2017 INITIAL LICENSE NRC EXAM
SCENARIO # 1

Facility: Catawba NRC Exam 2017	Scenario No.: 1	Op Test No.: 2017301	
Examiners:		Operators:	SRO
			RO
			BOP

Initial Conditions: Unit 1 is at 75% power at the EOL. Unit 2 is at 100% power.

Turnover: Unit 1 is at 75% power at the EOL. Unit 2 is at 100% power. 1A CA Pump is removed from service for PMs. 1A CA Pump has been inoperable for 3 hours and is expected to be returned to service in 6 hours. 1A Condensate Booster Pump is tagged out for emergent motor replacement. Direction for the crew is to decrease reactor power to 50% to secure a main feedwater pump in preparation for entering a Unit 1 Refueling Outage. A reactivity plan has been provided by Reactor Engineering for a 10% per hour decrease in reactor power.

Event No.	Malf. No.	Event Type*	Event Description
1		R - RO N – BOP N – SRO	Decrease reactor power
2	CM004F	C – BOP C – SRO	1B CFPT suction valve fails closed / 1B CFPT fails to auto trip
3	NC005F	C – RO C – SRO TS - SRO	NC PORV 1NC-32B fails open
4	NV020D	C – BOP TS – SRO	1A NV pump trips
5	IPX001A IPX001B	C – RO C – SRO	1A CFPT trips / Reactor fails to automatically trip
6	CA005 EP008B	M – ALL	Loss of Secondary Heat Sink
7	EP008B CA005	C – RO	1ETB Blackout / CAPT #1 fails to autostart
8	NI001A	C – BOP C - SRO	1A NI pump fails to auto start on initiation of Feed and Bleed

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Scenario 1 – Summary

Initial Condition
Unit 1 is at 75% power at the EOL. Unit 2 is at 100% power.

Turnover:
Unit 1 is at 75% power at the EOL. Unit 2 is at 100% power. 1A CA Pump is removed from service for PMs. 1A CA Pump has been inoperable for 3 hours and is expected to be returned to service in 6 hours. 1A Condensate Booster Pump is tagged out for emergent motor replacement. Direction for the crew is to decrease reactor power to 50% to secure a main feedwater pump in preparation for entering a Unit 1 Refueling Outage. A reactivity plan has been provided by Reactor Engineering for a 10% per hour decrease in reactor power.

Event 1
BOP will perform an initial boration and RO will input desired load rate and target load into the main turbine. RO may also insert control rods prior to placing the main turbine in 'GO' to initiate the power decrease at 10%/hour.

Event 2
The 1B CFPT suction valve (1CM-140) will fail closed. 1B CFPT will not trip on low suction pressure or low suction flow. Following manual trip of the 1B CFPT, the crew will enter AP/1/A/5500/003 (Load Rejection) Case 1 (Switchyard Available) to address the turbine runback.

Verifiable Action – BOP will manually trip 1B CFPT.

Event 3
NC PORV 1NC-32B will fail open. Crew will enter AP/1/A/5500/011 (Pressurizer Pressure Anomalies) to address this failure.

Verifiable Action – The RO will attempt to manually close 1NC-32B. This valve will not close and the RO will be required to close the PORV isolation valve, 1NC-31B, to isolate the failed open PORV.

Event 4
1A NV pump will trip. The crew will enter AP/1/A/5500/012 (Loss of Charging or Letdown) to address this failure.

Verifiable Action – BOP will start the 1B NV pump and restore normal letdown to service per AP/1/A/5500/012.

Event 5
A trip of the running Condensate Booster Pumps will cause 1A CFPT to trip on low suction pressure after 20 seconds. The RO will take the immediate actions of AP/1/A/5500/006 (Loss of S/G Feedwater) to manually trip Unit 1 reactor.

Verifiable Action – RO trips Unit 1 reactor.

Event 6
A loss of secondary heat sink will occur following loss of all power to 1ETB (1A CA pump tagged out & 1B CA pump loss of power) and subsequent overspeed trip of CAPT #1.

Verifiable Action – RO will start CAPT #1 following failure of it to autostart. Crew will eventually enter EP/1/A/5000/FR-H.1 (Loss of Secondary Heat Sink), and establish NC system feed and bleed.

Event 7
1ETB will lose all power and CAPT #1 will fail to autostart on the blackout.

Verifiable Action – RO will manually start CAPT #1.

Event 8
NI pumps will fail to autostart upon initiation of S/I for establishing NC system feed and bleed.

Verifiable Action – BOP initiates S/I, will reset ECCS and D/G load sequencer for ‘A’ train and manually start 1A NI pump, and then open 2 Pressurizer PORVs.

***Critical Task 1* – Manually isolate failed open Pressurizer PORV (1NC-32B) prior to any RPS actuation.**

***Critical Task 2* – Manually trip the reactor from the control room prior to S/G dryout conditions (<12% W/R level) occurs on any S/G.**

***Critical Task 3* – Initiate Reactor Coolant System Bleed and Feed before Pressurizer PORVs 1NC-34A and 1NC-36B open automatically (NC system pressure of 2335 PSIG) due to heat up of the NC system.**

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5–8)	6
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	4
4. Major transients (1–2)	1
5. EOPs entered/requiring substantive actions (1–2)	1
6. EOP contingencies requiring substantive actions (0–2)	1
7. Critical tasks (2–3)	3

EXERCISE GUIDE WORKSHEET

1. INITIAL CONDITIONS:

1.1 Reset to IC # 170 and load schedule file for NRC Scenario 1

START TIME:__________

✓	✓	Trigger	Instructor Action	Final	Delay	Ramp	Delete In	Event
		2	VLV-CM004F (CM140 COND CF PMP 1B SUCTION ISOL FAIL TO POSITION)	0		:20		2
		2	BST-JFB5940B (2/3 LO SUCT FLOW CFPT B TRIP)	AS_IS				2
		2	BST-JFB5943B (2/3 LO SUCT FLOW CFPT B TRIP)	AS_IS				2
		2	BST-JPB5972 (2/3 LO SUCT PRESS CFPT B TRIP) - PS	AS_IS				2
		2	BST-JPB5973 (2/3 LO SUCT PRESS CFPT B TRIP) - PS	AS_IS				2
		3	ANN-AD19-F04 (YN CRITICAL TROUBLE)	ON				3
		10	VLV-NC005F (NC32B PZR PORV FAIL TO POSITION)	1				3
		4	OVR-NV020D (NV PMP 1A OFF PB)	ON				4
		5	LOA-CM040 (RACKOUT CBP 1B)	RACK-OUT				5
		5	LOA-CM041 (RACKOUT CBP 1C)	RACK-OUT				5
			LOA-CM039 (RACKOUT CBP 1A)	RACK-OUT				5
			MAL-IPX001A (AUTO REACTOR TRIP FAILURE TRN A)	ACTIVE				5
			MAL-IPX001B (AUTO REACTOR TRIP FAILURE TRN B)	ACTIVE				5
			MAL-CA005 (CA PUMP OVERSPEED TRIP)	MECH-ANICAL				6
		7	MAL-EP008B (LOSS OF 4160V BUS ETB)	ACTIVE	:10			7
			MAL-NI001A (NI PUMP A FAILURE)	AUTO				8
			LOA-CA017 (RACKOUT CA PUMP 1A)	RACK-OUT				

		11	**OVR-NV020D (NV PMP 1A OFF PB)**	**OFF**			**:01**	
		13	**LOA-CNT002 (H2 ANALYZERS)**	**BOTH**	**10:00**			
		15	**VLV-NC004C (NC31B PZR PORV ISOL VLV FAIL PWR)**	**ACTIVE**	**10:00**			
		17	**LOA-NV078 (SEAL WATER LOW FLOW LCL REFLASH ACK (AD7,C4))**	**ACKN**	**5:00**			
		Ensure EVENT 7 = jpplp4(1) │ jpplp4(2) (Reactor Trip Either Train)						
		Ensure EVENT 10 = x5ri017a (1AD-19 Acknowledge)						
		Ensure EVENT 11 = x11i197i						
		Ensure control rods are placed in MANUAL						
		Ensure Red Collar is placed on 1A Condensate Booster Pump						
		Ensure Red Collar is placed on 1A CA Pump						
		Ensure all Pressurizer heaters are on for mixing						

2. SIMULATOR BRIEFING

2.1 Control Room Assignments:

Position	Name
CRS	
RO	
BOP	

2.2 Give a copy of Attachment 2 (Shift Turnover Information) to the CRS.

3. EXERCISE PRESENTATION

3.1 Familiarization Period

A. Allow examinees time to familiarize themselves with the Control Board alignments.

3.2 **Scenario EVENT 1**, Power decrease to 50%

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as SOC by the crew to inform of commencing power decrease, **REPEAT** the information.

3.3 **Scenario EVENT 2**, 1B CFPT suction valve 1CM-140 fails closed with failure of 1B CFPT to trip automatically

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 2** to cause 1B CFPT suction valve 1CM-140 to fail closed.

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for 1CM-140, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF an AO is contacted to complete shutdown of the CHDPs, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as the SOC reporting on runback of Unit 1, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Radiation Protection to sample and analyze gaseous effluents referring to SLC 16.11-6, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Primary Chemistry to sample for isotopic analysis of iodine between 2-6 hours following a power change of > 15% in a 1 hour period referring to Tech Spec 3.4.16, **REPEAT** back the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Reactor Engineering to report on Unit 1 runback, **REPEAT** the information.

3.4 **Scenario EVENT 3**, NC PORV 1NC-32B Fails Open

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 3** to cause an HVAC Panel Trouble Alarm. Once this alarm is acknowledged on 1AD-19, NC PORV 1NC-32B will fail open.

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for 1NC-32B, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF an AO or the Unit Supervisor is contacted to create a clearance to remove power from 1NC-31B, **REPEAT** the information and **INSERT Trigger 15**.
	After 10 minutes, contact the control room and **REPORT** "Power has been removed from 1NC-31B."

3.5 **Scenario EVENT 4**, 1A NV Pump Trip

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 4** to cause 1A NV Pump Trip.

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for 1A NV Pump, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as an AO to perform a post start check of 1B NV pump, **REPEAT** the information.
	After 5 minutes, contact the crew and **REPORT** "1B NV pump looks good for continued operation".

✓	BOOTH INSTRUCTOR ACTION
	When AP-12 Case 2 Step 16.k (WHEN 5 minutes has elapsed…)is read, call the control room and **REPORT** "Using time compression, 5 minutes has elapsed."

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as an AO to acknowledge seal water low flow alarm on reflash panel 1, **REPEAT** the information and **INSERT Trigger 17**.
	After 5 minutes, contact the crew and **REPORT** "Seal Water Low Flow alarm has been acknowledged".

3.6 **Scenario EVENT 5**, Trip of Running Condensate Booster Pumps

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 5** to cause a trip of the running condensate booster pumps.

3.7 **Scenario EVENTS 6, 7, 8**, Loss of Heat Sink, 1ETB Blackout, and NI Pumps Fail to Autostart On Initiation of Bleed and Feed

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to expedite the return of 1A CA pump, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF an AO is contacted to locally reset the Trip and Throttle valve, **REPEAT** the information.
	After 10 minutes, **REPORT** "The trip and throttle valve is mechanically bound and cannot be reset."

✓	BOOTH INSTRUCTOR ACTION
	IF AO is dispatched to place the containment H_2 Analyzers in service per OP/1/A/6450/010, **REPEAT** the information and **INSERT Trigger 13**.
	After 10 minutes contact the crew and **REPORT** "Ice Condenser Air Handling Units have been secured per G-1 Enclosure 11, and the H_2 Analyzers have been placed in service per OP/1/A/6450/010".

✓	BOOTH INSTRUCTOR ACTION
	IF an AO is contacted to restore power to 1NC-31B (1EMXD-F02C), **REPEAT** the information.

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Event Description:	Power Reduction To 50%						

<u>Note To Evaluator</u>:

The scenario begins with a power decrease to 50% by the crew. This will involve several procedures to accomplish. The following procedures are included in this guide:

- **OP/1/A/6150/009 Enclosure 4.2 (Boration)**
- **OP/1/A/6150/008 Enclosure 4.16 (Control Bank Manual Operation At Power)**
- **OP/0/B/6300/001 Enclosure 4.2 (Load Changing)**

These procedures may be performed in any order by the crew. Instructions for continuing to the next Event are included at the end of OP/0/B/6300/001 Enclosure 4.2.

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Event Description:	Power Reduction To 50%						

Enclosure 4.2
Boration

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1. Limits and Precautions

1.1 This procedure is Reactivity Management related because it controls activities that can affect core reactivity by changing boron concentration. (R.M.)

1.2 The following Limits and Precautions are Reactivity Management related: (R.M.)

1.2.1 If the boron concentration is being increased in the NC System, at least one NC pump or one ND pump shall be in operation, recirculating the NC System.

1.2.2 If the unit has operated continuously for several months, significant Boron 10 depletion may have occurred. The effective boron concentration of the NC System may be lower than indicated by Chemistry samples.

1.3 Maintaining VCT pressure as low as practical during large makeups will minimize gas absorption. VCT pressure can be reduced by diverting letdown or by VCT purge.

2. Initial Conditions

BB 2.1 IF in Mode 1, 2 or 3, ensure R2 reactivity management controls established AD-OP-ALL-0203 (Reactivity Management). (R.M.)

BB 2.2 Verify the NV System is in operation per OP/1/A/6200/001 (Chemical and Volume Control System).

BB 2.3 Verify sufficient RHT volume is available to receive the reactor coolant displaced during the planned boration operation.

3. Procedure

NOTE:	This enclosure will affect reactivity of the core and is therefore designated important to Reactivity Management per the guidelines of AD-OP-ALL-0203 (Reactivity Management). (R.M.)

BB 3.1 Ensure valves are aligned per Enclosure 4.8 (Valve Checklist).

3.2 Ensure the following valve control switches in "AUTO":

____ • 1NV-238A (B/A To Blender Ctrl Vlv)

____ • 1NV-186A (B/A Blender Otlt To VCT Otlt)

____ 3.3 Ensure 1NV-238A (B/A Xfer Pmp To Blender Ctrl) controller in auto.

____ 3.4 Ensure at least one boric acid transfer pump is in "AUTO" or "ON".

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Enclosure 4.2 OP/1/A/6150/009

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☐ 3.5 Record the desired volume of boric acid to be added. _________ gallons

_____ 3.6 Adjust the boric acid counter to the desired volume of boric acid to be added. (R.M.)

_____ 3.7 <u>IF</u> the blender is set up for automatic makeup per Enclosure 4.1 (Automatic Makeup), record the setpoint of the controller for 1NV-238A (B/A Xfer Pmp To Blender Ctrl). _______gpm

_____ 3.8 Place the "NC MAKEUP MODE SELECT" switch in "BORATE".

NOTE:	Boric Acid flow rates > 32 gpm may result in a boric acid flow deviation annunciator.

_____ 3.9 <u>IF</u> required, adjust the controller for 1NV-238A (B/A Xfer Pmp To Blender Ctrl) to the desired flow.

_____ 3.10 <u>IF</u> NC System boron concentration will be changed by ≥ 50 ppm, initiate PZR spray to equalize the boron concentration throughout the system by operating backup heaters per OP/0/A/6200/055 (Miscellaneous Component Operation).

_____ 3.11 <u>IF AT ANY TIME</u> it is desired to divert letdown to the RHT manually operate 1NV-172A (3-Way Divert To VCT-RHT) as follows:

_____ 3.11.1 Place the control switch for 1NV-172A (3-Way Divert To VCT-RHT) to the "RHT" position.

_____ 3.11.2 Ensure VCT level is monitored continuously while diverting to the RHT.

NOTE:	Procedure may continue while performing the following step.

3.11.3 <u>WHEN</u> desired VCT level is reached return 1NV-172A (3-Way Divert To VCT-RHT) to auto as follows:

_____ 3.11.3.1 Place the control switch for 1NV-172A (3-Way Divert To VCT-RHT) in the "VCT" position.

_____ 3.11.3.2 Place the control switch for 1NV-172A (3-Way Divert To VCT-RHT) in the "AUTO" position.

_____ 3.12 <u>IF AT ANY TIME</u> during the makeup it becomes necessary to change the makeup flow rate, adjust the setpoint for 1NV-238A (B/A Xfer Pmp To Blender Ctrl) as necessary to achieve the desired flow.

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Enclosure 4.2
Boration

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_____ 3.13 **IF AT ANY TIME** while boration is in progress it becomes necessary **OR** it is desired to stop the boration, perform the following:

_____ 3.13.1 Place the "NC MAKEUP CONTROL" switch to the "STOP" position.

3.13.2 Ensure the following valves close: (R.M.)

- _____ 1NV-238A (B/A To Blender Ctrl Vlv)
- _____ 1NV-186A (B/A Blender Otlt To VCT Otlt)

☐ 3.13.3 Record boric acid volume added as indicated on the Boric Acid counter.
____________ gallons

3.13.4 **WHEN** conditions allow resuming the boration, perform the following:

☐ 3.13.4.1 Determine remaining volume to be added by subtracting the amount previously added (Step 3.13.3) from the desired volume to be added (Step 3.5).

