



*Transportation*

**PRESERVATION AND STORAGE OF  
WAR RESERVE MATERIEL VEHICLES  
AND EQUIPMENT**

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This handbook implements AFDPO 24-3, *Operation, Maintenance and Use of Transportation Vehicles and Equipment*. It defines the responsibilities, technical instructions, requirements, and criteria concerning storage, processing procedures, and maintenance in storage of War Reserve Materiel vehicles. This guide applies to all Pacific Air Forces units. This handbook is not applicable to US Air Force Reserve or National Guard units.

**SUMMARY OF REVISIONS**

This revision lists the annual deep storage report submission requirement by maintainers. It changes guidance of application of parts or inspections mandated by TCTO or one-time inspection. It revises salvage/disposition procedures. It details exercise requirements for vehicles coded for inactive storage but not yet processed for deep storage. It changes tire/track treatment processes for inactive storage. It modifies exterior preservation requirements for actively stored vehicles. It changes some equipment item quantities identified in **Attachment 3**, Preservation Equipment. A bar (|) indicates revision from previous edition.

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## Chapter 1

### PURPOSE

#### 1.1. Introduction.

1.1.1. This handbook provides information on requirements for preservation of War Reserve Materiel (WRM) vehicle assets being processed for storage.

1.1.2. Related WRM vehicle and equipment management guidance is provided in AFI 25-101, Instructions for the War Reserve Materiel (WRM) Program, and PACAFI 25-101.

1.1.3. For the purpose of this handbook, the term “maintainer” refers to military, civilian, and contractor maintenance personnel.

#### 1.2. General.

1.2.1. PACAF stores its WRM vehicles in one of two categories: active (ready to roll), or inactive (deep stored).

1.2.2. Inactive stored vehicles should be stored in enclosed buildings if available. Inactive stored vehicles will be preserved as prescribed in **Chapter 5** of this handbook. Note: To offset the costs of preservation actions, inactive vehicles will remain in storage for a minimum of three years unless otherwise directed.

1.2.3. Active stored vehicles will be preserved as prescribed in **Chapter 6** of this handbook.

1.2.4. Forward recommended changes to HQ PACAF/LGRWM.

1.2.5. Handling of potentially hazardous materials is governed by standards in AFI 32-7043, Hazardous Waste Management Guide.

#### 1.3. Responsibilities.

1.3.1. HQ PACAF/LGRWM is the responsible office for this handbook and is the focal point for all waivers and deviations to procedures in this handbook.

1.3.2. The maintainer provides all services necessary to maintain vehicles and equipment during the term of the storage. Minimum tasks include acceptance, inspections, preservation, and maintenance.

1.3.3. Vehicle Operations, or contractor personnel, performs all services necessary to manage stored assets.

1.3.4. Annually, not later than 31 March, the vehicle maintenance manager or contractor through the QAE will provide a written evaluation concerning the effects of current storage procedures to HQ PACAF/LGRWM. This report will be coordinated through the base and NAF War Reserve Materiel Officer/NCO (WRMO). Also, submit a report when negative trends are observed. Items to be included in the report are outlined in paragraph **9.2.** of this handbook.

## Chapter 2

### VEHICLE STORAGE AND PRESERVATION PROCESSING OVERVIEW

#### 2.1. Acceptance.

2.1.1. Upon receipt of vehicles, the maintainer performs an initial acceptance inspection using AFTO Form 91, "Limited Technical Inspection - Motor Vehicles (LTI)" and ensures vehicles and on-vehicle equipment (OVE) are serviceable according to T.O. 36-1-191, Chapter 1.

2.1.2. Load vehicles into On-Line Vehicle Interactive Management System (OLVIMS), the OLVIMS Fleet Management Module, and the Automated Fleet Equipment Management System (AFEMS). These systems will be used to gather analysis data and manage the fleet.

2.1.3. The maintainer functionally checks each vehicle to identify potential problems. The maintainer makes all needed repairs to ensure the condition of vehicles meets TO 36-1-191 standards. Note: Vehicles being processed for inactive storage will be inspected and repaired in accordance with TO 36-1-191 Plus condition standards ([Attachment 4](#)).

2.1.4. The maintainer, or contractor through the QAE, provides written reports on any damage beyond fair wear and tear (i.e., shipping damage and accidents) to HQ PACAF/LGRWM. Waive minor dents that do not affect performance, handling, or operation of the vehicle.

2.1.5. Vehicle Operations or contractor personnel ensure all vehicles are completely washed with fresh water and VCI 415 preservative wash to include fender wells, frame, hydraulic cylinder rams, and any other places where salt or dirt deposits can accumulate during shipment. Use care to prevent damage to critical components (i.e. electrical units, control panels, etc.). Accomplish washing within 30 days of vehicle arrival. **Note: Ensure no water remains in vehicle bodies after washing.**

#### 2.2. Storage.

2.2.1. As previously stated, inactive (deep) and active (ready to roll) are PACAF's two categories for storing its WRM vehicle fleet.

2.2.1.1. Inactive: Vehicles in inactive storage are stored inside enclosed buildings, if available, and are prepared IAW the procedures in [Chapter 3](#) and [Chapter 5](#) of this handbook. Visual inspections are performed quarterly for inside stored vehicles and monthly for outside stored vehicles. Refer to [Chapter 9](#) for scheduled maintenance intervals. Vehicle Maintenance contractor personnel, verified by the QAE, perform walk-thru inspections checking for evidence of pilferage or theft, unusual leaks, any damage, and condition of preservative measures.

2.2.1.2. Active: Vehicles required for use by initial incoming forces are maintained as prescribed in [Chapter 6](#) of this handbook. WRM vehicles stored at this level receive scheduled maintenance actions as outlined in paragraph 7.13.2 of AFMAN 24-307. Vehicle Operations or contractor personnel will perform weekly walk-thru inspections of the active vehicles to check tire inflation, accumulation of water in vehicle bodies, evidence of pilferage and theft, unusual leaks, and any other obvious defects. In addition, Vehicle Operations or contractor personnel perform an operational check once a quarter. Utilizing the vehicle operator inspection guide (AF Form 18XX), the vehicle is operated for a minimum of 20 minutes (30 minutes for diesel engines) operating all auxiliary functions of the vehicle and ensuring the vehicle systems reach operating temperatures. Document, and correct as required, discrepancies annotated during this inspection.

2.2.1.2.1. Once initial treatment is accomplished, preservatives are reapplied as necessary to maintain the proper level of protection.

