Grapple and Sample Hoist Load Cell Loop Test and Calibration

CPO Maintenance Procedure

USQ # N/A-4

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Type: CONTINUOUS
Document No.: 1-GENI-900
Rev/Mod: A-3
Release Date: 12/10/2018
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## Grapple and Sample Hoist Load Cell Loop Test and Calibration

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Figure 1 – Honeywell/Sensotec In-Line Amplifier Layout
1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for performing loop test and calibration on the Grapple and Sample Hoist load cells, In-Line Amplifiers and local display instruments.

1.2 Scope

The Grapple and Sample Hoist Loop Test consists of the associated load cells, Sensotec/Honeywell In-Line Amplifiers (which provide excitation voltage to the load cells and output voltage to the local displays) and the Red Lion displays as follows:

**Grapple Hoist Load Cell Loop Test:**
- WE-001 – Grapple Hoist Load Cell
- WY-001A – Grapple Hoist Sensotec/Honeywell In-Line Amplifier
- WI-001 – Grapple Hoist Red Lion weight Display.

**Sample Hoist Load Cell Loop Test:**
- WE-002 – Sample Hoist Load Cell
- WY-002A – Sample Hoist Sensotec/Honeywell In-Line Amplifier
- WI-002 – Sample Hoist Red Lion weight Display.

2.0 INFORMATION

2.1 Terms and Definitions

- CSS – Core Sampling System
- QR – Quill Rod
- RLU – Remote Latch Unit
2.2 General Information

2.2.1 Cycling of the SR Ball Valve BV-010 is performed as determined by the certified platform operator as a best Radiological Control practice to limit buildup of waste on SR Ball Valve.

2.2.2 Terminal test points given throughout this procedure for test equipment hook-up are suggested terminal points. Different terminal points may be utilized as determined by the technical field workers due to ALARA concerns, convenience, ease of connection, or location.

2.2.3 The Sensotec/Honeywell In-Line Amplifiers, WY-001A and WY-002A provide input excitation voltage to their Load Cells WE-001 and WE-002 and also provide input voltage to the Red Lion displays, WI-001 and WI-002.

2.2.4 If calibration is required, the low and high alarm setpoints for the Grapple and Sample Hoists will be adjusted during calibration of their respective Red Lion display/alarms, WI-001 and WI-002 per Procedure 6-GENI-600.

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 Personnel exposure to energized equipment may occur when making adjustments to electrical components during this procedure. If working around live circuits, extreme caution should be used.

3.1.2 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 This procedure requires the lifting of moderately heavy weights. Proper lifting techniques must be utilized to prevent injury per TFC-ESHQ-S_IH-STD-16, Ergonomics.

3.1.5 Beryllium controls will be implemented and followed as authorized in the Beryllium Work Permit (BWP).
3.2 Radiation and Contamination Control

3.2.1 This procedure will be performed within the controls of a work package screened and approved by Radiological Control.

3.2.2 Work in radiological areas will be performed using a Radiological Work Permit following reviews by Radiological Control per the ALARA work planning procedure TFC-ESHQ-RP-RWP-C-03.

3.2.3 The work area(s) shall be posted as Contamination Area(s) with ground cover installed when breaching internally contaminated Core Sampling Platform systems.

3.2.4 Radiological areas may be downposted based on HPT survey results. Area postings may be adjusted based on changing work activities and radiological conditions.

3.2.5 Potential for radiological contamination exists for the Sample Hoist Remote Latch Unit (RLU) and the Grapple Hoist.

3.2.6 Work area air sampling is required when breaching contaminated systems, and when working in containments (Sleeving) to verify the effectiveness of engineering controls.

3.2.7 Containment is required when the Remote Latch Unit (RLU) or grapple is lowered outside of the SR or QR.

3.2.8 Precautions are needed to prevent contamination of test equipment including test weights, and slings.

3.2.9 Due to ALARA concerns for contamination and radiation levels while adding and removing test weights at the Grapple and Sample Hoists, the low and the high alarm(s) As-Found and As-Left values will be determined using a calibrated voltage source per 6-GENI-600 (versus the test weights) being input at the following:

- WI-001 - Grapple Hoist Red Lion Alarm/Weight Display
- WI-002 - Sample Hoist Red Lion Alarm/Weight Display.
3.3 Environmental Compliance

3.3.1 Immediately report any spills or releases to Environmental Compliance per the Environmental Compliance On-Call List in accordance with procedure TFC ESHQ-ENV_FS-C-01. This includes any water discharge to surface contamination areas.

3.3.2 Conduct pre and post job surveys.

3.4 Limits

This procedure may not be performed within a tank farm boundary unless applicable flammability controls are specifically added as part of the field work package.

