES #0906

A. Initial Inspection/Disposal Criteria

1. Visually inspect.
2. Inspect for missing parts (screws, screen, and adaptor when required).
3. Inspect for damaged threads and gaskets.

B. Tests

Ensure valve assembly functions.

C. Refurbishing Procedures

Repair or replace missing parts.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. All items will be washed and cleaned of foreign matter, such as mud, dirt and grease.
2. Rinse thoroughly.
3. Stand upright to drain and dry.

F. Repackaging

Local cache option for repackaging.

G. Storage and Shelf Life Checks

None at this time.

ITEM: VALVE, PRESSURE RELIEF, 1 1/2" NH-F* NFES #0229

A. Initial Inspection/Disposal Criteria

1. Visually inspect
2. Inspect for missing parts
3. Inspect handle
4. Inspect threads

B. Tests

1. Pressure testing
   a. Install valve on test pump
   b. Close handle
   c. Attach cap or nozzle for testing
   d. Test for leaks at 250 psi
      (1) Check for leaks around female coupling
      (2) Check for leaks under top of handle shaft
      (3) Check for leaks on bottom end of handle shaft
      (4) Check for leaks in casing.

C. Refurbishing Procedures

Replace missing or damaged handle.

D. Retesting Criteria

Retest after repair. See Section B.

E. Cleaning Procedures

1. All items will be washed and cleaned of foreign matter, such as mud, dirt, and grease.
2. Rinse thoroughly.
3. Stand upright to drain and dry.

F. Repackaging

Local cache option for repackaging.

G. Storage and Shelf Life Checks

None at this time.

ITEM: VALVE, SHUTOFF, BALL — NFES #1201, 1207, 0738*

A. Initial Inspection/Disposal Criteria

Check for obvious damage:

1. Check for burrs.
2. Check tail gasket.
3. Must turn freely.
4. Fire damage.

B. Tests

1. Tail gasket:
   a. Replace if missing.
   b. In good condition, not cracked or stiff.
   c. Must be seated properly.
2. Install valve on test pump.
3. Close valve and turn on water to valve.
4. Open valve to expel air then close valve.
5. Turn on pump to 250 psi.
   a. NFES #1201 & NFES #1207.
   b. NFES #0738 test at 100 psi.
6. Check for leaks.
   a. Around the tail gasket.
   b. At the handles.
   c. If valve leaks, dispose through local procedures.

C. Refurbishing Procedures

Replace cracked or missing tail gasket.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. All items will be washed and cleaned of foreign matter, such as mud, dirt and grease.
2. Clean in a dishwashing detergent with brush or scouring pad as needed.
3. Do not soak for extended periods of time or the detergent will corrode the metal.
4. Rinse thoroughly
5. Stand upright with barrel in open position to drain water and dry.

F. Repackaging

Pack 10 each in 8" x 8" x 16" carton (NSN 8115-00-079-8693).

G. Storage and Shelf Life Checks

None at this time.

ITEM: VALVE, WYE **NFES #0259, 0231, 0739**

A. Initial Inspection/Disposal Criteria

Check for obvious damage:

1. Handles.
   a. Bent, if it has a slight bend, replace the handle.
   b. Broken.
   c. Missing.
   d. Too tight.
   e. Too loose.
   f. Expansion pins coming out or missing.
   g. Handles positioned properly.
   h. Correct handle, left and right.
   i. Burrs.
2. Male flange, lock ring and setscrews:
   a. Damaged threads.
   b. Missing.
   c. Smooth, flat surface on flange.
   d. Burrs.
   e. Loose.
3. Female coupling:
   a. Coupling spins freely, if not throw away.
   b. Tail gasket is present.
   c. No rough burrs.
4. Casting (body):
   a. Fire damage, look for further damage, “0” rings.
   b. Corrosion.
   c. Cracks.
   d. Burrs.
5. Plastic Sphere
   Inspect sphere while turning handle; if pitted or rough, replace.

B. Tests

1. Pressure Testing: (NFES #0259 & NFES #0231 test at 250 psi for 3 minutes)
   (NFES #0739 test 100 psi for 3 minutes)
   a. Install valve on test pump.
   b. Close handles.
   c. Turn on water to valve.
   d. Open handle to expel air.
   e. Turn on pump and check valve for leaks.
      (1.) If valve is found to be defective, repair as needed.
      (2.) Retest after repair.

C. Refurbishing Procedures

Replace worn, cracked, or missing “O” rings or tail gasket.

D. Retesting Procedures

Retest if “O” rings or gasket are replaced as per Section B.

E. Cleaning Procedures

1. All items will be washed and cleaned of foreign matter, such as mud, dirt and grease. Clean in a dishwashing detergent with brush or scouring pad as needed. Do not soak for extended periods of time or the detergent will corrode the metal.
2. Rinse thoroughly.
3. Stand upright with handles in open position to drain water and dry.
4. Lubricate with appropriate type of dry lubricant such as Graphite.

F. Repackaging

Local cache option for carton. Carton must provide adequate protection for both the handles and the threads.

G. Storage and Shelf Life Checks

None at this time.

ITEM: WYE, CONNECTION* **NFES #0839**
WYE, SIAMESE* **NFES #0739, 0883**

A. Initial Inspection/Disposal Criteria

1. Check for damage.
2. Tail gasket.
3. Burrs.
4. Damaged threads.
5. Body.

B. Tests

1. Clean threads.
2. Cap male ends.
3. Attach to test pump.
   a. NFES #0839 & NFES #0883 test at 200 psi.
   b. NFES #0739 test at 100 psi.
4. Check for leaks.
5. Discard if leaking.

C. Refurbishing Procedures

Replace worn, cracked or missing tail gasket. Replace tail gaskets if missing, cracked or stiff.

D. Retesting Criteria

Retest if tail gasket was replaced.

E. Cleaning Procedures

1. Wash to remove all mud, dirt and grease. Clean with dishwashing detergent, brush and scouring pad as needed.
2. Do not soak. Detergent may corrode metal.

F. Repackaginng

1. Local cache option for repackaging.

G. Storage and Shelf Life Checks

None at this time.

NOMEX® Aramid Fiber Laundering Guide

FOR MORE INFORMATION,
PLEASE CALL 1-800-453-8527 OR WRITE:

DuPont
Advanced Fibers Systems
Chestnut Run Plaza
Laurel Run Building
Wilmington, DE 19880-0705

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SECTION I: INTRODUCTION TO NOMEX® ARAMID FIBER

GENERAL INFORMATION

Garments of NOMEX® aramid fiber have been used for more than 30 years for protection against fire-related personal injury. During this time, the line of NOMEX® products has been expanded and improved to include products made from fiber blends, such as blends of NOMEX® with KEVLAR® and static-dissipative fibers. The family of NOMEX® aramid fibers now includes:

1. 100% NOMEX® T-450, which is used in its natural, undyed state or dyed for sewing thread;

2. NOMEX® III, a blend of NOMEX® and KEVLAR®;

3. NOMEX® IIIA, a blend of NOMEX®, KEVLAR® and a static-dissipative fiber; and

4. Producer-colored NOMEX®, which is supplied in a blend with KEVLAR® and may also be supplied with a static-dissipative fiber.

