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**Maintenance**

**HYDRAZINE (H-70) FAMILIARIZATION  
TRAINING, LEAK DETECTION, SPILLS, AND  
RECOVERY OF AIRCRAFT WITH FIRED  
EMERGENCY POWER UNITS**

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This instruction establishes policy and procedures to support hydrazine (H-70) familiarization training, leak detection, spills, and recovery of F-16 aircraft after operation of the emergency power unit (EPU) and it implements AFD 21-1, *Managing Aerospace Equipment Maintenance*. It applies to all personnel and units assigned, attached, or tenant to the 51<sup>st</sup> Fighter Wing. In situations where the EPU servicing spill clean-up team leader determines this instruction does not adequately cover procedures for the particular situation, authority is granted to add to or deviate from the procedures when safety of personnel or damage to equipment is involved.

**SUMMARY OF REVISIONS**

The references were updated and the Fire Department, Wing Safety, Bioenvironmental Engineering, and EPU servicing spill clean-up responsibilities were updated. A bar (|) indicates revision from the previous edition.

**1. References:** LCL-51LG-LGQ-011, AFI 91-301, AFOSH STD 48-8, 48-22, 48-137, 91-31, 91-68, AFMAN 91-201, TO's 00-25-172, 1F-16CG-2-49JG-00-1, 1F-16CG-2-49JG-00-2, 1F-16CG-2-49JG-00-3, 6J14-11-2, and Osan AB OPLAN 32-1.

**2. Definition of Hydrazine.** Hydrazine is a clear, oily liquid having an ammonia-like odor that is corrosive and highly toxic.

## WARNING

**Non-essential personnel shall leave the immediate area to avoid breathing Hydrazine vapors. Failure to do so may result in personal injury. Personnel will exercise care to ensure that hydrazine does not come in contact with skin or eyes. All EPU firings and suspected hydrazine leaks will be treated as definite leaks until the EPU servicing/spill cleanup team determines otherwise.**

**3. Hydrazine Training.** All aircraft maintenance and aircraft fuel systems personnel will receive familiarization training in the hazards of hydrazine. All unit commanders will ensure that personnel with duties in the proximity of F-16 aircraft or Hydrazine also receive training.

3.1. The 51 MOS/MXOT will provide initial hydrazine familiarization training for all personnel, including fire protection personnel.

3.2. The 51 MXS/MXMCF, 51 CES/CED (EOD), 51 SG/AOEM, 51 AMDS/SGPB, and 51 CES/CEF will provide in-shop specialized training as required.

## **4. Designated Areas.**

4.1. Recovering Aircraft with a Fired EPU. If the aircraft is landing on runway 27, it will be parked on taxi-way "B" or its alternate, the hot cargo pad (G.O./P.O.). If the aircraft is landing on runway 09, it will be parked on taxiway "F" or its alternate, the hot brake/arming area.

4.2. Routine EPU Maintenance: The primary hydrazine maintenance area is located in dispersal area "A", (hard stand A-10 and A-11), and flow throughs 15 thru 24. This area will be utilized to perform maintenance of the F-16 EPU to include: H-70 tank replacements, purge and hook-up couplings, and mono-propellant checks.

4.3. Authorized Storage Area. Building 1765 is the only facility on Osan AB authorized for the storage of hydrazine.

**5. Responsibilities.** Any individual who discovers leakage of a clear liquid coming from the aircraft or detects the presence of an ammonia odor will immediately evacuate the area, notify MOC through the most expeditious means possible, and seek immediate medical attention. Personnel will remain a minimum of 100 feet upwind, crosswind and downwind from the suspected leak and direct response personnel upon their arrival. The following actions will be taken upon notification of a suspected hydrazine leak or spill.

5.1. The 51 MOS/MXOOM (MOC) will:

5.1.1. Declare ground emergency and notify the Fire Department and EPU servicing spill cleanup team of a suspected hydrazine leak/spill.

