



FORT ST. VRAIN NUCLEAR GENERATING STATION
PUBLIC SERVICE COMPANY OF COLORADO

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2.3 Monitor Critical Safety Functions Per EOP's.

Monitor critical safety functions per EOP's and take any steps required by EOP's.

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TITLE: LOSS OF AN INSTRUMENT AIR HEADER

RESPONSIBLE FOR	<i>M. E. Livingston</i>		
AUTHORIZED BY	<i>[Signature]</i>		
PORC REVIEW	PORC 877 APR 11 1990		EFFECTIVE DATE 4-19-90
DCCF NUMBER (S)	90-0164		

FT. ST. VRAIN
NON-CONTROLLED
COPY
VERIFY ISSUE STATUS
WITH SITE DOCUMENT
CONTROL CENTER PRIOR
TO USE

(L)
LOSS OF AN INSTRUMENT AIR HEADER
SYMPTOM-ACTION MATRIX

ACTIONS	SYMPTOMS				
	1.1 Inst. Air Pressure Low 1-06H, 2-6	1.2 Inst. Air Header "A" Pressure Low 1-06 (PI-8212)	1.3 Inst. Air Header "B" Pressure Low 1-06 (PI-8254)	1.4 Loss of both inst. air headers	XX
<u>OPERATOR ACTIONS</u>					
2.1 Terminate Defueling Activities					
2.2 Ensure standby compressor starts and alignment to affected header	XX	XX	XX		
2.3 Ensure appropriate Service Air backup to affected header		XX	XX		
2.4 If 60 PSIG and decreasing, set the helium circulator brake and seals.			XX		
2.5 Dispatch operators to identify leak source and isolate, if possible		XX	XX		
2.6 Isolate portions of affected header and determine if header pressure is regained		XX	XX		
<u>OPERATOR ACTIONS</u>					
a) Close V-8265 and V-82884 to isolate Reactor Building "A" header		XX			

(L)
LOSS OF AN INSTRUMENT AIR HEADER
SYMPTOM-ACTION MATRIX

ACTIONS	SYMPTOMS			
	1.1 Inst. Air Pressure Low 1-06H, 2-6	1.2 Inst. Air Header "A" Pressure Low 1-06 (PI-8212)	1.3 Inst. Air Header "B" Pressure Low 1-06 (PI-8254)	1.4 Loss of both Inst. air headers
b) Close V-8254 and V-82885 to isolate Reactor Building "B" header			XX	
c) Close V-8264 and V-82883 to isolate Turbine Building "A" header		XX		
d) Close V-8255 and V-82886 to isolate Turbine Building "B" header			XX	
2.7 If header pressure is regained, leave portion containing leak isolated		XX	XX	
NOTE: THE FOLLOWING ACTIONS ARE REQUIRED ONLY IF CONTROL VIA THE AFFECTED AIR HEADER HAD BEEN LOST				
OPERATOR ACTIONS				
2.8 Shutdown auxiliaries, including bearing water pumps and isolate surge tank level valves			XX	
2.9 Put reactor building sump pumps in PULL-TO-LOCK			XX	
2.10 Refer to TABLES L.3 and L.4 for effect of loss of air and valves backed with nitrogen	XX	XX	XX	XX



INTRODUCTION

Each loop in this plant has a complete instrument air supply system consisting of an instrument air compressor, air aftercooler, air accumulator, air dryer, and distribution header. In addition, there is a spare instrument air compressor that should start automatically and furnish air for either loop in case the primary compressor is shutdown because of trouble or for maintenance. The service air compressor may also be used to furnish instrument air to either loop of the instrument air system. The service air can be introduced into either system just ahead of the system air accumulator, ahead of the system air dryers, or downstream of the system air dryers in case these components are also out of service.

Instrument air header "A" furnishes air to the Loop 1 instruments and header "B" furnishes air to the Loop 2 instruments.