The introduction of new, low-temperature detergent formulations has resulted in improved washfastness for garments of NOMEX®. Accordingly, DuPont has modified its recommended procedures for laundering garments of NOMEX®. The revised procedures outlined in this bulletin are designed to remove flammable contaminants and maximize garment life.

Properly dyed and finished garments of NOMEX® are inherently flame resistant. No laundry procedures are known to remove the flame resistance of NOMEX®. However, thermal protection can be compromised by the presence of flammable contaminants on the garment, or on the fabric from which it is made. Even though garments of NOMEX® are inherently flame resistant, flammable contaminants on the garments can ignite and burn until consumed, thus increasing heat transfer to the wearer.

Laboratory tests have shown that the procedures recommended in this bulletin are effective in removing oil-based soils from garments while minimizing the impact on colorfastness and wear life. Users of textile items made of NOMEX® should ensure that the techniques they use achieve similar results.

This bulletin is intended to provide general recommendations on conditions and products for laundering garments of NOMEX®. Throughout the remainder of this bulletin, all variations of NOMEX® and blends of NOMEX® will be referred to as NOMEX®. The products and conditions described in this bulletin performed well in laboratory evaluations; other conditions and products may provide equivalent results. To achieve the best results for specific applications, assistance should be obtained from chemical suppliers for the chemicals used.

SECTION II: COMMERCIAL LAUNDERING GARMENTS OF NOMEX® ARAMID FIBER

SORTING AND WASH WHEEL LOADING

Garments of NOMEX® should be washed separately from other articles to avoid contamination with lint of flammable fibers. In addition, to avoid possible staining of light-colored garments, dark-dyed garments of NOMEX® should be sorted and washed separately from very light shades or undyed articles.

To ensure thorough cleaning, washer loads for garments of NOMEX® should be approximately 2/3 the weight of loads recommended by the wash wheel manufacturer for 100% cotton goods. However, because garments of NOMEX® generally weigh less than their all-cotton counterparts, no significant loss in the number of garments processed per wash cycle should be experienced.

WASHING SUPPLIES

A source list for laundering products is presented in Appendix I. Laboratory tests have shown these products to be effective; other products also may provide acceptable results.

Detergent

Many commercial and industrial detergent formulations have been evaluated in the laboratory for their cleaning effectiveness and impact on washfastness. Tests show that formulations designed for use at a temperature of 140ºF (60ºC) or less—such as high-surfactant, low-alkalinity products—adequately clean NOMEX® and provide the best fabric color retention. Color loss after 200 launderings in a commercial wash wheel using these formulations has been found to be minimal. The use of soaps for laundering NOMEX® is not recommended due to the potential formation of insoluble scums with hard water. Soap scums may be flammable and could adversely affect the thermal protective performance of the garment.

Alkalinity (pH)

The detergents listed in Appendix I have pH values ranging from 9 to 11 and have been found to effectively lift dirt and oil from the NOMEX® fiber. The use of higher wash temperatures and detergent formulations with higher alkalinity will improve cleaning; however, these harsher conditions can negatively impact the colorfastness of the garments. Users must choose appropriate laundering conditions to maintain the desired balance between garment cleanliness and color retention.

Bleach

Only oxygen-based bleach is recommended for use on garments of NOMEX®— chlorine bleach should not be used. Although chlorine bleach will not affect the inherent flame resistance of NOMEX®, it may cause strength and color loss in garments over time.

Sour

When laundering items of NOMEX®, the use of a sour after thorough rinsing helps ensure that any remaining traces of alkalinity are neutralized.

Softeners, Anti-Stats and Wicking Agents

The following wash wheel supplies perform useful and often highly desirable functions when applied to the load in the last operation:

- Fabric softeners* impart a softer “hand” to the fabric and assist in wrinkle removal when articles of NOMEX® are tunnel or tumble dried.

- Anti-stats* reduce the effects of nuisance static electricity, such as clinging and lint pick-up. Nuisance static is fairly common with textiles, especially in low-humidity environments. Under normal conditions, garments of NOMEX® IIIA do not require the use of anti-stats because NOMEX® IIIA contains a proprietary static-dissipative fiber.

*Some materials when added to garments may have a negative impact on thermal protection. The impact of fabric softeners, wicking agents and anti-stats should be evaluated at the intended use level prior to routine use.

NOTE: Although certain anti-stats can provide a high degree of static control when properly applied in the wash wheel, they cannot ensure safety in situations where a discharge of static electricity could create a hazard to life or property, such as in an explosive or highly flammable environment. For this reason, it is important that personnel and equipment be properly grounded for maximum safety.

- Wicking agents* help fabrics adsorb and spread moisture. Experience suggests that these characteristics contribute to comfort in warm, humid environments by helping to rapidly dissipate perspiration, thereby taking full advantage of the cooling effect of evaporation.

Non-Durable Water and Oil Repellents

Water and oil repellency may be a desirable feature in some industrial applications. If the original fabric has not been treated with a repellent, water and oil repellency can be obtained by using sprays or laundry-applied chemicals. Laboratory tests have shown that fluorocarbon sprays, such as Winsol® Fireline Water Repellent, and laundry additives, such as ZONYL® 6991, when applied according to manufacturers' recommendations, will impart water and oil repellency to garments of NOMEX® with minimal effect on the thermal protection of the garment. These materials will cause liquids to bead on the fabric surface and minimize wicking into the fabric. They will not, however, prevent liquids from being forced through the open structure of the fabric.

For example, ZONYL® 6991 may be applied in conjunction with AVITEX® DN without reducing its anti-static activity. However, the wicking action of the AVITEX® DN will be compromised due to the repellency imparted by the ZONYL® 6991. The use of these or other chemicals should be evaluated with respect to the particular oils and/or solvents encountered to determine if they meet the required chemical and thermal protective performance criteria. In addition, because these water repellents may wear away or wash out, re-treatment may be necessary, especially after garment cleaning.

WASHING PROCEDURES

General Wash Formulas

The formulas in Appendices II and III have been developed to wash garments of NOMEX®. Within the limits of these general procedures, modifications should be made to meet the needs of particular types of wash loads and other specific quality standards. To achieve desired results, assistance should be obtained from chemical suppliers.

Wash Temperatures

The detergents listed in this bulletin are primarily designed to work at 140ºF (60ºC). At this temperature, these surfactant-based formulas effectively lift oily soil while maximizing color retention. For heavily stained and oily garments of NOMEX®, a higher temperature wash formula may be required for adequate cleaning. The use of higher temperature formulas will not affect the inherent flame resistance of the garments or their overall wear life. However, higher wash temperatures or alkalinity levels may adversely affect garment colorfastness. Where color loss is a concern, dry cleaning is an alternative method of removing heavy soil and may be preferable to repeated high-temperature washing.

Prevention of Soil Redeposition

To improve soil removal and minimize soil redeposition in heavily soiled loads, a "multiple add" procedure is recommended. Adding washing supplies to the suds cycle ensures that the concentration is kept high enough to keep the soil in suspension.

Rinsing

Garments of NOMEX® must be adequately rinsed to remove residual wash chemicals. Rinse cycles should be continued until the pH of the rinse closely approaches that of the water supply. To minimize washer-induced wrinkles, water temperature should be reduced in each succeeding rinse cycle until the last operation (sour), where it should be 90ºF (32ºC) or lower.

