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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for performing electrical equipment inspections of Flexible Cord Sets, Receptacles, portable electrical distribution equipment, and Cord-and-Plug utilization connected equipment that is not part of the permanent wiring of buildings or structures or is not GFCI protected unless otherwise specified on the required Data Sheet.

1.2 Scope

Inspections ensure that electrical components are maintained in a safe and satisfactory condition and are properly connected to ensure personnel safety and availability of equipment.
2.0 INFORMATION

2.1 General Information

2.1.1 Maintenance called for in Section 5.0 pertains to electrical equipment and associated wiring. Instruments are excluded.

2.1.2 Inspections per Section 5.3, Grounding Conductor Inspection, will ensure that equipment Grounding Conductors on Flexible Cord Sets, Receptacles (not part of permanent wiring) and Cord-and-Plug connected equipment are installed and maintained in accordance with applicable requirements.

2.1.3 Inspections will normally be performed when the equipment is out of service.

2.1.4 This procedure applies to equipment to be inspected, which includes electrical cables and plugs, enclosures, cords, and connectors.

2.1.5 During the performance of this procedure, minor repairs or identical replacement of damaged or failed components may be made as described in this procedure. If parts are required, or if major repairs are needed, FWS or Engineering is to be contacted.
2.1 General Information (Cont.)

2.1.6  All required tests shall be performed when any of the following conditions have been met:

- Before first use on site, or if the inspection is not current.
- When there is evidence of damage.
- Before equipment is returned to service following any repairs.
- Before equipment is used after any incident which may be reasonably suspected to have caused damage (e.g., when a cord set is run over).
- Cords being used shall be inspected quarterly. Inspections for the next quarter are allowed to occur during the last month of each quarter: cords shall not be used unless it has been inspected for the current quarter.
  
  - Quarterly inspection tags (G605911), or equivalent, shall be applied on both ends in a visible location.
  - When in the field, Flexible Cord Set(s), Receptacles, and Cord-and-Plug-connected equipment shall be labeled with a unique identifier on both ends if applicable, with permanent labels that will be used for inspection tracking.

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Months</th>
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<tbody>
<tr>
<td>First</td>
<td>January, February, March</td>
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<tr>
<td>Second</td>
<td>April, May, June</td>
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<td>Third</td>
<td>July, August, September</td>
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- Periodic testing may be exempted if testing will present a greater hazard to personnel and is approved by the NFPA 70 Authority Having Jurisdiction (AHJ).
- This procedure will also be used to perform quarterly testing of equipment of utilization which includes but not limited to:
  
  - Air Samplers
  - Portable Light Stands
  - Eye Wash Heat Blankets
  - Smoke Generators
  - Space Heaters
  - Vacuum Pumps
  - Cord and Plug connected equipment that performs a function that does not require user interaction after initial operational setup.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 If a lock and tag is required during the performance of this procedure, perform Lockout/Tagout in accordance with DOE-0336, Hanford Site Lockout/Tagout Procedure.

3.1.2 Personnel exposure to energized equipment may occur when performing electrical inspections. Failure to follow electrical safety practices as outlined in DOE-0359, Hanford Site Electrical Safety Program could result in serious injury or death.

3.1.3 Job specific protective equipment requirements should be addressed during the pre-job brief and be in accordance with TFC-ESHQ-S_IS-C-02.

3.2 Equipment Safety

3.2.1 Flexible cords and cables shall be protected from accidental damage. Sharp corners and projections shall be avoided. Where passing through doorways and other pinch points, protection shall be provided to avoid damage per NEC 400.0 (3), flexible cords are not allowed to pass thru doors, windows, and like openings unless attended or protected.

3.2.2 Flexible cords and cables entering enclosures containing devices requiring termination shall be secured to box with fittings designed for that purpose.

3.2.3 Cable assemblies, flexible cords and cables shall be supported in place at intervals that ensure they will be protected from physical damage. Support shall be in the form of cable ties, straps, or similar type fittings installed so as not to cause damage.

