PRINCO L3610 Transmitters as Used at Liquid Retention Basins

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>
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<tr>
<td>A-5</td>
<td>10/24/2018</td>
<td>Radcon Requirement</td>
<td>Added Radiation and Contamination Control, Added new Figure(s), Added Attachment.</td>
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<tr>
<td>A-4</td>
<td>08/14/2017</td>
<td>WRPS-PER-2016-2301.1</td>
<td>Added Water Trap Device to special tools, updated performance documents, added steps for potential free liquids, added Attachment 1 and Figure 2</td>
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<tr>
<td>A-3</td>
<td>08/10/2017</td>
<td>Periodic Review</td>
<td>Inconsequential changes made to update Records statement.</td>
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<tr>
<td>A-2</td>
<td>06/01/2017</td>
<td>Process Improvement</td>
<td>Add new Step to read “RECONNECT the coax center wire to the probe.” Remove Step “RE LAND field wiring.”</td>
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<tr>
<td>A-1</td>
<td>07/21/2016</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>10/15/2015</td>
<td>Converting to WRPS Format</td>
<td>New Procedure; Supersedes ETF-PRO-MN-52163 (EL18049)</td>
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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides a safe, uniform method for calibration of PRINCO L3610 leachate level transmitters.

1.2 Scope

This procedure provides instructions for calibrating PRINCO L3610 leachate level transmitters used at the LERF.

2.0 INFORMATION

2.1 Terms and Definitions

- mA - Milliamps.

2.2 General Information

2.2.1 Measurement of leachate level in the LERF is performed by a PRINCO L3610 Transmitter, which is a type of detector that varies in capacitance as water or other fluids vary in height along the length of the detector. As the capacitance changes, it affects a bridge amplifier that amplifies the signal to give a 4 to 20 mA output.

2.2.2 The leachate level detector has been installed with a bubbler tube running alongside of the detector. For a one-point calibration check, air is introduced into the bubbler and the pressure is measured to determine water level, or basin level is determined by physical measurement and compared to actual indicated level (as measured by the leachate level detector).

2.2.3 Leachate sensor is 108.2 inches long and is installed at an angle. The full range of the instrument is set to 28 in. wc, vertical.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Radiation and Contamination Control

3.1.1 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.

3.1.2 The opening of any system or component within a Radiological Area requires presence of a Health Physics Technician to verify contamination control.

3.1.3 When disconnecting, breaching, or opening systems or system components that are currently or previously connected to waste tanks or waste transfer systems:
   - Follow the RWP for radiological control requirements
   - Pre-job and post-job surveys are required
   - Follow Calibration Instructions (Attachment 2)

3.2 Environmental Compliance

3.2.1 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.

4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

NOTE - Measuring and Test Equipment 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/S data sheet or is at least four times greater than specified device tolerance.

The following supplies may be needed to perform this procedure:
   - Pressure source, 0 to 50 in. wc range
   - CMD
   - Capacitance Calibration Simulator; i.e., Drexelbrook Model 401-6-8
   - Water trap device Figure 2.
4.2 Performance Documents

The following documents may be needed to perform this procedure:

- ETF-EL18025, Digital Indicators
- H-2-79649, Sheets 1 through 8
- CVI No. 22152, Instruction Manual for PRINCO Model L3610
- Radiological survey plan
- Waste planning checklist
- Pressure M&TE vendor manual.
5.0  PROCEDURE

5.1  Leachate Level Detector Calibration Check

5.1.1  IF performing this procedure on a system that has the potential for free liquids or moisture to enter the Pressure M&TE, USE a water trap device.

5.1.1.1  ENSURE the Water Trap is installed in a vertical position to operate correctly Figure 2.

5.1.1.2  IF liquids or moisture gets into the Water Trap or Pressure M&TE REFER to Attachment 1.

5.1.1.3  IF performing this procedure on a system that is potentially contaminated, FOLLOW Calibration Instructions (Attachment 2)

5.1.2  CONNECT a pressure source to the bubbler tube inlet in the sensor flange.

5.1.3  SLOWLY INCREASE air pressure until air pressure stabilizes, indicating that air is bubbling out the bubbler.

NOTE - The bubbler tube is physically one inch above the sensor.

5.1.4  RECORD the air pressure plus one inch WC on the data sheet.

5.1.5  RECORD indicated level from leachate level indicator AND COMPUTE differential.

5.1.6  IF the indicated level is within tolerance per data sheet and needs no adjustments, RECORD as-found values in the as-left portion of the data sheet AND GO TO Section 5.3, Restoration.

5.1.7  IF the indicated level is out of tolerance:

5.1.7.1  CALIBRATE indicator per ETF-EL18025.

5.1.7.2  IF the indicated level is within tolerance, RECORD as-left indication.
5.1 Leachate Level Detector Calibration Check (Cont.)

5.1.8 IF the indicated level is still out-of-tolerance, PERFORM the following

5.1.8.1 IF the actual level is between 8 and 16 in. WC, REQUEST Operations pump leachate bed down,

OR

ALLOW the level to increase to allow for adjustment.