__________ - __________ = ___________ gallons
(Step 3.5) (Step 3.13.3)

_____ 3.13.4.2 Adjust boric acid counter to the volume of boric acid determined in Step 3.13.4.1. (R.M.)

_____ 3.13.4.3 Place the "NC MAKEUP CONTROL" switch in the "START" position. (R.M.)

_____ 3.13.4.4 Verify the following:

☐ 1NV-238A (B/A To Blender Ctrl Vlv) modulates to establish desired flow
☐ 1NV-186A (B/A Blender Otlt To VCT Otlt) opens

_____ 3.13.4.5 **IF** in "AUTO", verify the boric acid pump starts.

_____ 3.14 **WHILE** makeup is in progress, monitor the following for expected results:

☐ Control rod motion
☐ NC System Tavg
☐ Reactor Power

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Enclosure 4.2
Boration

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NOTE:	If a small makeup is being performed, placekeeping for Steps 3.15 through 3.18 may be performed after Step 3.19 is performed.

_____ 3.15 Place the "NC MAKEUP CONTROL" switch to the "START" position. (R.M.)

_____ 3.16 Verify the following:

- ☐ 1NV-238A (B/A To Blender Ctrl Vlv) modulates to establish desired flow
- ☐ 1NV-186A (B/A Blender Otlt To VCT Otlt) opens

_____ 3.17 IF in "AUTO", verify the boric acid transfer pump starts.

☐ 3.18 Verify proper flow by observing the Boric Acid Counter. {PIP 96-0137}

NOTE:	The boric acid counter may count up 1 - 5 gallons after termination.

3.19 WHEN the desired volume of boric acid is reached on the boric acid counter, ensure the following valves close: (R.M.)

_____ • 1NV-238A (B/A To Blender Ctrl Vlv)

_____ • 1NV-186A (B/A Blender Otlt To VCT Otlt)

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Enclosure 4.2
Boration

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NOTE:	If additional borations will be performed over the course of the shift, flushing the makeup line is **NOT** recommended.

N/A 3.20 **IF** desired, flush the makeup line as follows:

☐ 3.20.1 Record the setpoint on 1NV-242A (RMWST To B/A Blender Ctrl): ___________gpm

_____ 3.20.2 Place controller for 1NV-242A (RMWST To B/A Blender Ctrl) in manual.

_____ 3.20.3 Increase demand on controller for 1NV-242A (RMWST To B/A Blender Ctrl) to full open.

NOTE:	It is essential for the operator to read and understand the following steps before initiating a flush of the makeup line. If a reactor makeup water pump is currently on, the following step will initiate flow to the makeup line. Steps 3.20.4, 3.20.5, and 3.20.6 may be performed prior to signing off the steps.

3.20.4 Open the following valves:

_____ • 1NV-242A (RMWST To B/A Blender Ctrl)

_____ • 1NV-186A (B/A Blender Otlt To VCT Otlt)

_____ 3.20.5 Ensure one reactor makeup water pump is in "ON".

3.20.6 **WHEN** ~ 20 gallons of makeup water have been flushed through the makeup line, close the following valves:

_____ 3.20.6.1 1NV-242A (RMWST To B/A Blender Ctrl)

_____ 3.20.6.2 1NV-186A (B/A Blender Otlt To VCT Otlt)

3.20.7 Place the following valve control switches in "AUTO":

_____ • 1NV-242A (RMWST To B/A Blender Ctrl)

_____ • 1NV-186A (B/A Blender Otlt To VCT Otlt)

_____ 3.20.8 Ensure controller for 1NV-242A (RMWST To B/A Blender Ctrl) is set to the value recorded in Step 3.20.1. (R.M.)

_____ 3.20.9 Place controller for 1NV-242A (RMWST To B/A Blender Ctrl) in auto.

_____ 3.20.10 **IF NOT** required for current plant operation, place the reactor makeup water pump started in Step 3.20.5 in "AUTO".

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Boration

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_____ 3.21 **IF** automatic makeup is desired, perform one of the following:

_____ 3.21.1 **IF** it is desired to change the blender outlet boron concentration, refer to Enclosure 4.1 (Automatic Makeup).

OR

_____ 3.21.2 **IF** makeup at the previous concentration is acceptable **AND** the system was previously aligned per Enclosure 4.1 (Automatic Makeup), perform the following:

_____ 3.21.2.1 Ensure the controller for 1NV-238A (B/A Xfer Pmp To Blender Ctrl) is set to the value recorded in Step 3.7. (R.M.)

_____ 3.21.2.2 Place the "NC MAKEUP MODE SELECT" switch in "AUTO".

_____ 3.21.2.3 Place the "NC MAKEUP CONTROL" switch to the "START" position. (R.M.)

_____ 3.22 **IF** initiated in Step 3.10, terminate PZR spray by securing backup heaters per OP/0/A/6200/055 (Miscellaneous Component Operation).

3.23 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

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Enclosure 4.16
Control Bank Manual Operation At Power

OP/1/A/6150/008
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1. Limits and Precautions

1.1 This procedure is Reactivity Management related because it controls activities that can affect core reactivity by changing control rod position. (R.M.)

1.2 The following Limits and Precautions are Reactivity Management related: (R.M.)

1.2.1 When rods are being moved, observe "RODS IN/RODS OUT" light for proper direction.

1.2.2 When rods are being moved, observe the demand position and actual (digital) position to verify proper operation of the Rod Control System.

1.2.3 Adjusting T-Avg ± 1°F of T-Ref before transferring rod control to "AUTO" will prevent undesired rod movement.

1.2.4 Monitor startup rate continuously during any rod motion to ensure < 0.5 DPM stable startup rate.

1.3 Automatic rod control shall **NOT** be used when less than 15% (184 MW_e) turbine power.

1.4 Individual control bank positions on "CRD BANK SELECT" switch shall not be used to position rods manually. (The automatic overlap feature is disabled.)

1.5 After releasing Rod Motion lever, waiting 2 seconds before attempting to move rods again will allow all signals to clear the firing cards.

1.6 A rod motion demand below zero steps may result in the movable grippers **NOT** properly engaging the drive shaft.

2. Initial Conditions

__BB__ 2.1 Ensure Reactivity Management controls established per AD-OP-ALL-0203 (Reactivity Management. (RM)

__BB__ 2.2 Verify Unit 1 is **NOT** in an EP or AP.

__BB__ 2.3 Verify one of the following exist:

- ☒ Control Bank movement required to increase/decrease Reactor Power
- ☐ Control Bank movement required to increase/decrease Tavg
- ☐ Control Bank movement required to maintain AFD
- ☐ Control Bank manual control required to support testing/maintenance activity

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Enclosure 4.16
Control Bank Manual Operation At Power

OP/1/A/6150/008
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3. Procedure

NOTE:	Steps 3.1 through 3.6 may be signed off as time allows ensuring operator maintains proper focus on reactivity management.

BB 3.1 Monitor the following:

- Tavg/Tref
- Demand Counter positions
- DRPI rod positions
- ROD MOTION RODS-IN/RODS-OUT Light
- ROD MOTION DEMAND SIGNALS - TEMP ERROR/POWER MISMATCH
- Power Range instruments
- IR SUR (Startup Rate)

BB 3.2 IF MANUAL ROD movement is desired, perform the following:

- Verify the "ALM" LED on circuit card A206 in the left side of 1ERCC0006 (Rod Control Logic Cabinet) is **NOT** illuminated.
- Verify one GRP select light is illuminated on each power cabinet.

BB 3.3 IF plant conditions require, place the "CRD BANK SELECT" switch in "MAN".

N/A 3.4 IF withdrawing Control Banks, pull and hold the "ROD MOTION" lever "OUT" as required until control rods are in the desired position. (R.M.)

____ 3.5 IF inserting Control Banks, push and hold the "ROD MOTION" lever "IN" as required until control rods are in the desired position. (R.M.)

____ 3.6 IF automatic rod control is desired, perform the following:

____ 3.6.1 Verify Unit 1 Reactor Power is ≥ 15% RTP.

____ 3.6.2 WHEN Tavg is within 1°F of Tref, place "CRD BANK SELECT" in "AUTO".

3.7 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

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Enclosure 4.2 OP/**1**/B/6300/001

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_____ 3.1.3.7 Verify new load target appears on Target Display.

_____ 3.1.3.8 Select "GO" and verify it illuminates to start load increase.

_____ 3.1.3.9 Coordinate with Secondary Chemistry to adjust S/G blowdown flowrates to obtain maximum blowdown for the appropriate load.

CAUTION:
1. The load, hydrogen pressure and power factor limits per the Unit One Revised Data Book Figure 43 shall **NOT** be exceeded.
2. Rate of change of First-Stage Bowl Inner Surface Temperature shall **NOT** exceed 150°F/hr (OAC point C1P1283 (First Stage Metal Temp Rate)).
3. OAC point C1A1140 (Turbine Lower Inner Shell Temp) vs. Percent Steam Flow (OAC point C1P1588 (Design Total Main Steam Flow, Measured (%)) shall be maintained above and to the left of curve in the Unit One OAC Databook "Load-Changing Recommendations".
4. Control valve casing difference, OAC point C1A0961 (Turb Valve Chest Inner Surface Metal Temp) minus C1A0967 (Turb Valve Chest Outer Surface Metal Temp), shall **NOT** exceed curve "Allowable Temp Difference on Turbine Valve Chest" in the Unit 1 OAC Databook.

_____ 3.2 **IF** decreasing turbine generator load, perform the following:

_____ 3.2.1 Ensure the proper reactivity management controls established per AD-OP-ALL-0203 (Reactivity Management). (R.M.)

_____ 3.2.2 **WHILE** decreasing turbine generator load, perform the following:

_____ 3.2.2.1 **IF** CV4 fully closes (92% of full load, 1127 MWe), verify 1SM-33 (Ctrl Vlv #4 Stm Lead Drn) opens.

_____ 3.2.2.2 **IF** CV3 fully closes (65% of full load, 796 MWe), verify 1SM-25 (Ctrl Vlv #3 Stm Lead Drn) opens.

Op Test No.:	301	Scenario #	1	Event #	1	Page	20 of 139
Event Description:	Power Reduction To 50%						

Enclosure 4.2
Load Changing

OP/1/B/6300/001
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CAUTION:
1. Normal steady-state load change shall be made without exceeding limits shown on Enclosure 4.7 (Generator Operating Limits) and in the Unit 1 OAC Databook "Recommended Starting and Loading Curves".
2. Unit One Reactor Operating Data, Section 2.4 shall be referred to for allowable ramp rates.

3.2.3 Decrease turbine generator load by performing the following:

_____ 3.2.3.1 Select "LOAD RATE" and verify it illuminates.

_____ 3.2.3.2 Input the desired load rate.

_____ 3.2.3.3 Select "ENTER" and verify "LOAD RATE" goes dark

_____ 3.2.3.4 Select "TARGET" and verify it illuminates.

_____ 3.2.3.5 Input the desired load target.

_____ 3.2.3.6 Select "ENTER" and verify "TARGET" goes dark.

_____ 3.2.3.7 Verify new load target appears on Target Display.

_____ 3.2.3.8 Select "GO" and verify it illuminates to start load decrease.

_____ 3.2.3.9 Coordinate with Secondary Chemistry to adjust S/G blowdown flowrates to obtain maximum blowdown for the appropriate load.

3.3 Do <u>NOT</u> file this enclosure in the Control Copy folder of this procedure.

<u>Note To Evaluator</u>:

At this point, the power decrease to 50% has begun. At the discretion of the Lead Evaluator, the scenario may continue to the next event by having the booth operator INSERT Trigger 2 for Event 2 (1B CFPT suction valve fails closed with failure of 1B CFPT to automatically trip).

Op Test No.:	301	Scenario #	1	Event #	2	Page	21 of 139

Event Description: 1B CFPT Suction Valve Fails Closed With Failure of 1B CFPT To Trip Automatically

Control Room Indications
1AD-5, D/4 "CFP B LOW SUCT FLOW" - LIT
1AD-5, F/5 "CFP B LOW SUCT PRESS" - LIT
CF PUMP 1B Suction pressure on 1CMP5970 decreasing
CF PUMP 1B Suction flow on 1CMP5940 decreasing
GREEN CLSD light LIT and RED OPEN light DARK on 1CM-140

Note To Evaluator:

Normally 20 seconds after receiving a low suction pressure or flow on a CFPT, that CFPT will trip. Both of these trips are blocked for 1B CFPT for this scenario, so the crew will be required to manually trip 1B CFPT. Once this occurs the crew will transition to AP/1/A/5500/003 (Load Rejection) Case 1 (Switchyard Available). This procedure begins on the following page.

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Event Description: 1B CFPT Suction Valve Fails Closed With Failure of 1B CFPT To Trip Automatically

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 3 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. **Verify turbine load - DECREASING IN AUTOMATIC.**	**Perform the following:** __ a. Select "MANUAL" on turbine control panel. __ b. Depress "CONTROL VALVES LOWER" pushbutton and reduce turbine load as required.
Note To Evaluator: **Crew may make the decision to return control rods to AUTO for the runback.**	
2. **Verify proper reactor response:** __ • Control rods - IN "AUTO" AND STEPPING IN __ • P/R neutron flux - DECREASING.	__ **IF T-Avg is greater than 1.5°F higher than T-Ref, THEN insert control rods as required to maintain T-Avg within 1°F of T-Ref.**
3. **Verify proper steam dump operation as follows:**	
__ a. Verify T-Ref instrumentation - AVAILABLE.	__ a. IF T-Avg Coastdown is in progress, THEN determine T-Ref from table. REFER TO Enclosure 4 (T-Ref Value Following Runback/Power Reduction).
__ b. "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT.	b. Perform the following: __ 1) Operate S/G PORVs as necessary to maintain T-Avg at T-Ref. __ 2) GO TO Step 4.

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Event Description: 1B CFPT Suction Valve Fails Closed With Failure of 1B CFPT To Trip Automatically

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 4 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. (Continued)	
c. Verify the following: __ • "C-7A LOSS OF LOAD INTLK COND DUMP" status light (1SI-18) - LIT. __ • Steam dump valves - MODULATING.	c. IF steam dump valves are closed AND T-Avg is 3°F greater than T-Ref, THEN: __ 1) Place "STM DUMP CTRL" in manual. __ 2) Adjust "STM DUMP CTRL" to 0% demand. __ 3) Place the steam dumps in pressure mode. __ 4) Operate condenser steam dump valves to maintain T-Avg at T-Ref. __ 5) IF steam dump valves fail to operate, THEN dump steam as necessary from available S/G PORVs to maintain T-Avg at T-Ref.
__ d. T-Avg - DECREASING TO T-REF.	d. Perform the following: __ 1) Place "STM DUMP CTRL" in manual. __ 2) Adjust "STM DUMP CTRL" to 0% demand. __ 3) Place the steam dumps in pressure mode. __ 4) Operate condenser steam dump valves to maintain T-Avg at T-Ref. __ 5) IF steam dump valves fail to operate, THEN dump steam as necessary from available S/G PORVs to maintain T-Avg at T-Ref.

Op Test No.: 301	Scenario # 1	Event # 2	Page 24 of 139				
Event Description:	1B CFPT Suction Valve Fails Closed With Failure of 1B CFPT To Trip Automatically						

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 5 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. **Verify Pzr PORV and Pzr spray valve status as follows:**	
__ a. All Pzr PORVs - CLOSED.	a. IF Pzr pressure is less than 2315 PSIG, THEN: __ 1) CLOSE Pzr PORV(s). __ 2) IF any Pzr PORV cannot be closed, THEN close its isolation valve. 3) IF Pzr PORV isolation valve cannot be closed, THEN: __ a) Trip reactor. __ b) GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).
__ b. Normal Pzr spray valves - CLOSED.	N/A b. IF Pzr pressure is less than 2150 PSIG, THEN: __ 1) CLOSE the affected spray valve(s). __ 2) REFER TO AP/1/A/5500/011 (Pressurizer Pressure Anomalies).

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Event Description: 1B CFPT Suction Valve Fails Closed With Failure of 1B CFPT To Trip Automatically

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 6 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. Verify proper CM System operation as follows:	
__ a. **WHEN** reactor power is less than 75%, **THEN** ensure both C-htr drain pumps - OFF.	
__ b. Verify reactor power - GREATER THAN 56% PRIOR TO THE EVENT.	__ b. GO TO Step 6.
__ c. Verify standby hotwell pump(s) - ON.	__ c. Start standby hotwell pump(s) as necessary.
__ d. Verify standby condensate booster pump(s) - ON.	__ d. Start standby condensate booster pump(s) as necessary.
6. Verify the following generator alarms - DARK:	**__ Ensure turbine generator load - REDUCED TO APPROXIMATELY 48% AND THE ALARM CLEARS.**
__ • 1AD-11, C/1 "GEN BKR A OVER CURRENT"	
__ • 1AD-11, F/1 "GEN BKR B OVER CURRENT".	