- 5.1.2. Notify all maintenance vehicles of the suspected leak/spill location and clear radio net except for essential personnel.
- 5.1.3. For Major Spills (1 liter or more). MOC will interface with all agencies responsible for disaster preparedness, fire protection, security and medical support.
- 5.2. The 51 CES/CEF (fire department) will:
  - 5.2.1. Notify 51 OSS/OSAM (airfield management) to activate the secondary crash net.
  - 5.2.2. The senior ranking fire department personnel on scene will perform all duties of the on-scene commander.
  - 5.2.3. Provide a water source for dilution/neutralization of hydrazine for personnel decontamination of EPU Servicing and spill cleanup team members.
  - 5.2.4. Maintain contact with the EPU servicing/spill cleanup team and provide condition updates to the command post as required.
  - 5.2.5. The fire department will egress pilot from cockpit using portable oxygen bottle when hydrazine is suspected of being present.
  - 5.2.6. The on-scene commander will determine wind direction, coordinate with EPU servicing/spill cleanup team and security police to establish position of entry, control point and will appoint an entry control point guard.
- 5.3. The 51 MXS/CC will:
  - 5.3.1. Ensure the EPU servicing/spill cleanup team performs inspections and conducts containment, dilution, and neutralization actions as required in applicable directives.
  - 5.3.2. Ensure the EPU servicing/spill cleanup team members are provided with the proper personal protective equipment, chemicals and materials for inspection, identification, and neutralization of hydrazine.
- 5.4. The 51 MSG/CC or designated representative will:
  - 5.4.1. Ensure area security and cordon measures are carried out through the security police.
  - 5.4.2. Ensure area Disaster Control Group (DCG) is available for activation IAW Osan AB OPLAN 10-1. Activation will be accomplished by the wing commander.
- 5.5. The 51 CES/CED (Explosive ordnance Disposal) will:
  - 5.5.1. If ordinance are on board the aircraft and a leak is detected, provide a Weapons team to render safe any munitions at the direction of the on-scene commander.
- 5.6. The 51 AMDS/SGPB (Bioenvironmental Engineering) will:
  - 5.6.1. Provide technical guidance and advise to the on-scene commander on issues related to health consequences from exposure and disposal of neutralized waste.
  - 5.6.2. Provide assistance in the selection of appropriate personal protective equipment.
  - 5.6.3. Upon completion of containment and neutralization, test the aircraft or spill areas to detect any residual presence of hydrazine vapors and liquids.
  - 5.6.4. Provide technical assistance in the neutralization and disposal of the neutralized Hydrazine.

- 5.6.5. Assist in investigations of personnel exposures to Hydrazine resulting from spill or EPU firings.
- 5.7. The 51 SFS/SFO (Security Forces) will:
- 5.7.1. As directed by the on-scene commander, establish a cordon at least 100 feet in all directions of the leak/spill area.
  - 5.7.2. Allow only those personnel into the area that are approved by the on-scene commander.
  - 5.7.3. Evacuate the area to a distance of at least a 100 foot radius. If spills are inside a hangar, evacuate hangar and any adjoining offices, and suspend all maintenance.
- 5.8. The 51 FW/SE (Wing Safety) will:
- 5.8.1. Monitor operations from outside designated perimeter until scene is mitigated for investigation.
  - 5.8.2. Assist commanders in investigating and reporting all incidents or mishaps involving Hydrazine IAW AFI 91-204.
- 5.9. The 51 MXS/MXMC (EPU servicing/spill cleanup team) will:
- 5.9.1. Dispatch the EPU servicing/spill cleanup team to the site of the suspected leak.

### **WARNING**

**Maximum protective safety gear (level A or modified level B) is required for investigating a suspected or confirmed hydrazine leak.**

- 5.9.2. Once the on-scene commander has ensured aircraft is safe, the EPU servicing/spill cleanup team will investigate suspected leak by the most appropriate means (visual, litmus paper, multi-gas tester).
- 5.9.3. If a hydrazine leak is confirmed, notify MOC and the on-scene commander that a confirmed leak/spill exists and if it is a minor (less than one liter) or major (more than one liter) leak/spill.
- 5.9.4. Provide situation updates to the on-scene commander.