DISCUSSION OF SYMPTOMS

ALARMS AND INDICATIONS

1.1 Instrument Air Pressure Low, I-06H, 2-6

When the pressure in either instrument air header drops below 70 psig, the alarm sounds and the window in the alarm panel lights.

NOTE: Operators, in most cases, will have been alerted to trouble prior to reaching this pressure.

1.2 Instrument Air Header "A" Pressure Low, I-06 PI-8212

1.3 Instrument Air Header "B" Pressure Low, I-06 PI-8254

In order to identify which header has the low pressure, the meters on the control board must be checked.

DISCUSSION OF OPERATOR ACTION

2.1 Terminate Defueling Activities

Until instrument air headers are restored, terminate defueling activities and close all openings to PCRV.



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2.2 Ensure standby compressor starts and alignment to affected header.

At 85 psig, ensure backup Instrument Air Compressor starts. Operator should then ensure compressor is delivering to the affected header by observing the pressure indicators on I-06, and placing HS-8219 or HS-8220 in the proper position.

2.3 Ensure appropriate Service Air backup to affected header.

At 80 psig, ensure service air backup is going to the affected header; FSV-8218 for "A" header and FSV-8255 for "B" header.

At 75 psig, ensure dryer is bypassed.

At 70 psig, ensure Service Air backup downstream of dryer is open; FCV-8217 open and FCV-8218 closed for "A" header; FCV-8221 open and FCV-8255 closes for "B" header.

2.4 IF 60 psig and decreasing, set helium circulator brake and seals.

At 60 psig and still decreasing pressure, control will soon be lost to most of the controllers in the affected loop. At 50 psig the Service Air backup will automatically be isolated from the affected air header. Some of the more critical control services have backup operating media which will last for a limited period of time. The proper action, therefore, is to isolate the coolant loop serviced by the affected header. Loop #2 is isolated by HS-93334 and HS-93336. The helium circulator brake and seal are set to prevent primary coolant leakage and moisture inleakage.

2.5 Dispatch operators to identify the leak source and isolate if possible.

With below normal air header pressure, the source of the problem should be determined and corrected if possible.

CAUTION: THE FOLLOWING STEPS ARE TO BE PERFORMED ONLY
IF; AIR HEADER PRESSURE HAS BEEN LOST, AND THE
LOOP ISOLATED.

The remainder of this abnormal procedure assumes there has been a major breach in an air header line. As such the remaining steps deal with leak source identification and isolation.

2.6 Isolate portion of affected header and determine if header pressure regained.

- a) Close V-8265 and V-82884 to isolate reactor building "A" header.
- b) Close V-8254 and V-82885 to isolate reactor building "B" header.
- c) Close V-8264 and V-82883 to isolate turbine building "A" header.
- d) Close V-3255 and V-82886 to isolate turbine building "B" header.

2.7 If header pressure regained, leave portion containing leak isolated.

Closing air header isolation valves should be an effective means of locating the portion of the header containing the leak and also an effective means for isolation. There are local pressure gauges at each of the isolation valves. Isolation of a portion of the header containing the leak will minimize subsequent operator actions required for control of the plant.

NOTE: THE FOLLOWING ACTIONS ARE REQUIRED ONLY IF CONTROL
VIA THE AFFECTED AIR HEADER HAS BEEN LOST.

The following steps of this abnormal procedure are necessary only to the degree instrument air for control of the equipment has been lost. This will depend upon the air header affected and that portion which has been isolated.



- 2.8 In affected loop, shutdown auxiliaries, including bearing water pumps and isolate surge tank level valves.

Control of the loop has been lost with loss of the associated instrument air supply.

- 2.9 Put reactor building sump pumps in PULL-TO-LOCK.

HV-7204-1 is on "B" header and fails open. The Reactor Building Sump Pumps should be put in pull-to-lock to avoid filling the liquid waste system.

- 2.10 Refer to Tables L.3 and L.4 for effect of loss of air and valves backed with nitrogen.

These tables provide a listing of these controllers which are affected by a loss of air pressure, their failure modes, emergency backup provisions, and those controllers which have backup emergency nitrogen supply.