Op Test No.:	301	Scenario #	1	Event #	2	Page	26 of 139
Event Description:	1B CFPT Suction Valve Fails Closed With Failure of 1B CFPT To Trip Automatically						

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 7 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **Verify S/G levels are adequate as follows:**	**Perform the following:**
__ • All S/G low level alert alarms (1AD-4) - DARK	__ a. Ensure feedwater regulating valves - MODULATING TO CONTROL S/G LEVELS AT PROGRAM SETPOINT.
__ • All S/G low CF flow alarms (1AD-4) - DARK.	b. <u>IF</u> any S/G(s) N/R level is decreasing in an uncontrolled manner, <u>THEN</u>:
	__ 1) Trip reactor.
	__ 2) <u>GO TO</u> EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).
__ 8. **Verify reactor power - GREATER THAN 20%.**	**Perform the following:**
	__ a. Place "CRD BANK SELECT" switch in manual.
	__ b. Maintain control rods above insertion limits.
	__ c. Operate control rods to stabilize reactor power between 6%-10%.
	d. <u>IF AT ANY TIME</u> reactor power is less than or equal to 5%, <u>THEN</u> perform the following:
	__ 1) Ensure turbine - TRIPPED.
	__ 2) Concurrently insert control rods to shutdown the reactor. <u>REFER TO</u> OP/1/A/6150/008 (Rod Control).
	__ 3) <u>GO TO</u> AP/1/A/5500/002 (Turbine Generator Trip).
	__ e. <u>GO TO</u> Step 10.
__ 9. **<u>IF AT ANY TIME</u> reactor power is less than or equal to 20%, <u>THEN</u> perform Step 8 RNO.**	

Op Test No.:	301	Scenario #	1	Event #	2	Page	27 of 139

Event Description: 1B CFPT Suction Valve Fails Closed With Failure of 1B CFPT To Trip Automatically

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 8 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 10. Verify AS header pressure - GREATER THAN OR EQUAL TO 140 PSIG.	__ Adjust 1AS-2 (Main Stm To Aux Steam) as required to maintain AS header pressure between 140 PSIG and 150 PSIG.
__ 11. Adjust 1TL-4 (Stm Seal Reg Byp) as necessary to maintain steam seal pressure between 4 PSIG - 6 PSIG.	
__ 12. Monitor Enclosure 3 (Rod Insertion Limit Boration).	**Enclosure 3 is included as Attachment 3.**

Op Test No.: 301	Scenario # 1	Event # 2	Page 28	of 139			

Event Description: 1B CFPT Suction Valve Fails Closed With Failure of 1B CFPT To Trip Automatically

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 9 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 13. **Verify reactor power - LESS THAN 30%.**	**Perform the following:**
	N/A a. IF the runback target load is less than 30%, THEN:
	__ 1) WHEN time and personnel permit, THEN perform applicable steps of OP/1/A/6100/003 (Controlling Procedure For Unit Operation).
	__ 2) Do not continue in this procedure until reactor power is less than 30%.
	__ 3) WHEN reactor power is less than 30%, THEN GO TO Step 14.
	b. WHEN the appropriate runback target load is reached, THEN:
	__ 1) Stabilize unit at appropriate power level.
	__ 2) Maintain control rods above insertion limits.
	3) Adjust the following as required to maintain T-Avg within 1°F of T-Ref:
	__ • Turbine load __ • Control rods __ • Boron concentration.
	__ c. GO TO Step 15.

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Event Description: 1B CFPT Suction Valve Fails Closed With Failure of 1B CFPT To Trip Automatically

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 10 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 14. **Verify the "RESET" light on "AMSAC FOR CF VALVES" switch - DARK.**	**Perform the following:** __ a. <u>IF</u> turbine impulse pressure is less than 190 PSIG, <u>THEN</u> notify IAE to correct the cause of the AMSAC failure to deactivate. __ b. Depress the "BYPASS" pushbutton on "AMSAC FOR CF VALVES" switch. __ c. <u>WHEN</u> 2 minutes has elapsed, <u>THEN</u> verify "RESET" light on "AMSAC FOR CF VALVES" switch has remained dark.

Op Test No.:	301	Scenario #	1	Event #	2	Page	30	of	139
Event Description:	1B CFPT Suction Valve Fails Closed With Failure of 1B CFPT To Trip Automatically								

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 11 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15. **Verify the following PCBs - CLOSED:** __ • Generator breaker 1A __ • Generator breaker 1B __ • PCB 14 __ • PCB 15 __ • PCB 17 __ • PCB 18.	<u>NOTE</u> When separated from the grid the turbine reverts to speed control. **Perform the following:** __ a. <u>IF</u> both generator PCBs are open, <u>THEN</u> ensure main turbine speed - MAINTAINED BETWEEN 1792 AND 1807 RPM. b. <u>IF</u> the turbine generator is separated from the grid, <u>THEN</u>: __ 1) Ensure main turbine speed - MAINTAINED BETWEEN 1792 AND 1807 RPM. __ 2) Ensure main generator voltage - MAINTAINED BETWEEN 21 KV AND 23 KV. c. <u>IF</u> load rejection caused by loss of main busline 1A or 1B, <u>THEN</u>: 1) Notify Transmission Control Center (TCC), using one of the following methods, to investigate and repair cause of the loss of busline: __ • 704-382-9403 __ • 704-382-9404 __ • 704-399-9744 __ • 704-382-4413 (System Operating Center). __ 2) <u>WHEN</u> notified by TCC that the affected busline is ready to be re energized, <u>THEN</u> restore power to the affected busline. <u>REFER TO</u> Enclosure 1 (Offsite Power Restoration).

Op Test No.:	301	Scenario #	1	Event #	2	Page	31 of 139
Event Description:	1B CFPT Suction Valve Fails Closed With Failure of 1B CFPT To Trip Automatically						

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 12 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 16. **Adjust power factor as necessary. <u>REFER TO</u> Unit 1 Revised Data Book Figure 43.**

17. **<u>WHEN</u> the appropriate runback target load is reached, <u>THEN</u>:**

- __ Stabilize unit at appropriate power level.
- __ Maintain control rods above insertion limits.
- Adjust the following as required to maintain T-Avg within 1°F of T-Ref:
  - __ Turbine load
  - __ Control rods
  - __ Boron concentration.

__ 18. **Notify System Operating Center (SOC) using the red dispatcher telephone of current unit status.**

__ 19. **Determine and correct cause of load rejection.**

Op Test No.: 301 Scenario # 1 Event # 2	Page 32 of 139
Event Description:	1B CFPT Suction Valve Fails Closed With Failure of 1B CFPT To Trip Automatically

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 13 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20. **Shut down unnecessary plant equipment as follows:**	
a. Restore CM and CF as follows:	
__ 1) Verify C-htr drain pumps - ON.	__ 1) WHEN time and manpower permit, THEN complete the shutdown of the C-htr drain pumps. REFER TO OP/1/B/6250/004 (Feedwater Heater Vents, Drains and Bleed System).
__ 2) Verify both CF Pumps - IN SERVICE.	__ 2) GO TO Step 20.b.
__ 3) Shutdown one CF pump as necessary. REFER TO OP/1/A/6250/001 (Condensate and Feedwater System).	
__ 4) Shutdown excess Condensate Booster Pumps. REFER TO OP/1/A/6250/001 (Condensate and Feedwater System).	
__ 5) Shutdown excess Hotwell Pumps. REFER TO OP/1/A/6250/001 (Condensate and Feedwater System).	
__ b. RC pump(s) and cooling tower fans. REFER TO OP/1/B/6400/001A (Condenser Circulating Water System).	
21. **Reset steam dump valves as follows:**	
__ a. Verify reactor power - STABLE.	a. Perform the following: __ 1) WHEN reactor power is stable, THEN perform Steps 21.b through 21.g.
	(RNO continued on next page)

Op Test No.: 301 Scenario # 1 Event # 2	Page 33 of 139
Event Description:	1B CFPT Suction Valve Fails Closed With Failure of 1B CFPT To Trip Automatically

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 14 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21. (Continued)	
	__ 2) <u>GO TO</u> Step 22.
__ b. Verify steam dump valves - IN "T-AVG" MODE.	b. Perform the following: 1) <u>IF</u> using S/G PORVs, <u>THEN</u>: __ a) <u>WHEN</u> T-Avg is within 1°F of T-Ref <u>AND</u> stable, <u>THEN</u> close S/G PORVs. __ b) <u>GO TO</u> Step 21.d. 2) <u>WHEN</u> T-Avg is within 1°F of T-Ref <u>AND</u> stable, <u>THEN</u>: __ a) Ensure steam dumps - CLOSED. __ b) Perform Steps 21.d through 21.g. __ 3) <u>GO TO</u> Step 22.
__ c. Verify steam dump valves - CLOSED.	c. Perform the following: __ 1) <u>WHEN</u> steam dump valves are closed, <u>THEN</u> perform Steps 21.d through 21.g. __ 2) <u>GO TO</u> Step 22.
__ d. Reset steam dump valves.	
e. Verify the following status lights (1SI-18) - DARK: __ • "C-7A LOSS OF LOAD INTLK COND DUMP" __ • "C-7B LOSS OF LOAD INTLK ATMOS DUMP".	

Op Test No.:	301	Scenario #	1	Event #	2	Page	34	of 139
Event Description:	1B CFPT Suction Valve Fails Closed With Failure of 1B CFPT To Trip Automatically							

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 15 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21. (Continued)	
__ f. <u>IF</u> "T-AVG" mode of operation is available, <u>THEN</u> ensure steam dump valves in "T-AVG" mode.	
__ g. Verify "STM DUMP CTRL" - IN AUTO.	__ g. <u>IF</u> steam dumps are in "T-AVG" mode, <u>THEN</u> place "STM DUMP CTRL" in auto.
__ 22. **Verify reactor power - GREATER THAN 15%.**	__ **Transfer feed flow to CA nozzles. <u>REFER TO</u> Enclosure 2 (Transferring Feed Flow From CF To CA Nozzles).**
__ 23. **Verify CA pumps - OFF.**	**Perform the following:** __ a. <u>WHEN</u> CA is no longer needed to feed S/G(s), <u>THEN</u> shutdown the CA System following the automatic start and return CA System to standby readiness. <u>REFER TO</u> OP/1/A/6250/002 (Auxiliary Feedwater System). __ b. Re-establish S/G blowdown. <u>REFER TO</u> OP/1/A/6250/008 (Steam Generator Blowdown).
__ 24. **Verify reactor power change - GREATER THAN <u>OR</u> EQUAL TO 15% IN A 1 HOUR PERIOD.**	__ **<u>GO TO</u> Step 26.**

Op Test No.:	301	Scenario #	1	Event #	2	Page	35 of 139
Event Description:	1B CFPT Suction Valve Fails Closed With Failure of 1B CFPT To Trip Automatically						

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 16 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

25. **Notify the following sections to take appropriate samples:**

__ • Radiation Protection to sample and analyze gaseous effluents. <u>REFER TO</u> Selected Licensee Commitments Manual, Section 16.11-6.

__ • Primary Chemistry to sample for isotopic analysis of iodine. <u>REFER TO</u> Tech Specs 3.4.16 (Sample must be taken between 2 hours and 6 hours following last power change greater than or equal to 15% rated thermal power within a 1 hour period).

26. **Ensure compliance with appropriate Tech Specs:**

N/A • 3.1.1 (Shutdown Margin (SDM))

N/A • 3.1.6 (Control Bank Insertion Limits)

N/A • 3.8.1 (AC Sources - Operating)

N/A • SLC 16.8-2 (230 KV Switchyard Systems).

__ 27. **Notify Reactor Group Engineer of occurrence.**

__ 28. **Determine long term plant status. <u>RETURN TO</u> OP/1/A/6100/003 (Controlling Procedure For Unit Operation).**

<u>END</u>

<u>Note To Evaluator</u>:

This concludes Event 2. At the Lead Evaluators discretion, scenario can continue to the next event by having the booth operator INSERT Trigger 3 for Event 3 (This trigger will initially cause an HVAC Panel Trouble Alarm. When acknowledged, NC PORV 1NC-32B fails open).

Op Test No.:	301	Scenario #	1	Event #	3	Page	36	of 139
Event Description:	NC PORV 1NC-32B Fails Open							

Control Room Indications
1AD-13, F/5 “HVAC PANEL TROUBLE” – LIT (This is the only initial alarm until the alarm panel is acknowledged on 1AD-19 – Then the following alarms and indications are noted)
1AD-6, D/10 “PZR LO PRESS PORV NC32 & 36 BLOCKED” - LIT
1AD-6, D/11 “PZR LO PRESS PORV NC34 BLOCKED” - LIT
1AD-6, E/10 “PZR PORV DISCH HI TEMP” - LIT
1AD-6, F/8 “PZR LO PRESS CONTROL” - LIT
Pressurizer Pressure Channels on 1MC-10 decreasing

Op Test No.:	301	Scenario #	1	Event #	3	Page	37 of 139

Event Description: NC PORV 1NC-32B Fails Open

CNS AP/1/A/5500/011	PRESSURIZER PRESSURE ANOMALIES Case I Pressurizer Pressure Decreasing	PAGE NO. 2 of 9 Revision 23

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. **Verify all Pzr PORVs - CLOSED.**	**Perform the following:**
	__ a. CLOSE Pzr PORV(s).
	b. IF any Pzr PORV cannot be closed, THEN:
	__ 1) CLOSE affected PORV(s) isolation valve. Critical Task #1
	N/A 2) IF Pzr PORV isolation valve cannot be closed, THEN perform the following:
	__ a) IF in Mode 3 with CLAs isolated OR in Mode 4, THEN GO TO AP/1/A/5500/027 (Shutdown LOCA).
	__ b) Trip Unit 1 reactor.
	__ c) WHEN reactor tripped OR S/I setpoint reached, THEN ensure S/I initiated.
	__ d) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).

Op Test No.:	301	Scenario #	1	Event #	3	Page	38	of 139
Event Description:	NC PORV 1NC-32B Fails Open							

CNS AP/1/A/5500/011	PRESSURIZER PRESSURE ANOMALIES Case I Pressurizer Pressure Decreasing	PAGE NO. 3 of 9 Revision 23

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE Control rods may withdraw on decreasing NC pressure.	
__ 2. **Verify Pzr spray valve(s) - CLOSED.**	**Perform the following:** __ a. CLOSE affected spray valve(s). b. IF affected spray valve(s) will not close, THEN perform the following: 1) Select "FAIL CLOSED" for affected spray valve(s) mode select switch: __ • "1 NC-27 PZR SPRAY VLV MODE SELECT" __ • "1 NC-29 PZR SPRAY VLV MODE SELECT". 2) IF AT ANY TIME Control Room Supervisor determines that reactor trip required, THEN: __ a) Trip Unit 1 reactor. __ b) WHEN reactor power less than 5%, THEN stop NC Pumps 1A and 1B. __ c) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection). __ 3) IF NC pressure stable OR increasing, THEN GO TO Step 3. (RNO continued on next page)

CNS AP/1/A/5500/011	PRESSURIZER PRESSURE ANOMALIES Case I Pressurizer Pressure Decreasing	PAGE NO. 4 of 9 Revision 23

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. (Continued)	4) IF NC pressure continues to decrease, THEN: a) IF in Modes 1 or 2, THEN: __ (1) Trip Unit 1 reactor. __ (2) WHEN reactor power less than 5%, THEN stop NC Pumps 1A and 1B. __ (3) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection). __ b) Stop NC Pumps 1A and 1B. __ c) IF 1C and 1D NCPs on, THEN stop one additional NCP. __ d) REFER TO AP/1/A/5500/004 (Loss of Reactor Coolant Pump).
__ 3. **Verify all Pzr heaters - ENERGIZED.**	**Perform the following:** __ a. IF Pzr pressure less than 2220 PSIG AND stable or decreasing, THEN ensure all Pzr heaters energized. __ b. IF Pzr pressure less than 2220 PSIG AND increasing, THEN operate Pzr heaters as required to stabilize Pzr pressure at 2235 PSIG. __ c. WHEN Pzr pressure returns to normal AND automatic Pzr pressure control desired, THEN place Pzr heaters in auto.

Op Test No.:	301	Scenario #	1	Event #	3	Page	40 of 139
Event Description:	NC PORV 1NC-32B Fails Open						

CNS AP/1/A/5500/011	PRESSURIZER PRESSURE ANOMALIES Case I Pressurizer Pressure Decreasing	PAGE NO. 5 of 9 Revision 23

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 4. **Ensure 1NV-37A (NV Supply To Pzr Aux Spray) - CLOSED.**	

<u>NOTE</u> Positive reactivity is inserted during an increase in NC pressure which may cause auto rod insertion.