## **6. Procedures for Fired EPU with No Visual Hydrazine Leak Detected.**

- 6.1. Once a hydrazine leak has been confirmed, the on-scene commander will inform the control tower. The fire department will have the pilot shut down the engine immediately, chock the left main landing gear tire and egress pilot from cockpit using a portable oxygen bottle. After pilot is clear of the area, the fire department will install ground safety pins in main landing gear, EPU, and gun. If weapons are on board, the on-scene commander will ensure the weapons are safe as required.
- 6.2. Once the on-scene commander determines the aircraft has been made safe, he will direct the EPU servicing/spill cleanup team to investigate aircraft for possible Hydrazine leak. IAW LCL-51LG-CCVQ-011.
- 6.3. If hydrazine is detected, follow procedures for fired EPU with Hydrazine leak.

- 6.4. If it has been confirmed that no hydrazine leaks are present, the on-scene commander will inform the control tower.
- 6.5. The EPU servicing/spill cleanup team will emergency depressurize the hydrazine tank.
- 6.6. If hydrazine is detected during the depressurization the EPU servicing/spill cleanup team will post four hydrazine caution signs at a 100-foot radius and establish an entry control point upwind at the direction of the on-scene commander. The on-scene commander will appoint an Entry Control Point (ECP) monitor.
- 6.7. The EPU servicing/spill cleanup team will, contain the leak, and perform clean-up/neutralization procedures.
- 6.8. Once spill has been contained and neutralized, bioenvironmental will test aircraft and surrounding area for residual presence for hydrazine. If area is determined to be safe, the aircraft will be towed to the EPU maintenance/servicing area and EPU system returned to operationally ready status.
- 6.9. If hydrazine is not detected during depressurization, the aircraft will be towed to EPU maintenance and servicing area and the EPU system returned to operationally ready status in accordance with T.O. 1F-16CG-2-49GS-00-1, Section 4.

## **7. Procedures for Fired EPU with Hydrazine Leak Visually Detected.**

- 7.1. Once a hydrazine leak has been confirmed, the on-scene commander will inform the control tower. The fire department will have the pilot shut down the engine immediately, chock the left main landing gear tire and egress pilot from cockpit using a portable oxygen bottle. After the pilot is clear of the area, the fire department will install ground safety pins in main landing gear, EPU, and gun. If weapons are on board, the on-scene commander will ensure the weapons are safe as required.
- 7.2. The EPU servicing/spill cleanup team will post four hydrazine caution signs at a 100-foot radius and establish an entry control point upwind upon direction by the on-scene commander. The on-scene commander will appoint an (ECP) monitor.
- 7.3. The EPU servicing/spill cleanup team will don personal protective equipment and two members will open access panels to locate the source of the leak, while the team leader acts as a safety observer and back-up for the other two members.
- 7.4. The EPU servicing/spill cleanup will emergency depressurize the hydrazine tank, contain leak, and perform cleanup/neutralization procedures.
- 7.5. Once the spill has been contained and neutralized, bioenvironmental will test aircraft and the surrounding area for residual presence of hydrazine. If area is determined to be safe, the aircraft will be towed to the EPU maintenance/service area and the EPU system returned to operationally ready status in accordance with T.O. 1F-16CG-2-49GS-00-1, Section 4.

## **8. Deployment Requirements.**

- 8.1. A three member team with an approved hydrazine detection unit, spill kit and personnel protective equipment will accompany all F-16 deployments consisting of four or more aircraft, lasting more than a week if the deployed location has no hydrazine support capability.

8.2. Immediately upon arrival at a non F-16 base, the Senior EPU servicing/spill cleanup team member will coordinate with the host base representative for a briefing on the dangers of hydrazine and procedures for spills and leak responses.

8.3. The fuel shop supervisor will develop and maintain at least one hydrazine kit for hydrazine leaks in coordination with Bioenvironmental Engineering. The hydrazine kit will be mobile and readily available for dispatch.

## 9. Equipment Maintenance.

9.1. To reduce the possibility of personnel becoming exposed to Hydrazine vapors, the following precautions must be adhered to:

9.1.1. The EPU test set must be tested for hydrazine vapors after every use. If hydrazine is present, the equipment must be purged by qualified 2A6X4 personnel.

9.1.2. Calibration of the EPU test set will not be accomplished until the tester has been purged by qualified personnel.

### WARNING

**Failure to purge EPU test set properly may result in injury of personnel or damage to equipment.**

9.1.3. Purged testers will have an AFTO Form 244, **Industrial/Support Equipment**, and 350, **Repairable Item Processing Tag**, that will be annotated to reflect the date used and date purged.