2.2.1.2.2. Vehicles/equipment with rubber tires in inactive deep storage are raised and blocked so the tires do not touch the ground. Active stored vehicles with rubber tires should not be raised and blocked with the tires off the ground. **Note: Actuate steering wheel until steering motion ceases on vehicles with pressurized hydraulic systems (i.e., Terex or Euclid fork lifts) prior to placing vehicle on blocks.**

**2.3. Battery Upkeep.**

2.3.1. Solargizers are to be installed on both inactive and active stored vehicles. Active stored vehicles will have the Solargizer panel installed to the lower right corner of the windshield in a manner that won't obstruct the driver's vision. Designed to extend the lifecycle of the vehicle battery, the Solargizer is a solar powered device that converts sunlight into a high frequency, pulsating electrical current that generates a low-voltage, low-amperage energy surge that keeps batteries in a ready state. Solargizers used for indoor application are equipped with a specially designed 115 or 220-volt AC transformer. For assets stored in locations where sunlight or electricity is not available, the local VMM/QAE will develop a plan to ensure batteries are addressed on spin up programs.

**2.4. Storage Type by Location.**

**Figure 2.1. Storage Requirements.**

Type of Protection	Andersen	Korea	Alaska	Diego Garcia	Japan (mainland)	Kadena
<u>Inactive</u> Shrink-wrap Plastic + VCI Protection	I+	I/O#	I+	I+	I/O#	I+
<u>Active</u> VCI Protection (no bag or plastic)	I+	I/O#	I+	I+	I/O#	I+

I = Inside only (+) Use 8mil plastic wrap for inside storage  
 I/O = Inside or outside depending on facility availability (#) Use 10mil MilCorr plastic wrap for outside storage  
 A = Active stored vehicles.  
**NOTE:** See [Chapter 5](#) for inactive storage procedures and [Chapter 6](#) for active storage procedures.

**2.5. Technical Orders (TO) and Service/Parts Manuals.** The maintainer keeps current TOs or service/parts manuals for all vehicle types stored. Each base storing vehicles will maintain a TO account on-hand and readily available for reference.

**2.6. Time Compliance Technical Orders (TCTO).** The maintainer must ensure all TCTO's, one time inspections, and manufacturer's service bulletins are accomplished as specified in applicable instructions. Vehicles that are in inactive storage may have all TCTO parts binned and identified on the PCN-15, Delayed Maintenance Report, until the vehicle is removed from inactive storage. This determination will be made by the VMM or QAE based on time/effort involved and safety to the vehicle. Immediately upon removal from storage, all TCTO, one-time inspections, and service bulletin actions will be completed prior to placing the vehicle into active service.

**2.7. Management Procedures.** Vehicle operations, maintenance, or contractor personnel manage and maintain the vehicle fleet while in storage IAW directives listed in [Attachment 1](#).

**2.8. Salvage/Disposition.** Disposition actions will be in accordance with TO 36-1-191, Chapter 5, Maximum Repair Allowances, Replacement Codes, and Priority Buy Program for USAF Vehicles. An AFTO Form 91, Limited Technical Inspection - Motor Vehicle, is prepared by the responsible maintenance activity. Forward a copy of the LTI for AF and command critical assets with each vehicle disposition request to HQ PACAF/LGRWM. For Korea, all vehicle disposition requests will be forwarded to 607th ASUS/LGRWM for determination. An AFTO Form 375 is forwarded with disposition requests for vehicular equipment items (i.e. FMSE, deicers, etc.).

## Chapter 3

### VEHICLE STORAGE AND PRESERVATION PROCEDURES

**3.1. General Procedures.** Prior to actual storage, an “F” prefix work order is initiated in OLVIMS for each vehicle. The work order will reflect the following minimum actions for each asset:

3.1.1. Inactive stored vehicles; perform LTI, inspect to “36-1-191 Plus” condition. **Note: If necessary, repairs exceeding the one-time-repair limit should be considered for disposition IAW TO 36-1-191, Chapter 5 prior to commencing repair actions.**

3.1.1.1. Active stored vehicles; perform LTI, inspect to 36-1-191 condition. **Note: If necessary, repairs exceeding the one-time-repair limit, should be considered for disposition IAW TO 36-1-191, Chapter 5, prior to commencing repair actions.**

3.1.1.2. Annotate required repairs using applicable system codes and install any on-hand deferred parts (for active stored vehicles).

3.1.1.3. Perform corrosion control inspection; correct deficiencies as required (for active stored vehicles). **Note: If complete corrosion control is required, annotate the corrosion control on a second workorder using an “E” prefix.**

3.1.2. Preservation actions, to include 36-1-191 “Plus” component testing results, are documented on locally developed checklists containing the items listed in [Attachment 2](#), “Vehicle and Equipment Preservation Checklist”, to ensure all required preservatives have been applied to vehicle components. This checklist is maintained as part of the permanent vehicle historical record for each vehicle. Labor hours associated with preservation actions will be accounted for using the appropriate system code in the 35 series (35XX). All preservative costs will be entered into OLVIMS against the work order on which the preservation action was accomplished.

3.1.3. When possible, store nonvolatile on-vehicle equipment (OVE) such as exhaust pipe caps and extra length cargo covers with the vehicle. OVE not stored with the vehicle is to be non-destructively marked with the vehicle registration number. Maintain all OVE in a serviceable condition. Attach a tag stating “OVE incomplete” to the steering wheel of each vehicle having disassembled OVE and indicate the storage location.

3.1.4. Ensure all maintenance actions are annotated and accomplished and that deferred parts are ordered. **Note: Document preservation actions as a separate line item using system code 35AC.**

3.1.5. Ensure all scheduled maintenance actions are accomplished, and VCI preservatives added, and annotated prior to all vehicles being placed into inactive storage.

## Chapter 4

### VEHICLE/EQUIPMENT PRESERVATION DATA

**4.1. Overview.** This chapter describes the Vehicle and Equipment Preservation Checklist, and defines the filing procedures. To find preservation requirements for a particular task, refer to **Chapter 5** for inactive storage, or **Chapter 6** for active storage, for step-by-step procedures.

#### **4.2. Documentation.**

4.2.1. Maintain only the current copy of the Vehicle and Equipment Preservation Checklist in each stored vehicle/equipment records jacket.

4.2.2. Use the preservation sheet during vehicle processing to ensure each component is properly preserved. Manual entries are made on the Vehicle and Equipment Preservation Checklist when the processed component or system is not listed in the preprinted data.

