A-189 GPC Exh II 184

PRB MEETING MINUTES CONTINUATION SHEET

A. The board convened to review Deficiency Card 1-95-077, which documented the discovery of moisture in the tubing/fittings on 1PI-9053, 1PI-9057, and 1PI-9052, DG right and left bank starting air pressure gauges. The discussion centered around the possible cause(s) for the evidence of water in the gauges. The board concurred with the reportability determination for this DC, and the recommended corrective actions with the following comments:

- Reword the root cause stated on the Root Cause Determination Worksheet, to make it consistent with the conclusion stated in the discussion of root cause and corrective action
- Add an interim corrective action to perform monthly follow-up moisture checks (for 3 months)
- Revise the corrective action to state: "When calibrating instrumentation an appropriate calibration medium for that system should be utilized. Instrumentation, particularly the DG, shall be calibrated with air"
- Consider adding this DC/Event to the continuing training program for I & C
- Incorporate the following 4 step plan into the corrective actions:
  1) Determine the scope & feasibility of tubing blowdown
  2) Monthly moisture checks as stated above
  3) If positive results obtained from monthly checks (3 monthly cycles), then defer to outage
  4) Check for moisture during each calibration

Meeting Adjourned

Deficiency Card Rom/ 51062

Completed By Initiator

Card # 1-95-077 ☑ Unit 1 ☐ Unit 2 ☐ Common

1: Description of Deficiency (Additional Sheets Attached? ☐ Yes ☐ No)

At approx. 1500 moisture was detected in the tubing/Fittings on 1PI-9053, 1B D/G right bank starting air pressure gauge. (≈0.315ml)
At approx 1700 moisture was detected in the tubing/Fittings on 1PI-9057, 1B D/G left bank starting air pressure gauge. (≈1.62)
At approx 1800 moisture was detected in the tubing/Fittings on 1PI-9052, 1A D/G right bank starting air pressure gauge. (≈0.165ml)

MPL Tag Number 1PI-9052, 9053, 9057 Serial No. NA

Location Of Deficiency? 1A + 1B D/G Engine Control Panel

What is Affected By The Deficiency?/What Controls Were Violated?

Unknown

How Was The Deficiency Discovered? During testing under MWO19502428

Event Time Various Date 8-18-95 Discovery Time Various Date 8-18-95

Discovered By? L.P. Noblett Work # 4306 Dept. I+C

Completed By USS Within 2 Hours

2. Shift Supervisor Review W3, E.M. Thornton) WL13 — 1437 8-21-95
Name Of USS Reported To? [illegible] Time 1500 Date 8-18-95

Plant Mode/Condition: 1 / 100 %

Is Immediate Notification Required? ☐ Yes ☒ No

If Yes, ☐ 1 Hour, ☐ 4 Hour, or ☐ 24 Hour Reported: Date N/A Time N/A

Tech. Spec. Required Action Taken? ☐ Yes ☐ No ☒ N/A

List Applicable Tech. Spec. Section(s) 3.8.1.1 — This was previous Evaluated By E.M. Thornton 8/18/95) 1845 on DC-1-95-076

Summarize Compensatory Action Taken: Moisture drained, receivers dewpoint + control air dew point are sat. [illegible]

LCO Initiated ☐ Yes ☒ No # Type: Info LCO Fire

WO Initiated ☒ Yes ☐ No # MWO 19502428

Signature Of USS WL13 — Date 8-21-95 Time 1432

Completed In 1 Day

3: NSAC Evaluation/Review (Check Appropriate Box) Date Received: 8-21-95

A. ☐ No Disposition Required. Send Copy To Responsible Dept., Close Original

B. ☐ Reportable Deficiency. Report #

C. ☒ Deficiency, Not Reportable.

Explanation: Per discussion with system engineering this condition does not prevent the DGs from starting and performing their intended safety functions. Tech. Specs. have not been violated and this is not reportable per 10CFR50.73.

Note: This DC supersedes DC #1-95-76.

Responsible Dept.: Eng. Support

NSAC Reviewer: Tim [illegible] Date: 8-21-95 NSAC Supervisor: [illegible] Date: 8/21/95

Completed in 1 Month By Responsible Department

4. Disposition: Hardware NOT affected - use AS IS. Water removed per MWO 1950242-8 [signature] 9/1/95 [signature] 9/1/95

5. RCCA Required: [X] Yes (Complete per 00058-C) [ ] No (Complete 6 & 7 below)

6. Cause(s), if known: N/A

7. Action to Prevent Recurrence, if applicable: N/A

Concurrence for Corrective Actions Assigned to Another Dept.: [signature] 9-7-95

8. Cause Code(s): E3D, E1D Cause Dept(s): Maint

Department Manager: [signature] Date: 9/6/96

9. Event Code(s): 2B NSAC Initials: TEM 9-7-95

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EVENT INVESTIGATED

1. DC # 1-95-077
2. Event Report # N/A
3. RCCA requested by MGT. [ ]
4. Other (specify)
5. Personnel statement(s) attached. Yes [ ] No [X]