9.2. Procedures in the event of personnel being exposure to H-70.

9.2.1. Exposed personnel will be isolated in an area upwind and away from the contaminated area and will need to undergo medical evaluation.

9.2.2. Personnel who are exposed to H-70 on their skin or clothing will proceed to the nearest source of water.

9.2.2.1. Clothing: Immediately remove all clothing and flush affected skin area with water for a minimum of 15 minutes. Contaminated clothing will be neutralized and disposal will be coordinated with Bioenvironmental Engineering and the Civil Engineering Environmental Flight.

9.2.2.2. Eyes: Immediately flush with large amounts of water for a minimum of 15 minutes. Transport to hospital emergency room.

9.2.2.3. Inhalation: Seek medical evaluation from the medical response team and transport to hospital emergency room.

9.3. The EPU servicing/spill cleanup team will properly neutralize and/or dispose of all contaminated clothing and equipment.

## 10. Hydrazine Servicing and Storage Facility.

10.1. Location of operation: Bldg 1765.

10.2. Safety precautions:

10.2.1. The servicing and storage facility will be identified by the appropriate chemical agents, signs, and placards mounted to all four sides of the building (fence, if installed) and easily visible from all directions.

10.2.2. Any time the facility is open, the two person concept will be used. A third person will be present as a safety observer during any Hydrazine servicing or handling operations.

10.2.3. Full protective clothing and respiratory protection (level A or modified level B) for each person present will be readily available any time the building is open.

10.3. Emergency procedures:

10.3.1. Hydrazine spill: In the event of a hydrazine spill at bldg 1765, MOC will be notified and the area evacuated to a minimum distance of 100 feet upwind.

10.3.2. Fire: In the event of a fire at bldg 1765, the MOC will be notified and personnel evacuated upwind. The area will be cordoned off a minimum of 500 ft.

10.4. Hydrazine storage limits:

10.4.1. 110 Gallons.

10.4.2. Five full Hydrazine tanks.

10.5. Personnel limits while servicing Hydrazine tanks:

10.5.1. Maximum: Eight.

10.5.2. Minimum: Three.

10.6. Operating procedures: The Aircraft Fuel System Repair Shop will prepare and maintain local operating instructions governing servicing and storage procedures. These instructions will be coordinated with the fire department, disaster, preparedness, the ground safety office, and Bioenvironmental Engineering at least annually.

## 11. Transportation of Hydrazine Fuel Tanks on Base.

11.1. Safety Procedures:

11.1.1. Transportation of Hydrazine tanks will be held to a minimum.

11.1.2. All tanks, either empty or containing any amount of Hydrazine, will be transported in a DOT approved shipping container only.

11.1.3. The two person concept will be used during all phases of transport.

11.2. The fuel shop supervisor will inform MOC prior to and upon completion of transport of Hydrazine tanks to and from the storage facility.

11.3. Emergency procedures: In the event a shipping container develops a leak in transit, the MOC will be immediately notified and personnel will evacuate to a minimum distance of 100 feet upwind of the site.

11.4. MOC will:

11.4.1. Maintain status of the transport operation, including advance knowledge of route to be used.

- 11.4.2. Initiate emergency notification procedures if a spill or leak occurs during transportation.
- 11.5. Ensure each transport vehicle will carry *no more than* three full hydrazine tanks at any given time.
- 11.6. Personnel limits:
  - 11.6.1. Maximum: One supervisor, four workers.
  - 11.6.2. Minimum: One supervisor, two workers.
- 11.7. Equipment requirements:
  - 11.7.1. Military vehicle.
  - 11.7.2. Fuel tank shipping/handling/storage container (DOT approved).
  - 11.7.3. Personal protective clothing (three sets):
    - 11.7.3.1. Boots.
    - 11.7.3.2. Apron.
    - 11.7.3.3. Gloves.
    - 11.7.3.4. Face Shield.
    - 11.7.3.5. Self-contained (level A or modified B) Breathing Apparatus.
  - 11.7.4. Maintenance net radio.
  - 11.7.5. DOT poison, corrosive material, and flammable liquid placards.

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