3.2.3.1 Flexible cord(s) shall not be permanently attached to building or structure (reference NEC 400.8 (4)).

3.3 Radiation and Contamination Control

3.3.1 Work in radiological areas will be performed using a radiological work permit following review by Radiological Control per ALARA Work Planning procedure TFC-ESHQ-RP_RWP-C-03.
4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

The following supplies may be needed to perform this procedure:

- Digital Multimeter (DMM)
- 1000 volt Megger
- Portable generators
- Insulated hand tools
- Torque wrench, accuracy ± 5%
- Repair material for unused openings
- Lint free cloths
- Soft bristle brush
- Lightning Bolt Hole Punch

4.2 Performance Documents

The following documents may be needed in performance of this procedure:

- TO-100-052, Perform Waste Generation, Segregation and Accumulation
- DOE-0336, Hanford Site Lockout/Tagout Procedure
- DOE-0359, Hanford Site Electrical Safety Program

4.3 Field Preparation

4.3.1 IF applicable, INSTALL Lock and Tag or Authorized Worker Lockout/Tagout in accordance with DOE-0336, Hanford Site Lockout/Tagout Procedure, and/or as directed in work package instructions.

4.3.2 IF rodent contaminated areas are found, STOP WORK in affected area, NOTIFY operations AND PERFORM clean-up per procedure TO-100-052.
5.0 PROCEDURE

Special Instructions:

If performance of any steps in this procedure is not required for procedure completion, steps not performed are to be marked "N/A" in appropriate Data Sheet signoff space, and explained in comments/remarks section of Data Sheet.

NOTE - Steps may be worked in any logical order and may be worked concurrently.

5.1 Visual Inspections

NOTE - Step 5.1.1 is a visual inspection of cables and the general area where they are installed. The inspection may be conducted with the equipment energized and in operation and cables may be handled to the extent needed to adequately perform inspections.

- When cable protectors are opened and there is no evidence of rocks or other debris no further inspection is required.

- Hand over hand inspection of the entire cable length is not required.

5.1.1 PERFORM a visual inspection of cables per Data Sheet in the general area where the cables are installed. Examination of cable protectors should include but is not limited to the following:

- To confirm there is no evidence of rocks or other debris when they are opened
- For obvious signs of damage
- For equipment or components that should not be connected to them.

5.1.1.1 IF any of the following conditions exist, cables in cable protectors under steel plates are not required to be inspected unless directed by FWS:

- There is evidence of rodents near entrance/exit locations
- There is evidence of rocks or other debris having migrated under the steel plate near entrance/exit locations.
5.1 Visual Inspections (Cont.)

5.1.1.2 IF any problems/deficiencies are found during cable examination RECORD them in comment Section of Data Sheet [ITEM 1], AND CORRECT problems/deficiencies found.

5.1.1.3 RE-INSPECT corrected problems/deficiencies AND refer to Step 2.1.6.

5.1.2 IF damaged cord is identified PERFORM the following:

5.1.2.1 INSTALL barricade around area.

5.1.2.2 CONTACT and inform engineering.

5.1.2.3 RECORD in the Comments Section of Data Sheet.
5.2 Physical Inspections

5.2.1 IF performing this Section ENSURE Lock and Tag or Authorized Worker Lockout/Tagout is hung in accordance with DOE-0336, Hanford Site Lockout/Tagout Procedure.

5.2.2 PERFORM the following Physical Inspections per Data Sheet AND

RECORD problems/deficiencies in comment Section of Data Sheet \textit{ITEM 2}.

5.2.2.1 IF connections or terminations are loose

TIGHTEN loose connections/terminations AND

REPLACE degraded or compromised terminal lugs/screws.

NOTE - Equipment and hold-down bolts are prone to becoming loose due to temperature cycling and vibration.

5.2.2.2 ENSURE equipment and hold-down bolts are tightened AND

IF hold-down bolts required tightening on rotating equipment, RECORD in comment section of Data Sheet.

5.2.2.3 INSPECT for the following:

- dust
- oils
- excessive dirt buildup
- Moisture on wiring, or in electrical components.

a. IF any of these conditions were found during the inspection, CLEAN them.

5.2.2.4 ENSURE covers and panels have all screws or fasteners in place.

5.2.2.5 INSPECT condition of covers and panel gaskets.

b. IF worn or degraded, REPLACE covers/panel gaskets.

5.2.2.6 WIPE all porcelains with a clean, dry, lint-free cloth.
5.2 Physical Inspections (Cont.)

5.2.3 PERFORM a continuity check on equipment grounding conductor and ground conductor (neutral when applicable) and frame of mobile equipment on the following:

- each phase
- equipment grounding conductor and ground conductor (neutral when applicable) from receptacles
- pins on plugs
- inlets and sockets of connectors
- breaker or disconnect supplying device.

