Calibrate BW Controls 7330X Magnetostrictive Level System

Tank Farm Maintenance Procedure

MAINTENANCE

USQ # Routine Maintenance

<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>B-0</td>
<td>05/16/2016</td>
<td>Periodic Review</td>
<td>Add Special Inst. with Steps 5.1.9, 5.2.1 &amp; 5.2.4. Reword 3.1.5, 3.3, 4.1, 4.2, 5.1, 5.2.2.1, 5.2.2.2, 5.2.3.1, 5.2.3.2, 5.3.3, 5.3.5. Struck Steps 5.1.10, 5.1.11, 5.2.2.2, 5.2.5 and 5.2.6.</td>
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<tr>
<td>A-1</td>
<td>11/10/2014</td>
<td>CHAMPS Removal</td>
<td>Removed reference to CHAMPS, updated records statements and removed next periodic review date.</td>
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<td>A-0</td>
<td>04/07/2014</td>
<td>Maintenance request</td>
<td>New procedure.</td>
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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for setting the 4/20mA output positions for B/W Controls 7330X Magnetostrictive Level System.

1.2 Scope

This procedure applies to B/W Controls 7330X Magnetostrictive Level System.

2.0 INFORMATION

NONE

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 An Energized Electrical Work Permit is not required when working energized parts that operate at less than 50 volts potential per DOE–0359, Hanford Site Electrical Safety Program.

The maximum voltage encountered when connecting and disconnecting from terminal strips is less than 50 VDC.

3.1.2 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.

3.1.3 IF a lock and tag is required during the performance of this procedure, comply with the DOE-0336, Hanford Site Lockout/Tagout Procedure.

3.1.4 Failure to use protective equipment when working on or near energized systems could result in serious injury. Job specific protective equipment requirements should be addressed during the pre-job brief and be in accordance with TFC-ESHQ-S_IS-C-02.

3.1.5 When working with Diesel Fuel (GHS-SDS and/or MSDS #067085), proper PPE shall be worn when handling level instrument.

3.2 Radiation and Contamination Control

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.
3.3 **Environmental Protection**

The Central Shift Office must be notified in the event of a leak or a spill in accordance with TFC-ESHQ-ENV_FS-C-01, Environmental Notification.

### 4.0 PREREQUISITES

#### 4.1 Special Tools, Equipment and Supplies

The following supplies may be needed to perform this procedure:
- Digital Multimeter (DMM)
- 24 VDC Power Supply
- Clean rags
- Sharpie pin or equivalent (to mark cardinal points)
- Measuring tape or ruler (minimum length of 50 inches)
- Safety Glasses with side shields
- PVC gloves or equivalent
- Other tools, equipment and supplies as identified by Shift Manager/OE/FWS/User.

#### 4.2 Performance Documents

The following documents may be needed to perform this procedure:
- DOE-0336, Hanford Site Lockout/Tagout Procedure
- Hanford MSDS #067085
- TO-100-052, Perform Waste Generation, Segregation, Accumulation and Clean-up
- 7330 Pro-Stik II, Magnetostrictive Level System Product Manual.

#### 4.3 Field Preparation

4.3.1 **REQUEST** Operations to configure system to allow performance of this procedure.

4.3.2 **IF** Lockout/Tagout is required, **ENSURE** lockout/tagout and overlocking requirements have been satisfied per DOE-0336, Hanford Site Lockout/Tagout Procedure.
5.0 PROCEDURE

NOTE - This procedure is written to adjust the span to match actual tank conditions. Adjusting the span is the only calibration performed on this transmitter.

- To perform this procedure the physical center float locations relating to the desired 4 and 20mA positions are needed.

5.1 Obtain As-Found Values

5.1.1 DISCONNECT AND REMOVE connector from the level transmitter.

5.1.2 DON the following safety equipment:
• Safety glasses
• PVC gloves (or equivalent).

5.1.3 REMOVE the level transmitter from the Diesel fuel tank.

5.1.4 SUPPORT level probe assembly in a vertical position.

5.1.5 USING clean rags, WIPE-DOWN transmitter probe assembly to remove excess diesel fuel.

5.1.6 DISPOSE of rags in accordance with TO-100-052, Perform Waste Generation, Segregation, Accumulation and Clean-up.

5.1.7 CONNECT M&TE to transmitter at terminal box per Figure 1.

5.1.8 RE-ATTACH connector to the level transmitter.

Special Instructions

ALLOW float to rest on spacer at the bottom of probe to obtain minimum mA output value (Figure 2) per Data Sheet.

5.1.9 APPLY level inputs values by positioning the center of the float at required points along the span of the tube per Data Sheet, AND

CHECK output values for tolerance.