4.2.3. Enter vehicle type, registration number, the date each component was preserved or restored, and initials of the person that performed the preservation/restoration.

4.2.4. Ensure preservation material costs and labor hours are annotated on the Vehicle and Equipment Checklist (**Attachment 2**) to facilitate compilation of data. **Note: Use system code 35XX to capture labor hours associated with preservation hours. Charge total preservation material costs to the same work order.**

4.2.5. Vehicles coded inactive on the VAL, but have yet to be processed through VCI, will be maintained and exercised as active stored.

## Chapter 5

### COMPONENT PRESERVATION PROCEDURES - INACTIVE STORAGE

**5.1. General.** The following preservation requirements for vehicle components apply to vehicles in inactive storage. Identify the components requiring preservation, find the paragraph in this chapter that addresses that component, then service/preserve as required. Information regarding specified preservative materials is contained in [Chapter 7](#). Upon placing vehicles into deep storage, ensure the Maintenance Control and Analysis section adds three years to the life expectancy loaded in OLVIMS. When the vehicles are removed from storage at the end of three years and returned to the active fleet, they will cycle through normal replacement codes. **Note: Preservation should be accomplished in the sequence identified below.**

#### **5.2. Annual Scheduled Maintenance.**

5.2.1. Perform ALL required annual scheduled maintenance, filling all fluid levels to the following levels: crankcase oil – 80%, coolant – 95%, fuel – add 2 pints of VCI-705 for every 10-gallons of fuel in the tank (fill tanks to  $\frac{3}{4}$  full). All fluids will be topped-off with the required VCI preservative maximum capacity (exception: see “Fuel Tanks” below).

5.2.2. Remove all vehicle accessories, i.e., tarp bows, cranes, side rails, wiper blades, etc. Store with vehicle where ever possible.

5.2.3. Dry and fold canvas covers. Wrap cover in a plastic bag and place inside a plywood box. Mark box with vehicle registration number and store either in the vehicle or in a suitable facility.

**5.3. 36-1-191 Plus.** Prepare vehicle to “36-1-191 PLUS” condition per [Attachment 4](#). Ensure all components, alternators, batteries, and starters, have been load tested and no signs of premature failure are evident.

**5.4. Vehicle Washing Requirements.** Using VCI-415 wash vehicle thoroughly covering all exposed surfaces. Mix 1 part VCI-415 to 10 parts water and apply using a sprayer, steam cleaner, power washer, brush, cloth, or sponge.

**Figure 5.1. VCI VCI 415 Pre-Wash.**



**5.5. Radiator Coolant.** Using M640L, treat radiator coolant. Add 5% of VCI-M640L full strength bringing radiator coolant level to its maximum capacity.

**5.6. Steering Fluid.** Using VCI-323, treat steering fluid (standard and power). Add 20% of VCI-323 full strength.

**5.7. Engine Oil.** Using VCI-323, treat engine oil. Add 20% of VCI-323 full strength.

**5.8. Transmission Fluid.** Using VCI-323, treat transmission fluid (manual and automatic). Add 20% of VCI-323 full strength.

**5.9. Transfer Case Fluid.** Using VCI-323, treat transfer case fluid. Add 20% of VCI-323 full strength.

**5.10. Differential Fluid.** Using VCI-323, treat differential fluid (Include front, intermediate, and rear on multi-wheel drive vehicles). Add 20% of VCI-323 full strength.

**5.11. Hydraulic Fluid.** Using VCI-322, treat hydraulic fluid. Treat all tanks if equipped with more than one. Add 20% of VCI-322 full strength.

**5.12. Lube Points.** Using VCI-369 Cor-lube, grease all lube points (grease zerks) thoroughly.

**5.13. Air Tanks.** Using VCI-337, fog air tanks. Start with draining tanks. Once drained, spray VCI-337 directly into the tank (through the drain nozzle) to produce a fogging effect inside the tank. Ensure all tanks are treated in this manner if equipped with more than one tank. Use 1 pint of the VCI-337 for every 50 cubic feet of enclosed space.

**5.14. Water tank trailers.** Use the appropriate VCI preservative to treat the outside of the water tank, however, **DO NOT TREAT THE INSIDE OF THE WATER TANK – THIS WOULD MAKE THE WATER TANK UNSERVICEABLE FOR POTABLE WATER.**

**5.15. Metal Surfaces.** Spray VCI-368 on all exposed non-working metal surfaces to include but not limited to engine, engine accessories, fork tines, lift chains/gears, exhaust system, steering wheel chains and locks, and towing devices.

**5.16. Working Mechanisms.** Spray VCI-369 on all working mechanisms to include but not limited to hood/door latch, hinges, locks, rollers, chains, wire rope, mast, gears, and hydraulic cylinder rams thoroughly. Unreel all winch cables and coat cables with VCI-369.

**5.17. Fuel Tanks.** Using VCI-705, treat fuel in tanks. Treat ALL tanks if equipped with more than one. This includes heater fuel tank if separate from main fuel tank. Add 2 pints of VCI-705 for every 10-gallons of fuel in the tank (fill tanks to  $\frac{3}{4}$  full).

**5.18. Engine/Component Operation.** Operate vehicle to normal operating temperature ensuring all systems are fully operated to ensure all preservatives have circulated through the appropriate systems.

**5.19. Leaks.** Check for leaks and repair as necessary. Top off all fluids with recommended VCI additive.

**5.20. Electrical Components.** Place VCI-101/VCI-105/VCI-132 emitters in all enclosed compartments to include but not limited to electrical boxes, battery boxes, toolboxes, and storage bins. The enclosure size will determine the size and number of emitters used. VCI-101 (1 cubic foot enclosure) VCI-105 (5 cubic foot enclosure) VCI-132 10"X10" (8 cubic foot enclosure). These may be used in any combination to achieve adequate protection per enclosure. Emitters will also be placed in various locations throughout the enclosed shrink-wrap or bag, i.e., on the deck of K-loaders, in the bed of pick-up trucks, on the bottom of the bag/shrink-wrap, etc. VCI-101 and VCI-105 have self-adhesive backings and may be left in the vehicle once removed from storage. If the vehicle is later returned to storage these must be removed and replaced.

**5.21. Electrical Connections.** Spray VCI-238 ElectriCorr on all electrical connections to include but not limited to junction boxes, fuse boxes, under dash, alternator, interior/exterior lights, and control panels. VCI-238 ElectriCor is to be applied lightly, approximately 30 cc per cubic foot or a minimum film thickness of .25mm.