ROOT CAUSE ANALYSIS TECHNIQUE (indicate each method used)

1. Paper and Pencil Narrative (Figure 3) [ ]
2. Barrier Analysis (Figure 4) [ ]
3. Change Analysis (Figure 5) [ ]
4. Event/Root Cause Flow Chart (Figure 6) [ ]
5. Cause Identification Worksheet (Figure 7) [X]
6. Fault Tree Analysis [ ]
7. Mgt Oversight Risk Tree (MORT) [ ]
8. Other

EVENT DESCRIPTION or FAILURE SCENARIO:

Narrative attached: [X]
Sequence of Events attached: [ ]

BROADNESS REVIEW

PRIOR OR SIMILAR OCCURRENCE (Complete all line items. Check appropriate response)

1. DC Database reviewed	YES [X]	NO [ ]	N/A [ ]
2. NPMIS Database reviewed	YES [X]	NO [ ]	N/A [ ]
3. NPRDS Database reviewed	YES [X]	NO [ ]	N/A [ ]
4. Isolated occurrence? If no, attach review	YES [ ]	NO [X]	
5. Previous RCCA adequate?	YES [ ]	NO [ ]	N/A [X]

IMPACT

1. Other train/channel/unit checked?	YES [X]	NO [ ]	N/A [ ]
2. Other similar process checked?	YES [X]	NO [ ]	N/A [ ]
3. Other similar component?	YES [X]	NO [ ]	N/A [ ]

4. Other (specify)

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ROOT CAUSE(S) and CONTRIBUTING CAUSES: Include any previous corrective actions that were ineffective	ROOT CAUSE CODE(S):
Water was most likely used to calibrate instruments and not completely removed. The procedure (22705-C) gives no guidance for removing the water when used in an air system.	**F3D and E1D**
Continuation Sheet attached: [ ]	

Is the event a MPFF? [ ] Yes [X] No — Rev 9/1/95 per conversation w/K. Stokes

RECOMMENDED CORRECTIVE ACTIONS:	EST. COMPLETION DATE
(1) Revise procedure 22705-C (and all other applicable procedures) to include instructions to properly remove all water when calibrating instruments used in air systems. For instruments on the diesel generator air system, use only nitrogen, air or some other gas as the calibrating medium.	**September 29, 1995**
(2) Brief technicians on procedure changes.	**September 29, 1995**
(3) Perform monthly moisture check on these gauges for both units to verify no water is present. If possible, blowdown the instrument line to remove any moisture. Take these actions for the next 3 months. If moisture is still present after 3 months ensure system engineer determines appropriateness of further corrective actions.	**December 1, 1995**

Continuation Sheet attached: [ ]

M. J. Hobbs for KRH — RESP DEPT MANAGER APPROVAL — 9/7/95 DATE

(NOT REQUIRED IF SAME AS RESPONSIBLE DEPARTMENT MANAGER)

Karen Stokes — INVESTIGATOR — 9/7/95 DATE

W. Burmeister — LEAD MANAGER/ERTL APPROVAL — 9-7-95 DATE

OIT NUMBER(S): 3451

OITs INITIATED; COMMITMENTS REVIEWED:

TECHNICAL SUPPORT SUPERVISOR — DATE

ATTACHMENT TO RCCA FOR DC #1-95-077
EVENT DESCRIPTION or FAILURE SCENARIO
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POSSIBLE CAUSES:

1. Water condensing from the control air.

2. High humidity air introduced in the system when the tubing was open for maintenance/calibration.

3. Water introduced during calibration of the instrument from:

   A. Calibration using contaminated air

   B. Calibration using nitrogen/dry air through tubing contaminated with water

   C. Calibration using water

DISCUSSION:

1. For water to have condensed from the control air, the temperature inside the tubing would have to fall below the dew point temperature of the control air. Following the identification of the water in the tubing to the pressure gauges, dew point measurements were made of the air in the air receiver and in the 60 psig pneumatic air system per MWO 19502428. The dew point/pressure for the air receivers was 46.7°F/228 psig (PI-9053) and 42.8°F/237 (PI-9057) psig for train B and 46.6°F/228 psig (PI-9052) for train A. The dew point/pressure for the 60 psig pneumatic air system was 16.6°F/60 psig and 22.4°F/60 psig for trains A and B, respectively. Relating these readings to a dew point conversion chart (Reference Figure 27-L from Compressed Air and Gas Data, Third Edition , Ingersoll-Rand), the receiver and 60 psig pneumatic air system readings are reasonable (i.e. a dew point temperature of 46.7°F at 228 psig would be approximately 22°F at 60 psig). At these dew point values, for condensation to precipitate out of the control air in the tubing to the pressure indicators, the temperature inside the tubing would have to fall below 46.7°F.