__ 5. **Verify NC pressure - STABLE OR INCREASING.**	__ **<u>IF</u> pressure continues to decrease, <u>THEN</u> <u>REFER TO</u> AP/1/A/5500/010 (REACTOR COOLANT LEAK).**
6. **<u>WHEN</u> NC pressure stable, <u>THEN</u>:**	
__ • Stabilize unit at appropriate power level.	
• Adjust the following as required to maintain T-Avg within 1°F of T-Ref: __ • Turbine load __ • Control rods __ • Boron concentration.	
N/A 7. **<u>IF</u> Pzr pressure channel failed, <u>THEN</u> perform following:**	
__ a. Verify "P-11 PZR S/I BLOCK PERMISSIVE" status light (1SI-18) in required state for unit conditions.	__ a. Ensure compliance with Tech Spec 3.3.2 (Engineered Safety Features Actuation System (ESFAS) Instrumentation).
b. Notify IAE to fail following bistables for affected channel per Model W/O #00874531. Bistables shall be tripped within 72 hours: __ • Pzr low pressure S/I __ • OT Delta T __ • Pzr high pressure Reactor Trip __ • Pzr low pressure Reactor Trip.	

Op Test No.:	301	Scenario #	1	Event #	3	Page	41 of	139

Event Description: NC PORV 1NC-32B Fails Open

CNS AP/1/A/5500/011	PRESSURIZER PRESSURE ANOMALIES Case I Pressurizer Pressure Decreasing	PAGE NO. 6 of 9 Revision 23

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

8. **Ensure compliance with appropriate Tech Specs:**

N/A • 3.3.1 (Reactor Trip System (RTS) Instrumentation)

N/A • 3.3.2 (Engineered Safety Features Actuation System (ESFAS) Instrumentation)

N/A • 3.3.3 (Post Accident Monitoring (PAM) Instrumentation)

N/A • 3.3.4 (Remote Shutdown System)

__ • 3.4.1 (RCS Pressure, Temperature, and Flow Departure From Nucleate Boiling (DNB) Limits)

N/A • 3.4.4 (RCS Loops - MODES 1 and 2)

N/A • 3.4.5 (RCS Loops - MODE 3)

N/A • 3.4.6 (RCS Loops - MODE 4)

N/A • 3.4.9 (Pressurizer)

N/A • 3.4.10 (Pressurizer Safety Valves)

__ • 3.4.11 (Pressurizer Power Operated Relief Valves (PORVs))

N/A • 3.4.13 (RCS Operational Leakage).

Note To Evaluator:

The DNB limits for Pressurizer Pressure from the COLR are:

- **Control board meter - ≥ 2219.8 psig**
- **Computer - ≥ 2215.8 psig**

Tech Spec 3.4.1 (If Pressurizer Low Pressure DNB limit alarm received):

- **Condition A applies. Crew will need to restore DNB parameter to within limit in 2 hours.**

Tech Spec 3.4.11:

- **Condition B applies. Crew will need to close associated block valve in 1 hour AND remove power from the associated block valve in 1 hour AND restore the PORV to OPERABLE status in 72 hours.**

__ 9. **Determine long term plant status. RETURN TO procedure in effect.**

END

Note To Evaluator:

This concludes Event 3. At the Lead Evaluators discretion, scenario can continue to the next event by having the booth operator INSERT Trigger 4 for Event 4 (1A NV Pump Trip).

Op Test No.:	301	Scenario #	1	Event #	4	Page	42 of 139
Event Description:	1A NV Pump Trip						

Control Room Indications
1AD-7, C/4 “NCP SEAL WATER LO FLOW” - LIT
1AD-7, E/1 “CHARGING LINE HI/LO FLOW” - LIT
GREEN OFF light for 1A NV Pump - LIT

Op Test No.:	301	Scenario #	1	Event #	4	Page	43 of 139
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case I Loss of Charging	PAGE NO. 2 of 35 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

C. Operator Actions

__ 1. **Stop any power changes.**

2. **Ensure the following letdown isolation valves - CLOSED:**

   - __ 1NV-10A (Letdn Orif 1B Otlt Cont Isol)
   - __ 1NV-11A (Letdn Orif 1C Otlt Cont Isol)
   - __ 1NV-13A (Letdn Orif 1A Otlt Cont Isol).

__ 3. **Ensure any malfunctioning NV pump - SECURED.**

Op Test No.:	301	Scenario #	1	Event #	4	Page	44	of 139
Event Description:	1A NV Pump Trip							

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case I Loss of Charging	PAGE NO. 3 of 35 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. **Monitor conditions for continued NC pump operation as follows:** __ • NC pump #1 seal outlet temperature - LESS THAN 235°F __ • NC pump lower bearing temperature - LESS THAN 225°F.	**Perform the following:** a. **IF** in Mode 1 or 2, **THEN** perform the following: __ 1) **IF** all NC pumps affected, **THEN** place steam dumps in pressure mode. __ 2) Trip reactor. 3) **WHEN** reactor power less than 5%, **THEN** perform the following: __ a) Trip affected NC pump(s). __ b) Ensure normal spray valve associated with tripped NC pump(s) - IN MANUAL AND CLOSED. __ 4) **GO TO** EP/1/A/5000/E-0 (Reactor Trip or Safety Injection). __ b. Trip affected NC pump(s). __ c. Ensure normal spray valve associated with tripped NC pump(s) - IN MANUAL AND CLOSED. __ d. **REFER TO** AP/1/A/5500/004 (Loss of Reactor Coolant Pump).
N/A 5. **IF excess letdown in service, THEN ensure manual loader for 1NV-124B (Excess Letdn Press Ctrl) - ADJUSTED TO 0%.**	

Op Test No.:	301	Scenario #	1	Event #	4	Page	45 of 139
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case I Loss of Charging	PAGE NO. **4 of 35** **Revision 34**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE Gas entrainment in the NV pump suction can produce pump failure or degradation. Gas entrainment can result in a complete loss of charging, or in a reduction of charging capacity, without indication of cavitation.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. **Verify NV pump status as follows:**	**Perform the following:**
__ • At least one NV pump - ON.	__ a. Ensure any malfunctioning NV pump - SECURED.
__ • Charging flow - ADEQUATE FOR PLANT CONDITIONS.	b. Ensure the following valves - OPEN: __ • 1NV-203A (NV Pumps A&B Recirc Isol) __ • 1NV-202B (NV Pmps A&B Recirc Isol).
	c. Ensure only one suction source as follows: • VCT: __ • 1NV-188A (VCT Otlt Isol) - OPEN __ • 1NV-189B (VCT Otlt Isol) - OPEN __ • VCT level - GREATER THAN 23% __ • 1NV-252A (NV Pumps Suct From FWST) - CLOSED __ • 1NV-253B (NV Pumps Suct From FWST) - CLOSED.
	(RNO continued on next page)

Op Test No.:	301	Scenario #	1	Event #	4	Page	46 of 139
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case I Loss of Charging	PAGE NO. 5 of 35 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

6. (Continued)

OR

- FWST:
  - Either of the following valves - OPEN:
    - __ 1NV-252A (NV Pumps Suct From FWST)
    - __ 1NV-253B (NV Pumps Suct From FWST).
  - Either of the following valves - CLOSED:
    - __ 1NV-188A (VCT Otlt Isol)
    - __ 1NV-189B (VCT Otlt Isol).

N/A d. **IF** operating NV pump tripped due to loss of suction, **THEN** perform the following:

__ 1) Dispatch operator(s) to vent available NV pump. **REFER TO** Enclosure 2 (NV Pump Venting).

__ 2) **WHEN** pump venting complete, **THEN GO TO** Step 6 RNO e.

(RNO continued on next page)

Op Test No.:	301	Scenario #	1	Event #	4	Page	47 of 139
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case I Loss of Charging	PAGE NO. **6 of 35** **Revision 34**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

6. (Continued)

3) **IF AT ANY TIME** Standby Makeup pump required to maintain Pzr level **OR** seal injection, **THEN** perform the following:

__ a) **IF** 1EMXS de-energized, **THEN** dispatch operator to align alternate power supply. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 20 (Align Alternate Power Supply To 1EMXS).

__ b) Dispatch operator to SSF to establish NC makeup. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 19 (Establishing NC Makeup/Seal Injection From The SSF).

__ c) **WHEN** Standby Makeup Pump started, **THEN** adjust Control Rods and Turbine load, as required, to maintain T-Avg within 1°F of T-Ref.

__ 4) **GO TO** Step 14.

(RNO continued on next page)

Op Test No.:	301	Scenario #	1	Event #	4	Page	48 of 139
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case I Loss of Charging	PAGE NO. 7 of 35 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	e. Start available NV pump as follows: __ 1) OPEN 1NV-309 (Seal Water Injection Flow) to full open. __ 2) CLOSE 1NV-294 (NV Pmps A&B Disch Flow Ctrl). __ 3) Start NV pump aux oil pump. __ 4) Start available NV pump. __ 5) Stop NV pump aux oil pump. N/A 6) **IF** suction from FWST, **THEN** adjust Control Rods and Turbine load, as required, to maintain T-Avg within 1°F of T-Ref. **REFER TO** the following: __ • AP/1/A/5500/009 (Rapid Downpower) OR __ • OP/1/A/6100/003 (Controlling Procedure For Unit Operation). (RNO continued on next page)

Op Test No.: 301	Scenario # 1	Event # 4	Page 49 of 139				
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case I Loss of Charging	PAGE NO. **8 of 35** **Revision 34**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

6. (Continued)

N/A f. **IF** no NV pump(s) available, **THEN** perform the following:

__ 1) Initiate actions to restore one NV pump to operable.

__ 2) **WHEN** an NV pump available, **THEN RETURN TO** Step 6 RNO e.

3) **IF** Standby Makeup pump required to maintain Pzr level **OR** seal injection, **THEN** perform the following:

__ a) **IF** 1EMXS de-energized, **THEN** dispatch operator to align alternate power supply. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 20 (Align Alternate Power Supply To 1EMXS).

__ b) Dispatch operator to SSF to establish NC makeup. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 19 (Establishing NC Makeup/Seal Injection From The SSF).

__ c) **WHEN** Standby Makeup Pump started, **THEN** adjust Control Rods and Turbine load, as required, to maintain T-Avg within 1°F of T-Ref.

__ 4) **GO TO** Step 14.

Op Test No.:	301	Scenario #	1	Event #	4	Page	50 of 139
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case I Loss of Charging	PAGE NO. 9 of 35 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **Verify charging header aligned to NC loop as follows:**	
__ a. 1NV-312A (Chrg Line Cont Isol) - OPEN.	__ a. OPEN valve.
__ b. 1NV-314B (Chrg Line Cont Isol) - OPEN.	__ b. OPEN valve.
c. Verify one of the following valves - OPEN: __ • 1NV-32B (NV Supply To Loop A Isol) OR __ • 1NV-39A (NV Supply To Loop D Isol).	__ c. OPEN either valve.

Op Test No.:	301	Scenario #	1	Event #	4	Page	51 of 139
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case I Loss of Charging	PAGE NO. **10 of 35** **Revision 34**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. (Continued)	
d. Verify the following NC pump conditions:	d. Slowly restore seal injection flow to limit NC pump cooldown rate as follows:
__ • #1 seal outlet temperatures less than or equal to 180°F	__ 1) Maintain lower bearing temperature cooldown rate less than or equal to 1°F per minute.
__ • Lower bearing temperatures less than or equal to 180°F.	__ 2) Maintain #1 seal outlet temperature cooldown rate less than or equal to 1°F per minute.
	__ 3) OPEN 1NV-309 (Seal Water Injection Flow).
	__ 4) THROTTLE open 1NV-294 (NV Pmps A&B Disch Flow Ctrl) to establish 32 GPM "N/R CHRG LN FLOW".
	NOTE "TOTAL SEAL WTR FLOW" rate greater than 6 gpm may exceed cooldown limit.
	__ 5) Slowly increase "TOTAL SEAL WTR FLOW" by throttling 1NV-309 to cooldown #1 seal and lower bearing.
	__ 6) **WHEN** all NC pump #1 seal outlet **AND** lower bearing temperatures less than 180°F, **THEN GO TO** Step 8.

Op Test No.:	301	Scenario #	1	Event #	4	Page	52 of 139
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case I Loss of Charging	PAGE NO. **11 of 35** **Revision 34**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. (Continued)	
__ e. Verify 1NV-294 (NV Pmps A&B Disch Flow Ctrl) - OPEN.	e. Perform the following: __ 1) OPEN 1NV-309 (Seal Water Injection Flow). __ 2) THROTTLE 1NV-294 (NV Pmps A&B Disch Flow Ctrl) to establish greater than 32 GPM "N/R CHRG LN FLOW".
8. **Verify the following:** __ • "TOTAL SEAL WTR FLOW" - GREATER THAN 32 GPM __ • 1NV-309 (Seal Water Injection Flow) - IN AUTO.	**Perform the following:** N/A a. <u>IF</u> any NC pump #1 seal outlet temperature <u>**OR**</u> lower bearing temperature greater than 180°F, <u>**THEN**</u> maintain cooldown rate less than or equal to 1°F per minute. __ b. Slowly THROTTLE 1NV-309 (Seal Water Injection Flow) to establish 32 GPM "TOTAL SEAL WTR FLOW". __ c. Place 1NV-309 in auto.
__ 9. **Verify Pzr level - GREATER THAN 17%.**	**Perform the following:** __ a. <u>IF</u> Pzr level less than 17% due to NC leak, <u>**THEN GO TO**</u> AP/1/A/5500/010 (Reactor Coolant Leak). __ b. Maintain charging flow less than 180 GPM. __ c. Increase charging flow to restore Pzr level greater than 17%. __ d. Do not continue in this procedure until Pzr level greater than 17%.

Op Test No.:	301	Scenario #	1	Event #	4	Page	53 of 139
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case I Loss of Charging	PAGE NO. 12 of 35 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 10. **Control charging to stabilize Pzr level greater than 17%.**	
__ 11. **Ensure "PZR HTR GROUP 1C" - ON.**	
12. **Control VCT level as follows:**	
__ a. Verify NC system makeup - SET FOR DESIRED BORON CONCENTRATION.	__ a. Adjust NC system makeup controls for desired boron concentration.
__ b. Verify "NC MAKEUP MODE SELECT" - IN AUTO.	__ b. Makeup to VCT as required to maintain VCT level greater than 23%. **REFER TO** OP/1/A/6150/009 (Boron Concentration Control).
__ 13. **Verify normal letdown - IN SERVICE.**	**Perform the following:**
	N/A a. **IF** excess letdown was previously in service, **THEN** perform the following:
	__ 1) Establish excess letdown. **REFER TO** OP/1/A/6200/001 (Chemical and Volume Control System).
	__ 2) **GO TO** Step 14.
	__ b. Restore normal letdown. **REFER TO** Case II (Loss of Letdown).

Note To Evaluator:

Crew will transition to Case II at this time to restore Normal Letdown. Once Letdown is restored, the crew will transition back to Case I Step 14.

Op Test No.:	301	Scenario #	1	Event #	4	Page	54 of 139
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case II Loss of Letdown	PAGE NO. 15 of 35 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. **Operator Actions**	
__ 1. **Stop any power changes.**	
2. **Ensure the following letdown isolation valves - CLOSED:** __ • 1NV-10A (Letdn Orif 1B Otlt Cont Isol) __ • 1NV-11A (Letdn Orif 1C Otlt Cont Isol) __ • 1NV-13A (Letdn Orif 1A Otlt Cont Isol).	
__ 3. **Verify Pzr level - GREATER THAN 17%.**	**Perform the following:** __ a. **IF** Pzr level less than 17% due to NC leak, **THEN GO TO** AP/1/A/5500/010 (Reactor Coolant Leak). __ b. Maintain charging flow less than 180 GPM. __ c. Increase charging flow to restore Pzr level greater than 17%. __ d. Do not continue in this procedure until Pzr level greater than 17%.
__ 4. **Control charging to stabilize Pzr level at program level while maintaining seal injection flow.**	
__ 5. **Ensure "PZR HTR GROUP 1C" - ON.**	

Op Test No.:	301	Scenario #	1	Event #	4	Page	55 of 139
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case II Loss of Letdown	PAGE NO. 16 of 35 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. **Control VCT level as follows:**	
__ a. Verify NC system makeup - SET FOR DESIRED BORON CONCENTRATION.	__ a. Adjust NC System makeup controls for desired boron concentration.
__ b. Verify "NC MAKEUP MODE SELECT" - IN AUTO.	__ b. Makeup to VCT as required to maintain VCT level greater than 23%. **REFER TO** OP/1/A/6150/009 (Boron Concentration Control).
__ 7. **Determine and correct cause of loss of letdown.**	
N/A 8. **IF AT ANY TIME excess letdown required, THEN establish excess letdown. REFER TO OP/1/A/6200/001 (Chemical and Volume Control System).**	
__ 9. **Verify proper VC/YC system operation. REFER TO Enclosure 3 (Control Room Ventilation System Verification).**	**Enclosure 3 is included as Attachment 4.**

Op Test No.:	301	Scenario #	1	Event #	4	Page	56	of 139
Event Description:	1A NV Pump Trip							

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case II Loss of Letdown	PAGE NO. 17 of 35 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **Ensure compliance with appropriate Tech Specs:** N/A • 3.3.1 (Reactor Trip System (RTS) Instrumentation) N/A • 3.3.3 (Post Accident Monitoring (PAM) Instrumentation) N/A • 3.3.4 (Remote Shutdown System) N/A • 3.4.1 (RCS Pressure, Temperature, and Flow Departure From Nucleate Boiling (DNB) Limits) N/A • 3.4.12 (Low Temperature Overpressure Protection (LTOP) System) N/A • 3.4.13 RCS (Operational Leakage) N/A • 3.6.3 (Containment Isolation Valves).	
11. **Verify at least one of the following valves - CLOSED:** __ • 1NV-1A (NC Letdn To Regen Hx Isol) OR __ • 1NV-2A (NC Letdn To Regen Hx Isol).	__ **GO TO Step 16.**

Op Test No.:	301	Scenario #	1	Event #	4	Page	57 of 139
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case II Loss of Letdown	PAGE NO. **18 of 35** **Revision 34**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. **Verify the following Letdn Orif Otlt Cont Isol valves - CLOSED:** __ • 1NV-10A (Letdn Orif 1B Otlt Cont Isol) __ • 1NV-11A (Letdn Orif 1C Otlt Cont Isol) __ • 1NV-13A (Letdn Orif 1A Otlt Cont Isol).	**Perform the following:** __ a. CLOSE affected valve(s). __ b. Establish excess letdown. **REFER TO** OP/1/A/6200/001 (Chemical and Volume Control System). **NOTE** Charging is maintained greater than 32 GPM to ensure charging line downstream of 1NV-309 (Seal Water Injection Flow) is pressurized. __ c. Ensure charging flow maintained greater than 32 GPM during letdown line pressurization. __ d. Dispatch operator(s) to pressurize normal letdown line. **REFER TO** Enclosure 1 (Pressurization Of Normal Letdown Line). __ e. **GO TO** Step 15.