**5.22. Tires/Tracks.** Treat tires/soft tracks (inside and out) and other exterior rubber surfaces with VCI regrip rubber revitalizer. Rubber revitalizer will be applied with a paint brush.

**5.23. Vehicle/Equipment Exterior.** Using VCI-386CMA, spray all vehicle exterior surfaces possible. Apply a 2 mils thick coating to all surfaces excluding windows, lights, bare metal moving parts, i.e., hydraulic cylinders. Allow to dry completely, (approximately 2 hours). In extreme environments apply a second coat. **Note: When ordering VCI-386CMA be sure to indicate whether you need a gloss or matted finish.**

**5.24. Film/Bag Layout.** Layout shrink wrap film, allowing enough for overlap to facilitate fusing together by torch. (NOTE: Use 8mil VCI-126 shrink wrap film for vehicles being stored inside and 10mil MilCorr shrink wrap film for vehicles being stored outside)

**5.25. Vehicle Positioning.** Position vehicle on the spread out shrink film. Try and position the vehicle so the seaming operation will occur at a comfortable level, approximately waist level.

**Figure 5.2. VCI Shrink Wrap Layout.**



**5.26. Exterior Pad Placement.** Place additional VCI-132 pads in the cab/drivers compartment, engine compartment, underneath, and on top of vehicle. The number required is determined by the size of the area to be treated. Calculate the area and place one 10"X10" pad for every 8 cubic foot of volume.

**5.27. Battery.** Disconnect battery and spray terminals with VCI-238 ElectriCor. Reconnect positive battery terminals ONLY.

**5.28. Solargizer.** Ensure the Solargizer is hooked up properly and operating correctly by checking the LED on the Solargizer box. The red light needs to be illuminated at all times. Where you store your assets, i.e., inside or outside, will determine which Solargizer to use, i.e., solar powered or electrically powered. **Ensure Solargizers are installed in a position that will allow them to be easily inspected on a regular basis, i.e., the inspector needs to be able to see the red LED light, if the red LED light is not illuminated the Solargizer may not be working therefore the batteries may not be getting the assistance they need.**

**Figure 5.3. Solargizer Location.**



**5.29. Protruding Items.** Fold in any protruding items as possible, without removing the items to include but not limited to mirrors, lights, bars, and cranes.

**5.30. Antenna.** Remove antenna if not retractable.

**5.31. Vehicle Jacking.** Jack up the vehicle and use shoring/jack-stands to support the vehicle removing the weight of the vehicle from the tires. (**Note:** Place padding/cardboard under shoring/jack-stands to prevent them protruding through the film once the film is shrunk.)

**5.32. Air Tanks (Drain).** Drain all air tanks and leave petcocks open.

**5.33. Vehicle Preparation/Padding.** Use padding on any existing protruding edges and sharp corners to include but not limited to bumpers, top of cab, fenders, exhaust pipes, lift mast, and wheel wells, taping or tying in place as needed. (**Note:** Padding should be thick enough to prevent tearing over a long period of time and movement of the bag when it expands and contracts during temperature changes. Sharp points and corners need particularly thick (well-secured) padding to ensure the shrink wrap is not punctured).

**Figure 5.4. Vehicle Padding.**



**5.34. Film/Bag Procedures.** Pull shrink wrap film over top of vehicle and remove any excess slack looking for any areas that may cause a puncture as the film is shrunk tight against the vehicle. (NOTE: Use 8mil VCI-126 shrink wrap film for vehicles being stored inside and 10mil MilCorr shrink wrap film for vehicles being stored outside)

**Figure 5.5. VCI Shrink-Wrap.**



**5.35. Pad Verification.** Using additional padding on any additional areas noticed in step [5.34](#). and repeat as necessary.

**5.36. Seaming.** Using the small seaming wand propane torch, fuse/weld the shrink wrap film together completely, sealing the vehicle inside. Repair any holes by applying a patch or taping as required, using the appropriate VCI shrink-wrap tape. **NOTE:** To patch a hole simply cut a piece of shrink wrap film at least 3 times larger than the size of the hole that needs to be repaired. Hold the piece of shrink wrap film being used as the patch near the hole while heating it and the area around the hole with the small seaming wand to weld the two together.

**CAUTION:** When using the torch wands, do not keep the open flame in the same spot for more than five (5) seconds. Direct application of heat in one area may damage to the vehicle's surface and cause a fire.

**Figure 5.6. Shrink Wrap Seaming.**



**5.37. Shrinking.** Using the large shrinking wand propane torch, shrink the film by applying heat evenly in a circular motion over entire vehicle. There is no need to shrink the plastic too tight. It should be taut, but not tight. Leave enough slack to allow the shrink wrap to expand and contract during temperature changes. The goal is to enclose the vehicle, not wrap it with excessive tightness. Note that the more heat you apply, the thinner the plastic wrap becomes; this increases the chances of tears and punctures.

**Figure 5.7. Vehicle Shrink Wrap Heating.**



**5.38. Repairs.** Repair any holes by applying tape as required.

**5.39. Vehicle Identification.** Place placard on wrapped/bagged vehicle identifying registration number and date placed into inactive storage.

**Figure 5.8. VCI Process Complete.**



## Chapter 6

### COMPONENT PRESERVATION PROCEDURES - ACTIVE STORAGE

**6.1. General.** The following preservation requirements for vehicle components apply to vehicles in active storage. Active stored vehicles will not be placed into plastic wrap or VCI bags. During the Limited Technical Inspection required prior to placing a vehicle in storage, identify any items affecting safety or serviceability of the asset being inspected using criteria in TO 36-1-191, Chapter 1. Repair all deficiencies that affect safety or serviceability before placing a vehicle in storage. Document repair actions on the AF Form 1823, Vehicle and Equipment Work order.

#### **6.2. Annual Scheduled Maintenance.**

6.2.1. Perform ALL required annual scheduled maintenance.

6.2.2. Remove all vehicle accessories, i.e., tarp bows, cranes, side rails, wiper blades, etc. Store with vehicle where ever possible.

6.2.3. Dry and fold canvas covers. Wrap cover in a plastic bag and place inside a plywood box. Mark box with vehicle registration number and store either in the vehicle or in a suitable facility.

6.2.4. When vehicles are removed from active storage to deep storage, comply with requirements in [Chapter 5](#).

**NOTE:** When vehicles are removed from active storage and used, i.e., for exercises, etc., vehicles must be washed with VCI-415 prior to being placed back into active storage (see [6.5](#) below). **Note:** Before placing vehicles back into storage, a thorough inspection must be accomplished to determine the condition of existing preservatives, i.e., exterior coatings, emitters, etc. – reaccomplish storage steps as deemed necessary, i.e., spraying of exterior coatings, replacement of emitters, etc.