*Some materials when added to garments may have a negative impact on thermal protection. The impact of fabric softeners, wicking agents and anti-stats should be evaluated at the intended use level prior to routine use.

Souring

Residual alkalinity in garments of NOMEX® can cause skin irritation and other problems. To ensure that all traces of wash chemical alkalinity are neutralized, sour can be added to the final rinse cycle in the wash wheel. Garments should not be rinsed further after the sour is added. Overuse of sours should be avoided because it will result in highly acidic fabrics. Any standard or buffered sour is acceptable for use with garments of NOMEX®.

Softeners, Anti-Stats and Wicking Agents

Generally, softeners and anti-stats are not permanently affixed to fabrics. Instead, they should be applied in the last wash wheel operation, then reapplied at the end of each subsequent wash cycle. Most are compatible with sours and can be applied in the sour bath. When applying any proprietary laundry product in the wash wheel, it is essential to seek the supplier's advice on its exact use and possible effect on the flammability and thermal protection of the garment.

Although the use of anti-stats may not be required with garments of NOMEX® IIIA, the "feel" and wickability of such garments can be improved with softeners and wicking agents. For example, tests have shown that AVITEX® DN softens fabrics of NOMEX®, reduces static propensity and significantly improves wicking, without adversely affecting thermal protection.

When using AVITEX® DN, the following should be noted (see Appendices II and III):

• AVITEX® DN does not permanently attach itself to the NOMEX® fiber; therefore, it must be reapplied or "added on" at the end of each wash cycle.

• AVITEX® DN is compatible with sours and can be conveniently applied during the souring step.

• AVITEX® DN tends to foam profusely. To control this foaming action, a very small amount of an effective anti-foam agent can be applied to the bath.

• As with sours, garments should not be rinsed after AVITEX® DN is applied.

• When applying AVITEX® DN, the cycle time should be extended to ensure complete and uniform distribution on the garments.

• Within the limits recommended, AVITEX® DN does not adversely affect the thermal protective performance of garments of NOMEX®.

• The "add-on" of AVITEX® DN is a function of both the concentration in the final cycle and the percentage of "wet pickup" (the moisture retained after the final cycle and extraction).

• AVITEX® DN add-on can be improved by raising the concentration in the final rinse and/ or increasing the percentage of wet pickup.

• The amount of AVITEX® DN added to the wheel should not be reduced for partial loads. Always add AVITEX® DN in the amount calculated for a full load, unless the water level in the final bath cycle has been reduced.

• Contamination of the AVITEX® DN supply by detergents should be avoided because it can destroy the anti-static property. Keep the supply container closed to avoid evaporation and drying out. Gelling or thickening of the AVITEX® DN indicates product alteration or deterioration. In such cases, the supply should be replaced.

CAUTION: When using AVITEX® DN, avoid contact with the eyes or skin. In the event of contact with the eyes, flush the eyes thoroughly with water for at least 15 minutes and consult a physician. In the event of skin contact, wash thoroughly with soap and water. For detailed use instructions, consult the DuPont Material Safety Data Sheet for AVITEX® DN.

Effective softening, static suppression and wicking are achieved with garments of NOMEX® when AVITEX® DN is applied, as recommended, to give a calculated 0.50% to 0.75% add-on, based on the dry weight of the garment. Achieving the desired add-on depends on a number of factors that vary with different laundry procedures. Appendix IV provides definitions of the essential terms employed and gives two examples of how to calculate the amount of AVITEX® DN softener necessary to achieve the desired add-on. Appendix V contains a chart that can be used when the percentages of wet pickup and wheel volumes are known.

AVITEX® DN tends to cause foaming, which may overrun the wash wheel. Excessive foaming reduces agitation and will retard or prevent the uniform distribution of the softener/anti-stat in the wheel. If foaming is excessive, it can be controlled by adding approximately 0.005% of Dow Corning® Antifoam 1430 to the wheel when the softener/ anti-stat is added. This level of antifoam is equivalent to approximately 0.67 oz/100 gal. (5 g/100 L) of liquid in the wash wheel. Silicone anti-foams can result in water treatment problems because they are not easily biodegradable. Check manufacturers' recommendations before using these products.

Repellents

Some fabrics are treated with water repellents during the manufacturing operation prior to the fabrication of garments. These treatments may last for many cleanings, but are not considered permanent. Other repellents are available that can be applied during or after laundering to previously untreated garments, or to previously treated garments that have lost their repellency. Repellent applications will reduce moisture wicking and can make garments that come in contact with the body less comfortable in hot, humid weather. In addition, repellent chemicals may be flammable. Before applying any repellent, it should be evaluated to determine if it will impact the thermal protective performance of the garment.

Repellents can reduce the penetration of oils, solvents and water through the fabric by causing them to bead up on the fabric surface. The level of repellency depends on the type and level of the material being applied, as well as the characteristics of the soils coming into contact with the garment. Fabrics used in industrial work or laboratory garments are not designed to be chemical or liquid barriers. Thus, where exposure to hazardous materials must be prevented, an appropriate chemical barrier suit must be worn.

Winsol® Fireline Water Repellent is available as an aerosol spray or in bulk form. It is an example of a repellent that can be sprayed onto the surface of a clean, dry garment. It must be applied in a well-ventilated area, and the solvent must be allowed to evaporate before garment use. This material will wash out completely after several launderings and must be reapplied to maintain repellency. The amount applied should be the minimum required to obtain the desired repellency. Repellency can be determined by applying a drop of liquid (water, oil or solvent) to the fabric surface to determine whether it wicks into the fabric or beads on the surface. Not all liquids will be repelled. Contact the manufacturer for applicability and impact on fabric flammability.

Another repellent, ZONYL® 6991, is applied in the final wash wheel rinse and is exhausted onto the fabric by adjusting the pH and increasing the water temperature. Garments must be hot-air dried after application for this repellent to be effective. Under the conditions shown in Appendix VI, approximately 80% of the material added to the final rinse will be exhausted onto the garments. An initial level of 2% to 3% on the dry weight of the garment is required for noticeable repellency of water or motor oil. ZONYL® 6991 may or may not be removed during the cleaning process, depending on the procedures used. Additional repellent should not be added during subsequent cleaning cycles unless indicated by a repellency test. Buildup or application of excessive levels of repellents can increase the level of flammable material and compromise the thermal protective performance of the garment. Use for specific applications should be evaluated prior to general adoption.

If AVITEX® DN is normally used for static control, it should be added with ZONYL® 6991 in the final rinse. If AVITEX® DN is added earlier in the wash procedure, it can be removed during further rinsing. The same holds true for ZONYL® 6991.

DRYING AND FINISHING

General Guidelines

Garments of NOMEX® can be rapidly dried and finished with good appearance using several methods. Economic savings are possible if drying and finishing are combined into one step, as with the wet-to-dry tunnel method.