Op Test No.:	301	Scenario #	1	Event #	4	Page	58 of 139
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case II Loss of Letdown	PAGE NO. **19 of 35** **Revision 34**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE
- If either NC loop letdown valve (1NV-1A or 1NV-2A) closed before all orifice isolation valves (1NV-10A, 1NV-11A and 1NV-13A), the letdown line will require local repressurization.
- If all valves closed from automatic signal(s), it can be assumed the orifice valves reached the closed position first.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. **Verify all the following valves - CLOSED BY AUTOMATIC SIGNAL(s).** __ • 1NV-1A (NC Letdn To Regen Hx Isol) __ • 1NV-2A (NC Letdn To Regen Hx Isol) __ • 1NV-10A (Letdn Orif 1B Otlt Cont Isol) __ • 1NV-11A (Letdn Orif 1C Otlt Cont Isol) __ • 1NV-13A (Letdn Orif 1A Otlt Cont Isol).	**Perform the following:** __ a. **IF** all orifice isolation valves are known to have been closed prior to either NC loop letdown valve closing, **THEN GO TO** Step 16. __ b. Establish excess letdown. **REFER TO** OP/1/A/6200/001 (Chemical and Volume Control System). **NOTE** Charging is maintained greater than 32 GPM to ensure charging line downstream of 1NV-309 (Seal Water Injection Flow) is pressurized. __ c. Ensure charging flow maintained greater than 32 GPM during letdown line pressurization. __ d. Dispatch operator(s) to pressurize the normal letdown line. **REFER TO** Enclosure 1 (Pressurization Of Normal Letdown Line). __ e. **GO TO** Step 15.
__ 14. **GO TO Step 16.**	

Op Test No.:	301	Scenario #	1	Event #	4	Page	59 of 139
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case II Loss of Letdown	PAGE NO. 20 of 35 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15. **Do not continue in this procedure until one of the following met:** __ • Notified by dispatched operator that the letdown line is pressurized. OR __ • Station management authorizes normal letdown restoration.	
16. **Establish letdown as follows:**	
__ a. Verify ability to establish normal letdown - RESTORED.	a. Perform the following: __ 1) Establish excess letdown. **<u>REFER</u> <u>TO</u>** OP/1/A/6200/001 (Chemical and Volume Control System). __ 2) Do not continue in this procedure until the ability to establish normal letdown has been restored.
__ b. Ensure 1NV-849 (Letdn Flow Var Orif Ctrl) valve demand position - 0%.	
c. Verify the following valves - OPEN: __ • 1NV-1A (NC Letdn To Regen Hx Isol) __ • 1NV-2A (NC Letdn To Regen Hx Isol).	c. Perform the following: __ 1) OPEN affected valve(s). 2) **<u>IF</u>** affected valve(s) will not open, **<u>THEN</u>** perform the following: __ a) Establish excess letdown. **<u>REFER</u> <u>TO</u>** OP/1/A/6200/001 (Chemical and Volume Control System). __ b) **<u>WHEN</u>** normal letdown can be restored, **<u>THEN</u> <u>RETURN</u> <u>TO</u>** Step 11. __ c) **<u>GO</u> <u>TO</u>** Step 17.

Op Test No.:	301	Scenario #	1	Event #	4	Page	60	of	139
Event Description:	1A NV Pump Trip								

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16. (Continued)	
d. OPEN the following valves: __ • 1NV-15B (Letdn Cont Isol) __ • 1NV-10A (Letdn Orif 1B Otlt Cont Isol).	d. Perform the following: __ 1) Ensure 1NV-10A (Letdn Orif 1B Otlt Cont Isol) - CLOSED. __ 2) Establish excess letdown. **REFER TO** OP/1/A/6200/001 (Chemical and Volume Control System). __ 3) **WHEN** normal letdown can be restored, **THEN RETURN TO** Step 11. __ 4) **GO TO** Step 17.
__ e. Adjust 1NV-294 (NV Pmps A&B Disch Flow Ctrl) as necessary to maintain letdown subcooled in the following steps.	
__ f. THROTTLE 1NV-148 (Letdn Press Control) to 45% demand.	
g. THROTTLE open 1NV-849 (Letdn Flow Var Orif Ctrl) in 1% to 5% increments until one of the following conditions met: __ • Letdown flow and letdown pressure increases OR __ • Valve demand position is 60% open.	
__ h. Do not continue until one of the above conditions met.	

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Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case II Loss of Letdown	PAGE NO. 22 of 35 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16. (Continued)	
__ i. Verify letdown flow and letdown pressure - HAS INCREASED.	i. Perform the following: 1) CLOSE the following valves: __ • 1NV-849 (Letdn Flow Var Orif Ctrl) __ • 1NV-10A (Letdn Orif 1B Otlt Cont Isol). __ 2) Establish excess letdown. **REFER TO** OP/1/A/6200/001 (Chemical and Volume Control System). __ 3) **WHEN** normal letdown can be restored, **THEN RETURN TO** Step 11. __ 4) **GO TO** Step 17.
__ j. Adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure between 150 - 200 PSIG.	

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Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case II Loss of Letdown	PAGE NO. 23 of 35 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

16. (Continued)

k. **WHEN** 5 minutes have elapsed, **THEN** perform the following:

__ 1) Adjust 1NV-849 (Letdn Flow Var Orif Ctrl) in 1% to 5% increments to desired letdown flow.

2) **WHEN** letdown at desired flow, **THEN** perform the following:

__ a) Adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure at 350 PSIG.

__ b) Ensure 1NV-148 (Letdn Press Control) - IN AUTO.

N/A 3) **IF AT ANY TIME** additional letdown flow desired, **THEN** establish letdown with 45 or 75 GPM orifice. **REFER TO** OP/1/A/6200/001 (Chemical and Volume Control System).

l. **WHEN** Pzr level restored to programmed level, **THEN** perform the following:

__ 1) Ensure 1NV-294 (NV Pmps A&B Disch Flow Ctrl) - IN AUTO.

__ 2) Ensure "PZR Level Master" - IN AUTO.

17. **Determine required notifications:**

__ • **REFER TO** RP/0/A/5000/001 (Classification Of Emergency)

__ • **REFER TO** RP/0/B/5000/013 (NRC Notification Requirements).

Note To Evaluator:

To use time compression for this step, have the booth operator contact the control room and REPORT "5 minutes has elapsed."

Op Test No.:	301	Scenario #	1	Event #	4	Page	63	of	139
Event Description:	1A NV Pump Trip								

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case II Loss of Letdown	PAGE NO. 24 of 35 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 18. **Verify excess letdown - ISOLATED.**	__ **WHEN normal letdown restored, THEN secure excess letdown. REFER TO OP/1/A/6200/001 (Chemical and Volume Control System).**
__ 19. **Determine long term plant status. RETURN TO procedure in effect.**	

END

Note To Evaluator:

Crew will transition back to Case I Step 14 at this point.

Op Test No.:	301	Scenario #	1	Event #	4	Page	64	of	139
Event Description:	1A NV Pump Trip								

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case I Loss of Charging	PAGE NO. 13 of 35 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. **Ensure compliance with appropriate Tech Specs:**	
N/A • 3.4.12 (Low Temperature Overpressure Protection (LTOP) System)	
N/A • 3.4.13 (RCS Operational Leakage)	
N/A • 3.4.14 (RCS Pressure Isolation Valve (PIV) Leakage)	
__ • 3.5.2 (ECCS - Operating)	Tech Spec 3.5.2: • Condition A applies to restore ECCS train to OPERABLE status in 72 hours. SLC 16.9-10: • Condition A applies to restore the non-functional Boration System Charging Pump to FUNCTIONAL status in 72 hours.
N/A • 3.5.3 (ECCS - Shutdown)	
N/A • 3.5.5 (Seal Injection Flow)	
N/A • 3.6.3 (Containment Isolation Valves)	
N/A • SLC 16.9-9 (Boration Systems Charging Pump - Shutdown)	
__ • SLC 16.9-10 (Boration Systems Charging Pump - Operating).	
15. **Determine required notifications:**	
__ • **REFER TO** RP/0/A/5000/001 (Classification Of Emergency)	
__ • **REFER TO** RP/0/B/5000/013 (NRC Notification Requirements).	
__ 16. **Verify at least one NV pump - ON.**	__ **RETURN TO Step 6.**
N/A 17. **IF Standby Makeup Pump in service and no longer required, THEN secure the pump. REFER TO OP/0/B/6100/013 (Standby Shutdown Facility Operations).**	

Op Test No.:	301	Scenario #	1	Event #	4	Page	65 of 139
Event Description:	1A NV Pump Trip						

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN Case I Loss of Charging	PAGE NO. 14 of 35 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 18. **Determine long term plant status.** **RETURN TO procedure in effect.**	

END

Note To Evaluator:

This concludes Event 4. At the Lead Evaluators discretion, scenario can continue to the next event by having the booth operator INSERT Trigger 5 for Event 5 (Trip of Running Condensate Booster Pumps leads to loss of 1A CFPT on low suction pressure).

Op Test No.:	301	Scenario #	1	Event #	5	Page	66	of 139
Event Description:	Trip of Condensate Booster Pumps / 1A CFPT Trip On Low Suction Pressure							

Control Room Indications
1AD-5, B/4 “CFPT A LO SUCT FLOW” - LIT
1AD-5, E/5 “CFP A LOW SUCT PRESS” - LIT
1AD-5, A/1 “CFPT A TRIPPED” – LIT (After 20 second delay)
1AD-4, C/1-4 “S/G A/B/C/D FLOW MISMATCH LO CF FLOW” - LIT

Op Test No.:	301	Scenario #	1	Event #	5	Page	67 of 139
Event Description:	Trip of Condensate Booster Pumps / 1A CFPT Trip On Low Suction Pressure						

CNS AP/1/A/5500/006	LOSS OF S/G FEEDWATER Case I Loss of CF Supply To S/Gs	PAGE NO. 2 of 20 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. **Verify reactor power - LESS THAN 5%.**	**IF AT ANY TIME all CF supply to S/G(s) lost, THEN perform the following:** __ a. Manually trip reactor. Critical Task #2 __ b. **GO TO** EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).
Note To Evaluator: Crew will transition to E-0 at this point which begins the Major Event (Loss of Heat Sink). CAPT#1 will overspeed and 1ETB will blackout. Crew will transition to FR-H.1 and immediately initiate Feed & Bleed due to no NV pumps available.	
__ 2. **Verify all S/G hi-hi level alert alarms (1AD-4) - DARK.**	**IF 2/4 S/G N/R levels on any one S/G are greater than 83%, THEN:** __ a. Verify all Feedwater Isolation status lights (1SI-5) - LIT. b. **IF** any Feedwater Isolation status light is not lit, **THEN**: __ 1) Manually initiate Feedwater Isolation. __ 2) **IF** proper status light indication is not obtained, **THEN** manually close affected valve(s).
__ 3. **Verify 1AD-2, F/9 "DCS ALTERNATE ACTION" - DARK.**	**IF all the following conditions exist:** __ • 1AD-2, F/9 in alarm for CF control function in alternate action __ • At least one CF pump - IN SERVICE __ • 1AD-3, C/6 "CF ISOL TRN A" - DARK __ • 1AD-3, D/6 "CF ISOL TRN B" - DARK. __ **THEN GO TO** Case III (CF Control Not in Auto).

Op Test No.:	301	Scenario #	1	Event #	6, 7, 8	Page	68 of 139
Event Description:	CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B						

Note To Evaluator:

Once the reactor is tripped, a blackout of 1ETB will occur. CAPT#1 will fail to start automatically, requiring the crew to manually start it to feed the S/Gs. Once started, it will experience a mechanical overspeed trip. Once S/G levels all decrease to below 11% N/R, a transition to FR-H.1 will occur. Crew will immediately transition to steps to initiate NC system Feed and Bleed due to no NV pumps being available. Once S/I is initiated, the 1A NI pump will fail to start requiring the crew to reset S/I and the D/G load sequencer and manually starting the 1A NI pump. The 1A NV pump will also start when S/I is initiated.

Op Test No.:	301	Scenario #	1	Event #	6, 7, 8	Page	69	of	139
Event Description:	CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B								

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 4 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

C. Operator Actions

__ 1. Monitor Enclosure 1 (Foldout Page).

Enclosure 1 is included as Attachment 5.

2. **Verify Reactor Trip:**
   - __ All rod bottom lights - LIT
   - __ All reactor trip and bypass breakers - OPEN
   - __ I/R power - DECREASING.

Perform the following:

__ a. Trip reactor.

b. IF reactor will not trip, THEN concurrently:

- __ Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).
- __ GO TO EP/1/A/5000/FR-S.1 (Response to Nuclear Power Generation/ATWS).

3. **Verify Turbine Trip:**
   - __ All turbine stop valves - CLOSED

Perform the following:

__ a. Trip turbine.

b. IF turbine will not trip, THEN:

__ 1) Depress "MANUAL" pushbutton on turbine control panel.

__ 2) Rapidly CLOSE control valves by simultaneously depressing "CONTROL VALVE LOWER" and "FAST RATE" pushbuttons.

3) IF control valves will not close, THEN CLOSE:

- __ All MSIVs
- __ All MSIV bypass valves.

Op Test No.: 301	Scenario # 1	Event # 6, 7, 8	Page 70 of 139
Event Description:	CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B		

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 5 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 4. **Verify 1ETA and 1ETB - ENERGIZED.**	**Perform the following:**
	N/A __ a. IF 1ETA AND 1ETB de-energized, THEN GO TO EP/1/A/5000/ECA-0.0 (Loss of All AC Power).
	__ b. WHEN time allows, THEN attempt to restore power to de-energized switchgear while continuing with this procedure. REFER TO AP/1/A/5500/007 (Loss of Normal Power).
5. **Verify S/I actuated:**	
__ a. "SAFETY INJECTION ACTUATED" status light (1SI-13) - LIT.	a. Perform the following:
	1) Verify conditions requiring S/I:
	__ • Pzr pressure - LESS THAN 1845 PSIG
	OR
	__ • Containment pressure - GREATER THAN 1.2 PSIG.
	N/A 2) IF S/I required, THEN initiate S/I.
	3) IF S/I not required, THEN concurrently:
	__ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).
	__ • GO TO EP/1/A/5000/ES-0.1 (Reactor Trip Response).
__ b. Both E/S load sequencer actuated status lights (1SI-14) - LIT.	__ b. Initiate S/I.

Note To Evaluator:

Crew will transition to ES-0.1 which begins on the next page.

Op Test No.:	301	Scenario #	1	Event #	6, 7, 8	Page	71 of 139
Event Description:	CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B						

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 2 of 42 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. **Monitor Enclosure 1 (Foldout Page).**	**Enclosure 1 is included as Attachment 6.**
2. **Verify the following:** __ • All 6.9 KV busses - ENERGIZED. __ • VI pressure - GREATER THAN 85 PSIG.	**Perform the following:** a. **IF** loss of offsite power has occurred, **THEN** perform the following: __ • CLOSE all MSIVs __ • CLOSE all MSIV bypass valves __ • Ensure available RN pump(s) - IN SERVICE AS REQUIRED __ • **WHEN** time and manpower permit, **THEN** ensure available RL pump(s) in service as required. **REFER TO** OP/0/B/6400/003 (Low Pressure Service Water System). __ • **WHEN** time and manpower permit, **THEN** ensure available KR pump(s) in service as required. **REFER TO** OP/0/B/6400/004 (Recirculated Cooling Water System). b. **IF AT ANY TIME** VI pressure less than or equal to 55 psig, **THEN** CLOSE the following valves: __ • All MSIVs __ • All MSIV bypass valves. c. **IF** S/G N/R level less than 11% in all S/Gs, **THEN** THROTTLE feed flow to achieve the following: __ • Minimize cooldown __ • Maintain total feed flow greater than 450 GPM. d. **WHEN** N/R level greater than 11% in any S/G, **THEN** THROTTLE feed flow further to achieve the following: __ • Minimize cooldown __ • Maintain at least one S/G N/R level greater than 11%. (RNO continued on next page)

Op Test No.:	301	Scenario #	1	Event #	6, 7, 8	Page	72	of 139

Event Description: CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 3 of 42 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2. (Continued)

e. **IF** VI pressure less than 85 PSIG, **THEN** perform the following:

- Align N_2 to Pzr PORVs by opening the following valves:
  - __ 1NI-438A (Emer N2 From CLA A To 1NC-34A)
  - __ 1NI-439B (Emer N2 From CLA B To 1NC-32B).
- __ Dispatch operator to ensure proper VI compressor operation. **REFER TO** AP/0/A/5500/022 (Loss of Instrument Air).