TABLE L.3

LOSS OF AN INSTRUMENT AIR HEADER

FUNCTION	EFFECT OF LOSS ON "A" INST. AIR HEADER	EFFECT OF LOSS ON "B" INST. AIR HEADER	NOTES
NOTE: (FO) = Fails Open (FC) = Fails Closed			
Normal Bearing Water System	LV-2135-1 (FO)	LV-2136-1 (FO)	Shut down bearing water pumps and isolate level control valves on loss of backup air supply.
	LV-2135-2 (FC) Has backup air for 1 hour and manual shutoff valves.	LV-2136-2 (FC) Has backup air for 1 hour and manual shutoff valves.	
	Recycle valve FV-21297 (FO)	Recycle valve FV-21298 (FO)	Produces helium circulator trip (Loss of bearing water due to simultaneous failure of backup bearing water supply.
Bearing Water Accumulators	PDV-21285-1 (FO)	PDV-21286-1 (FO)	Failure of normal and backup bearing water fires the accumulator.
	PDV-21285-2 (FO) Backup air for 5 minutes.	PDV-21286-2 (FO) Backup air for 5 minutes.	
Buffer Helium Supply	HV-2366-1 (FO)	PDV-23111 (FC) Has backup air for 13 hours	
	PDV-2367-1 (FC) Backup air	HV-2366-2 (FC)	
Low Pressure Separator Drains	Lose normal drain LV-21115 (FC) Drain to turbine water drain tank.	Water drains to turbine water drain tk. LV-21119 (FO)	

TABLE L.3
LOSS OF AN INSTRUMENT AIR HEADER

FUNCTION	EFFECT OF LOSS ON "A" INST. AIR HEADER	EFFECT OF LOSS ON "B" INST. AIR HEADER	NOTES
NOTE: (FO) = Fails Open (FC) = Fails Closed			
Turbine Water Drain Tank	LV-21130 (FO) Has backup air for 1 hour and hand- jack.	LV-21114 (FO) Turbine water re- moval pumps cycle. LV-21130 operates normally (opens on high level). PV-21120 (FO) Has backup air for 1 hr and handjack.	
Flash Tank Drain System	LCV-3218 (FC) LCV-3217-1 (FC) LCV-3217-2 (FC) Because XEP-3217 loses supply air. LCV-3251-1 (FO) LCV-3251-2 (FO)	LCV-3217-2 (FC) HV-3220-1 (FC) HV-3220-6 (FC)	On loss of either header operation is via emergency drain path. On loss of "A" header only controlling valve is HV-3250.
150 psig HDR Valves	PCV-5201 (FO) HV-5202-2 (FO) HV-5211-1 (FO) HV-5211-2 (FO)	PCV-5214-1 (FO) PCV-5214-2 (FO) PCV-5214-3 (FO) (Flow to Close) HV-5202-1 (FO) HV-5203-1 (FO) HV-5203-2 (FO)	Loss of "A" HDR requires local manual control if aux boiler is on. Loss of "B" HDR requires local manual control of 5214 valve station.