No matter which method is chosen, every effort should be made to avoid introducing hard-set and unnecessary wrinkles during washing or extraction. For best results, garments should not be bagged. However, if bagging is necessary, the bags should not be filled to more than half their capacity to ensure that the garments have adequate freedom of movement. Similarly, the wash wheel should not be overloaded. After the break and suds cycles, the water temperature should gradually be reduced through several rinse cycles to avoid introducing "thermal shock" wrinkles, which can be very difficult to remove. The final operation (sour) should be carried out at a temperature of 90ºF (32ºC) or lower.

Garments should not be fully extracted unless they are to be pressed. If an extraction is used as a preliminary step to other finishing methods, garments should be cold and subjected only to very brief and light hydraulic or centrifugal pressure. Extraction will reduce softener add-on by diminishing water carry-over; thus, a higher softener concentration in the final rinse will be required to achieve the desired add-on.

Tumble Dry Conditioning/Finishing

In some instances, tumble dry conditioning is the only finishing necessary for garments of NOMEX®. Tumble dry conditioning also can be done prior to dry-to-dry tunnel finishing or pressing. Adequate tumbling action is necessary for good wrinkle removal; therefore, tumble dryers should not be overloaded. Garments will dry rapidly and satisfactorily at exhaust air temperatures between 140ºF (60ºC) and 160ºF (71ºC). Garment temperature measured in the basket should not exceed 280ºF (138ºC). Excessive shrinkage and color loss can occur if higher temperatures are encountered. Tumbling without heat for an additional 10 minutes at the end of the drying cycle will cool the garments and help avoid dryer-induced wrinkles. To avoid set-in wrinkles, garments should not remain in a hot tumbler when it is not in motion, nor should they be folded or stacked.

Wet-to-Dry Type Tunnel Drying/Finishing

With this method, wet garments from the wash wheel are hung on hangers, placed on a conveyor and passed through a tunnel containing forced air supplied at 300ºF (149ºC) dry bulb and 190ºF (88ºC) wet bulb. Garments subjected to this combination of heat and air movement dry and finish wrinkle free and ready to wear. Garment temperature should not exceed 280ºF (138ºC). After exiting the tunnel, garments should hang freely and should not be compressed against other garments until they have cooled to below 100ºF (38ºC).

Dry-to-Dry Type Tunnel Drying/Finishing

After being conditioned in a tumble dryer, garments can be hung on hangers and rapidly and continuously conveyed through an abbreviated finishing cabinet. Steam, heat and forced air agitation minimize wrinkles and allow processing in a short period of time.

Pressing

If pressing is required, a steam-heated hot head press is recommended with a steam pressure of 80 psig (325ºF [163ºC]) and a steam/bake/vacuum cycle of 5/10/5 seconds. If an electrically heated hot head is used, a temperature of 375ºF (191ºC) should be used for 20 seconds as a starting point. Garments should be examined for glazing and dye sublimation before adopting these methods on a commercial basis.

SECTION III: HOME LAUNDERING

GARMENTS OF NOMEX® ARAMID FIBER

GENERAL GUIDELINES

Garments of NOMEX® can be washed and dried by any conventional home method, followed by hand ironing if necessary. No special technology is needed for home laundering garments of NOMEX®. However, home procedures may not remove the last traces of very heavy, widespread or ground-in soils, which may be flammable and could adversely affect the thermal protective performance of garments of NOMEX®.

If home laundering does not remove contaminants or contaminant build-up, garments can be periodically dry cleaned or commercially laundered. When garments are contaminated by hazardous materials, only commercial or on-site laundering or dry cleaning should be used with the appropriate wastewater treatment techniques.

The following procedures can help provide optimum cleaning:

Sorting

Garments of NOMEX® should be sorted and washed separately from other garments to prevent contamination with lint of flammable fibers.

Pretreating

Stains, as well as deep soil lines on the collars and cuffs of garments, are more readily removed if pretreated. Stains should be pretreated at the earliest opportunity and sufficient time allowed for the pretreatment material to penetrate and loosen the soil. The heavily soiled or stained areas should be rubbed with a full-strength, heavy-duty liquid detergent or any off-the-shelf laundry pretreatment product.

Preparing the Wash Load

Before laundering garments of NOMEX®, pockets should be emptied, pants cuffs cleaned out and zippers closed.

Load Size

When laundering garments of NOMEX®, it is important not to overload the machine. To ensure a cleaner wash and avoid setting wash wrinkles, the load size must permit clothes to move freely through the wash water and rinse cycle. Regardless of the machine's rated capacity in pounds, bulk—not weight—should be the limiting factor.

Wash Water Temperature

Moderate soil levels may be removed adequately at normal wash water temperature settings. Heavily soiled and stained garments of NOMEX® require a higher water temperature setting.

Detergents

Synthetic, heavy-duty liquid laundry detergents are recommended for washing garments of NOMEX®. These "designed" products do a superior job of removing soils and are less likely than soap to form sticky deposits of lime soap curds, which are difficult to rinse out. Fatty-based soaps should not be used. Under-use of detergent results in poor soil removal and frequently causes suspended soils to redeposit on the clothes. Failure to use a sufficient amount of detergent is the single greatest cause of inadequate home cleaning.

Water and Water Conditioners

For best results, an adequate supply of "soft" water is required for home laundering garments of NOMEX®. "Hard" water contains minerals, such as calcium and magnesium salts, that combine with fatty-based soaps to form insoluble film, scum or curd. These insoluble contaminants are difficult to rinse from fabrics, may be flammable and could adversely affect the thermal protective performance of garments if not adequately removed. Soap is not recommended, but if it is used in hard wash water (more than approximately 7 grains/gal., 120 mg/L or 120 ppm), a nonprecipitating-type water conditioner should be added. Softening the water reduces soap consumption and improves the quality of washing.

Bleaches

Only oxygen-based bleaches should be used on garments of NOMEX®—chlorine bleach should not be used. Although chlorine bleach will not affect the inherent flame resistance of NOMEX®, it may cause strength and color loss in garments over time.

Fabric Softeners and Anti-Stats*

Under normal conditions, garments of NOMEX® IIIA do not require the use of anti-stats because NOMEX® IIIA contains a proprietary static-dissipative fiber. Nevertheless, numerous washer- and dryer-applied fabric softeners are available for use in home laundry equipment. These products improve the "feel" of items of NOMEX® and can reduce the nuisance effects of static electricity— such as lint pick-up and clinging—that are often experienced with textiles. However, they are not as effective as industrial anti-stats applied in the wash wheel.

NOTE: Anti-static additives cannot ensure safety in situations where a discharge of static electricity could create a potential hazard to life or property. If garments of NOMEX® will be worn in an area where explosive or highly flammable materials are present, it is important that personnel and equipment be properly grounded for maximum safety.

Tumble Drying

Garments of NOMEX® will have a smoother appearance when tumble dried instead of being line or drip dried. To ensure maximum removal of wrinkles, tumble dryers should not be overloaded.

Drying time varies with the nature and size of the load. Garments of NOMEX® dry faster than all-cotton garments of the same weight. When tumble dried at the medium- or high-temperature setting, a properly sized load usually dries in approximately 20 minutes.

Machines designed to give the best automatic wash-and-wear or durable-press performance are programmed so that the blower fan and clothes drum continue to operate five to 10 minutes after the heater turns off. This provides a cool-down period for the garments and helps minimize wrinkles. Tumble dryers with this capability usually feature a control dial or push button with a "Wash-and-Wear" or "Durable Press" setting that provides the proper temperature and a cool-down cycle.

