PURPOSE

Objective

* The purpose of this work order is to provide direction for the calibration of the stator water inlet flow switch CEN-FISL-0032 and then using this indication, calibrate pressure switches CEN-PSLL-0026A, CEN-PSLL-0026B, CEN-PSLL-0026C, CEN-PSL-0027 and   
  CEN-PSL-0028.

Component Function

* CEN-FISL-0032 provides local indication of stator cooling water flow and along with   
  CEN-PSL-0027 and CEN-PSL-0028 provides local and control room alarms.
* CEN-PSLL-0026A, CEN-PSLL-0026B, CEN-PSLL-0026C provide control room alarms and input to the turbine trip logic.

Other Information/OE/History

* See Attached OE
* Annunciator Windows are multiple input windows and since this work is normally performed during a Refueling outage the window may not reset, it is therefore acceptable to verify that the window alarms and that the PMS point alarms and resets, window reset may be N/A’d.

**M&TE**

* Pressure gauge capable of 0-150 In. H2O with accuracy of better than +/- 2.00 In. H2O and 2 water bottles for calibrating FISL-32
* Multi-meter
* ¾ inch open-end wrench. (2)

precautions and lIMITATIONS

* Ensure pressure is bled to atmosphere prior to opening instrument line.
* 125 VDC present at switch contacts.

PREREQUISITES

Notify the Control Room Operator that the following alarms will be unreliable during this activity: (J-CEL-0001 & J-CEL-0002)

* Ann. Window 6B07A “GEN STATOR CLG WTR SYS TRBL”
* Ann. Window 6B07B “GEN STATOR CLG WTR LO PRESS/ HI TEMP TRIP”
* Ann. Window 6B07C “GEN STATOR CLG WTR INLT PRESS LO”
* PMS Points CEFS32 “STATOR COOLANT FLOW LO”
* PMS Point CEPS26 “STATOR COOLING WATER LO-LO PRESS. TRIP
* PMS Point CEPS28 “STATOR COOLING WATER INLET PRESS. LO”

Note

Performance of this PM has I&C throttling flow, using CEN-PV-34, to calibrate the pressure switches which may cause the stand-by stator cooling pump to auto start.

Verify Stator cooling water system is running.

IF desired by Operations, THEN have Operations place the stand-by Stator Cooling Pump to the “Pull-To-Lock” position.

Verify Turbine is off line.

INSTRUCTIONS

Verify the equipment to be worked is specified by the Affected Object List (AOL). Document this verification by initialing next to the applicable DCID(s) on the hardcopy AOL.

Calibrate CEN-FISL-0032 per TABLE 1:

Apply test pressure to the high side of CEN-FISL-0032 and vent the low side to atmosphere.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CEN-FISL-0032**  Accuracy per CPXCOMP Accuracy: 2% (+/- 3.0 In. H2O) | | | | | | |
| % OF SPAN | INDICATION (GPM) | DESIRED  (In. H2O) | MIN (In. H2O) | AS FOUND (In. H2O) | AS LEFT  (In. H2O) | MAX (In. H2O) |
| 0 | 0.00 | 0.00 | -3.00 |  |  | 3.00 |
| 25 | 390.00 | 37.50 | 34.50 |  |  | 40.50 |
| 50 | 550.00 | 75.00 | 72.00 |  |  | 78.00 |
| 75 | 675.00 | 112.50 | 109.50 |  |  | 115.50 |
| 100 | 780.00 | 150.00 | 147.00 |  |  | 153.00 |
| 75 | 675.00 | 112.50 | 109.50 |  |  | 115.50 |
| 50 | 550.00 | 75.00 | 72.00 |  |  | 78.00 |
| 25 | 390.00 | 37.50 | 34.50 |  |  | 40.50 |
| 0 | 0.00 | 0.00 | -3.00 |  |  | 3.00 |
| M&TE INDEX #s\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | | | |

Calibrate CEN-FISL-0032 alarms per TABLE 2.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CEN-FISL-0032**  Set Point: 83.230 In. H2O Decreasing Accuracy +/- 2.250 In. H2O | | | | | | |
| CONTACT ACTION | DESIRED  (In. H2O) | MINIMUM  (In. H2O) | | AS FOUND  (In. H2O) | AS LEFT  (In. H2O) | MAX   (In. H2O) |
| CLOSE | 83.230 | 80.980 | |  |  | 85.480 |
| OPEN | RECORD VALUE | | |  |  | N/A |
|  | Verify | | Annunciator Window RKNUA0006B – 07A | | Computer Point  CEFS32 | |
| SET | \_\_\_\_\_\_\_\_ | | ON | | LO | |
| RESET | \_\_\_\_\_\_\_\_ | | OFF | | N-LO | |
|  | Verify | | Annunciator Window CENE01B Local 1-1 | |  | |
| SET | \_\_\_\_\_\_\_\_ | | ON | |  | |
| RESET | \_\_\_\_\_\_\_\_ | | OFF | |  | |
| M&TE Index # \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | | | |

Remove test equipment.

Restore CEN-FISL-0032 to normal.

Obtain “As Found” conditions of CEN-PV-0234 as follows:

Observe CEN-PV-0034 all-thread configuration/valve-stop setup: (clamping mechanism).

Note below the initial scribe mark position on the shaft coming off the valve itself.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Record CEN-FISL-0032 flow indication before throttling CEN-PV-0034  
  
CEN-FISL-0032\_\_\_\_\_\_\_\_\_\_GPM

Back off the bottom valve stop nuts/washer(s) of PV-0034.

Change the valve position using the set-point on PC-0034 or drive   
PV-0034 open and close using the all-thread configuration/valve-stop setup as needed to ensure switch trips/resets properly while observing CEN-FISL-0032 flow indication.

IF unable to use the controller to cycle the valve,   
THEN the valve may be cycled manually by the use of a manual air regulator to the valve diaphragm.

Note

To perform calibration of switches the process will have to be throttled by the use of CEN-PV-0034 while observing indication on CEN-FISL-0032.

Snubbers are used on the sensing lines for CEN-FISL-0032 (U-2 snubbers are to be installed via WO 4600743), this causes CEN-FISL-0032 to respond slower than the actual process. Flow shall be varied slowly so the actual process matches indication on CEN-FISL-0032. (M400-0313-00005)

* Calibrate CEN-PSLL-0026A, 26B, 26C per TABLE 3, TABLE 4 & TABLE 5:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CEN-PSLL-0026A**  Set Point: 549.00 GPM Decreasing Accuracy +/- 7.00 GPM | | | | | |
| CONTACT ACTION | DESIRED  (GPM) | MINIMUM (GPM) | AS FOUND (GPM) | AS LEFT  (GPM) | MAX  (GPM) |
| CLOSE | 549.00 | 542.00 |  |  | 556.00 |
| OPEN | RECORD VALUE | |  |  | N/A |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CEN**-**PSLL**-**0026B**  Set Point: 549.00 GPM Decreasing Accuracy +/- 7.00 GPM | | | | | |
| CONTACT ACTION | DESIRED  (GPM) | MINIMUM (GPM) | AS FOUND (GPM) | AS LEFT  (GPM) | MAX  (GPM) |
| CLOSE | 549.00 | 542.00 |  |  | 556.00 |
| OPEN | RECORD VALUE | |  |  | N/A |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CEN**-**PSLL**-**0026C**  Set Point: 549.00 GPM Decreasing Accuracy +/- 7.00 GPM | | | | | |
| CONTACT ACTION | DESIRED  (GPM) | MINIMUM (GPM) | AS FOUND (GPM) | AS LEFT  (GPM) | MAX  (GPM) |
| CLOSE | 549.00 | 542.00 |  |  | 556.00 |
| OPEN | RECORD VALUE | |  |  | N/A |

Note

The alarm in function is a 2-out-of-3 logic and cannot be verified until two of these switches (26A, 26B, & 26C) are closed.