**6.3. Corrosion Control.** Spot paint as required to preserve surfaces from rust and deterioration with paint conforming to current paint instructions. A small brush may be used to touch up or spot paint small areas such as chips, scratches, and minor corrosion. If complete painting of vehicle body panels is required it will be performed with a paint gun following procedures in TO 36-1-191, Chapter 2. If a vehicle requires complete repainting, paint it IAW TO 36-1-191, Chapter 2.

**6.4. Exposed Components.** Exposed components such as plastic sight tubes, nylon bushings, and other rubber items are covered, or removed and stored in the vehicle. Items may be covered with barrier paper or plastic and secured with tape.

**6.5. Vehicle Washing Requirements.** Using VCI-415 wash vehicle thoroughly covering all exposed surfaces. Mix 1 part VCI-415 to 10 parts water and apply using a sprayer, steam cleaner, power washer, brush, cloth, or sponge.

**6.6. Water Tank Trailers.** Use the appropriate VCI preservative to treat the outside of the water tank, however, DO NOT TREAT THE INSIDE OF THE WATER TANK – THIS WOULD MAKE THE WATER TANK UNSERVICABLE FOR POTABLE WATER.

**6.7. Vehicle/Component Operation.** Check for leaks and repair as necessary.

**6.8. Tires/Tracks.** Treat tires/soft tracks (inside and out) and other exterior rubber surfaces with VCI regrip rubber revitalizer. Reapply as necessary.

**6.9. Vehicle Exterior.** Using VCI-386CMA, spray all vehicle exterior surfaces possible. Apply a 2 mils thick coating to all surfaces excluding windows, bare metal moving parts, i.e., hydraulic cylinders, and lights. Allow to dry completely, (approximately 2 hours). In extreme environments apply second coat.

**NOTE:** When ordering VCI-386CMA be sure to indicate whether you need a gloss or matted finish.

**6.10. Battery.** Disconnect battery and spray terminals with VCI-238 ElectriCor. Reconnect positive battery terminals ONLY. If a master switch is installed, battery terminals do not have to be disconnected, but instead turn the switch to “off”.

**6.11. Solargizer.** Ensure the Solargizer is hooked up properly and operating correctly by checking the LED on the Solargizer box. Red light needs to be illuminated at all times. Storage location will determine the type of Solargizer used, i.e., solar powered or electrically powered. Solargizers installed on active stored vehicles will be mounted to the lower right corner of the windshield, not to obstruct the drivers view, and will remain installed even when the vehicle is in use.

## Chapter 7

### PRESERVATIVE DESCRIPTION

**7.1. Overview.** This chapter includes descriptions of preservatives used during storage processing and is to be utilized as a guide to order preservatives. Order quantities based on need, ensuring that the preservative meets the specification number. Local maintenance managers will coordinate with HQ PACAF/LGRWM prior to substituting materials other than those listed herein.

#### **7.2. Description of Preservatives:**

7.2.1. **Corvine® 300 Canister.** Corwipes remove grease, oil and light corrosion deposits, while leaving behind a thin film of corrosion inhibitors. It cleans machinery equipment, machine shop tools, hoods, parts in-process, etc. Corwipe® 300 contains an active water-based material that is safe to handle, is not harmful to skin and is classified as non-hazardous. Corwipe® 300 leaves a thin film of corrosion inhibitors on the treated surface to protect most metal surfaces against corrosion.

7.2.2. **CorShield®.** Corshield® is a multiple-layered protective fabric with a non-woven, soft inside layer. Corshield® protects valuable items from corrosion during storage and shipment. Corshield® offers complete protection to valuable items from machinery to vehicles. Reusable and recyclable, Corshield® can be sewn to custom sizes and covers. Product offers 5 years UV protection.

7.2.3. **EcoShield®.** Ecoshield® is a multiple-layered protective fabric with a non-woven, soft inside layer. Made from high-density polyethylene tapes and extrusion laminated, Ecoshield® protects valuable items from corrosion during storage and shipment. Ecoshield® offers complete protection to valuable items from machinery to vehicles. Reusable and recyclable, Ecoshield® can be sewn to custom sizes.

7.2.4. **Cor-Pak™ EcoWeave®.** Cor-Pak™ Ecoweave® is a woven polyethylene film that offers extra strength, durability, multi-metal corrosion protection, reusability and recyclability. Ecoweave® will provide the protection needed for expensive, but heavy, raw materials and finished products. It provides protection against corrosion, Mother Nature and traditional transit and storage damage as well as Corshield® and Ecoshield®.

7.2.5. **VCI-126 Series/MilCor High Technology Anti-Corrosion Films One -Step Corrosion Protection and Packaging.** VCI (Vapor Corrosion Inhibitor) 126 Series/MilCor films combine the latest film technology with the most effective corrosion protection for all your metals. VCI films protect metal parts from all types of corrosion including rust, tarnish, stains, white rust and oxidation for up to 5 years, depending on film construction thickness and application.

7.2.6. **VCI-101 & VCI-105 Patented VCI-101 (NSN: 6850-01-338-1392).** Devices are designed to provide corrosion protection for metal components and parts enclosed in non-ventilated control boxes, cabinets or toolboxes. A VCI-101 device protects up to 1 cubic foot (28 liters) in volume. VCI-101 is a small foam device. The VCI's emit vapors that form a molecular layer on metal surfaces to protect critical, complex and expensive electronic equipment during operations, shipping or storage. VCI-101 provides long-term protection against corrosion even in the presence of adverse conditions including salt, moisture, airborne contaminants H<sub>2</sub>S, SO<sub>2</sub>, NH<sub>3</sub>, and others.

7.2.6.1. **VCI-105 (NSN: 6850-01-406-2060).** Emitters provided protection up to 5 cubic feet (0.15 m<sup>3</sup>) in volume. VCI-105 is a small, patented plastic emitter with a breathable Tyvek® mem-

brane through which the corrosion inhibitor is slowly released and moisture and air pollutants can enter to be absorbed.

7.2.7. **Electricorr™ VCI-238 (NSN: 6850-01-413-9361).** Electricorr™ VCI-238 forms a molecular barrier effective against aggressive environments, including industrial, marine and tropical climates. This does not alter the electrical, resistance or magnetic properties. Electricorr™ VCI-238 can be safely applied for protection of even low-voltage circuits or relays without causing any changes in conductivity. It can be safely used with plastics, elastomers, and other non-metallics. In addition to corrosion protection, Electricorr™ VCI-238 is an excellent contact cleaner of oils, grime and other contaminants. Electricorr™ VCI-238 is an effective inhibitor of galvanic corrosion for most metals.