Ironing

If garments of NOMEX® need touch-up pressing, a steam or dry iron may be used at the medium setting.

*Most dryer sheet and some liquid fabric softener products contain disclaimers from the manufacturer stating their product should not be used on children's sleepwear or FR garments. If used in home laundry applications, products with no disclaimer should be selected.

SECTION IV: DRY CLEANING

GARMENTS OF NOMEX® ARAMID FIBER

GENERAL GUIDELINES

There are times when dry cleaning garments of NOMEX® is desirable for economic reasons or because greases and oils cannot be adequately removed during home or commercial laundering. Garments of NOMEX® can be satisfactorily dry cleaned in any conventional commercial dry-cleaning system. With heavily soiled garments, using a two-bath cycle may improve soil removal and minimize redeposition. Garments of NOMEX® should be cleaned separately from articles of other materials to avoid contamination with lint of flammable fibers. The practice of maintaining a clean solvent supply must be observed.

No special technology exists for applying anti-stat treatments to garments of NOMEX® during dry cleaning. Some suppliers to the dry-cleaning industry offer anti-stat treatments for dresswear that also can be used with uniforms of NOMEX®. If equipment is available, dry-cleaned garments of NOMEX® also can be treated with AVITEX® DN softener from a water solution, as described in the commercial laundering section of this bulletin.

SECTION V: REMOVING SPOTS AND OTHER NON-STANDARD

CONTAMINANTS FROM GARMENTS OF NOMEX® ARAMID FIBER

GENERAL GUIDELINES

Properly dyed and finished garments of NOMEX® are flame resistant. However, flame resistance can be compromised by the presence of flammable contaminants on the garment, or on the fabric from which it is made. Paint, heavy oily soils or other flammable materials encountered in an industrial environment can pose a hazard if not removed from the garment. In addition, these contaminants are unsightly and detract from the professional appearance of a high-quality garment.

For work assignments where employees are routinely exposed to paint, epoxy or other difficult- or impossible-to-remove contaminants, the use of flame retardant disposable coveralls as overgarments should be considered. This will minimize the cleaning task and prolong the life of the garment of NOMEX®. When accidental exposures occur, the contaminant should be removed as soon as possible before it sets in or dries. And, the contaminated garment should be clearly identified so the cleaning facility can spot clean the garment before routine laundering or dry cleaning.

The NOMEX® fiber is resistant to most chemicals typically used to launder, dry clean or spot clean garments, including special laundry detergent/solvent emulsifier formulations designed to remove paint, tar, adhesives and other difficult-to-clean stains. These special formulations can be used as either spot cleaners or as laundry or dry-cleaning additives. As an added precaution, they should be checked for compatibility with fabric of NOMEX® before any contaminant removal is attempted. The chemical supplier’s spotting and cleaning procedure recommendations should be followed.

Because these formulations may contain flammable solvents, garments should be cleaned by standard cleaning methods after spot cleaning. When chemical additives are used in laundering or dry cleaning, garments should be thoroughly rinsed to ensure the removal of any residual flammable solvents.

Several technical bulletins describing the resistance of NOMEX® to various chemicals are available through the DuPont Product Information Center (800-441-7515) or the DuPont Aramids Telemarketing Group (800-453-8527).

APPENDIX I: SOURCE LIST FOR LAUNDERING PRODUCTS*

Product/Trademark	Detergent Vendor
Alert Dynalite/Force Innovator Ultra Liquid Innovator Ultra Powder	Ecolab, Textile Care 370 Wabasha Street St. Paul, MN 55102 (800) 553-8683
Factor Plus* Liquid Factor* I Liquid Factor* II	Diversity Fabrilife 4480 Lake Forest Drive Cincinnati, OH 45242 (800) 862-8883
Surpass 2	U.N.X., Inc. P.O. Box 7206 Greenville, NC 27835-7206 (919) 756-8616
Choice	Washing Systems, Inc. (WSI) 1865 Summit Road Cincinnati, OH 45237 (800) 272-lWSI (272-1974)

Product/Trademark	Softeners/Anti-Stats Vendor
AVITEX® DN	DuPont Company Specialty Chemicals 1007 Market Street Wilmington, DE 19898 (800) 441-9442

Product/ Trademark	Antifoams Vendor
Dow Corning® Antifoam 1430	Dow Corning PHAC Customer Service P.O. Box 0994 Midland, MI 48686-0994 (800) 362-6373

Product/Trademark	Water/Oil Repellents Vendor
Winsol® Fireline Water Repellent	Winsol Laboratories 1417 N.W. 51st Street Seattle, WA 98107 (800) 782-5501
ZONYL® 6991	DuPont Company Specialty Chemicals 1007 Market Street Wilmington, DE 19898 (800) 441-9442

*NOTE: Listing of products in this appendix does not indicate a DuPont endorsement. Other products not listed in this appendix also may be acceptable laundering products for garments of NOMEX®- aramid fiber Other products that have not been tested but that belong to the same class of low temperature, low alkalinity, high surfactant-based products also may provide acceptable results.

APPENDIX II: SUGGESTED WASH PROCEDURE FOR LIGHTLY SOILED GARMENTS OF NOMEX® ARAMID FIBER*

Operation	Water Level, in. (cm)	Water Temp., ºF (ºC)	Time, min.	Supplies**/100 lb (45 kg) of Garments
Break	6 (15)	140 (60)	15	2.5 lb (1.1 kg) recommended detergent
Rinse	10 (25)	140 (60)	3	
Rinse	10 (25)	135 (57)	3	
Rinse	10 (25)	120 (49)	3	
Rinse	10 (25)	105 (41)	3	
Rinse	10 (25)	90 (32)	3	
Sour	6 (15)	Cold	10	1-4 oz. ammonium silicofluoride
Softener/Anti-Stat (optional)				AVITEX® DN***

*Load wheel to _ of its rated capacity.
**See Appendix I for laundry supplies.
***If used, apply 0.50% to 0.75% on weight of dry fabric, as described in text and Appendices IV and V.

APPENDIX III: SUGGESTED WASH PROCEDURE FOR HEAVILY SOILED GARMENTS OF NOMEX® ARAMID FIBER*

Operation	Water Level, in. (cm)	Water Temp., ºF (ºC)	Time, min.	Supplies**/100 lb (45 kg) of Garments
Break	6 (15)	160 (71)	20	2.5-3 lb (1.1-1.4 kg) recommended detergent
Flush	8 (20)	160 (71)	3	
Suds	6 (15)	160 (71)	10	1.25-1.5 lb (0.5-0.7 kg) recommended detergent
Rinse	10 (25)	160 (71)	3	
Rinse	10 (25)	160 (71)	3	
Bleach	10 (25)	150 (66)	5	oxygen-based bleach only
Rinse	10 (25)	150 (66)	3	
Rinse	10 (25)	135 (57)	3	
Rinse	10 (25)	120 (49)	3	
Rinse	10 (25)	105 (41)	3	
Sour	6 (15)	Cold	10	1-4 oz. ammonium silicofluoride
Softener/Anti-Stat (optional)				AVITEX® DN***

*Load wheel to _ of its rated capacity.
**See Appendix I for laundry supplies.
***If used, apply 0.50% to 0.75% on weight of dry fabric, as described in text and Appendices IV and V.