4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

The following supplies may be needed to perform this procedure:

- Six (6) 50 lb. Stamped Weights with handles that can be lifted with a sling
- Lifting device as given below or equivalent to:
  - Sling rated at ≥600 pounds
  - Shackle rated ≥600 lbs. (D ring with removable bolt) for above sling

4.2 Performance Documents

The following may be needed to perform this procedure:

- TO-100-052 - Perform Waste Generation, Segregation, Accumulation, and Clean-up
- 6 GENI-600 Calibrate Red Lion Digital Input Panel Meter
- Red Lion PAXDP Manual - Bulletin #PAXDP-J, Drawing LP0578
- Honeywell/Sensotec Model UV-10 in-line amplifier Manual# 008-0315-00
- ES-108884 (Grapple Hoist loop components: WE-001, WY-001A, WI-001)
- ES-108885 (Sample Hoist loop components: WE-002, WY-002A, WI-002).
4.3 Field Preparations

The following prerequisite steps must be completed before the procedure may commence.

4.3.1 ENSURE NucFil filter(s) is installed on vent to tank lines from towers.

4.3.2 MEASURE weight of “Lifting Device” (sling and shackle or equivalent) to be used on the Grapple and Sample Hoist AND RECORD the lifting device weight on Data Sheet(s).

4.3.3 ENSURE Core Sampling System (CSS) has been energized a minimum of ten (10) minutes to allow instruments to stabilize.

4.3.4 CHECK Red Lion displays WI-001 (Grapple Hoist) and WI-002 (Sample Hoist) are in calibration.

4.3.4.1 IF not, CALIBRATE per 6-GENI-600 prior to starting this procedure.

4.3.5 CONDUCT a pre-job survey.
5.0 PROCEDURE

NOTE - Section groups 5.1 through 5.3 (Grapple Hoist) and Section groups 5.4 through 5.6 (Sample Hoist) may be performed in any logical order, independently or skipped to complete individual task(s) when directed by FWS and with those directions recorded on Comments Sheet.

- Terminal test points given throughout this procedure for test equipment hook-up are suggested terminal points. Different terminal points may be utilized as determined by the technical field workers due to ALARA concerns, convenience, ease of connection, or location.

- When removing caps, the cap and/or bagging can serve as a drape.

5.1 Prepare Grapple Hoist Unit.

5.1.1 INSTALL ground cover in work area.

5.1.2 POST work area as a Contamination Area (CA)

5.1.3 STAGE sleeving with absorbent material sealed to pintle rod.

5.1.4 REMOVE quill rod Kamloc cap into bagging with absorbent.

5.1.4.1 CONTROL the breach area as an HCA.

5.1.5 SEAL sleeving to Quill Rod.

5.1.6 LOWER grapple.

5.1.6.1 HPT PERFORM dose rate surveys.

5.1.7 LATCH pintle rod into grapple.
Grapple Hoist Load Cell Loop Test

As-Found Values

5.2.1 ENSURE weight of “Lifting Device” (sling and shackle or equivalent) has been recorded on Data Sheets (from Step 4.3.2).

5.2.2 CHECK time Core Sampling System (CSS) was started AND ENSURE runtime is greater than ten (10) minutes before proceeding.

5.2.3 IF in alarm, ACKNOWLEDGE OR SILENCE low level alarm (AL01).

5.2.4 REMOVE cover from In-Line amplifier WY-001A located in POR-264-SAMP-JBX-002.

5.2.5 WITH Minimum weight value applied per Data Sheet to Grapple Hoist ENSURE Grapple Hoist is suspended off the ground and is stable.

5.2.6 AFTER the Minimum weight reading at the Red Lion Indicator WI-001 is stabilized, RECORD displayed weight in As-Found column on Data Sheet.

5.2.7 USE lifting device (sling and shackle or equivalent) to connect weights to hoist.

5.2.8 ATTACH mid-range weight(s) per Data Sheet to Grapple Hoist AND ENSURE Grapple Hoist is suspended off the ground and is stable.

5.2.9 AFTER the mid-range weight reading at the Red Lion Indicator WI-001 is stabilized, CALCULATE the actual weight per Data Sheet AND RECORD obtained value in As-Found column on Data Sheet.

5.2.10 ATTACH Maximum weight per Data Sheet to Grapple Hoist AND ENSURE Grapple Hoist is suspended off the ground and is stable.

5.2.11 AFTER the Maximum weight reading at the Red Lion Indicator WI-001 is stabilized, CALCULATE the actual weight per Data Sheet AND RECORD obtained value in As-Found column on Data Sheet.
5.2 Grapple Hoist Load Cell Loop Test (Cont.)