__ 3. **Announce "Unit 1 Reactor Trip, non-essential personnel stay out of Unit 1 Turbine bldg".**

NOTE Enclosure 2 (NC Temperature Control) shall remain in effect until subsequent steps provide alternative NC temperature control guidance.

__ 4. **Control NC temperature. REFER TO Enclosure 2 (NC Temperature Control).**

Enclosure 2 is included as Attachment 7.

5. **Determine required notifications:**

- __ **REFER TO** RP/0/A/5000/001 (Classification Of Emergency)
- __ **REFER TO** RP/0/B/5000/013 (NRC Notification Requirements).

Op Test No.: 301	Scenario # 1	Event # 6, 7, 8	Page 73 of 139				

Event Description: CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. **4 of 42** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. **Verify Main Generator as follows:**	
__ a. Verify turbine generator megawatt output - LESS THAN **OR** EQUAL TO ZERO MW.	a. Perform the following: __ 1) Determine and correct cause of continued turbine generator output. __ 2) **WHEN** turbine generator megawatt output less than or equal to zero MW, **THEN** perform Step 6.b and Step 6.c. __ 3) **GO TO** Step 6.d.
b. Ensure the following breakers and MODs - OPEN: __ • MOD 1BG and 1BT __ • MOD 1AG and 1AT __ • Generator Breakers 1A and 1B.	
__ c. Ensure main generator "EXCITATION" - OFF.	
__ d. Verify "MAN/AUTO REG" select switch "MAN" mode light - LIT.	__ d. Transfer to manual mode.

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Event Description: CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 5 of 42 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **Verify feedwater status as follows:**	
__ a. T-Avg - LESS THAN 564°F.	a. Perform the following: __ 1) **<u>WHEN</u>** T-Avg less than 564°F, **<u>THEN</u>** perform Steps 7.b and 7.c. __ 2) **<u>GO TO</u>** Step 7.c.
__ b. All Feedwater Isolation status lights (1SI-5) - LIT.	b. Perform the following: __ 1) Initiate Feedwater Isolation. __ 2) **<u>IF</u>** any status light remains dark, **<u>THEN</u>** perform Enclosure 3 (Closure of Feedwater Isolation Valves).
__ c. Total feed flow to S/G(s) - GREATER THAN 450 GPM.	c. Establish feed flow to maintain at least one S/G N/R level greater than 11% **<u>OR</u>** total feed flow greater than 450 GPM using one of the following: __ • CA pumps OR __ • Main Feedwater System. **<u>REFER TO</u>** OP/1/A/6250/001 (Condensate and Feedwater System).

Op Test No.:	301	Scenario #	1	Event #	6, 7, 8	Page	75	of 139
Event Description:	CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B							

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 6 of 42 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. **Verify adequate shutdown margin as follows:**	
__ a. DRPI indication - AVAILABLE.	a. Verify adequate shutdown margin as follows: 1) Emergency borate 10,000 gallons of 7000 PPM boron solution as follows: __ a) OPEN 1NV-236B (Boric Acid To NV Pumps Suct). __ b) **IF** 1NV-236B will not open, **THEN** dispatch operator to open 1NV-236B (Boric Acid To NV Pumps Suct) (AB-550, HH-JJ, 53-54, Rm 234). c) **WHEN** 1NV-236B open, **THEN** perform the following: __ (1) Start boric acid transfer pumps. __ (2) Calculate required injection time based on boric acid flowrate. __ (3) **WHEN** required boric acid injected, **THEN** secure emergency boration. __ 2) Notify Reactor Group Duty Engineer to perform analysis to determine required shutdown margin. __ 3) **GO TO** Step 8.c.

Op Test No.:	301	Scenario #	1	Event #	6, 7, 8	Page	76	of	139
Event Description:	CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B								

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. **7 of 42** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. (Continued)	
__ b. All control and shutdown rods - FULLY INSERTED.	b. **IF** two or more rods not fully inserted, **THEN** perform the following: 1) Emergency borate 224 PPM for each rod not fully inserted as follows: __ a) OPEN 1NV-236B (Boric Acid To NV Pumps Suct). __ b) **IF** 1NV-236B will not open, **THEN** dispatch operator to open 1NV-236B (Boric Acid To NV Pumps Suct) (AB-550, HH-JJ, 53-54, Rm 234). c) **WHEN** 1NV-236B open, **THEN** perform the following: __ (1) Start boric acid transfer pumps. __ (2) Calculate required boron addition. **REFER TO** ROD Book, Section 4.1. __ (3) Calculate required injection time based on boric acid flowrate. __ (4) **WHEN** required boric acid injected, **THEN** secure emergency boration. __ 2) Notify Reactor Group Duty Engineer to perform analysis to determine required shutdown margin.
__ c. Stop any boron dilutions in progress.	

Op Test No.:	301	Scenario #	1	Event #	6, 7, 8	Page	77	of 139

Event Description: CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. **8 of 42** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. (Continued)	
__ d. All NC T-Colds - GREATER THAN 545°F.	d. Perform the following: __ 1) Determine lowest T-Cold. __ 2) Determine core burnup in effective full power days (EFPD) (OAC Point P1457 or from Reactor Operators logbook). __ 3) Verify lowest current T-Cold greater than or equal to allowable limit at present burnup. **REFER TO** ROD Book, Section 2.6. __ 4) **IF** lowest T-Cold less than allowable limit, **THEN** immediately add 30 gallons of 7000 PPM boron solution at greater than or equal to 30 GPM for each degree lowest T-Cold below limit of ROD Book, Section 2.6. __ 5) **GO TO** Step 9.
__ e. **IF AT ANY TIME** NC T-Colds decrease to less than or equal to 545°F, **THEN** perform Step 8.d.	

Op Test No.:	301	Scenario #	1	Event #	6, 7, 8	Page	78	of 139

Event Description: CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. **9 of 42** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. **Verify proper Pzr level control as follows:**	
__ a. Verify VI pressure - GREATER THAN 50 PSIG.	a. Perform the following: 1) **IF** Pzr Level less than 17%, **THEN** perform the following: __ a) Ensure normal letdown - ISOLATED. __ b) Ensure all Pzr heaters - OFF. __ c) Control charging to restore Pzr level to greater than 17% while maintaining flow less than 180 GPM. __ d) **WHEN** Pzr level greater than 17%, **THEN** Depress C Heater "ON" pushbutton. 2) **IF AT ANY TIME** NV controllers not maintaining stable charging flow, **THEN** perform the following: __ a) Maintain charging flow less than 180 GPM. b) Dispatch operator with radio to THROTTLE 1NV-295 (NV Pmps A & B Disch Ctrl Isol) (AB-551, JJ-55, Rm 231) to maintain the following: __ • Pzr level - GREATER THAN 17% __ • Pzr level - TRENDING TO "PZR REF LEVEL". (RNO continued on next page)

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. **10 of 42** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
	c) Dispatch operator with radio to perform the following:
	__ (1) THROTTLE 1NV-311 (Seal Wtr Inj Flow Ctrl Byp) (AB-555, JJ-54, Rm 233) as required to maintain 32 GPM total seal water flow in subsequent steps.
	__ (2) CLOSE 1NV-308 (Seal Wtr Inj Flow Ctrl Isol) (AB-554, JJ-54, Rm 233).
	__ d) **WHEN** dispatched operators have throttled 1NV-295 and 1NV-311, **THEN** depress manual pushbutton and increase output to 100% demand position for 1NV-294 (NV Pmps A&B Disch Flow Ctrl).
	__ e) **WHEN** VI restored, **THEN** perform Step 9.
	__ f) **GO TO** Step 10.

Op Test No.: 301 Scenario # 1 Event # 6, 7, 8	Page 80 of 139
Event Description:	CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. **11 of 42** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
__ b. Verify Pzr level - GREATER THAN 17%.	b. Perform the following: __ 1) Ensure normal letdown - ISOLATED. __ 2) Ensure all Pzr heaters - OFF. __ 3) Control charging to restore Pzr level to greater than 17% while maintaining flow less than 180 GPM. 4) **WHEN** Pzr level greater than 17%, **THEN** perform the following: __ a) Establish normal letdown. **REFER TO** AP/1/A/5500/012 (Loss of Charging or Letdown). __ b) Depress C Heater "ON" pushbutton. __ 5) **GO TO** Step 9.d.
__ c. Verify charging and letdown - IN SERVICE.	__ c. Restore charging and letdown. **REFER TO** AP/1/A/5500/012 (Loss of Charging or Letdown).
__ d. Verify Pzr level - TRENDING TO "PZR REF LEVEL".	__ d. Control charging and letdown to maintain Pzr level at "PZR REF LEVEL".
__ 10. **Verify Pzr pressure - GREATER THAN 1845 PSIG.**	**Perform the following:** __ a. Ensure S/I - ACTUATED. __ b. **GO TO** EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).

Op Test No.:	301	Scenario #	1	Event #	6, 7, 8	Page	81 of 139
Event Description:	CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B						

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 12 of 42 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 11. **Verify 1A and 1B NC pumps - ON.**	__ **Ensure Pzr spray valve for stopped NC pump - IN MANUAL <u>AND</u> CLOSED.**
__ 12. **Verify Pzr pressure - STABLE AT OR TRENDING TO 2235 PSIG.**	**Perform one of the following:** a. <u>IF</u> Pzr pressure less than 2235 PSIG <u>AND</u> decreasing, <u>THEN</u> perform the following: __ 1) Ensure all Pzr PORVs - CLOSED. __ 2) <u>IF</u> any Pzr PORV cannot be closed, <u>THEN</u> CLOSE its isolation valve. 3) <u>IF</u> 1NC-32B <u>OR</u> 1NC-34A cannot be closed <u>OR</u> isolated, <u>THEN</u> perform the following: a) Align N_2 to PORVs by opening the following valves: __ • 1NI-438A (Emer N2 From CLA A To 1NC-34A) __ • 1NI-439B (Emer N2 From CLA B To 1NC-32B). __ b) CLOSE affected Pzr PORV. __ 4) Ensure Pzr spray valves - CLOSED. 5) <u>IF</u> spray valve(s) cannot be closed, <u>THEN</u> perform the following: __ a) Stop NC pumps 1A and 1B. __ b) <u>IF</u> both 1C <u>AND</u> 1D NC pumps on, <u>THEN</u> stop one additional NC pump. __ 6) Ensure all Pzr heaters - ON. __ 7) <u>GO TO</u> Step 13. (RNO continued on next page)

Op Test No.: 301	Scenario # 1	Event # 6, 7, 8	Page 82 of 139				

Event Description: CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 13 of 42 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. (Continued)	
	b. **IF** Pzr pressure greater than 2235 PSIG **AND** increasing, **THEN** perform the following: __ 1) Ensure all Pzr heaters - OFF. __ 2) Control Pzr pressure using normal Pzr spray. 3) **IF** normal Pzr spray not available, **THEN** perform the following: __ a) **IF** letdown in service, **THEN** control Pzr pressure using NV aux spray. **REFER TO** Enclosure 4 (NV Aux Spray). b) **IF** letdown not in service **OR** NV aux spray not available, **THEN** control Pzr pressure as follows: __ (1) Verify Pzr PORV(s) maintain Pzr pressure less than - 2335 PSIG. __ (2) **IF AT ANY TIME** Pzr pressure greater than - 2335 PSIG, **THEN** control pressure with one Pzr PORV in manual.
13. **Control S/G levels as follows:**	
__ a. Verify N/R level in any S/G - GREATER THAN 11%.	__ a. Maintain total feed flow greater than 450 GPM until at least one S/G N/R level greater than 11%.
__ b. THROTTLE feed flow to maintain S/G N/R levels between 11% and 50%.	__ b. **IF** N/R level in any S/G continues to increase, **THEN** stop feed flow to that S/G.

Op Test No.:	301	Scenario #	1	Event #	6, 7, 8	Page	83 of 139

Event Description: CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 14 of 42 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 14. **Initiate concurrent actions in Abnormal Procedures as needed while continuing with this procedure.**	
15. **Verify all AC busses energized by offsite power as follows:**	**Perform the following:**
• A Train:	__ a. Restore offsite power while continuing with this procedure. **REFER TO** AP/1/A/5500/007 (Loss of Normal Power).
__ • "FTA B/O NORM FDR FRM ATC" - CLOSED	b. Start the following equipment:
__ • "D/G 1A BKR TO ETA" - OPEN	__ • Start all available CRD vent fans.
__ • 1ETA - ENERGIZED.	__ • Dispatch operator to start all available VI compressors.
• B Train:	__ c. **IF AT ANY TIME** Spent Fuel Pool cooling not restored within 2 hrs, **THEN** ensure available operator monitors Spent Fuel Pool level and temperature. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 1 (Unit 1 Spent Fuel Pool Monitoring).
__ • "FTB B/O NORM FDR FRM ATD" - CLOSED	
__ • "D/G 1B BKR TO ETB" - OPEN	
__ • 1ETB - ENERGIZED.	

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CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. **15 of 42** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16. **Transfer condenser steam dump to pressure control mode as follows:**	
__ a. Verify "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT.	a. Perform the following: 1) Place steam dumps in pressure mode as follows: __ a) Place "STM DUMP CTRL" in manual. __ b) Adjust "STM DUMP CTRL" output to 0% demand (1SMP5211). c) Using "STEAM DUMP SELECT" switch, perform the following: __ • Reset C-7A and C-7B __ • Place steam dumps in pressure mode. __ 2) Dump steam using S/G PORV(s) in subsequent steps. __ 3) **GO TO** Step 17.

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Event Description: CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16. (Continued)	
__ b. Verify all MSIVs - OPEN.	b. Perform the following: **NOTE** If Pzr is solid, opening S/G PORVs too rapidly can cause a large drop in NC pressure. 1) Dump steam from isolated S/G(s) using S/G(s) PORV as follows: __ a) Ensure NC pressure maintained stable while throttling PORVs. __ b) Operate PORVS as required to stabilize S/G pressures at 1090 PSIG. __ c) Operate S/G PORVs as required in subsequent steps. __ 2) **IF** all MSIVs closed, **THEN GO TO** Step 17.
__ c. Ensure "STM DUMP CTRL" - SET AT 1090 PSIG STEAM HEADER PRESSURE.	
__ d. Verify steam dumps in T-AVE mode.	d. Perform the following: __ 1) **IF** C-7A and C-7B reset, **THEN GO TO** Step 17. 2) Using "STEAM DUMP SELECT" switch, perform the following: __ a) Reset C-7A and C-7B. __ b) Return steam dumps to pressure mode. __ c) **GO TO** Step 17.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

16. (Continued)

e. Place steam dumps in pressure mode as follows:

__ 1) Place "STM DUMP CTRL" in manual.

__ 2) Ensure "STM DUMP CTRL" M/A station output equal to "% STM DUMP DEMAND" (1SMP5211).

3) Using "STEAM DUMP SELECT" switch, perform the following:

__ • Reset C-7A and C-7B

__ • Place steam dumps in pressure mode.

__ 4) Place "STM DUMP CTRL" in auto.

__ 5) Ensure steam dumps control to maintain steam header pressure - 1090 PSIG.

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CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. **18 of 42** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 17. **Verify 1B NC pump - ON**	**Perform the following:** **NOTE** Preference should be given to starting 1B NC pump to provide Pzr spray capability. If 1B NC pump not available, running 1A NC pump along with 1 or 2 additional NC pumps may be required for adequate spray. __ a. Start 1B NC pump. **REFER TO** OP/1/A/6150/002A (Reactor Coolant Pump Operation). __ b. **IF AT ANY TIME** 1B NC pump cannot be started, **THEN** start NC pumps as needed to provide adequate Pzr spray. **REFER TO** OP/1/A/6150/002A (Reactor Coolant Pump Operation). __ c. **IF** any NC pump on, **THEN GO TO** Step 18. __ d. Ensure Natural Circulation until an NC pump can be started. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 15 (Natural Circulation Monitoring Parameters). e. Ensure compliance with appropriate Tech Specs: __ • 3.4.5 (RCS Loops - MODE 3) __ • 3.4.6 (RCS Loops - MODE 4).

