## 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>F-1</td>
<td>12/08/15</td>
<td>Maintenance Request</td>
<td>Changed Figure 1</td>
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<tr>
<td>F-0</td>
<td>08/20/2015</td>
<td>Periodic Review</td>
<td>No Changes</td>
</tr>
<tr>
<td>E-2</td>
<td>10/22/2014</td>
<td>CHAMPS Removal</td>
<td>CHAMPS removal, new records statement.</td>
</tr>
<tr>
<td>E-1</td>
<td>02/08/2013</td>
<td>DOE Standard</td>
<td>Replaced references to document TFC-ESHQ-S-STD-03, Electrical Safety with DOE-0359, Hanford Site Electrical Safety Program.</td>
</tr>
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<td>E-0</td>
<td>08/01/2012</td>
<td>Periodic Review</td>
<td>Put the word “voltage” inside existing parenthesis in step 5.3.4 and 5.2.1. Changed general statements to be more specific.</td>
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**USQ # Routine Maintenance**

**Tank Farm Maintenance Procedure**
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5.8 Records ........................................................................................................ 8

Figure 1 - Bench Test Setup for Troubleshooting or Calibration .......................... 9
1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides a method for calibration of the Bailey Strip-Chart Recorder.

1.2 Scope

This procedure applies to Bailey Strip-Chart Recorders, Types 771, 772, and 773.

2.0 INFORMATION

NONE

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 This unit contains both 120 VAC and 24 Volt DC power and possible alarms.

3.1.2 As applicable, ensure applicable Lock and Tag or Authorized Worker Lockout/Tagout requirements have been satisfied per DOE-0336, Hanford Site Lockout/Tagout Procedure.

3.1.3 Compliance with DOE–0359, Hanford Site Electrical Safety Program is required when working with this procedure.

3.2 Radiation and Contamination Control

Work in radiological areas will be performed using a Radiological Work Permit following review by Radiological Control per the 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:

- Bailey box
- Digital Volt Meter
- Voltage Source 1-5 Volt DC.
5.0 **PROCEDURE**

5.1 **Instrument Status**

5.1.1 CONNECT test equipment to input of recorder. (See Figure 1)

5.1.2 ADJUST input to each value specified on Data Sheet.

5.1.3 RECORD each As-Found Value on Data Sheet.

5.1.4 IF values are within tolerance, RECORD As-Found data in the As-Left portion of Data Sheet AND

GO TO Section 5.5.

5.1.5 IF values are not within tolerance, PROCEED to Section 5.2 to adjust.

5.2 **Chart Calibration**

NOTE - For reverse acting pens, R10 may be adjusted at 100% indication and R7 for 0% indication.

5.2.1 SET input signal to 0% (voltage or mA) AND

ADJUST potentiometer R10 to 0% line on chart.

5.2.2 INCREASE input signal to 100% of range AND

ADJUST SPAN potentiometer R7 to 100% line on chart.

5.2.3 REPEAT Steps 5.2.1 and 5.2.2 until no further adjustment is required.

5.2.4 ADJUST input to each value specified on Data Sheet.

5.2.5 IF values are in tolerance, RECORD values in the As-Left portion of Data Sheet AND

GO TO Section 5.4 or 5.5 as applicable.

5.2.6 IF further calibration or repair is required, GO TO Section 5.3.
5.3 Major Calibration

NOTE - Steps 5.3.1 through 5.3.14 are only necessary for initial calibration or if repairs or replacement has been made on pen drive mechanism or boards.

5.3.1 ADJUST damping potentiometer, R6 fully counterclockwise (CCW).

5.3.2 ADJUST low-level limit potentiometer R21 fully clockwise.

5.3.3 ADJUST high-level limit potentiometer R20 fully counterclockwise.

NOTE - For reverse acting pens, R10 may be adjusted at 100% indication and R7 for 0% indication.

