LorTec 30 KVA Model LE-3030 UPS and Battery Tests

Tank Farm Maintenance Procedure

Effluent Treatment Facility

USQ Not Required – ETF is a <Hazard Category 3 Radiological Facility

CHANGE HISTORY (≤ last 5 REV-MODS)

<table>
<thead>
<tr>
<th>Rev-Mod</th>
<th>Release Date</th>
<th>Justification</th>
<th>Summary of Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-2</td>
<td>09/25/2018</td>
<td>Environmental/TA/Doc owner request.</td>
<td>Step 2.1.1: Delete &quot;(five years)&quot; &amp; &quot;(per data sheet EL-2895, 30 KVA UPS Breaker Inspection)&quot;. Sentence should read, &quot;Periodically the power cable connections will be inspected and tightened.&quot; (Reason: The RCRA permit calls for annual inspections and PM EL-000704 is annual.) (Environmental, TA, and Doc owner request) Deleted redundant step 4.3.3, this is performed in step 5.1.2. (TA and Doc owner request) Step 5.1.8: Added a 6th bullet: &quot;Indicator lights have fault condition&quot; (Reason: RCRA permit required a check of the indicator lights for a fault condition.) (Environmental and TA request)</td>
</tr>
<tr>
<td>A-1</td>
<td>07/27/2016</td>
<td>Correct Use Type</td>
<td>Change from continuous use to reference use per document owner’s direction.</td>
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<tr>
<td>A-0</td>
<td>11/04/2015</td>
<td>Conversion to WRPS Format</td>
<td>New Procedure; Supersedes ETF-PRO-MN-51455 (EL22004)</td>
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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides a safe, uniform method for inspecting, cleaning, and testing the LorTec Model #LE-3030, 30 KVA UPS (25I-UPS-1) and associated batteries at ETF.

1.2 Scope

This procedure provides instructions for a visual inspection of the UPS and associated batteries. The batteries are tested to ensure each battery is in good condition. Power cable terminations are inspected and tightened.

2.0 INFORMATION

2.1 General Information

2.1.1 Periodically the power cable connections will be inspected and tightened. The UPS will need to be shut down with power isolated (locked and tagged) for this work. The facility will be shut down due to loss of power for human machine interface computers.

2.1.2 UPS will be placed in BYPASS mode and the battery bank will be put in maintenance shutdown during performance of this procedure. Loads connected to the UPS will not be provided with an alternate energy source in case normal power is lost. Power will not be conditioned during maintenance.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

**WARNING** – Failure to observe energized electrical work permit and PPE requirements may result in personnel injury or death.

**WARNING** - Battery trays weigh approximately 190 lb (86 kg) and can be pulled completely off the slide, resulting in serious injury or death.

3.1.1 If working around live circuits, extreme caution should be used. Failure to follow electrical safety practices as outlined in DOE-0359, Hanford Site Electrical Safety Program, could result in serious injury or death.

3.1.2 Some locations require lock and tag for protection against temperature, pressure or hazardous chemicals before breaching the system. Under these circumstances, lock and tag is required in accordance with procedure DOE-0336, Hanford Site Lockout/Tagout Procedure.

3.1.3 Failure to use protective equipment when working on or near energized systems could result in serious injury.

3.2 Equipment Safety

**CAUTION** - Using a micro-ohmmeter across a battery will destroy the micro-ohmmeter.

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-ESH-RP_RWP-C-03.

3.4 Environmental Compliance

3.4.1 In the event of a spill/leak/release, notify the SOM/FWS and respond per ETF-ERP-85B-003, Emergency Spill or Release at ETF.

3.4.2 The UPS is a required system as listed in the facility RCRA permit. In the event of any problems identified, or missed or overdue testing, notify SOM and Environmental Field Representative.
4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

NOTE - M&TE used to collect acceptance criteria data during performance of this procedure shall meet the following requirements:
- Be within its current calibration cycle as evidenced by an affixed calibration label
- Be capable of desired range
- Accuracy is equal to or greater than M&TE tolerance specified on PM data sheet or is at least four times greater than specified device tolerance.

The following supplies may be needed to perform this procedure:
- Digital calibrated voltmeter
- 100 AMP automotive type battery tester (TIF 2500)
- Torque wrench, ranged for 75 in-lbs
- Calibrated micro-ohmmeter
- Vacuum cleaner with non-conductive hose attachments
- Scotch-Brite (scrubbing pad, not metal)
- Hand lift truck
- Clean rags
- Other tools, equipment and supplies as identified by FWS/User.

