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LOSS OF INSTRUMENT AIR

1.0 ENTRY CONDITIONS

IF IA PRESS is ≤ 85 psig,
THEN use this procedure.

This Procedure Addresses Safety Related Components

Approved by MNPO Gregory Halnon (SIGNATURE ON FILE) Date 4/12/94

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2.0 IMMEDIATE ACTIONS

	ACTIONS	DETAILS
2.1	Ensure in-house air compressors are running or have auto started.	o IAP-1A o IAP-1B o SAP-1A o SAP-1B

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3.0 FOLLOW-UP ACTIONS

ACTIONS	DETAILS
3.1 ___ Notify personnel of plant conditions as required.	o ___ SOTA o ___ Plant operators o ___ SSOD to evaluate plant conditions for potential entry into the emergency plan
3.2 ___ CONCURRENTLY PERFORM VP-580, Plant Safety Verification Procedure, beginning with Step 3.1.	
3.3 ___ IF, at any time while performing this procedure, any of the following conditions exist: o Loss of SC flow, o Loss of SC system cooling, o Loss of SW to CRDs, o Loss of SW to RCPs, o Both MFWPs are tripped, THEN trip the Rx, AND CONCURRENTLY PERFORM EOP-2, Vital System Status Verification.	Depress Rx Trip pushbutton.
3.4 ___ IF, at any time while performing this procedure, SW is lost to the RCPs, THEN stop all 4 RCPs within 5 minutes.	

3.3 IF any of the following conditions exist:

- o Loss of SC flow,
- o Loss of SC system cooling,
- o Loss of SW to CRDs,
- o Loss of SW to RCPs,
- o Both MFWPs are tripped,

THEN trip the Rx,
AND CONCURRENTLY PERFORM EOP-2, Vital System Status Verification.

3.4 IF SW is lost to the RCPs,
THEN stop all 4 RCPs within 5 minutes.

3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.5 ___ IF IA PRESS decreases to < 80 psig, THEN verify IAV-30 closes, OR isolate IAV-30.	IAV-30 is isolated by closing: o IAV-10, and o SAV-5. IAV-10 and SAV-5 are located near IAV-30, 95' TB.

Note

MFWP(s) may be operated in HAND in order to control MFW flow if air fail locking of the MFW control valves occur.

3.6 ___ IF MFW flow can NOT be controlled, THEN trip both MFWPs.	
3.7 ___ Notify HP of degraded IA system as a precaution for personnel using breathing air.	
3.8 ___ Isolate Station Air Loops.	Close SAV-30 and SAV-31 located above IAT-1A.
3.9 ___ Ensure proper operation of air compressors.	Notify TB operator to ensure proper operation of air compressors. o IAP-1A o IAP-1B o SAP-1A o SAP-1B o SAP-1C o SAP-1D o SAP-1E

3.3 IF any of the following conditions exist:

- o Loss of SC flow,
- o Loss of SC system cooling,
- o Loss of SW to CRDs,
- o Loss of SW to RCPs,
- o Both MFWPs are tripped,

THEN trip the Rx,
AND CONCURRENTLY PERFORM EOP-2, Vital System Status Verification.

3.4 IF SW is lost to the RCPs,
THEN stop all 4 RCPs within 5 minutes.

ACTIONS	DETAILS
Note Excessive ΔP between IA-4-PI and SA-4-PI may indicate plugging of IA dryer and/or filters.	
Note If air pressure downstream of dryer/filters is ≤ 85 psig, it will cause IADR-2 to de-energize, placing both towers in service.	
3.10 ___ Notify TB operator to check for proper operation of the IA dryer/filter.	IF > 15 psi ΔP across IA dryer/filter due to plugging, THEN bypass dryer, AND place standby filter in service. o IA dryer bypass: IAV-31 o IAFL-3A/IAFL-3B
3.11 ___ IF IA PRESS continues to decrease, THEN notify available personnel to inspect for IA leaks and isolate if possible.	
3.12 ___ IF IA leak is between IAPs and first loop isolation valves (IAV-21, 22, 26 & 27), THEN isolate the leak, AND crosstie SA to IA.	1. Ensure the following are closed: ___ IAV-10 (95' TB near IAV-30) ___ IAV-5 (95' TB E of IAT-1B) ___ IAV-21 (O/H, E of Bus Duct Clr) ___ IAV-22 (O/H, E of Bus Duct (Clr) ___ IAV-26 (O/H, S of IAPs) ___ IAV-27 (O/H, S of IAPs) 2. Ensure the following are open: ___ SAV-30 (above IAT-1A) ___ SAV-31 (above IAT-1A) ___ SAV-128 (119' IB above PZR HTR MCC 3A)

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- o Loss of SC system cooling,
- o Loss of SW to CRDs,
- o Loss of SW to RCPs,
- o Both MFWPs are tripped,

THEN trip the Rx,
AND CONCURRENTLY PERFORM EOP-2, Vital System Status Verification.