5.2.12 REPEAT Steps 5.2.8 and 5.2.9 to obtain mid-range value “decreasing”.

5.2.13 REPEAT Steps 5.2.5 and 5.2.6 to obtain no load value “decreasing” AND RETURN to Step 5.2.14 to continue.

5.2.14 IF the As-Found Calculated weight values are not within tolerance per Data Sheet, GO TO Step 5.2.16.

5.2.15 IF the As-Found Calculated weight values are within tolerance, RECORD in the As-Left columns of the Data Sheet AND GO TO Section 5.3.

Calibrate Grapple Load Cell Loop

5.2.16 ENSURE Core Sampling System (CSS) has been energized a minimum of ten (10) minutes to allow instruments to stabilize.

5.2.17 REFER to Figure 1 for Zero and Span adjustment location on In-Line amplifier WY-001A.

5.2.18 IF not already removed, REMOVE cover from In-Line amplifier WY-001A located in POR-264-SAMP-JBX-002.

5.2.19 WITH Minimum weight value applied per Data Sheet to the Grapple Hoist (Load Cell WE-001) ENSURE Grapple Hoist is suspended off the ground and is stable.
5.2 Grapple Hoist Load Cell Loop Test (Cont.)

Adjust ZERO Value

5.2.20 AFTER the Minimum weight reading is stabilized, ADJUST the ZERO potentiometer on the In-Line Amplifier (WI-001A) to read the Minimum value per Data Sheet as indicated on Red Lion Display, WI-001.

5.2.21 USE the sling and shackle to connect weights to the hoist.

5.2.22 ATTACH Maximum weight per Data Sheet to Grapple Hoist AND ENSURE Grapple Hoist is suspended off the ground and is stable.

Adjust SPAN Value

5.2.23 AFTER Maximum weight reading is stabilized, ADJUST the SPAN potentiometer on the In-Line Amplifier (WY-001A) to read the Calculated Maximum value per Data Sheet as indicated on Red Lion Display, WI-001.

5.2.24 RE-CHECK zero and full scale by repeating Steps 5.2.19 through 5.2.24 until values are within tolerance,

OR

IF unable to bring values within tolerance NOTIFY FWS for resolution.

5.2.25 WHEN ZERO and SPAN are within tolerance, REPEAT Section 5.2 starting at step 5.2.5 to obtain As-Left Values.
5.3  Restore Grapple Hoist Unit.

5.3.1  DISCONNECT pintle rod from grapple.

5.3.2  RETRACT grapple into QR.

5.3.3  CONTROL breach area as an HCA AND REMOVE sleeving from QR.

5.3.4  INSTALL Kamloc cap on QR.

5.3.5  DECONTAMINATE all areas to < 1,000 dpm/100cm² beta-gamma and < 20 dpm/100cm² alpha prior to releasing work area from CA.

5.3.6  PERFORM one of the following steps as directed by FWS AND RECORD those directions in the comments section of the Data Sheet:

5.3.6.1  GO TO Section 5.4

OR

5.3.6.2  IF Section 5.4 is not being performed per directions of FWS, GO TO Restoration Section 5.7.
5.4 Prepare Sample Hoist Remote Latch Unit (RLU)

5.4.1 ENSURE ground cover is installed in work area.

5.4.2 ENSURE work area is posted as a Contamination Area (CA).

5.4.3 STAGE sleeving with absorbent material sealed to quadralatch unit.

5.4.4 CONTROL breach area as an HCA.

5.4.5 REMOVE SR Kamloc cap into bagging with absorbant.

5.4.6 SEAL sleeving to shielded receiver.

5.4.7 OPEN Shielded Receiver Ball Valve BV-010.

5.4.8 LOWER RLU.

5.4.8.1 HPT PERFORM dose rate surveys.

5.4.9 LATCH quadralatch unit to RLU.
5.5 Sample Hoist Load Cell Loop Test

As-Found Values

5.5.1 ENSURE weight of “Lifting Device” (sling and shackle or equivalent) has been recorded on the Data Sheet(s) (from Step 4.3.2).

5.5.2 CHECK time Core Sampling System (CSS) was started AND ENSURE runtime is greater than ten (10) minutes before proceeding.

5.5.3 IF in alarm, ACKNOWLEDGE OR SILENCE low level alarm (AL01).

5.5.4 REMOVE cover from In-Line amplifier WY-002A located in POR-264-SAMP-JBX-010.

5.5.5 WITH Minimum weight value applied per Data Sheet to Grapple Hoist ENSURE Sample Hoist is suspended off the ground and is stable.

5.5.6 AFTER the Minimum weight reading at the Red Lion Indicator WI-002 is stabilized, RECORD displayed weight in As-Found column on Data Sheet.

5.5.7 USE the lifting device (sling and shackle or equivalent) to connect weights to the hoist.

5.5.8 ATTACH mid-range weight per Data Sheet to Sample Hoist AND ENSURE Sample Hoist is suspended off the ground and is stable.
5.5 Sample Hoist Load Cell Loop Test (Cont.)