APPENDIX IV: APPLICATION OF AVITEX® DN SOFTENER/ANTI-STAT

Definitions

• Add-On—The calculated percentage of AVITEX® DN added to the dry weight of the goods. (AVITEX® DN is not substantiative to NOMEX® aramid fiber. This calculation assumes that none of the "as received" formulation is lost due to evaporation during the drying cycle.)

• Wet Pickup—The percentage of liquid* carried by the goods that contains AVITEX® DN after the final cycle of the wash wheel.

$$\%\ \text{Wet Pickup} = \frac{\text{wet weight**} - \text{dry weight}}{\text{dry weight}} \times 100$$

• Solution Concentration—The percentage of AVITEX® DN in the final cycle of the wash wheel.

$$\%\ \text{Solution Concentration} = \frac{\text{AVITEX® DN added, gal. (or L)}}{\text{total water in wheel, gal. (or L)***}} \times 100$$

*Based on the dry weight of the goods.

**As the goods enter the final drying operation. Wet pickup depends on a number of factors, including whether or not the goods are extracted and, if so, how much? Wet pickup must be determined for each laundry procedure and, like other variables, must be redetermined if the laundry process is altered significantly.

***Varies with running water level in wheel. Must be determined by actual measurement, or calculated from the equipment manufacturer's specifications. Include water required to saturate clothes, as well as "free" water typically given in tables.

Discussion

Add-on is related to solution concentration and wet pickup in the following manner:

$$\% \text{ Add-on} = \frac{\% \text{ solution concentration} \times \% \text{ wet pickup}}{100}$$

When two of these three factors are known, the third can be easily calculated. Generally, the amount of add-on is set at the desired level. Then, with a known wet pickup, the needed solution concentration (i.e., AVITEX® DN) can be calculated. AVITEX® DN is added to the wash wheel to give this concentration and the subsequent calculated add-on.

Example 1

Given:

Wash Wheel:	Open pocket, 42 in. x 96 in. (107 cm x 244 cm), 400 lb (181 kg) capacity
Load:	300 lb (136 kg) garments of NOMEX® III aramid fiber
Water Level:	6 in. (15 cm) running, loaded
Total Water in Wheel:	160 gal. (606 L)
Plant Process:	Wash/light extract/tumble dry finish
Wet Weight Pickup:	55% (determined after extraction; see definitions)

Problem:
Using this information, determine:

(1) The wash wheel solution concentration needed to give a calculated add-on of 0.5% of AVITEX® DN; and
(2) The amount of AVITEX® DN that must be added to the wash wheel to give this solution concentration.

Solution:

$$\% \text{ Add-On} = \frac{\% \text{ solution concentration} \times \% \text{ wet pickup}}{100}$$

$$\frac{1}{\% \text{ solution concentration}} = \frac{\% \text{ wet pickup}}{\% \text{ add-on} \times 100}$$

$$\% \text{ Solution Concentration} = \frac{\% \text{ add-on} \times 100}{\% \text{ wet pickup}} = \frac{0.5 \times 100}{55} = 0.91$$

The wash wheel contains a total of 160 gal. (606 L) of water. The number of gallons (liters) of AVITEX® DN softener that must be added to give a 0.91% concentration can be approximated by using the following formula:

$$\text{AVITEX® DN} = \text{total water} \times \frac{\% \text{ solution concentration}}{100} = \frac{160 \text{ gal. (606 L)} \times 0.91}{100} = 1.46 \text{ gal. (5.5 L)}$$

Example 2

Given:

Wash Wheel:	Open pocket, 42 in. x 96 in. (107 cm x 244 cm), 400 lb (181 kg) capacity
Load:	300 lb (136 kg) garments of NOMEX® III aramid fiber
Water Level:	6 in. (15 cm) running, loaded
Total Water in Wheel:	160 gal. (606 L)
Plant Process:	Wash/hang/wet-to-dry tunnel finish
Wet Weight Pickup:	95% (determined at entrance to tunnel finisher)

Problem:
Using this information, determine:

(1) The solution concentration needed to give an add-on of 0.5% of AVITEX® DN; and
(2) The amount of AVITEX® DN that must be added to the wash wheel to give this solution concentration.

Solution:

$$\text{\% Add-On} = \frac{\text{\% solution concentration x \% wet pickup}}{100}$$

$$\frac{1}{\text{\% solution concentration}} = \frac{\text{\% wet pickup}}{\text{\% add-on x 100}}$$

$$\text{\% Solution Concentration} = \frac{\text{\% add-on x 100}}{\text{\% wet pickup}} = \frac{0.5 \times 100}{95} = 0.53$$

The wash wheel contains a total of 160 gal. (606 L) of water. The number of gallons (or liters) of AVITEX® DN needed to give a 0.53% concentration can be approximated by using the following formula:

$$\text{AVITEX® DN} = \text{total water} \times \frac{\text{\% solution concentration}}{100} = \frac{160 \text{ gal. (606 L)} \times 0.53}{100} = 0.85 \text{ gal. (3.2 L)}$$

APPENDIX V: SOFTENER/ANTI-STAT ADDITIONS CHART

Use the chart below to obtain an add-on of 0.50% of AVITEX® DN softener/anti-stat after determining the percentage of wet pickup of garments and the total number of gallons (or liters) of water in the wheel. The gallons (or liters) of AVITEX® DN to add to the wheel can be found at the intersection of the appropriate columns.

	Total Water in Wheel, *gal. (L)				
Wet Pickup, %**	30 (114)	50 (189)	100 (379)	200 (757)	300 (1,136)
30	0.50 (1.9)	0.83 (3.1)	1.50 (5.7)	3.33 (12.6)	5.00 (18.9)
40	0.38 (1.4)	0.62 (2.3)	1.25 (4 7)	2.50 (9.5)	3.80 (14.4)
50	0.30 (1.1)	0.50 (1.9)	1.00 (3.8)	2.00 (7.6)	3.00 (11.4)
60	0.25 (0.9)	0.42 (1.6)	0.83 (3.1)	1.70 (6.4)	2.50 (9.5)
70	0.21 (0.8)	0.36(1.4)	0.71 (2.7)	1.40(5.3)	2.10(8.0)
80	0.18 (0.7)	0.31 (1.2)	0.63 (2.4)	1.25 (4.7)	1.80 (6.8)
90	0.17 (0.6)	0.28 (1.1)	0.56 (2.1)	1.10 (4.2)	1.70 (6.4)
100	0.15 (0.6)	0.25 (0.9)	0.50 (1.9)	1.00 (3.8)	1.50 (5.7)
110	0.14 (0.5)	0.23 (0.9)	0.45 (1.7)	0.90 (3.4)	1.40 (5.3)
120	0.13 (0.5)	0.21 (0.8)	0.42 (1.6)	0.83 (3.2)	1.30 (4.9)
130	0.12 (0.5)	0.19 (0.7)	0.38 (1.4)	0.77 (2.9)	1.20 (4.5)
140	0.11 (0.4)	0.18 (0.7)	0.36 (1.4)	0.71 (2.7)	1.10 (4.2)
150	0.10 (0 4)	0.17 (0.6)	0.33 (1.2)	0.66 (2.5)	1.00 (3.8)

*Tables provided by wash wheel manufacturers typically give only the amount of water (1 gal. or 3.78 L) that must be added to a saturated running load to bring the water level up to a specified height (1 in. or 2.54 cm). Add to this amount the amount of water required to saturate the load, usually estimated to be 0.3 gal./lb (2.5 L/kg) of goods in the wheel.