7.2.8. **VCI-322.** VCI-322 oil based concentrate adds corrosion protection to lubricating oils. VCI-322 provides excellent protection in indoor open air conditions. First, oil-soluble corrosion inhibitors offer a tenacious film which clings to metal surfaces, giving excellent contact corrosion protection. In addition to this film barrier, VCI-322 releases vapor phase corrosion inhibitors into the air above the oil. These VCIs attach to metal surfaces for additional corrosion protection. Highly recommended in hydraulic systems.

7.2.9. **VCI-323.** VCI-323 is a vapor corrosion inhibiting oiled based concentrate for use with working engine systems, transmissions, compressors, etc. VCI-323 protects in two unique ways. First, oil soluble corrosion inhibitors offer a tenacious film which clings to metal surfaces, giving excellent contact corrosion protection. In addition to this barrier, VCI VCIs release vapor phase corrosion inhibitors in to the air above the oil. These VCIs attach electrochemically to the metal surface for additional corrosion protection.

7.2.10. **VCI-368 (NSN: 8030-00-062-6950).** VCI-368 is a coating that provides excellent protection to metal substrates exposed to harsh outdoor conditions. VCI-368 leaves a firm, wax-like film that can be removed by mineral spirits or alkaline cleaners such as VCI® VCI-415. This product features excellent flexibility, resistance to salt spray environment or outdoor conditions.

7.2.11. **VCI-369 (NSN: 8030-00-244-1297).** VCI-369 is the best inhibitor for use as an oil additive and/or temporary coating. The protective film is self-healing and moisture-displacing, providing superior protection against aggressive environments. VCI-369 is also excellent for mothballing, shipping or storage of parts and equipment when used as an oil additive. In small percentages, VCI-369 has a minimal effect on viscosities. Also excellent in outdoor and salt spray environments.

7.2.12. **VCI-369 Core-Lube™ Grease.** VCI VCI-369 Cor-Lube™ is an extreme pressure lubricant with good resistance to oxidation and hot and cold water. It is specifically formulated with superior corrosion-inhibiting properties against salt water, brines, H<sub>2</sub>S, HCl and other corrosive agents. VCI-369 Cor-Lube™ is suitable for both lay-up and operating conditions. Unique vapor phase corrosion inhibiting ability (VCI) for areas not in direct contact with Cor-Lube™ grease.

7.2.13. **VCI-386 CMA.** VCI-386 is a unique, water-based primer/topcoat that successfully provides protection in harsh, outdoor, unsheltered applications. The complex mixture of non-toxic, organic inhibitors offers protection that can compete with most paints and zinc-rich primers.

**NOTE: When ordering VCI-386CMA be sure to indicate whether you need a gloss or matted finish.**

7.2.14. **VCI-130 Series VCI Impregnated Foams (6950-01-426-3539).** VCI-130 Series Foams provide corrosion protection, cushioning and desiccant action all in one step. Parts protected with

VCI-130 Foams are always ready for use, no degreasing or coating removal is required. Metal Parts packaged with VCI Foams receive continuous protection against humidity, condensation, dissimilar metal corrosion (galvanic corrosion), salty air, and residual impurities left after processing.

7.2.15. **VCI-415.** VCI-415 is a heavy duty water-based alkaline cleaner and degreaser offering unique flash corrosion protection. VCI-415 can provide corrosion protection for up to 6 months during indoor storage. VCI-415 is formulated to meet the requirements for cleaning and corrosion protection of aircraft.

7.2.16. **VCI-649/VCI-649 T.** VCI-649 is a concentrated liquid formulation that protects ferrous and non-ferrous metals from corrosive solutions. In addition, these two products are designed to provide long-term protection in fresh water, steam and glycol closed loop systems.

7.2.17. **VCI-705.** VCI-705 is specially formulated for use in gasoline, diesel, gasohol mixtures and alcohol fuels as a corrosion inhibitor, fuel stabilizer, and water emulsifier. VCI-705 is soluble in both methanol blends as well as neat methanol fuel or neat gasoline. VCI-705 provides comparable corrosion protection, lubricity and elastomer protection for ethanol fuels, including gasohol. VCI-705 provides excellent corrosion protection for all the common engineering metals used in automotive fuel systems including aluminum, aluminum die cast and zinc die cast alloys, terneplate, copper, ferrous alloys, cast iron and solder. VCI-705 provides excellent corrosion protection for fuel tanks, carburetors, fuel pumps of all types and upper engine cylinder components during operation and storage. VCI-705 gives unique multimetal corrosion protection in all phases: liquid, interface and vapor phases above and below the fuel level.

7.2.18. **VCI-337.** VCI-337 is a ready-to-use waterborne corrosion inhibitor. It's used to fog void spaces, tanks, containers, and enclosures. It's effective on ferrous metals as well as aluminum and plated steels.

7.2.19. **M-640L.** M-640L is a corrosion inhibiting additive for water and ethylene glycol based engine heat exchange fluids. It protects ferrous and non-ferrous metals from corrosive contaminants. It passes the ASTM D-1384-87 for engine anti-freeze/coolants.

7.2.20. **Rubber Re-grip Revitalizer.** Re-grip is a fast acting liquid which cleans, protects and revitalizes hardened and glazed rubber surfaces. Designed for automotive tires, belts, hoses, etc.

## Chapter 8

### VEHICLE/EQUIPMENT RESTORATION

**8.1. Overview.** The storage preservation procedures have been designed to enable quick restoration of vehicles. All vehicle components are preserved to make them completely operational at the time of vehicle start-up. **Note: Restoration procedures for active stored vehicles are limited in scope and can be accomplished by the vehicle operator.**

#### **8.2. Restoration of Inactive Stored Vehicles:**

- 8.2.1. Remove shrink wrap/bag from the vehicle.
- 8.2.2. Check all fluid levels and top off as needed.
- 8.2.3. For inactive stored vehicles remove the Solargizer from the shrink-wrap plastic/bag and install on the lower right corner of the windshield (active stored vehicles already have the panel installed on the windshield), connect negative battery cable and start vehicle (keep at low idle until oil pressure builds up).
- 8.2.4. Check for leaks.
- 8.2.5. Check all lights, wiper blades, and any other items that could effect the safety of the vehicle.
- 8.2.6. Install all OVE to complete the vehicle.