5.3.4 SET input signal to 0% (voltage or mA) AND

ADJUST Zero potentiometer R10, until pen is aligned with the 0% line on chart.

5.3.5 INCREASE input signal to 100% of range AND

ADJUST SPAN potentiometer R7 to 100% line on chart.

5.3.6 REPEAT steps 5.3.4 and 5.3.5 until no further adjustment is required.

NOTE - For reverse acting pens R21 may be adjusted for high limit and R20 for low limit.

5.3.7 LOWER input signal to 1V DC (or 1mA) below 0% of range.

5.3.8 ADJUST low limit potentiometer R21 counterclockwise (CCW) until pen holder moves off chassis and is slightly below the 0% line on chart.

5.3.9 INCREASE input signal to 1V DC (or 1mA) above 100% of range.

5.3.10 ADJUST R20, high limit, Clockwise (CW) until the pen holder moves off the chassis and is slightly above the 100% line on chart.

5.3.11 ADJUST damping potentiometer, R6 clockwise to dampen out noise in the input signal.
5.3 Major Calibration (Cont.)

5.3.12 ADJUST input to each value specified on Data Sheet.

5.3.13 IF values are in tolerance, RECORD values in the As-Left portion of the Data Sheet AND

GO TO Section 5.4 or 5.5 as applicable.

5.3.14 IF proper tolerances cannot be achieved, GO TO Section 5.5.

5.4 Alarm Calibration

NOTE - This section will only be needed if the recorder has alarms connected and if As-Found conditions are out of tolerance. The alarm calibration procedure is broken down into separate high and low alarm sections for performance of only the required sections. For reverse acting mode, high alarm becomes low alarm and low alarm becomes high alarm.

High Alarm (staple jumper AL in the "H" position)

5.4.1 SET the input signal to the desired alarm set point.

5.4.2 ADJUST potentiometer R26 until the internal alarm light goes on.

5.4.3 ADJUST the input to check the set point.

5.4.4 IF R26 is not currently equal to the desired set point, ADJUST R26 until the desired set point is reached.

NOTE - Light goes on within ±1.0% of span of the desired set point.

5.4.5 STARTING from 1 volt less than 0% (non-alarm state), SLOWLY INCREASE the input signal until the alarm light goes on.

NOTE - Light goes off within ±1.0% of span of the desired set point.

5.4.6 SLOWLY DECREASE the input signal until the light goes off.

5.4.7 RECORD As-Left high alarm readings.

5.4.8 REPEAT steps 5.4.1 through 5.4.7 for any other high alarm.
5.4 Alarm Calibration (Cont.)

Low Alarm (staple jumper AL in the "L" position)

5.4.9 SET the input signal to the desired alarm set point.

5.4.10 ADJUST potentiometer R26 until the internal alarm light goes off.

5.4.11 ADJUST the input to check the set point.

5.4.12 IF R26 is not currently equal to the desired set point, ADJUST R26 until the desired set point is reached.

NOTE - Light goes on within ±1.0% of span of the desired set point.

5.4.13 STARTING from 1 volt greater than 100% (non-alarm state), SLOWLY DECREASE the input signal until the alarm light goes on.

NOTE - Light goes off within ±1.0% of span of the desired set point.

5.4.14 SLOWLY INCREASE the input signal until the light goes off.

5.4.15 RECORD As-Left low alarm readings.

5.4.16 REPEAT steps 5.4.9 through 5.4.15 for any other low alarm.
5.5 Restoration

5.5.1 DISCONNECT AND REMOVE Test Equipment as necessary.

5.5.2 RECORD Test Equipment information and calibration status on Data Sheet.

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

5.5.4 RESET OR CLEAR, alarms as applicable.

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

5.6 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.

5.7 Review

5.7.1 INFORM FWS test is complete.

5.7.2 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, as applicable.

5.8 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.
Bailey Strip-Chart Recorders, Types 771, 772, And 773

Figure 1 - Bench Test Setup for Troubleshooting or Calibration