3.4 IF SW is lost to the RCPs,
THEN stop all 4 RCPs within 5 minutes.

ACTIONS	DETAILS
Note Air locked valves may be operated by maintaining the associated Air Fail Reset pushbutton depressed during valve operation, until air supply is inadequate for valve operation.	
3.13 ___ Monitor MCB for spurious valve movements.	o See Enclosure 1 for a list of IA operated components and their failed position. o IF letdown flowpath isolates, THEN ensure closed MUV-38, MUV-39, and MUV-498.
3.14 ___ IF OTSG(s) are providing the RCS heat sink, THEN control RCS TEMP via the atmospheric dump valves.	Notify available operator to align N_2 to the ADVs, located at 119' TB near the west end of FWHE-6B on IB wall. 1. ___ Close the N_2 vent valve. o ___ NGV-324 2. ___ Open the ADV hdr N_2 Iso valve. o ___ NGV-312
3.15 ___ IF a MUP is in service and supplying RCS makeup, THEN minimize RCS makeup.	o Isolate normal makeup: o Close MUV-27. o Ensure MUP is aligned to the BWST. o Maintain PZR level > 50" using MUV-24. o Minimize RCP seal injection by performing the following: 1 ___ Open MUV-34 and MUV-35, 2 ___ Throttle MUV-17 for RCP seal injection flow control. 3 ___ Close MUV-14 and/or MUV-15, o Valves located in MUP valve alley, 95' AB.

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- o Loss of SW to CRDs,
- o Loss of SW to RCPs,
- o Both MFWPs are tripped,

THEN trip the Rx,
AND CONCURRENTLY PERFORM EOP-2, Vital System Status Verification.

3.4 IF SW is lost to the RCPs,
THEN stop all 4 RCPs within 5 minutes.

3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.16 ___ IF Gland Steam supply to the main turbine is lost, AND main condenser vacuum exists, THEN break vacuum, AND stop condenser ARPs.	o Open vacuum breaker valves: o ARV-48 o ARV-49 o Place ARP-1A and ARP-1B control switches to Pull-to-lock.
3.17 ___ Ensure both Spent Fuel Pit Supply air handling units are stopped.	o AHF-23A o AHF-23B
3.18 ___ Secure plant equipment affected by the loss of IA.	o IF ARP suction valves close, THEN stop: o ARP-1A o ARP-1B o IF SWV-12 closes, THEN stop the following: 1 ___ WDP-1A 2 ___ WDP-1B o IF ASV-52 fails open, THEN close ASV-51 and ASV-53, located 119' TB west stairwell.

Note

DH cooler valves will be failed in the full cooling position. Local manual valve operation is available.

3.19 ___ IF plant cooldown is desired, THEN determine the equipment availability to support the cooldown.

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- o Loss of SW to CRDs,
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- o Both MFWPs are tripped,

THEN trip the Rx,
AND CONCURRENTLY PERFORM EOP-2, Vital System Status Verification.

3.4 IF SW is lost to the RCPs,
THEN stop all 4 RCPs within 5 minutes.

ACTIONS	DETAILS
Note IAV-30 fails to the OPEN position upon loss of air to the valve actuator.	
Note Major IA loop isolations may be closed to enable IA restoration 1 loop at a time.	
3.20 ___ WHEN IA becomes available, THEN re-establish IA.	o Select all affected valves to their failed position. o IF IAV-30 has failed OPEN, THEN isolate IAV-30 by closing IAV-10 and SAV-5.
3.21 ___ WHEN IA PRESS > 45 psig, THEN ensure Air Locks are reset.	Depress the following pushbuttons: ___ MUV-16 Air Fail Reset ___ MUV-51 Air Fail Reset ___ MUV-31 Air Fail Reset ___ FWV-37 Air Fail Reset ___ FWV-38 Air Fail Reset
3.22 ___ WHEN IA and SA PRESS > 80 psig, THEN open IAV-30, AND reset SUCV Air Locks.	o IF IAV-30 was isolated, THEN unisolate IAV-30. o Place IAV-30 local control switch from "Auto" to "Close" and then back to "Auto" o Depress the following pushbuttons: ___ FWV-39 Air Fail Reset ___ FWV-40 Air Fail Reset
3.23 ___ Restore the IA/SA systems to normal operation AND exit this procedure.	o ___ Ensure open SAV-30 and SAV-31. o ___ Ensure SAV-128 closed. o ___ Refer to OP-411, Instrument and Station Air System, Sections 4.1 and 4.2.