5.5.9 AFTER the mid-range weight reading at the Red Lion Indicator WI-002 is stabilized, **CALCULATE** the actual weight per Data Sheet **AND**

**RECORD** obtained value in As-Found column on Data Sheet.

5.5.10 **ATTACH** Maximum weight per Data Sheet to Sample Hoist **AND**

**ENSURE** Sample Hoist is suspended off the ground and is stable.

5.5.11 AFTER the Maximum weight reading at the Red Lion Indicator WI-002 is stabilized, **CALCULATE** the actual weight per Data Sheet **AND**

**RECORD** obtained value in As-Found column on Data Sheet.

5.5.12 **REPEAT** Steps 5.5.8 and 5.5.9 to obtain mid-range value “decreasing”.

5.5.13 **REPEAT** Steps 5.5.5 and 5.5.6 to obtain no load value “decreasing” **AND**

**RETURN** to Step 5.5.14 to continue.

5.5.14 **IF** the As-Found Calculated weight values are not within tolerance per Data Sheet, **GO TO** Step 5.5.16.

5.5.15 **IF** the As-Found Calculated weight values are within tolerance, **RECORD** in the As-Left columns of the Data Sheet **AND**

**GO TO** Section 5.6.
5.5 Sample Hoist Load Cell Loop Test (Cont.)

Calibrate Sample Load Cell Loop

5.5.16 **ENSURE** Core Sampling System (CSS) has been energized a minimum of ten (10) minutes to allow instruments to stabilize.

5.5.17 **REFER** to Figure 1 for Zero and Span adjustment location on In-Line amplifier WY-002A.

5.5.18 **IF** not already removed, **REMOVE** cover from In-Line amplifier WY-002A located in POR-264-SAMP-JBX-010.

5.5.19 **WITH** Minimum weight value applied per Data Sheet to the Sample Hoist (Load Cell WE-002) **ENSURE** Sample Hoist is suspended off the ground and is stable.

Adjust ZERO Value

5.5.20 **AFTER** the Minimum weight reading is stabilized, **ADJUST** the ZERO potentiometer on the In-Line Amplifier WY-002A to read Minimum value per Data Sheet as indicated on WI-002.

5.5.21 **USE** the sling and shackle to connect weights to the hoist.

5.5.22 **ATTACH** Maximum weight per Data Sheet to Sample Hoist **AND**

**ENSURE** Sample Hoist is suspended off the ground and is stable.

Adjust SPAN Value

5.5.23 **AFTER** Maximum weight reading is stabilized, **ADJUST** the SPAN potentiometer on the In-Line Amplifier (WY-002A) to read the “Calculated” Maximum value per Data Sheet as indicated on Red Lion Display, WI-002.

5.5.24 **RE-CHECK** zero and full scale by repeating Steps 5.5.19 through 5.5.24 until values are within tolerance,

**OR**

**IF** unable to bring values within tolerance, **NOTIFY** FWS for resolution.

5.5.25 **WHEN** zero and full scale are within tolerance, **REPEAT** Section 5.5 starting at Step 5.5.5 to obtain As-Left Values.
5.6  Restore Sample Hoist Remote Latch Unit (RLU)

5.6.1  DISCONNECT quadralatch unit from RLU.

5.6.2  RETRACT RLU into shielded receiver.

5.6.3  CLOSE Shielded Receiver Ball Valve BV-010.

5.6.4  CONTROL breach area as an HCA AND

5.6.5  REMOVE sleeving from Shielded Receiver.

5.6.6  INSTALL Kamloc cap on SR.

5.6.7  DECONTAMINATE all areas to < 1,000 dpm/cm² beta-gamma and

5.6.7  < 20 dpm/100cm² alpha prior to releasing work area from CA.

5.6.7  PERFORM one of the following steps as directed by FWS AND

5.6.7  RECORD those directions in the comments section of the Data Sheet:

5.6.7.1  GO TO Section 5.1, Prepare Grapple Hoist Unit,

5.6.7.2  IF Section 5.1 has already been performed, or is not being performed per directions of FWS, GO TO Restoration

5.6.7.2  Section 5.7.
5.7 Restoration

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

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

5.7.3 CONDUCT a post-job survey AND

RECORD on Data Sheet Comments Section.

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

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

5.7.6 CONDUCT a post-job survey and record on Data Sheet Comments Section.

5.8 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.

5.9 Review

5.9.1 INFORM FWS test is complete.

5.9.2 FWS, REVIEW AND ENSURE the following:

- Complete 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.

5.10 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.
Figure 1 – Honeywell/Sensotec In-Line Amplifier Layout