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CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. **19 of 42** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18. **Determine status of N/Is as follows:**	
__ a. Verify I/R channels - LESS THAN 10^{-5}% POWER.	a. Perform the following: __ 1) **WHEN** I/R channels less than 10^{-5}% Power, **THEN** perform Steps 18.b and 18.c. __ 2) **GO TO** Step 19.
__ b. Verify S/R channels - ON SCALE.	b. Perform the following: __ 1) Verify "CPS NEUTRON LEVEL" on S/R drawers indicating as expected. __ 2) Notify IAE to investigate. __ 3) Monitor all available S/R and I/R indications.
__ c. Ensure any S/R displayed on NIS RECORDER.	

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CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. **20 of 42** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19. **Maintain stable plant conditions as follows:**	
__ a. Pzr pressure - AT 2235 PSIG.	
__ b. Pzr level - AT "PZR REF LEVEL".	
__ c. S/G N/R levels - BETWEEN 11% **AND** 50%.	
d. Verify condenser available as follows: __ • Verify "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT. __ • MSIVs on all intact S/Gs - OPEN.	d. **IF AT ANY TIME** S/G PORVs cycling in automatic, **THEN** perform the following to stabilize S/G pressure and NC temperature: 1) Perform the following substeps in rapid succession to limit risk of opening SM safeties: __ a) CLOSE PORV manual loaders. __ b) Place PORV control mode Switches - IN MANUAL. __ c) THROTTLE intact S/G PORVs as necessary to stabilize S/G pressure at approximately 1090 PSIG.
__ e. Verify at least one NC pump - ON.	e. Perform the following: __ 1) Maintain NC T-Cold at 557°F. __ 2) **GO TO** Step 20.
__ f. NC T-Avg at 557°F.	
__ 20. **Verify proper ventilation system operation. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 16 (Control Room Ventilation Verification).**	**G-1 Enclosure 16 is included as Attachment 8.**

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CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 21 of 42 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

21. **Shutdown unnecessary plant equipment as follows:**

__ a. Stop RC pumps and cooling tower fans as necessary to maintain condenser inlet temperature greater than 60°F to protect RC piping. **REFER TO** OP/1/B/6400/001A (Condenser Circulating Water System).

__ b. Stop excess condensate booster pumps.

__ c. Stop excess hotwell pumps.

__ d. Stop C heater drain pumps.

e. **IF** B/O actuated, **THEN** stop unnecessary loads placed on affected bus by sequencer as follows:

__ 1) Reset affected D/G load sequencer(s).

__ 2) Stop unnecessary loads.

> **Note To Evaluator:**
>
> Once all S/G N/R levels are < 11%, a RED path on the Heat Sink Critical Safety Function will occur, and the crew will transition to FR-H.1.

__ f. **IF** desired to feed S/Gs with CF, **THEN** align feedwater to S/Gs. **REFER TO** OP/1/A/6250/001 (Condensate and Feedwater System).

__ g. **WHEN** CA no longer needed to feed S/Gs, **THEN** shutdown the CA System following the automatic start and return CA System to standby readiness. **REFER TO** OP/1/A/6250/002 (Auxiliary Feedwater System).

__ h. **WHEN** both trains of CA reset, **THEN** align S/Gs for Chemistry sampling.

__ i. Perform required steps in OP/1/A/6100/003 (Controlling Procedure For Unit Operation).

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CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 2 of 90 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
N/A 1. **IF total feed flow is less than 450 GPM due to operator action, THEN RETURN TO procedure and step in effect.**	
CAUTION **IF a non-faulted S/G is available, THEN feed flow should only be established to non-faulted S/G(s) in subsequent steps.**	
2. **Verify secondary heat sink is required as follows:**	
__ a. NC pressure - GREATER THAN ANY NON-FAULTED S/G PRESSURE.	__ a. **IF** LOCA in progress, **THEN RETURN TO** procedure and step in effect.
__ b. Any NC T-Hot - GREATER THAN 350°F.	b. Perform the following while continuing with this procedure: __ 1) Attempt to place ND in service. **REFER TO** OP/1/A/6200/004 (Residual Heat Removal System). __ 2) **WHEN** adequate ND cooling is established, **THEN RETURN TO** procedure and step in effect.
__ 3. **Monitor Enclosure 1 (Foldout Page).**	**Enclosure 1 is included as Attachment 9.**
__ 4. **Verify at least one NV pump - AVAILABLE.**	__ **GO TO Step 19.**

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CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. **28 of 90** Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18. **Verify bleed and feed should be initiated as follows:**	
__ a. Steps 20 through 24 - HAVE BEEN PREVIOUSLY PERFORMED.	__ a. **GO TO** Step 18.c.
__ b. **GO TO** Step 33.	
__ c. W/R level in at least three S/Gs - LESS THAN 24% (36% ACC).	__ c. **RETURN TO** Step 1.
__ 19. **Perform Steps 20 through 24 quickly to establish NC heat removal by NC bleed and feed.**	
__ 20. **Ensure all NC pumps - OFF.**	
__ 21. **Initiate S/I.** Critical Task #3	

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CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 29 of 90 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22. **Verify NC System feed path as follows:**	
a. Verify the following pumps - ON: __ • At least one NV pump __ • At least one NI pump.	a. Perform the following for affected train(s): __ 1) Reset ECCS. __ 2) Reset D/G load sequencer. __ 3) Start pumps. __ 4) **IF AT ANY TIME** a B/O occurs, **THEN** restart S/I equipment previously on. __ 5) **IF** at least one NV pump in service, **THEN GO TO** Step 22.b. 6) **IF** all the following conditions are met, **THEN GO TO** Step 22.b: __ • At least one NI Pump - ON __ • Time between reactor trip and implementation of this procedure - GREATER THAN 90 MINUTES. __ 7) Continue attempts to restore NV and NI to service. 8) **IF AT ANY TIME** both the following conditions exist: __ • Containment pressure - GREATER THAN 20 PSIG __ • FWST level - GREATER THAN 20% (1AD-9, D/8 "FWST 2/4 LO LEVEL") __ **THEN** contact station management for guidance to mitigate containment pressure. __ 9) **RETURN TO** Step 6.

Note To Evaluator:

In the following RNO, ECCS can only be reset once a 60 second time delay has elapsed. If the crew attempts to reset ECCS prior to this time delay, it will not reset.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22. (Continued)	
__ b. Verify "NV S/I FLOW" - INDICATING FLOW.	b. Perform the following: 1) Ensure the following pumps - ON: __ • NV Pumps __ • NI Pumps. 2) <u>IF</u> at least one NV pump in service, <u>**THEN**</u> perform the following: a) Ensure the following valves - OPEN: __ • 1NV-252A (NV Pumps Suct From FWST) __ • 1NV-253B (NV Pumps Suct From FWST). b) Ensure the following valves - CLOSED: __ • 1NV-188A (VCT Otlt Isol) __ • 1NV-189B (VCT Otlt Isol). c) Ensure the following valves - OPEN: __ • 1NI-9A (NV Pmp C/L Inj Isol) __ • 1NI-10B (NV Pmp C/L Inj Isol). (RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22. (Continued)	3) **IF** NI Pump 1A is in service, **THEN** ensure the following valves - OPEN: __ • 1NI-103A (NI Pump 1A Suct) __ • 1NI-118A (NI Pump 1A C-Leg Inj Isol) __ • 1NI-162A (NI To C-Legs Inj Hdr Isol) __ • 1NI-100B (NI Pmps Suct From FWST). 4) **IF** NI Pump 1B is in service, **THEN** ensure the following valves - OPEN: __ • 1NI-135B (NI Pump 1B Suct) __ • 1NI-150B (NI Pump 1B C-Leg Inj Isol) __ • 1NI-162A (NI To C-Legs Inj Hdr Isol) __ • 1NI-100B (NI Pmps Suct From FWST). 5) **IF** no feed path can be aligned, **THEN** perform the following: __ a) Continue attempts to establish feed path. __ b) **RETURN TO** Step 6.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. **Establish NC System bleed path as follows:**	
__ a. Ensure all Pzr PORV isolation valves - OPEN.	
b. Select "OPEN" on the following PZR PORVs: __ • 1NC-34A (PZR PORV) **Critical Task #3** __ • 1NC-32B (PZR PORV).	
c. Align N_2 to Pzr PORVs by opening the following valves: __ • 1NI-438A (Emer N2 From CLA A To 1NC-34A) __ • 1NI-439B (Emer N2 From CLA B To 1NC-32B).	c. Perform the following: __ 1) Ensure Phase B containment isolation signals - RESET. __ 2) Ensure 1VI-77B (VI Cont Isol) - OPEN. __ 3) **<u>IF</u>** VI pressure less than 85 PSIG, **<u>THEN</u>** dispatch operator to ensure proper VI compressor operation.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. (Continued)	
__ d. Verify power to all Pzr PORV isolation valves - AVAILABLE.	d. Perform the following: 1) Dispatch operator to restore power to affected Pzr PORV isolation valve(s): __ • 1EMXD-F02C (PORV Isol Motor (1NC31B)) (AB-560, BB-50, Rm 372) __ • 1EMXC-F03C (Pressurizer Power Operated Relief Isol. Valve 1NC33A) (AB-577, BB-50, Rm 496) __ • 1EMXD-F05A (PORV Isol Motor (1NC35B)) (AB-560, BB-50, Rm 372). 2) **WHEN** power is restored, **THEN** perform the following: __ a) OPEN Pzr PORV isolation valves. Critical Task #3 __ b) Ensure two Pzr PORVs and associated Pzr PORV isolation valves - OPEN.

The critical part of this task is to ensure that two Pressurizer PORVs and their associated block valves need to be opened. This can be done per step 23.d.RNO 2.b or step 24 RNO e.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24. **Verify the following valves - OPEN:**	**Perform the following:**
__ • 1NC-31B (PZR PORV Isol)	__ a. Ensure Phase B containment isolation signals - RESET.
__ • 1NC-32B (PZR PORV)	__ b. Ensure 1VI-77B (VI Cont Isol) - OPEN.
__ • 1NC-33A (PZR PORV Isol)	N/A __ c. **IF** VI pressure less than 85 PSIG, **THEN** dispatch operator to ensure proper VI compressor operation.
__ • 1NC-34A (PZR PORV).	d. Ensure the following valves - OPEN:
	__ • 1NC-35B (PZR PORV Isol) __ • 1NC-36B (PZR PORV).
	__ e. Ensure two Pzr PORVs and associated Pzr PORV isolation valves - OPEN. Critical Task #3
	__ f. **IF** two Pzr PORV flow paths are open, **THEN GO TO** Step 25.
	g. Align A Train vent path by opening the following valves:
	__ • 1NC-250A (Rx Head Vent Block) __ • 1NC-251B (Rx Head Vent).
	(RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

24. (Continued)

h. **IF** A Train vent path cannot be aligned, **THEN** align B train vent path as follows:

1) Ensure the following valves - CLOSED:

__ • 1NC-250A (Rx Head Vent Block)
__ • 1NC-251B (Rx Head Vent).

2) Dispatch operator to CLOSE the following breakers:

__ • 1EMXL-F10C (Reactor Vessel Head Vent Motor (1NC252B)) (AB-560, BB-47, Rm 372)

__ • 1EMXS-F03E (Reactor Vessel Head Vent Motor (1NC253A)) (AB-577, BB-49, Rm 496).

3) OPEN the following valves:

__ • 1NC-252B (Rx Head Vent Block)

__ • 1NC-253A (Rx Head Vent).

i. Align any low pressure water source to intact S/G(s) using the following sources:

__ • Hotwell pump

__ • RN

__ • CA (gravity feed)

__ • RF. **REFER TO** Enclosure 3 (Aligning Alternate Water Source to S/G(s)).

__ j. **IF** no low pressure water source can be aligned, **THEN GO TO** Step 25.

(RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24. (Continued)	__ k. Depressurize at least one intact S/G to atmospheric pressure using S/G PORV to inject the low pressure water source.
25. **__WHEN__ manpower __AND__ time permits, __THEN__ verify proper system alignments as follows:** __ • **__REFER TO__** Enclosure 4 (System Verification Following S/I Actuation). __ • Notify Unit 2 operator to perform Enclosure 5 (Opposite Unit Ventilation Verification).	**Enclosure 4 is included as Attachment 10.**
26. **Maintain NC System heat removal as follows:** __ • Maintain S/I flow __ • Maintain two Pzr PORVs - OPEN.	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27. **Ensure S/I - RESET:**	
__ a. ECCS.	__ a. Reset ECCS. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 4 (ECCS Master Reset).
__ b. D/G load sequencers.	b. Dispatch operator to open affected sequencer(s) control power breaker: __ • 1EDE-F01F (Diesel Generator Load Sequencer Panel 1DGLSA) (AB-577, BB-46, Rm 496) __ • 1EDF-F01F (Diesel Generator Load Sequencer Panel 1DGLSB) (AB-560, BB-46, Rm 372).
__ c. **IF AT ANY TIME** a B/O occurs, **THEN** restart S/I equipment previously on.	
28. **Verify proper Phase B actuation as follows:**	
__ a. Containment pressure - HAS REMAINED LESS THAN 3 PSIG.	a. Perform the following: 1) Verify following monitor light panel lights - LIT: __ • Group 1 Sp lights __ • Group 5 Sp lights __ • Group 5 St light L/11. __ 2) **IF** monitor light panel is not in correct alignment, **THEN** ensure correct alignment. __ 3) Ensure Phase B containment isolation signals - RESET. __ 4) Ensure 1VI-77B (VI Cont Isol) - OPEN. (RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28. (Continued)	
	5) **IF** VI pressure is less than 85 PSIG **OR** 1VI-77B is closed, **THEN** align N2 to Pzr PORVs by opening the following valves:
	__ • 1NI-438A (Emer N2 From CLA A To 1NC-34A)
	__ • 1NI-439B (Emer N2 From CLA B To 1NC-32B).
	__ 6) **IF** VI pressure is less than 85 PSIG, **THEN** dispatch operator to ensure proper VI compressor operation.
	7) **IF AT ANY TIME** both the following conditions exist:
	__ • Containment pressure - GREATER THAN 20 PSIG
	__ • FWST level - GREATER THAN 20% (1AD-9, D/8 "FWST 2/4 LO LEVEL")
	__ **THEN** contact station management for guidance to mitigate containment pressure.
	__ 8) **GO TO** Step 31.
__ b. **IF AT ANY TIME** containment pressure exceeds 3 PSIG while in this procedure, **THEN** perform Step 28.a.	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28. (Continued)	
c. **IF** both the following conditions exist,	
__ • Containment pressure - BETWEEN 1 PSIG **AND** 3 PSIG	**Note To Evaluator:** When Feed and Bleed is aligned, the PRT will eventually rupture and cause containment pressure to increase. If containment pressure exceeds 1 PSIG but remains < 3 PSIG, then a VX fan will be started per Enclosure 9.
__ • Containment pressure - HAS REMAINED LESS THAN 3 PSIG	
__ **THEN** start one VX fan and secure normal containment ventilation. **REFER TO** Enclosure 9 (VX and Containment Ventilation Control).	
__ 29. **Ensure Phase B containment isolation signals - RESET.**	**Enclosure 9 can be found as Attachment 11.**

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30. **Establish VI to containment as follows:**	
__ a. Ensure 1VI-77B (VI Cont Isol) - OPEN	a. Perform the following: __ 1) Dispatch operator to open 1VI-77B (VI Cont Isol) (AB-553, CC-51, Rm 250) (Ladder needed). 2) Align N_2 to Pzr PORVs by opening the following valves: __ • 1NI-438A (Emer N2 From CLA A To 1NC-34A) __ • 1NI-439B (Emer N2 From CLA B To 1NC-32B).
__ b. Verify VI pressure - GREATER THAN 85 PSIG.	b. Perform the following: 1) Align N_2 to Pzr PORVs by opening the following valves: __ • 1NI-438A (Emer N2 From CLA A To 1NC-34A) __ • 1NI-439B (Emer N2 From CLA B To 1NC-32B). __ 2) Dispatch operator to ensure proper VI compressor operation. __ 3) Restore VI while continuing with this procedure. **REFER TO** AP/0/A/5500/022 (Loss of Instrument Air).

Op Test No.:	301	Scenario #	1	Event #	6, 7, 8	Page	105 of 139
Event Description:	CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B						

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. **41 of 90** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
31. **Obtain containment H_2 concentration as follows:**	
__ a. Ensure operator has been dispatched to secure all ice condenser air handling units. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 11 (Securing All Ice Condenser Units).	
__ b. Verify containment H_2 analyzers - IN SERVICE.	b. Perform the following: __ 1) Dispatch operator to place containment H_2 analyzers in service. **REFER TO** OP/1/A/6450/010 (Containment Hydrogen Control Systems). __ 2) **WHEN** H_2 analyzers are in service, **THEN** perform Steps 31.c through 31.e. __ 3) **GO TO** Step 32.
__ c. Verify containment H_2 concentration - LESS THAN 6%.	c. Perform the following: __ 1) Obtain recommendation from station management for method to reduce H_2 concentration. __ 2) **GO TO** Step 32.
__ d. Verify H2 Igniters - ON	__ d. **WHEN** all ice condenser air handling units are secured **AND** H2 concentration is less than 6%, **THEN** place H2 igniters in service.
__ e. Verify containment H2 concentration - LESS THAN 0.5%.	__ e. Dispatch operator to place H2 recombiners in service. **REFER TO** OP/1/A/6450/010 (Containment Hydrogen Control Systems).