5.2.4 IF readings are greater than (>l) 1 ohm, DOCUMENT the deficiencies in work package AND

INFORM FWS for resolution, [ITEM 3].
5.3 Grounding Conductor Inspection

5.3.1 IF performing this Section ENSURE Lock and Tag or Authorized Worker Lockout/Tagout is hung in accordance with DOE-0336, Hanford Site Lockout/Tagout Procedure.

5.3.2 PERFORM visual inspection only on cords to inaccessible equipment, OR

PERFORM Step 5.3.3 on all Flexible Cord Sets, Receptacles, and Cord-and-Plug connected equipment required to be grounded/bonded.

5.3.3 CONFIRM the following for equipment grounding conductor(s)(neutral when applicable) AND RECORD problems/deficiencies in Comment Section Data Sheet, \[ITEM 5\].

- Will be tested for continuity and shall be electrically continuous
- Is connected to proper equipment terminal and/or equipment frame
- Is correctly attached to each receptacle and attachment plug.

5.4 Quarterly Inspection Tags and Identification Label Installation

5.4.1 REPAIR OR REPLACE Flexible Cord Set(s), Receptacles and Cord-and-Plug connected equipment that failed to pass the preceding inspections AND RECORD in Comments Section of the Data Sheet.

5.4.2 AFFIX the appropriate Inspection Tags, per Data Sheet, to both ends of Flexible Cord Set(s), Receptacles, and Cord-and-Plug connected equipment, (including new or repaired) that passed the preceding inspections \[ITEM 6\].

5.4.3 CONFIRM Identification Labels are legible and if applicable, are affixed to both ends of Flexible Cord Set(s), Receptacles, and Cord-and-Plug connected equipment (including new or repaired), OR

AFFIX new Identification labels per Data Sheet \[ITEM 7\].

5.4.4 ENSURE quarterly inspection tag is punched for passed cords.
5.5 Megger Check for New or Repaired Cords

5.5.1 IF performing this Section ENSURE Lock and Tag or Authorized Worker Lockout/Tagout is hung in accordance with DOE-0336, Hanford Site Lockout/Tagout Procedure.

5.5.2 PERFORM phase to ground megger check on equipment (e.g., plugs, connectors, receptacles, and inlets) that feeds inaccessible equipment,

   OR

   PERFORM a megger check between phase conductors, equipment ground and grounded conductor (neutral when applicable) of plugs, connectors, receptacles, and inlets as listed on the Data Sheet.

5.5.2.1 IF readings are less than (<) 2 megohm, DOCUMENT the deficiencies in work package AND

   INFORM FWS for resolution, [ITEM 4].

5.5.3 REPAIR OR REPLACE Flexible Cord Set(s), Receptacles, and Cord-and-Plug connected equipment that failed to pass preceding inspections AND

   RECORD in Comment Section of Data Sheet.
5.6 Restoration

5.6.1 **DISCONNECT AND REMOVE** Test Equipment.

5.6.2 **ENSURE** all covers are replaced and doors/panels closed, *[ITEM 8]*.

5.6.3 **IF** hold-down bolts on rotating equipment were tightened during step 5.2.2.2, **ENSURE** comments have been recorded on Data Sheet.

5.6.4 **IF** lock and tag was installed, **REMOVE** Authorized Worker lock and tag.

5.6.5 **ENSURE** measuring and test equipment (M&TE) and calibration status are recorded on Data Sheet.

5.6.6 **ENSURE** equipment system restoration by observing indications are consistent with expected conditions.

5.7 Acceptance Criteria

Successful completion of inspections and/or repairs detailed in Sections 5.1 through 5.6 and recorded on Data Sheet(s) satisfies Acceptance Criteria.

5.8 Review

5.8.1 **INFORM** FWS that testing is complete.

5.8.2 **FWS REVIEW AND ENSURE** the following:

- Completed Data Sheet(s) meet the acceptance criteria and are forwarded to System Engineering.
- If applicable, request for additional monitoring (ref. Step 5.6.3) when equipment is returned to service.
- Comments sections are filled out appropriately.
- Work requests needed as a result of this procedure are identified and generated.
- Work request number(s) of any work documents generated as a result of this procedure are recorded in the Comments/Remarks section of the Data Sheet, as applicable.
5.9 Records

This procedure is performed within a work package, as such, the procedure in its entirety will be maintained as a record per the Work Control process.

The record custodian identified in the Company-level Records Inventory and Disposition Schedule (RIDS) is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02.