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TABLE 1.4

VALVES BACKED UP WITH NITROGEN

Valve Number	Function	Failure Mode
HV-2187-1	Circulator 1A Bearing Service Isolation	Open
HV-2187-2	Circulator 1A Bearing Service Isolation	Open
HV-2187-3	Circulator 1A Bearing Service Isolation	Open
HV-2187-4	Circulator 1A Bearing Service Isolation	Open
HV-2187-5	Circulator 1A Bearing Service Isolation	Open
HV-2187-6	Circulator 1A Bearing Service Isolation	Open
HV-2187-7	Circulator 1A Bearing Service Isolation	Open
HV-2187-8	Bearing Water Accumulator Circulator 1A	Open
LV-21303	Circulator 1A HP Separator DR (Manual)	Closed
HV-2188-1	Circulator 1C Bearing Service Isolation	Open
HV-2188-2	Circulator 1C Bearing Service Isolation	Open
HV-2188-3	Circulator 1C Bearing Service Isolation	Open
HV-2188-4	Circulator 1C Bearing Service Isolation	Open
HV-2188-5	Circulator 1C Bearing Service Isolation	Open
HV-2188-6	Circulator 1C Bearing Service Isolation	Open
HV-2188-7	Circulator 1C Bearing Service Isolation	Open
HV-2188-8	Bearing Water Accumulator Circulator 1C	Open
LV-21304	Circulator 1C HP Separator DR (Manual)	Closed
HV-2189-1	Circulator 1B Bearing Service Isolation	Open
HV-2189-2	Circulator 1B Bearing Service Isolation	Open
HV-2189-3	Circulator 1B Bearing Service Isolation	Open
HV-2189-4	Circulator 1B Bearing Service Isolation	Open
HV-2189-5	Circulator 1B Bearing Service Isolation	Open
HV-2189-6	Circulator 1B Bearing Service Isolation	Open
HV-2189-7	Circulator 1B Bearing Service Isolation	Open
HV-2189-8	Bearing Water Accumulator Circulator 1B	Open
HV-2190-1	Circulator 1D Bearing Service Isolation	Open
HV-2190-2	Circulator 1D Bearing Service Isolation	Open
HV-2190-3	Circulator 1D Bearing Service Isolation	Open
HV-2190-4	Circulator 1D Bearing Service Isolation	Open
HV-2190-5	Circulator 1D Bearing Service Isolation	Open
HV-2190-6	Circulator 1D Bearing Service Isolation	Open
HV-2190-7	Circulator 1D Bearing Service Isolation	Open
HV-2190-8	Bearing Water Accumulator Circulator 1D	Open
LV-2135-1	Makeup Bearing Water Surge Tank 1A	Open
LV-2135-2	Drain Bearing Water Surge Tank 1A	Closed
LV-2136-1	Makeup Bearing Water Surge Tank 1B	Open
LV-2136-2	Drain Bearing Water Surge Tank 1B	Closed
LV-21130	TWDT Drain to Reactor Building Sump	Open

TABLE L.4
VALVES BACKED UP WITH NITROGEN

Valve Number	Function	Failure Mode
PDV-21285-1	Loop 1 Bearing Water Accumulator	Open
PDV-21285-2	Gas Pressurizer 1A Outlet	Open
PDV-21286-1	Loop 2 Bearing Water Accumulator	Open
PDV-21286-2	Gas Pressurizer 1B Outlet	Open
HV-21277-1	Equalizing Line T-2110	Closed
HV-21277-2	Equalizing Line T-2110	Closed
HV-21277-3	Equalizing Line T-2110, Vent	Open
HV-21415-1	Loop 1 Accumulator Gas Pressure	Closed
HV-21415-2	Loop 1 Accumulator Purge Block	Closed
HV-21416-1	Loop 2 Accumulator Gas Pressure	Closed
HV-21416-2	Loop 2 Accumulator Purge Block	Closed
PV-21120	Turbine Water Drain Tank Vent	Open
LV-21130	Turbine Water Drain Tank Level Valve To Keyway	Open
PDV-2367-1	Buffer Makeup from Helium Storage	Closed
PDV-23111	Helium Purification Flow	Closed
LCV-3175-1	Deareator Level Control	Open
PV-22153	Loop 1 Stm/Gen Depress (Manual)	Closed
PV-22154	Loop 2 Stm/Gen Depress (Manual)	Closed
DV-73453	Rx Plant Exhaust Fan 1A In (Manual)	Closed
DV-73454	Rx Plant Exhaust Fan 1B In (Manual)	Closed
DV-73455	Rx Plant Exhaust Fan 1C In (Manual)	Closed
DV-73456	Rx Plant Exhaust Fan 1A Out (Manual)	Closed
DV-73457	Rx Plant Exhaust Fan 1B Out (Manual)	Closed
DV-73458	Rx Plant Exhaust Fan 1C Out (Manual)	Closed