**See Appendix IV

APPENDIX VI: EXHAUSTION PROCEDURE FOR ZONYL® 6991 APPLICATION*

Adding ZONYL® 6991 is the last procedure in the wash cycle. It should be added with agitation at water temperatures at or below 100ºF (38ºC). This procedure results in an exhaustion of approximately 80% of the active ingredients onto the fabric.

Guidelines for Application

- In the last rinse cycle, use either citric or acetic acid to adjust the pH of the water to between 4.5 and 5.5.
- After adjusting the pH, add ZONYL® 6991 with agitation at a water temperature of 100ºF (38ºC) or less.
- With continued agitation, raise the water temperature to a minimum of 120ºF (49ºC) and hold for five to 10 minutes. Higher water temperatures (up to 160ºF [71ºC]) will aid in the application of ZONYL® 6991.
- After application of ZONYL® 6991, drop the water bath and extract the garments. Do not rinse garments.
- After extraction, dry garments according to care instructions. For garments of NOMEX®, use a maximum stack temperature of 160ºF (71ºC). Drying is important to ensure proper performance of the ZONYL® 6991.

*Refer to the ZONYL® 6991 Technical Bulletin.

National Interagency Fire Center
3833 S. Development Avenue
Boise, Idaho 83705

United States
Department of Agriculture

Forest Service

File Code: 5160 Route To:

NIFC

Date: June 27, 1996

Subject: Fire Shelter Safety Alert

To: All Fire Directors,
NIFC Directors, All Cooperators

After a recent fire entrapment, the investigators discovered that a fire shelter had been used that should have been taken out of service sometime ago. To ensure the maximum safety of firefighters carrying fire shelters, the fire shelters must be inspected and then either removed or kept based on the criteria given below:

Shelters that **SHOULD NO LONGER BE IN SERVICE** are those manufactured before 1978 and these specific contracts:

Contract no.	Name	Year	Reason
GS-08S-33902	Norair Lancs	1978	Toxic
GS-08S-34122	Norair Lancs	1979	Toxic
GS-08S-35119	Metro Plastics	1980	Toxic
GS-08S-35188	Metro Plastics	1981	Brittle
GS-08S-36256	Cecile	’82-’83	Brittle

TOXIC SHELTERS MUST BE DESTROYED IMMEDIATELY. Other shelters may be kept for training purposes.

As of 1996, the only fire shelters that are acceptable are manufactured by Anchor Industries under various contrast numbers from 1983 to 1996 and shelters manufactured by Weckworth/Langdon in 1995. All fire shelters manufactured since 1995 are marked as compliant with NFPA 1977. **DO NOT PURCHASE ANY NEW FIRE SHELTERS THAT ARE NOT NFPA 1977 COMPLIANT.**

MTDC has inspected hundreds of fire shelters that were used in entrapments. At least 30 percent of the fire shelters showed damage that was visible through the clear plastic cases. This indicates a widespread failure to inspect the fire shelters at least every 14 days. Some firefighters have expressed the attitude that they were aware of the defects, but felt they would never have to use the shelter, so why bother to replace it. This is an unacceptable risk.

Fire shelter case liners will at least double the life of fire shelters, but at some point the shelters will become unserviceable. Inspections should continue at 14-day intervals. Pay particular attention to the fire shelter area at the open end of the liner. Each individual is responsible for inspecting his or her fire shelter. However, crew supervisors should routinely spot-check shelters to ensure only functional shelters are being carried.

If there are any questions concerning specific fire shelters or the above information, contact Ted Putnam, Fire Shelter Project Leader at the Missoula Technology Development Center (406) 329-3965. DG is T.Putnam:ROlA.

/S/ John B. Roberts

JOHN B. ROBERTS
Branch Chief, Fire Equipment & Chemicals

CARTONS REQUIRED

NFES	SIZE	NSN	USED FOR
0644	33"x16"x22"	8115-00-139-0691	NFES #0022; Bag, Sleeping, General Purpose NFES #0441; Blanket, Wool
0513	361/2''x24l/2''x17''	8115-01-290-9543	NFES#1062;Bag,Sleeping,Firefighters
2006	23"xl9"x10"	8115-00-139-0722	NFES #1551;Bag, Drinking Water, Nylon 4-Quart NFES #6131; Fly, Sunscreen NFES #0531; Net, Cargo, 12'x12' NFES #0220, 0221; Tank, Pyramid, Liquid Storage
0353	39"x13"x13"	8115-00-139-0706	NFES #0159; Chainsaw, Kit
TBA	18"x15"x51/2"	8115-00-290-3386	NFES #0560; Cord, Extension, 3 Wire NFES #1172 " NFES #1232 "
TBA	12"x12"x12"	8115-00-079-8680	NFES #1314-1315; Helmets, Flight NFES #1214-1215 " NFES #2313-2314-2315 "
TBA	161/2"xl2"xl0"	8115-00-079-8697	NFES #0070; Fly, Tent NFES #0960; Kit, Fly Tent w/Stakes & Guy Ropes
TBA	20"x20"x20"	8115-00-428-4158	NFES #0110-0713; Headlamp
2007	24"x16"x16"	8115-00-292-0123	NFES #0109; Helmet, Safety NFES #0458; Net, Cargo, 15'x15' NFES #1372; Pack, Firefighters, Field NFES #1855; Pack, Personal Gear NFES #0511,0512,0522; Shirts, Flame Resistant NFES #0569, 0570 " NFES #0577 to 0580 " NFES #2078, 2079 " NFES #1149; Pump, Backpack, Outfit.
0384	46"xll"x8"	8115-01-307-2951	NFES#1180;Tool,Combination
2030	24"x16"x12"	8115-00-183-9481	NFES #0503 to 0506; Jeans, Flame, Resistant NFES #0581 to 0585 " NFES #2010 to 2024 " NFES #2117 "
TBA	18"x14"x18"	8115-00-179-0580	NFES#1143;Kit,First-Aid, 10-Person Belt NFES #0068; Kit, First-Aid, 10-Person Box NFES #1604; Kit, First-Aid, 24-Person Box
TBA	8"x8"x16"	8118-00-079-8693	NFES #0125; Lantern, MS NFES #0241; Torch, Drip NFES #1201,1207,0738; Valve, Shutoff, Ball
TBA	10"x8"x5"	8115-00-080-1025	NFES #1081-1082; Nozzle, Shutoff, NFES #0137-0138; Combination, Barrel