   After identification of the water in the instrument tubing, checks for moisture were made at the control air pressure gauge, control air test connection, air filter trap, and starting air receiver drain valve (reference MWO 19502428). No indications of moisture were found at these locations.

   The Diesel Generator room is maintained above 50°F. The temperature inside of the control panel is also higher than the room temperature as shown in the room and panel temperatures taken and documented in MWO 19502428 (temperature

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DISCUSSION (Continued):

outside the panel was 86.2°F and the temperature inside the panel was 93.4°F). Based on the facts that (1)the tubing to the pressure indicators is located inside the panel, (2)the room and panel are maintained at a temperature above 50°F, and (3)the dew point of the starting air was 46.7°F, it can be concluded that it is highly improbable that the water was condensation from the control air. From the above, it can also be concluded that no condensation from the control air would be in the 60 psig pneumatic air system.

2. When the tubing system was open for maintenance/calibration of the instruments, it was exposed to the surrounding air in the building/control panel. If we postulate a room dry bulb temperature of 93°F (design outdoor temperature) and wet bulb temperature of 78°F (design outdoor temperature and relative humidity of approximately 51%), the specific humidity of the air will be 0.0175 pounds of moisture (lbm) per pound of dry air (lba) at standard conditions (reference 1993 ASHRAE Fundamentals psychometric chart). The density of dry air at 93°F is 0.07179 lba/ft^3 (reference Buffalo Forge Fan Engineering Handbook, 8th Edition, Table 1.17). The following calculates the volume of air required to obtain 1 milliliter (ml) of water at these conditions:

   1 ml = 1 ml x 1/1000 l/ml x 0.035315 ft^3/l = 3.53(10^{-5}) ft^3

   Density of the water in the air = 0.07179 lba/ft^3 x 0.0175 lbm/lba
   = 1.2563(10^{-3}) lbm/ft^3

   Density of water is 62.4 lbm/ft^3. Therefore, the weight of 1 ml of water is:

   62.4 lbm/ft^3 x 3.53(10^{-5}) ft^3 = 2.2027(10^{-3}) lbm

   The volume of air required to extract 1 ml of water would be:

   2.2027(10^{-3}) lbm / 1.2563(10^{-3}) lbm/ft^3 = 1.75 ft^3 of air

   By comparison of the required volume of air and the actual volume of 1/4" tubing (volume in 5 feet of 1/4" tubing = 5 ft x pi x (0.097 in / 12 in/ft)^2 = 1.026(10^{-3}) ft^3), it can be concluded that it is highly improbable that the water was caused from the surrounding air entering the piping system.

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EVENT DESCRIPTION or FAILURE SCENARIO
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DISCUSSION (Continued):

3. When the instruments are calibrated, VEGP Procedure 22705-C is used. The procedure does not specify the source (i.e. air, water, etc.) to use. If air or nitrogen is used, from the discussion in 2 above, it can be concluded that it is highly improbable that the air or nitrogen itself would have caused the water.

   The hose connecting the air/nitrogen supply to the instrument could have been contaminated with water and when the calibration occurred the water was transported from the hose to the 1/4" tubing. However, based on the fact that (1)the instrument and calibration connection is located in the top of the panel, (2)the hose would have been routed vertically to the connection, and (3)the volume of tubing (a few inches of 1/4" tubing) is very small, it is unlikely that the flowrate through the hose would have been sufficient to lift the water and carry it into the 1/4" tubing.

   The other method of calibrating the instrument would be to use water. Although it is not common practice to use water as a calibration medium for air systems, it is a medium that is frequently utilized for calibration purposes. Hypothetically, if water was used to calibrate the suspect gauges it could have become trapped in the bourdon tube. Since the bourdon tube is a dead end device, the water would have been held by the "Straw Effect" until sufficient mechanical agitation caused it to be released into the tubing. The water trapped in the bourdon tube could be held for an extended period of time before being exposed to the tubing. Interviews with plant personnel indicate no water was used in recent calibrations on these suspect instruments, however, as mentioned above this water could have been retained for an extended period of time which would indicate the water was introduced during any calibration, particularly those beyond the memory of those individuals interviewed. The procedure used to calibrate these instruments does not restrict the use of water; therefore, this hypothetical situation would be the most likely cause of the water getting in the tubing.

Conclusions

Based on the information available at this time and the above discussion, it can be concluded that the water most probably entered the system during a past instrument calibration.