4.2 Performance Documents

The following documents may be needed to perform this procedure:
- DOE-0336, Hanford Site Lockout/Tagout Procedure
- DOE-0359, Hanford Site Electrical Safety Program
- ETF-25B-003, UPS Operation

4.3 Field Preparation

4.3.1 CHARGE batteries, but not within 24 hours of an outage recharge.

4.3.2 IF work will be performed on UPS components, CONFIRM an energized electrical work permit is in work package.
5.0 PROCEDURE

5.1 As-Found Readings

5.1.1 PLACE UPS in BYPASS per ETF-25B-003.

5.1.2 INSTALL facility lock and tag per DOE-0336.

**WARNING**

Failure to observe energized electrical work permit and PPE requirements may result in personnel injury or death.

5.1.3 ENSURE PPE requirements for work activities identified in work package are implemented.

5.1.4 ENSURE battery system is isolated from supply and load.

5.1.5 UNPLUG connectors between battery trays.

5.1.6 CHECK air filters for dirt AND REPLACE dirty filter(s).

5.1.7 CHECK AND CLEAN the following:
- UPS
- Batteries
- Battery compartments.

5.1.8 CHECK battery bank and cabinet for the following AND NOTIFY FWS if any of the conditions are found:
- Heating
- Bulging
- Leaking
- Corrosion on frame and electrical parts
- Discolored electrical connections
- Indicator lights have fault condition.

5.1.9 ENSURE battery connections are tight.
5.1 As-Found Readings (Cont.)

CAUTION
Using a micro-ohmmeter across a battery will destroy the micro-ohmmeter.

5.1.10 MEASURE AND RECORD on data sheet as-found connection resistance of connected battery jumpers from (-) post of one battery to (+) post of next battery (not across battery).

5.1.11 IF connection resistance is out of tolerance per PM data sheet, OR

IF connection shows signs of heating or looseness, REPAIR connection.

WARNING
Battery trays weigh approximately 190 lb (86 kg) and can be pulled completely off the slide, resulting in serious injury or death.

5.1.12 IF battery trays are pulled out or removed, USE a lift hand truck to support the battery tray.

5.1.13 IF connection resistance is out of tolerance or required repair, PERFORM the following:

5.1.13.1 DISASSEMBLE connection AND
CLEAN mating surfaces.

5.1.13.2 REASSEMBLE connection AND
TIGHTEN to value listed on battery.

5.1.13.3 TORQUE connection to 75 in-lbs.

5.1.14 IF connectors are cleaned, REPEAT Step 5.1.10.

5.1.14.1 RECORD in as-left section of PM data sheet OTHERWISE
RECORD as-found data in as-left section of data sheet.
5.1 As-Found Readings (Cont.)

5.1.15 MEASURE voltage of each battery AND
RECORD value on PM data sheet.

5.1.16 IF any battery voltage is < 12.4 volts, CONTACT FWS.

5.1.17 SET TIF battery tester to heavy setting (600 CCA).

5.1.18 LOAD each battery passing Step 5.1.16 AND
RECORD pass/fail results.

5.1.19 ALLOW tester to cool between tests.

5.1.20 IF a battery fails load test or leaks, NOTIFY FWS.

5.1.21 IF removed REINSTALL battery trays AND
RE-CONNECT battery tray interconnecting cables.

CAUTION
Using a micro-ohmmeter across a battery will destroy the micro-ohmmeter.

5.1.22 FOR those battery jumpers not measured during first performance of
Step 5.1.10, MEASURE AND RECORD on data sheet as found connection
resistance of connected battery jumpers from (-) post of one battery to (+)
post of next battery (not across battery)

5.1.23 MEASURE total voltage of battery bank AND
RECORD value on PM data sheet.
5.2 Restoration

5.2.1 RESTORE to as-found conditions.

5.2.2 INFORM SOM test is complete and instrument/equipment/system may be returned to service.

5.2.3 IF lock and tag was installed, REQUEST its removal.

5.2.4 PLACE UPS in service per ETF-25B-003.

5.3 Acceptance Criteria

Acceptance criteria has been met when steps in this procedure have been satisfactorily performed and results are recorded on the data sheet(s).

5.4 Review

5.4.1 INFORM FWS test is complete.

5.4.2 (FWS) REVIEW AND ENSURE the following:

- Completed data sheets meet the acceptance criteria
- 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.

5.5 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.