5.1.10 RECORD the As Found mA output value in the As Found column of the Data Sheet.
5.1 Obtain As-Found Values (Cont.)

5.1.11 IF As-Found values are not within specified tolerance per Data Sheet, 
GO TO Section 5.2 Set 4mA and 20mA Position,

OR

IF As-Found values are within specified tolerance, but deemed marginal, and optimization is desired, GO TO Section 5.2 Set 4mA and 20mA Position,

OR

IF As-Found values are within specified tolerance, RECORD As-Found values in As-Left column of Data Sheet AND

GO TO Restoration, Section 5.3.
5.2 Set 4mA and 20mA Positions

NOTE - Setting the 4mA position is time sensitive and Steps 5.2.2.1 through 5.2.2.5 should be performed in sequence without delay.

5.2.1 REFER to Figure 1 and Figure 2 while performing calibration.

5.2.2 SET the 4mA position by performing the following:

5.2.2.1 ALLOW float to rest on spacer at the bottom of probe to set 4mA position per Data Sheet.

5.2.2.2 USING a jumper SHORT pin 2 to pin 1 for 3 seconds.

5.2.2.3 BREAK THE CONTACT of pin 2 and pin 1 for 3 seconds.

5.2.2.4 SHORT pin 2 to pin 1 for 2 seconds.

5.2.2.5 BREAK THE CONTACT of pin 2 and pin 1; completing this sequence will reset the 4mA position.

NOTE - Setting the 20mA position is time sensitive and Steps 5.2.3.1 through 5.2.3.5 should be performed in sequence without delay.

5.2.3 SET the 20mA position by performing the following:

5.2.3.1 PLACE AND HOLD the center of the float at the required 20mA position per Data Sheet.

5.2.3.2 WHILE holding the center of the float to the required 20mA position, SHORT pin 2 to pin 1 for 3 seconds.

5.2.3.3 BREAK the contact between pin 2 and pin 1 for 3 seconds.

5.2.3.4 SHORT pin 2 to pin 3 for 2 seconds.

5.2.3.5 BREAK the contact between pin 2 and pin 3, completing this sequence will reset the 20mA position.
5.2 Set 4mA and 20mA Position (Cont.)

**Special Instructions**

**ALLOW** float to rest on spacer at the bottom of probe to obtain minimum mA output value (Figure 2) per Data Sheet.

5.2.4 **APPLY** level inputs values by positioning the center of the float at required points along the span of the tube per Data Sheet, **AND**

**CHECK** output values for tolerance.

5.2.5 **IF** values are within tolerance per Data Sheet, **RECORD As-Left values on Data Sheet AND**

**GO TO** Restoration, Section 5.3.

5.2.6 **IF** values are not within tolerance per Data Sheet, **REPEAT** Steps 5.2.1 through 5.2.5 until values are within tolerance

**OR**

**IF** unable to bring values into tolerance, **NOTIFY FWS for resolution.**
5.3 Restoration

5.3.1 IF any problems were encountered with calibration, INFORM FWS.

5.3.2 IF not already removed; DISCONNECT AND REMOVE Test Equipment.

5.3.3 DISCONNECT AND REMOVE connector from the level transmitter.

5.3.4 INSTALL level transmitter to the Diesel fuel tank.

5.3.5 RE-ATTACH connector to the level transmitter.

5.3.6 RECORD the Test Equipment information and calibration status on Data Sheet.

5.3.7 CHECK equipment restoration by observing indications are consistent with expected conditions.

5.3.8 NOTIFY Operations that testing is complete and system may be returned to desired configuration.

5.4 Acceptance Criteria

Acceptance Criteria has been met when Steps in this procedure have been satisfactorily performed and As-Left values meet the specifications and tolerance(s) per the Data Sheet.

5.5 Review

5.5.1 INFORM FWS test is complete.

5.5.2 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.
5.6 Records

The performance of this procedure generates no records. However, PM Data Sheets associated with the procedure, are records and are maintained in the work package as record material.

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.
Figure 1 – Wiring Diagram

<table>
<thead>
<tr>
<th>SIGNAL NAME</th>
<th>&quot;M&quot; CONN. PIN NUMBER</th>
<th>PIGTAIL CABLE</th>
</tr>
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<tbody>
<tr>
<td>LOOP (−)</td>
<td>1</td>
<td>BLACK</td>
</tr>
<tr>
<td>PRG/M INPUT</td>
<td>2</td>
<td>WHITE</td>
</tr>
<tr>
<td>LOOP (+)</td>
<td>3</td>
<td>RED</td>
</tr>
<tr>
<td>CHASSIS GND</td>
<td>4</td>
<td>DRAIN WIRE</td>
</tr>
</tbody>
</table>

PIN 1
LOOP (−)
(Black wire)

PIN 2
PROGRAM INPUT
(White wire)

PIN 3
LOOP (+)
(Red wire)

PIN 4
CHASSIS GND
(Green wire)
Figure 2 – Dimension Diagram

SPACER (to ensure the float-magnet is always in the active span).