5.1.8.2 IF the actual level is ≤ 8 inches, ADJUST transmitter Zero pot (coarse and/or fine adj) to bring differential just within specification.

5.1.8.3 IF the actual level is ≥ 16 inches, ADJUST transmitter Span pot (coarse and/or fine adj) to bring the differential just within specification.

5.1.8.4 IF the indicated level is within tolerance, RECORD as-left indication AND

GO TO Section 5.3.

5.1.9 IF the indicated level is still out of tolerance, GO TO Section 5.2.
5.2 Leachate Level Detector In-Place Calibration

5.2.1 CONNECT a CMD (measuring for mA) to the output current loop.

5.2.2 DISCONNECT the coax center wire from the probe.

5.2.3 CONNECT a test set-up per Figure 1.

5.2.4 SET the calibration standard to the 4 mA pF value in data sheet comments.

5.2.5 ADJUST “ZERO” controls for 4 mA output.

5.2.6 SET the calibration standard to the 20 mA pF value in data sheet comments.

5.2.7 ADJUST “SPAN” controls for 20 mA output.

5.2.8 REPEAT Steps 5.2.4 through 5.2.7 until no further adjustments are necessary AND

RECORD mAdc readings from CMD in as-left section of data sheet.

5.2.9 RECONNECT the coax center wire to the probe.

5.2.10 RETURN TO Section 5.1 to complete calibration.
5.3 Restoration

5.3.1 \textbf{RESTORE} to as-found conditions.

5.3.2 \textbf{ENSURE} alarms are re-set or cleared.

5.3.3 \textbf{INFORM} SOM test is complete and instrument/equipment/system may be returned to service.

5.4 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).

5.5 Review

5.5.1 \textbf{INFORM} the field work supervisor (FWS) test is complete.

5.5.2 (FWS) \textbf{REVIEW AND ENSURE} the following

\begin{itemize}
  \item Completed data sheets meet the acceptance criteria
  \item Comments sections are filled out appropriately
  \item Work requests needed as a result of this procedure are identified and generated
  \item 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.
\end{itemize}

5.6 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.
Attachment 1 - Water Trap/Pressure M&TE

Water Trap with Potentially Contaminated Liquid

1. If potentially contaminated liquid gets into Water Trap, Suspend the work.
2. Notify the FWS.
3. When provided approval from the FWS proceed as follows.
4. Remove Pressure M&TE from field.
5. Return to a RMA.
6. Disassemble the Water Trap.
7. Allow trap to dry overnight.
8. Survey disassembled trap components in accordance with Radcon survey plan.
9. If the Water Trap can be released return it to tool crib.
10. If the Water Trap cannot be released, dispose of it per waste planning checklist.

Water Trap with Clean Liquid (NOT Contaminated)

1. If clean liquid gets into Water Trap, disassemble the Water Trap.
2. Allow Water Trap to dry overnight.
3. Re-assemble the Water Trap.
4. Return the Water Trap to the tool crib.
M&TE with Potentially Contaminated Liquid

1. If potentially contaminated liquid gets past water trap and inside Pressure M&TE, Suspend the work.
2. Notify FWS.
3. Wait for further directions.

M&TE with Clean Liquid (NOT Contaminated)

1. If clean liquid gets past the water trap disassemble and dry out Pressure M&TE per manufactures direction.
2. Return the M&TE to the tool crib.
3. Request the M&TE to be returned to NIST calibration lab for recalibration.
Attachment 2 – Calibration Instructions

**Positive pressure calibrations:**

Note: Vent Valve assembly is required on all positive pressure calibrations to ensure MT&E is not contaminated by venting potential process air back through MT&E.

Install vent valve assembly Per Figure 4

Ensure IV is open and VV is closed

Proceed with calibration per work package

- Whenever venting is required during calibration steps, vent stored pressure as follows.

NOTE – Valve IV can remain open when reading is required via M&TE.

Ensure IV valve is closed

Ensure VV valve is opened

Repeat sequence as necessary to complete the calibration.

After all steps are completed for the calibration, perform RCT survey release plan PO-RSP-2018-001

**Negative pressure calibrations:**

Note: use of surrogate filter is required for negative pressure calibrations to ensure MT&E is not contaminated by pulling process air into MT&E while drawing Vacuum.

Negative calibrations should be performed as follows.

Ensure surrogate filter holder has media installed.

Connect filter in-line per Figure 3

Ensure IV is open.

Pull a representative vacuum into MT&E through filter

Ensure IV is closed.

Vent through VV

RCT to perform survey of the media.

IF no contamination found remove surrogate filter holder/manifold and proceed with calibration.
Figure 1 - Calibration Set Up

- Princo Transmitter
- Capacitance Probe Input
- Capacitance Probe Simulator
- Milliammeter
Figure 2 - How the Trap Works

1. Gas/Air enters through the top slot which goes into the chamber.
2. Dirt and Moisture particles are collected in the chamber, which is visible through the clear transparent glass window.
3. Then Gas/Dry Air goes into the centre slot where it enters the instrument.
Figure 3 – Negative Pressure Connection
Figure 4 – Positive Pressure Connection

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