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Enclosure 1

LOIA Equipment Failure Modes

Note

"AR" indicates air reservoir; time period until air is lost may vary due to reservoir size, air usage, and air leaks.

Equip. ID	Description	Failed Position	
AHD-28	Damper for FH area	CLOSED	
AHD-29	Supply for WGDT area	OPEN	
AHD-30 thru 33 and 35	Dampers to misc AB rooms	CLOSED	
AHD-34	Main exhaust SF area	OPEN	
AHD-36	Damper from WGDT area	OPEN	
AHD-37	Aux Bldg makeup air	OPEN	
AHD-38 thru 51	AHF-14s, AHF-23s, AHF-11	CLOSED	
AHD-89	AHF-6A discharge	CLOSED	
AHD-90	AHF-6B discharge	CLOSED	
AHD-91	AHF-6A/B discharge	OPEN	
AHD-92	AHF-6A/B recirc	CLOSED	
AHD-94 thru 98	AHF-7A/B dampers	CLOSED	
ASV-26	AS from Units 1&2	CLOSED	
ASV-27	MS to AS header	CLOSED	
ASV-28 thru 30	AS to DFT	CLOSED	
ASV-52	AS de-superheater	OPEN	
ARV-1 thru 4	Waterbox priming	OPEN	
ARV-5	Vacuum priming valve	CLOSED	
ARV-8,11,14,17	Vacuum priming valves	OPEN	
ARV-24	ARP-1A suction	CLOSED	
ARV-28 thru 31	ARP-1A/B suction	CLOSED	
ARV-34	ARP-1B suction	CLOSED	
ARV-50 thru 57	Waterbox vacuum breakers	CLOSED	AR
CAV-6 & 7	Sample valves	CLOSED	
CAV-57 & 60	Boric acid addition valves	CLOSED	
CFV-25 & 26	Makeup to CFTs	CLOSED	
CFV-27 & 28	N2 to CFTs	CLOSED	
CFV-29	Isolation to WDS	CLOSED	
CFV-42	Sampling & WD Isolation	CLOSED	
CDV-35	GS condenser bypass	OPEN	AR
CDV-39	CDP recirc	OPEN	
CDV-87	Hotwell make-up	CLOSED	
CDV-88	Reject valve	CLOSED	
CDV-90	CX rinse valve	CLOSED	
CDV-100	Emergency hotwell make-up	AS-IS	AR
CDV-113	CST make-up	CLOSED	
CDV-119 & 120	Exhaust hood sprays	CLOSED	

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Note

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Equip. ID	Description	Failed Position	
CHV-60 thru 63	AHHE 10s & 13s isolations	OPEN	
CHV-68 & 69	CHHE-1A & 1B TCV	OPEN	
CIV-34,35,40,41	CI to cavity cooling	CLOSED	AR
CWV-1 thru 8	CW to SCHEs	AS-IS	AR
DCV-10 & 12	Demin Water to DCTs	CLOSED	
DOV-102	DO to DOT-1	OPEN	
DWV-128	DW to MU&P	CLOSED	
EXV-63 thru 74	Extraction non-returns	OPEN	
FWV-18 & 19	MFP recircs	OPEN	
FWV-37 & 38	LL control valves	AS-IS	
FWV-39 & 40	SU control valves	AS-IS	AR
FWV-47 & 48	FWBP recircs	OPEN	
FWV-145 & 146	MFP warm-ups	OPEN	
GSV-3	GS de-superheater	OPEN	
GSV-6	AS to GS control	CLOSED	
GSV-13	GS to HP turbine control	OPEN	
GSV-21,24,31,38	GS to LP turbine	OPEN	
GSV-63	GS dump to condenser	CLOSED	
GWV-1 thru 5	GW to MFPs & MFBPs	OPEN	
GWV-6 & 7	Seal return tank controls	CLOSED	
GWV-8	GS supply control	OPEN	
GWV-106	GWP recirc	CLOSED	