## Chapter 9

### INSPECTION AND DOCUMENTATION REQUIREMENTS FOR INACTIVE STORED VEHICLES

**9.1. Inspections.** Inspections will be either a visual inspection or a functional/operational inspection (on the 5% vehicles outlined herein). OLVIMS will be used by the maintainer IAW AFCSM 24-1 and this handbook to document these inspections. **Note:** Scheduled maintenance requirements other than those outlined in this chapter do not apply to inactive stored vehicles.

#### 9.1.1. Visual Inspections:

9.1.1.1. Load a quarterly visual inspection interval in OLVIMS for vehicles stored inside under protection and a monthly visual inspection for vehicles stored outside. Develop an annual plan to inspect an equitable portion of the vehicle fleet each month. Ensure available hours, projected employee leave, and holiday schedules are taken into account when developing this plan.

9.1.1.2. Document the visual inspection on AF Form 1823, Vehicle and Equipment Work Order, using an “F” prefix work order number and annotate annual visual inspection using system code 35AA. Add repair actions as required using the appropriate system code. **Note:** Do not add additional VCI preservatives to fluids that have already been serviced with preservatives unless the fluid system has been drained, i.e., due to scheduled maintenance, etc.

9.1.1.3. During the visual inspection, the condition of the bag/shrink-wrap will be checked and recorded on the reverse side of the Vehicle and Equipment Preservation Checklist. Visually inspect the bag/shrink wrap for deterioration. Evidence of deterioration to unserviceable levels will require the vehicle to be rewrapped or re-bagged. **Note:** Notify HQ PACAF/LGRWM prior to removing a vehicle from inactive storage as the result of a visual inspection. The completed Vehicle and Equipment Preservation Checklist will be placed in the vehicle historical record and will be used in accomplishing future inspections.

#### 9.1.2. Functional/Operational Inspection:

9.1.2.1. Remove the shrink wrap and perform a functional inspection on at least 5% of preserved vehicles annually. Ensure a random sampling of each of the following types: 463L, MHE, base maintenance, and general purpose. Out of this 5%, make every effort not to duplicate types of vehicles. Do not inspect the same vehicle (or count towards the 5% total) until all inactive stored vehicles have had at least one inspection.

9.1.2.2. During the 5% functional inspection all TCTO and deferred parts actions will be completed prior to rebagging. **Note:** DO NOT ADD ADDITIONAL VCI PRESERVATIVES TO FLUIDS THAT ALREADY HAVE PRESERVATIVES PRESENT FROM INITIAL SERVICING – THE ONLY TIME YOU NEED TO ADD ADDITIONAL VCI PRESERVATIVES IS WHEN A FLUID SYSTEM HAS BEEN DRAINED AND FLUIDS REPLACED.

9.1.2.3. Document results of the inspection and any repairs required in OLVIMS by opening an “F” prefix work order, annotating the operational/functional test using system code 35AB. Add additional repair actions as required, using the appropriate system code. Re-preserve vehicle IAW **Chapter 5** of this handbook and record preservation actions using system code 28AZ. Manually enter “Inactive Storage Preservation Actions” and total material cost of preservatives used in pre-

paring this vehicle in the remarks block for this work order when closing the work order in OLVIMS.

9.1.2.4. If discrepancies affecting safety or serviceability of any asset are identified during functional inspections, notify HQ PACAF/LGRWM prior to any repair actions.

9.1.2.5. Accomplish re-bagging or re-shrink-wrapping actions as outlined in **Chapter 5** of this handbook prior to returning a vehicle to inactive storage.

## **9.2. Evaluations.**

9.2.1. The maintainer (COB contractor through the QAE) is responsible for collecting data for use when evaluating storage concepts. Data for each stored vehicle will be maintained in the permanent side of the vehicle historical records. Retain this data for as long as the vehicle is stored. Data will address the following areas:

9.2.1.1. Average material cost and labor hours to preserve each group of vehicles by management code, reference paragraph **3.1.2.**, and **Attachment 2**, Note 1. f. & g.

9.2.1.2. The results of operational inspections, reference paragraph **9.1.2.**

9.2.1.3. Vehicle or equipment component degradation due to corrosion or preservative failure.

9.2.1.4. Any comments or concerns the maintainer may have regarding the preservation and restoration actions, or inactive storage concept.

## **9.3. Maintenance/Repairs of Stored Vehicles:**

9.3.1. Install deferred parts/TCTOs as needed during the 5% functional inspection.

9.3.2. Minor maintenance will be performed at the storage location.

9.3.3. Preservation shall be re-accomplished after maintenance is completed.

POLLY A. PEYER, Brig Gen, USAF  
Director of Logistics

**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFPD 24-3	Operation, Maintenance and Use of Transportation Vehicles and Equipment
AFI 25-101	War Reserve Materiel (WRM) Program Guidance and Procedures
AFI 32-7043	Hazardous Waste Management Guide
AFI 24-301	Vehicle Operations
AFSCM 24-1	On-Line Vehicle Interactive Management System (OLVIMS)
AFMAN 24-307	Procedures for Vehicle Maintenance Management
AFMAN 24-307/PACAF1	Procedures for Vehicle Maintenance Management
PACAFI 25-101	War Reserve Materiel (WRM) Program Guidance and Procedures
TO 00-20-14	Air Force Metrology and Calibration Program
TO 36-1-191	USAF Motor Vehicle and Vehicular Equipment Inspection Maximum Repair Allowances, Replacement Codes and Priority Buy Program for USAF Vehicles Painting, Marking, and Lighting Requirements for USAF Vehicles Processing of Motor Vehicles for Shipment and Storage Serviceability Standards for USAF Vehicles Preparation and Corrosion Treatment of Vehicles
TO 37A-1-101	Fuel, Water and Lubricant Dispensing Equipment

***Abbreviations and Acronyms***

<b>AFEMS</b>	—Air Force Equipment Management System
<b>AFI</b>	—Air Force Instruction
<b>AFM</b>	—Air Force Manual
<b>AOR</b>	—Area of Responsibility
<b>COB</b>	—Collocated Operating Base
<b>HQ PACAF</b>	—Headquarters Pacific Air Forces
<b>IAW</b>	—In Accordance With
<b>LTI</b>	—Limited Technical Inspection
<b>MOB</b>	—Main Operating Base