TBA	4"x4"x6"	8115-00-576-8428	NFES #0635 to 0638; Nozzle, Tips, NFES #0903, 0904,0737; SS and Spray
TBA	12"x9"x10"	8115-01-012-5004	NFES #0024; Nozzle, Twin Tip
0134	76"x24"xl9"(R6)	8815-01-381-6529	NFES #1566; Pad, Sleeping, Grey (76"x221/2"x201/2") GSA
TBA	8"x4"x4"	8115-00-290-3365	NFES#0009, 0010, 0418, 0713,Reducers
0338	37y2''x18l/2''x8''	8115-00-139-0673	NFES#0070;Tool,Axe,Single Bit NFES #1396; Tool, Hoe, Adze NFES #0146; Tool, Pulaski
0305	56"x20"xll"	8115-00-139-0690	NFES #1807; Tool, Council NFES #0296; Tool, McLeod
0337	55"x121/2 "x113/4"	8115-00-139-0689	NFES #0171; Tool, Shovel

TBA **To be assigned an NFES #.**

CARTONS, LOCAL CACHE OPTION

NFES #	ITEM DESCRIPTION	STANDARD PACK:CARTON
0003, 0004 0006, 0007	Adapters	None: Cache Option
0734	Applicator 1 Piece	10/Bundle: Cache Option
0720	Applicator, 2 Piece	10/Bundle: Cache Option
0425	Bag, Slingable, 72 Gal. Pot.	l/Carton: Cache Option
0426	Bag, Slingable, 72 Gal. Nonpot.	l/Carton: Cache Option
6017	Bag, Slingable, 250 Gal. Nonpot.	l/Carton: Cache Option
6021	Bag, Slingable, 360 Gal. Nonpot.	l/Carton: Cache Option
0036, 0085, 0265, 0350 0741, 1175, 1290, 1291, Etc.	Can, Gas, Jeep, Dot, Etc.	None: Cache Option
0563	Cord, Multi-Light	None: Cache Option
0053	Cot, Aluminum	None: Cache Option
0710, 0855, 0856 0857, 0916	Couplings	10 Or 60/Carton: Cache Option
0307, 0319, 1033, 2143	Extinguisher, Fire, Dry Chem.	l/Carton: Cache Option
0608	Fence, Plastic, 4’x50'	None: Cache Option
0501, 0507, 0508, 0509 0521, 0525, 0527, 0539 0514, 0517, 0518, 0519 0545, 0546, 0547, 0548 0567, 0572, 0574, 0576	Flight Suits	20/Carton: Cache Option
1521	Fly, Tent, Type II, 9’x10'	20/Carton: Cache Option
6139	Heater, Propane, 20# Tank Mntd.	Cache Option
6187	Heater, Propane, 360º, Radiant	l/Carton: Cache Option
1016	Hose, Garden, Syn.3/4"x50'	20/Carton: Cache Option
0964, 0965, 0967 1238, 1239	Hose, Lined	None: Cache Option
0111, 0112 1873, 0334	Hose Linen & Syn. Weeping	None: Cache Option
0115, 0652 0914, 1808	Hose, Suction	None: Cache Option
0416, 0854, 2235	Increasers	20/Carton: Cache Option
0480	Kit, Coffee Heating	l/Container: Cache Option

1309	Kit, Longline W/Remote Hook	l/Container: Cache Option
0430	Kit, Shelter, 15’x27"	None: Cache Option
0550	Kit, Shelter, 16' Octagon	None: Cache Option
0540	Kit, Shelter, 18' Octagon	None: Cache Option
0549	Kit, Shelter, 20' Octagon	None: Cache Option
0127	Lantern, Port. Elec. 6 Volt	None: Cache Option
2501	Lantern, Camp, Florescent	None: Cache Option
0627, 0628, 0629	Nozzle, Fire, Foam	None: Cache Option
0136	Nozzle, Garden Hose	10 Or 100/Carton: Cache Option
0140	Packboard	10/Carton: Cache Option
0744	Packsack,	Nylon W/Straps 20/Carton: Cache Option
0151	Pump, Single Action	None: Cache Option
0124, 0253	Pump, Lightweight	None: Cache Option
0417, 2229, 2230	Reducers	10/Carton: Cache Option
0930	Regulators, Propane	None: Cache Option
0210	Spout, Gas, Flex., Steel 16"	10/Carton: Cache Option
0526	Swivel, Cargo, 3000# Cap.	10/Carton: Cache Option
0286	Swivel, Cargo, 6000# Cap.	None: Cache Option
0588	Tank, Collapsible, 1000 Gal.	l/Carton: Cache Option
0090	Tank, Collapsible, 1200 Gal.	l/Carton: Cache Option
0589	Tank, Collapsible, 1500 Gal.	l/Carton: Cache Option
0668	Tank, Collapsible, 1800 Gal.	l/Carton: Cache Option
0568	Tank, Collapsible, 3000 Gal.	l/Container: Cache Option
6030	Tank, Collapsible, 4800 Gal.	l/Container: Cache Option
6031	Tank, Collapsible, 6000 Gal.	l/Container: Cache Option
0230, 0731, 1809, 2240	Tees, Hoseline	10/Carton: Cache Option
0077	Tent, 2-Person	None: Cache Option
0223, 0084	Tent, Wall l0’x12'/14’x16'	l/Carton: Cache Option
0735, 0736	Tip, Applicator	None: Cache Option
0228	Valve, Check & Bleeder	None: Cache Option
0212, 0906	Valve, Foot W/Strainer	None: Cache Option
0229	Valve, Pressure Relief	None: Cache Option
0839	Wye, Connection	None: Cache Option
0739, 0883	Wye, Siamese	None: Cache Option

CARTONS, SUGGESTED

NFES #	ITEM DESCRIPTION	CARTON	NSN: QTY/CTN.
0435	Bag, Drinking Water, 55 Gal.	18"xl5"x10"	8115-00-190-5007: l/Ctn
0437	Bag, Suppression, 55 Gal.	18"x15"x10"	8115-00-190-5007: l/Ctn
0097	Bag, Backpack Pump	23"x17"x13"	8815-00-079-8879: 6/Ctn
****	Bag, Backpack Pump (Old)	23"x17"x13'	8818-00-079-8879: 6/Ctn
0044,0045, 0078, 0150	Chaps, Protective	16"x14"x12"	8115-00-183-9484: 10Pr./Ctn
0943	Jug, Insulated	20"x16"x16"	8115-00-275-5777: l/Ctn
0827	Jug, Vacuum, 10 Gal.	20"x16"x16"	8115-00-275-5777: l/Ctn
0380	Lead Line, 6,000 Lbs.	17"x17"x4"	Commercial Ctn.: Cache Option
0531	Net,Cargo,12'X12' (Nfes#2006)	23"xl9"x10"	8115-00-139-0722: l/Ctn
1458	Net, Cargo, 15'X15' (Nfes#2007)	24"x16"x16"	8115-00-292-0123: l/Ctn
0082, 0089	Pole, Ridge	41/2''x6l/2''x42l/2''	Commercial: l/Ctn
0083	Pole, Upright	4l/2''x6l/2''x42l/2''	Commercial: 6/Ctn
2407	Shelter, Fire, Practice	16"x10"x12"	Commercial: 20/Ctn
0169	Shelter, Fire	16"x10"x12"	Commercial: 20/Ctn