* Perform an “Alarm Function Check” per :

|  |  |  |  |
| --- | --- | --- | --- |
| **Alarm Function Check** | | | |
|  | Verify | Annunciator Window RKNUA0006B – 07B | Computer Point  CEPS26 |
| SET | \_\_\_\_\_\_\_\_ | ON | ALARM |
| RESET | \_\_\_\_\_\_\_\_ | OFF | NORM |
| M&TE Index # \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | |

* Calibrate CEN-PSL-0027 per TABLE 6:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CEN-PSL-0027**  Set Point: 581.00 GPM Decreasing Accuracy +/- 7.00 GPM | | | | | | |
| CONTACT ACTION | DESIRED  (GPM) | MINIMUM (GPM) | | AS FOUND (GPM) | AS LEFT  (GPM) | MAX  (GPM) |
| CLOSE | 581.00 | 574.00 | |  |  | 588.00 |
| OPEN | RECORD VALUE | | |  |  | N/A |
|  | Verify | | Annunciator Window CENE01B Local 1-2 | |  | |
| SET | \_\_\_\_\_\_\_\_ | | ON | |  | |
| RESET | \_\_\_\_\_\_\_\_ | | OFF | |  | |
| M&TE Index # \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | | | |

* Calibrate CEN-PSL-0028 per TABLE 7:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CEN-PSL-0028**  Set Point: 581.00 GPM Decreasing Accuracy +/- 7.00 GPM | | | | | | |
| CONTACT ACTION | DESIRED  (GPM) | MINIMUM (GPM) | | AS FOUND (GPM) | AS LEFT  (GPM) | MAX  (GPM) |
| CLOSE | 581.00 | 574.00 | |  |  | 588.00 |
| OPEN | RECORD VALUE | | |  |  | N/A |
|  | Verify | | Annunciator Window RKNUA0006B – 07C | | Computer Point  CEPS28 | |
| SET | \_\_\_\_\_\_\_\_ | | ON | | ALARM | |
| RESET | \_\_\_\_\_\_\_\_ | | OFF | | NORM | |
| M&TE Index # \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | | | |

Return CEN-FISL-0032 flow indication to reading taken in Step using CEN-PV-0034 to throttle flow.

Ensure CEN-PV-0034 controller is returned to the As Found condition by performing the following:

PC-0034 set-point is restored along with

I Return PV-0034 to the initial valve "scribe-mark" on shaft from valve as identified in step .

Tighten the "all-thread" nuts using good mechanical judgment.

Verify restoration of all instruments to normal operating condition.

Verify alarm condition is as expected.

RETEST

Post Maintenance Test

None

Operations Test

None

Design Validation Test (DVT)

None

Post Installation Test (PIT)

None

RESTORATION

Notify operations of work completion.

**PM History page**

PM was changed to include JCENPSLL0026A, PSLL0026B, PSLL0026C, and JCENPSL0027, PSL0028.

The accuracy of JCENFISL0032 was established at the more conservative accuracy listed on WMN005.

12/18/1996 JCENFISL0032 is used to calibrate the associated task pressure switches and technician input felt the more restrictive value was prudent. M. Burleson X1038

09/18/2003 Instructions revised to meet latest revision of the writers guide and add RCM review recommendations. WAW.

02/25/2013 Instructions changed to meet the current revision of the writer’s guide. Implemented changes per LL 3898952, LL 4090733, & LL 3678793. Mike Minton

08/12/2013 Instructions changed to reflect installation of Mod CE-321 in U-2, added Appendix A for U-2 only. Carraway

11/20/14 Instructions changed to reflect CE-321 mod installation in U-1. Carraway

04/25/2015 Removed sections pertaining to CEN-PDSL-0289A, B & C, now included in MI 4648231, added bullets to switch calibrations. Carraway

08/24/2016 Amend – Corrected the accuracy in TABLE 1. Changed the accuracy from +/- 2.0 In. H2O to +/- 3.0 In. H2O per CPXCOMP. – Gary Smith