**NSN**—National Stock Number

**OLVIMS**—On-Line Vehicle Interactive Management System

**OVE**—On Vehicle Equipment

**PSI**—Pounds Per Square Inch

**QAE**—Quality Assurance Evaluator

**RPM**—Revolutions Per Minute

**SAE**—Society of Automotive Engineers

**TCTO**—Time Compliance Technical Order

**WRM**—War Reserve Materiel

**Attachment 2**

**SAMPLE VEHICLE AND EQUIPMENT PRESERVATION CHECKLIST**

REG Number:	Make:
NSN:	Photo Numbers:
Paint Condition (New/Spot):	Corroded Areas:
Overall Vehicle Condition:	Storage Location:
Date Accomplished:	Sch Maint Performed:

**Preparation Requirements**

Film Type:	Cut Size:
Pre-Wash:	Operate Vehicle:
Coolant:	Check For Leaks:
Steering Fluid:	Emitters:
Engine Oil:	Electrical Connections:
Transmission Fluid:	Tires:
Transfer Case:	Overcoat:
Differential:	Disconnect Batteries:
Hydraulic Fluid:	Solargizer:
Grease/Lube:	Store OVE:
Air Tanks:	Elevate Vehicle:
Non Exposed Metal (Spray):	Drain Air Tanks:
Fuel Tank:	Padding:

**36-1-191 "plus" Condition**

Historical Records Review:	Dust boots:
New Filters:	Cylinders:
Belts:	Battery Test:
Water Pump:	Starter Test
Hoses:	Alternator Test:

Clock Hours:	Fluids:	Sprays:	Wrap:	Total:
# of Personnel				
Solargizer Man hours:				
Total Cost of Storage:				

**Major Discrepancies/Notes**


## Attachment 3

## PRESERVATION EQUIPMENT

NSN	NOMENCLATURE	REMARKS
8415-00-601-0797	Coverall, disposable	
8020-00-178-9788	Brush, paint	*Package of 12
4240-01-250-2286	Filter, respirator	*Box of 4
8415-00-266-8679	Gloves, rubber, acid resistant	
4930-01-390-8196	Pump, undercoat	
4240-01-250-2273	Respirator, small	
4240-01-250-2274	Respirator, medium	
4240-01-251-9458	Respirator, large	
4940-00-261-8415	Spray Gun (Binks)	
4940-00-341-4032	Steam cleaner	
Local Procurement	1-gallon Fluid Dispensers (with flexible spout)	
4930-01-434-4067	Grease Guns	
4930-00-275-7900	Squirt-can Fluid Dispensers	
Local Procurement	Dunnage (for blocking vehicles off the ground)	
4240-00-269-7912	Molded Plastic Safety Glasses	
Local Procurement	Propane Tanks	
KP-184-H	18" & 4" Extension torch kit: contact Goss Inc. at 412-486-6100 or visit on-line at <a href="http://www.gossonline.com">www.gossonline.com</a>	
Shrinkfast 998	Wand type heat gun: contact Shrinkit Inc. at <a href="mailto:info@shrinkit-inc.com">mailto:info@shrinkit-inc.com</a>	
4910-01-250-2973	5-Ton Jack Stands	
4910-00-724-2172	10-Ton Jack Stands	
Local Procurement	Fire Extinguishers	
Local Manufacture	Roll Rack for Plastic Shrink-Wrap	
Local Procurement	Various Funnels (for fluid preservatives)	
6130-01-392-8347	24-volt Solargizer	
6130-01-388-0914	12-volt Solargizer	
	Solargizer transformers needed for inside use are available through the company identified below:	
	PulseTech Products Corp.	
	1100 S. Kimball Ave.	
	Southlake, TX. 76092	
	1-800-580-7554, 817-329-6099 or fax 817-329-5914	

**Attachment 4****TO "36-1-191 PLUS" CRITERIA**

**A4.1.** As a rule, placing a vehicle in T.O. 36-1-191 condition for storage assures that a vehicle is in a serviceable condition. That level of conditioning is generally acceptable for routine vehicle storage actions, but not for inactive-stored WRM vehicles.

**A4.2.** We have established an upgraded level of 36-1-191 conditioning called "36-1-191 Plus." What "191 Plus" means is that the vehicle has been conditioned to peak serviceability, and is expected to perform well for an extended period of use. "191 Plus" conditioning means that the deploying-in unit has an asset ready for extended use.

**A4.3.** "191 Plus" vehicle certification includes:

A4.3.1. Reviewing the historical record and work order history data to ensure nothing disqualifies the vehicle from performing as expected. This means:

A4.3.1.1. There is no indication that the vehicle has "hangar queen" tendencies.

A4.3.1.2. Neither VDM nor VDP (VOC) experience is inordinate when compared with peer vehicles.

A4.3.1.3. No adverse trend of repetitive maintenance is evident.

A4.3.1.4. The vehicle is not immediately scheduled for depot level input.

A4.3.1.5. There are no outstanding TCTOs which can be accomplished.

A4.3.2. Attending to the physical conditioning of the vehicle by certifying that:

A4.3.2.1. All new filters were installed (where possible, filters will be long-life, premium quality).

A4.3.2.2. Power and drive belts are absolutely crack-free and check-free.

A4.3.2.3. Cooling system is completely clean with antifreeze mixed to 60 percent antifreeze and 40 percent water (although a 50/50 mixture is acceptable per US Army TACOM advice).

A4.3.2.4. Water pump shows no sign of fatigue or leakage (if in doubt, replace it).

A4.3.2.5. All water hoses are crack free, with no bulging or sponginess.

A4.3.2.6. Dustboots, where installed, are absolutely crack-free, are properly positioned, and securely fastened.

A4.3.2.7. Hydraulic cylinder ramshaft wiping rings wipe the shaft as dry as factory/ manufacturer tolerance allows (to include power steering rams).

A4.3.2.8. Every system or major component for which an on-vehicle fault isolation test or operability assessment is developed (per tech data) was analyzed and load tested and found to be completely within specs (i.e. alternators, batteries, starter motors, fuel injector pumps, etc.). Document results and retain the data in the permanent vehicle records jacket.

A4.3.2.9. A thorough quality control inspection of work that was done during conditioning for inactive storage was conducted.

**A4.4.** The actions described in preceding paragraphs [A4.3.1.](#) and [A4.3.2.](#) can and should be expanded where needed to achieve the “191 Plus” condition. We are aware that this upgraded level of vehicle conditioning could affect the workload of those involved. However, it is better to expend the effort when placing a vehicle in inactive storage, in order to minimize the efforts to restore the vehicle for contingency operations.