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Note

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Equip. ID	Description	Failed Position	
HDV-9 thru 12	MSR drn control	OPEN	
HDV-33 thru 40	Flash tk drain	OPEN	
HDV-53 thru 65	Htr 5/6 drain/control	OPEN	
HDV-77 thru 80	MSR dumps	OPEN	
HDV-83	Deaerator Hi-Hi dump	AS-IS	AR
HDV-101 thru 104	Htr 1A/B control/dump	OPEN	
HDV-111 thru 114	Htr 2A/B control/dump	OPEN	
HDV-119 & 120	Htr 3A/B control	OPEN	
HDV-123 & 124	Htr 3A/B dump	OPEN	
HDV-247 thru 250	MSR drn tk dump	CLOSED	
HVV-404 & 405	HP rhtr excess stm	OPEN	
HVV-408 & 410	HP rhtr excess stm	OPEN	
HVV-429 thru 432	Flash tk to Htr 6	OPEN	
HVV-433 thru 436	Flash tk to Htr 5	CLOSED	
IAV-30	IA to SA isolation	OPEN	
MSV-9 thru 11 & 14	TBVs	CLOSED	AR
MSV-25 & 26	ADVs	CLOSED	**
MSV-49 thru 52	MS to MSRs	CLOSED	
MSV-59 thru 62	MS purge to MSRs	CLOSED	
MSV-109 thru 112	Drain trap bypasses	OPEN	
MSV-130 & 148	OTSG blowdowns	CLOSED	
MSV-411 thru 414	MSIVs	CLOSED	AR
MUV-16	Seal Injection control	AS-IS	
MUV-31	PZR make-up control	AS-IS	
MUV-49	Letdown isolation	CLOSED	
MUV-50	Letdown orifice isolation	CLOSED	
MUV-51	Letdown orifice bypass	AS-IS	
MUV-90,91,96,97	Post-filter isolations	CLOSED	
MUV-108	Make-up control	CLOSED	
MUV-116 & 117	MU demin	CLOSED	
MUV-124	MU demin	CLOSED	
MUV-133 & 134	MU demin	CLOSED	
MUV-144	Cation demin bypass	OPEN	
MUV-145 & 146	Cation demin isolation	CLOSED	
MUV-200 & 201	MU demin bypass	CLOSED	
MUV-242 thru 245	Pre-filter isolations	CLOSED	
MUV-253	RCP common bleedoff	CLOSED	AR

** Valve has a back up HP N_2 Bottle for operation when air is lost.

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Equip. ID	Description	Failed Position	
SCV-3 & 4	SCP discharges	AS-IS	AR
SCV-12	SC to generator cooling	OPEN	
SCV-23	SC to LO cooler	OPEN	
SCV-145	SCP recirc	OPEN	AR
SCV-146	DW to SCT-1	CLOSED	
SDV-1	SDT-1 to settling pond	CLOSED	
SUV-1	AS to DFT	OPEN	
SUV-9	Long cycle to hotwell	OPEN	
SWV-12	SW to misc	CLOSED	AR
SWV-35,37,39	SW to RB fans	OPEN	AR
SWV-41,43,45	SW to RB fans	OPEN	AR
SWV-47 thru 50	SW to letdown coolers	CLOSED	
SWV-79 thru 86	SW to RCPs	CLOSED	AR
SWV-109 & 110	SW to CRDMs	CLOSED	AR
SWV-151 & 152	CI to RB fans	CLOSED	AR
SWV-277	DW to SWT-1	CLOSED	
SWV-353 & 354	SW to RB fans	OPEN	AR
SWV-355	CI from RB fans	CLOSED	AR
SWV-763	CRDM Temperature Control	OPEN	
TDV-1 thru 10	MS line drains	OPEN	
TDV-16	FWP-2A stm line drn	OPEN	
TDV-23	FWP-2B stm line drn	OPEN	
TDV-26	FWP-2A stm line drn	OPEN	
TDV-30	FWP-2B stm line drn	OPEN	
TDV-32 & 33	FWP stm line drns	OPEN	
TDV-40	MS line drain	CLOSED	
All WDVs	Waste disposal valves	CLOSED	
WSV-3 thru 6	RB H_2 monitoring	CLOSED	