Op Test No.:	301	Scenario #	1	Event #	6, 7, 8	Page	106	of	139
Event Description:	CAPT #1 Overspeed / 1ETB Blackout / NI Pumps Fail To Autostart on Initiation of F&B								

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 42 of 90 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 32. **Verify KC flow to ND heat exchangers INDICATING FLOW.**	__ **<u>IF AT ANY TIME</u> an ND pump is operating with flow less than 1000 GPM to NC loops <u>AND</u> KC to associated ND HX is isolated, <u>THEN</u> stop affected ND pump within 3 hours.**
33. **Align CA to establish control of S/G feed as follows:** __ a. Ensure CA System valve control - RESET. __ b. CLOSE CA flow control valves on S/Gs not presently being fed.	
34. **Continue attempts to establish secondary heat sink in at least one S/G as follows:** __ • CA. **<u>REFER TO</u>** Steps 6 through 7 __ • CF or CM. **<u>REFER TO</u>** Steps 10 through 17.	<u>Note To Evaluator</u>: At this point NC System Bleed and Feed have been established and verified. All critical tasks have been performed. At the Lead Evaluators discretion, the scenario may be terminated by having the booth operator place the simulator in FREEZE.
__ 35. **Verify N/R level in at least one S/G - GREATER THAN 11% (29% ACC).**	__ **<u>RETURN TO</u> Step 34.**
36. **Verify NC System temperatures as follows:** __ • Core exit T/Cs - DECREASING __ • All NC T-Hots - DECREASING.	__ **<u>RETURN TO</u> Step 34.**

Attachment List

Scenario 1

ATTACHMENT 1 -	Crew Critical Task Summary
ATTACHMENT 2 -	Shift Turnover Information
ATTACHMENT 3 -	AP/1/A/5500/003 Enclosure 3 (Rod Insertion Limit Boration)
ATTACHMENT 4 -	AP/1/A/5500/012 Enclosure 3 (Control Room Ventilation System Verification)
ATTACHMENT 5 -	EP/1/A/5000/E-0 Enclosure 1 (Foldout Page)
ATTACHMENT 6 -	EP/1/A/5000/ES-0.1 Enclosure 1 (Foldout Page)
ATTACHMENT 7 -	EP/1/A/5000/ES-0.1 Enclosure 2 (NC Temperature Control)
ATTACHMENT 8 -	EP/1/A/5000/G-1 Enclosure 16 (Control Room Ventilation Verification)
ATTACHMENT 9 -	EP/1/A/5000/FR-H.1 Enclosure 1 (Foldout Page)
ATTACHMENT 10 -	EP/1/A/5000/FR-H.1 Enclosure 4 (System Verification Following S/I Actuation)
ATTACHMENT 11 -	EP/1/A/5000/FR-H.1 Enclosure 9 (System Verification Following S/I Actuation)

ATTACHMENT 1

CREW CRITICAL TASK SUMMARY			
SAT	**UNSAT**	**CT #**	**CRITICAL TASK**
		1	Manually isolate failed open Pressurizer PORV (1NC-32B) prior to any RPS actuation.
		2	Manually trip the reactor from the control room prior to S/G dryout conditions (W/R S/G level < 12%) occurs on any S/G.
		3	Initiate Reactor Coolant System Bleed and Feed before Pressurizer PORVs open automatically (NC system pressure of 2235 PSIG) due to heat up of the NC system.

Comments:

ATTACHMENT 2

SHIFT TURNOVER INFORMATION			
Unit 1 Status			
Power Level	**Power History**	**NCS Boron**	**Xenon**
75 **%**	EOL	177 PPM	per OAC
Controlling Procedure			
• OP/1/A/6100/003 (Controlling Procedure for Unit Operation), Enclosure 4.2 (Power Decrease). The steps up to step 3.15 are complete.			
Other Information Needed to Assume the Shift			
• Unit 1 is at 75% power at the EOL. Unit 2 is at 100% power. 1A CA Pump is removed from service for PMs. 1A CA Pump has been inoperable for 3 hours and is expected to be returned to service in 6 hours. 1A Condensate Booster Pump is tagged out for emergent motor replacement. Direction for the crew is to decrease reactor power to 50% to secure a main feedwater pump in preparation for entering a Unit 1 Refueling Outage. A reactivity plan has been provided by Reactor Engineering for a 10% per hour decrease in reactor power.			
AOs Available			
Seven AOs are available as listed on the status board			
METEOROLOGICAL CONDITIONS			
• Upper wind direction = 315 degrees, speed = 3 mph • Lower wind direction = 315 degrees, speed = 4.5 mph • Forecast calls for clear skies over the next 24 hours.			

ATTACHMENT 3

CNS AP/1/A/5500/003	LOAD REJECTION Enclosure 3 - Page 1 of 1 **Rod Insertion Limit Boration**	PAGE NO. 39 of 40 Revision 41

<u>CAUTION</u> **Failure to initiate boration within one hour of exceeding rod insertion limits may violate Tech Spec 3.1.6.**

<u>NOTE</u>
- OAC point C1L4409 (Ctrl Bank Tech Spec Insertion Lmt Reached) and R.O.D Book (Section 2.2) provide rod insertion limit indication.
- The "Reactivity Data Sheet" provides boration data to restore control rods above rod insertion limits.

1. **<u>IF</u> the control rods cannot be maintained above the rod insertion limits, <u>THEN</u> perform the following:**

__ a. Stop any dilutions in progress.

__ b. Borate NC system as required, to restore rods above insertion limits.

__ c. Ensure control rods restored above insertion limits within 2 hours of exceeding limits.

__ d. Ensure compliance with Tech Spec 3.1.6 (Control Bank Insertion Limits).

ATTACHMENT 4

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN **Enclosure 3 - Page 1 of 3** **Control Room Ventilation System Verification**	PAGE NO. **33 of 35** **Revision 34**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. **Verify one train of the following equipment in operation:** __ • YC chiller __ • CR AHU-1 __ • CRA AHU-1 __ • CRA PFT-1.	**Perform the following:** __ a. Shift operating VC/YC trains. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 17 (Shifting Operating VC/YC Trains). b. **IF** no train can be properly aligned, **THEN** dispatch operator and IAE/Maintenance to restore at least one train of VC/YC. **REFER TO** the following: __ • OP/0/A/6450/011 (Control Room Area Ventilation/Chilled Water System) __ • EM/0/A/5200/001 (Troubleshooting Cause For Improper Operation of VC/YC System).
2. **Verify the following annunciators - DARK:** __ • 1AD-18, A/8 "UNIT 1 INTAKE HI CHLORINE 1A" __ • 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE 1B" __ • 1AD-18, D/8 "UNIT 2 INTAKE HI CHLORINE 2A" __ • 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE 2B".	**IF chlorine odor detected in Control Room, THEN perform the following based on status of given alarms:** a. **IF** detectors on both unit intakes in alarm, **THEN** perform the following: 1) Ensure the following VC intake dampers - CLOSED: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet) __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). __ 2) **GO TO** Step 4. (RNO continued on next page)

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN **Enclosure 3 - Page 2 of 3** **Control Room Ventilation System Verification**	PAGE NO. **34 of 35** **Revision 34**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. (Continued)	
	b. **IF** Unit 1 intake HI chlorine detector(s) in alarm, **THEN** perform the following: 1) Ensure the following VC dampers - CLOSED: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet). 2) Ensure the following dampers - OPEN: __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). __ 3) **GO TO** Step 4.
	c. **IF** Unit 2 intake Hi chlorine detector(s) in alarm, **THEN** perform the following: 1) Ensure the following VC dampers - CLOSED: __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). 2) Ensure the following dampers - OPEN: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet). __ 3) **GO TO** Step 4.
3. **Ensure the following VC dampers - OPEN:** __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet) __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet).	

ATTACHMENT 4

CNS AP/1/A/5500/012	LOSS OF CHARGING OR LETDOWN **Enclosure 3 - Page 3 of 3** **Control Room Ventilation System Verification**	PAGE NO. **35 of 35** **Revision 34**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. **Repeat this enclosure until notified by Station Management as follows:** __ • At least once every 8 hours OR __ • Any time VC/YC related annunciators on 1AD-18 actuate.	

ATTACHMENT 5

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 1 of 2 **Foldout Page**	PAGE NO. 32 of 47 Revision 42

1. **NC Pump Trip Criteria:**
   - IF the following conditions satisfied, THEN trip all NC pumps while maintaining seal injection flow:
     - Any NV or NI pump - ON
     - NC subcooling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F
     - Reactor power - LESS THAN 5%.
2. **CA Suction Source Switchover Criterion:**
   - IF 1AD-8, B/1 "UST LO LEVEL" lit, THEN REFER TO AP/1/A/5500/006 (Loss of S/G Feedwater).
3. **Position Criteria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol):**
   - IF NC pressure less than 1500 PSIG AND NV S/I flowpath aligned, THEN CLOSE 1NV-202B and 1NV-203A.
   - IF NC pressure greater than 2000 PSIG, THEN OPEN 1NV-202B and 1NV-203A.
4. **Ruptured S/G CA Isolation Criteria:**
   - IF both the following conditions met, THEN stop CA flow to affected S/G:
     - Level increasing in an uncontrolled manner or radiation level in that S/G abnormal
     - N/R level - GREATER THAN 11% (29% ACC).

ATTACHMENT 5

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 2 of 2 **Foldout Page**	PAGE NO. 33 of 47 Revision 42

5. **Faulted S/G CA isolation Criteria:**
   - IF all the following conditions met, **THEN** stop CA flow to affected S/G:
     - S/G pressure decreasing in an uncontrolled manner or completely depressurized
     - Only one S/G diagnosed as faulted
     - Secondary heat sink criteria met:
       - Total CA flow - GREATER THAN 450 GPM

       OR

       - ANY S/G(s) N/R level - GREATER THAN 11%(29% ACC).

6. **NS Pump Trip Criterion:**
   - IF NS pump in recirc and S/I occurs, **THEN** perform one of the following:
     - IF train affected ECCS and D/G load sequencer - RESET, **THEN** stop NS pump.

     OR

     - **WHEN** sequencer loading complete, **THEN** perform the following for affected train:
       a. Notify Control Room Supervisor.
       b. Reset ECCS.
       c. Reset D/G load sequencer.
       d. Secure NS pump.
       e. IF **AT ANY TIME** B/O occurs, **THEN** restart S/I equipment previously on.

ATTACHMENT 6

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE **Enclosure 1 - Page 1 of 1** **Foldout Page**	PAGE NO. **28 of 42** **Revision 42**

1. **S/I Actuation Criteria:**

   - **IF** NC subcooling based on core exit T/Cs less than 0°F **OR** Pzr level cannot be maintained greater than 4%, **THEN** perform the following:

     a. Initiate S/I.

     b. **GO TO** EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).

   - **IF** S/I actuation occurs, **THEN GO TO** EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).

2. **CA Suction Source Switchover Criterion:**

   - **IF** 1AD-8, B/1 "UST LO LEVEL" lit, **THEN REFER TO** AP/1/A/5500/006 (Loss of S/G Feedwater).

ATTACHMENT 7

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE **Enclosure 2 - Page 1 of 6** **NC Temperature Control**	PAGE NO. **29 of 42** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 1. **Verify at least one NC pump - ON.**	**Perform the following:** __ a. Use NC T-Colds to determine NC temperature as required in subsequent steps. __ b. **IF** all MSIVs closed, **THEN GO TO** Step 4. __ c. Ensure "STM DUMP CTRL" - SET AT 1090 PSIG STEAM HEADER PRESSURE. d. Place steam dumps in pressure mode as follows: __ 1) Place "STM DUMP CTRL" in manual. __ 2) Ensure "STM DUMP CTRL" M/A station output equal to "% STM DUMP DEMAND" (1SMP5211). 3) Using "STEAM DUMP SELECT" switch, perform the following: __ • Reset C-7A and C-7B __ • Place steam dumps in pressure mode. __ 4) Place "STM DUMP CTRL" in auto. __ 5) Ensure steam dumps control to maintain steam header pressure - 1090 PSIG. __ e. **GO TO** Step 4.
__ 2. **Use NC T-Avg to determine NC temperature as required in subsequent steps.**	

ATTACHMENT 7

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE **Enclosure 2 - Page 2 of 6** **NC Temperature Control**	PAGE NO. **30 of 42** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 3. **<u>IF AT ANY TIME</u> NC pumps tripped, <u>THEN</u> use NC T-Colds to determine NC temperature as required in subsequent steps.**	
4. **Verify one of the following:** __ • NC temperature - STABLE AT LESS THAN OR EQUAL TO 557°F OR __ • NC temperature - TRENDING TO 557°F.	__ **<u>GO TO</u> Step 7.**
__ 5. **Continue to monitor NC temperature.**	
6. **Do not continue in this enclosure until one of the following occurs:** __ • NC temperature - GREATER THAN 557°F AND INCREASING IN AN UNCONTROLLED MANNER OR __ • NC temperature - GREATER THAN 557°F AND STABLE OR __ • NC temperature - LESS THAN 557°F AND DECREASING IN AN UNCONTROLLED MANNER.	

ATTACHMENT 7

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE **Enclosure 2 - Page 3 of 6** **NC Temperature Control**	PAGE NO. **31 of 42** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 7. **Verify NC temperature - LESS THAN 557°F AND DECREASING.**	**Perform the following:** a. **IF** NC temperature greater than 557°F **AND** increasing, **THEN** stabilize NC temperature at 557°F as follows: __ 1) **IF** steam dumps available, **THEN** use steam dumps. __ 2) **IF** steam dumps not available, **THEN** use S/G PORVs. b. **IF** the following conditions exist: __ • NC temperature greater than 557°F and stable __ • Time and manpower available, **THEN** stabilize NC temperature at 557°F as follows: __ 1) **IF** steam dumps available, **THEN** use steam dumps __ 2) **IF** steam dumps not available, **THEN** use S/G PORVs. __ c. **GO TO** Step 9.

ATTACHMENT 7

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE **Enclosure 2 - Page 4 of 6** **NC Temperature Control**	PAGE NO. **32 of 42** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. **Attempt to stop NC cooldown as follows:**	
a. **<u>IF</u>** steam dumps open **<u>AND</u>** any MSIV open, **<u>THEN</u>** place steam dumps in pressure mode as follows:	
__ 1) Ensure "STM DUMP CTRL" - SET AT 1090 PSIG STEAM HEADER PRESSURE.	
2) Place steam dumps in pressure mode as follows:	
__ a) Place "STM DUMP CTRL" in manual.	
__ b) Ensure "STM DUMP CTRL" M/A station output equal to "% STM DUMP DEMAND" (1SMP5211).	
c) Using "STEAM DUMP SELECT" switch, perform the following:	
__ • Reset C-7A and C-7B	
__ • Place steam dumps in pressure mode.	
__ d) Place "STM DUMP CTRL" in auto.	
__ e) Ensure steam dumps control to maintain steam header pressure - 1090 PSIG.	
__ b. Verify all S/G PORVs - CLOSED.	__ b. **<u>IF</u>** any S/G PORV cannot be closed, **<u>THEN</u>** CLOSE its isolation valve.
__ c. Ensure S/G blowdown isolated.	

ATTACHMENT 7

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. (Continued)	
d. CLOSE the following valves: __ • 1SM-77A (S/G 1A Otlt Hdr Bldwn C/V) __ • 1SM-76B (S/G 1B Otlt Hdr Bldwn C/V) __ • 1SM-75A (S/G 1C Otlt Hdr Bldwn C/V) __ • 1SM-74B (S/G 1D Otlt Hdr Bldwn C/V).	
e. Verify MSR Second Stage steam supply valves - CLOSED __ • 1HM-1 (MSRH 1A&1B SSRH Stm Source) __ • 1HM-2 (MSRH 1C&1D SSRH Stm Source).	e. Perform the following: __ 1) CLOSE MSR Second Stage steam supply valve(s). 2) **IF** steam flowpath cannot be isolated from control room, **THEN** CLOSE the following valves: __ • All MSIVs __ • All MSIV bypass valves.
f. Depress and hold "S/V BEFORE SEAT DRN" "CLOSE" pushbutton (1MC-3) to close the following valves: __ • 1SM-41 (Stop Vlv #1 Before Seat Drn) __ • 1SM-44 (Stop Vlv #2 Before Seat Drn) __ • 1SM-43 (Stop Vlv #3 Before Seat Drn) __ • 1SM-42 (Stop Vlv #4 Before Seat Drn).	

ATTACHMENT 7

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE **Enclosure 2 - Page 6 of 6** **NC Temperature Control**	PAGE NO. **34 of 42** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. (Continued)	
__ g. Verify NC cooldown - STOPPED.	g. **IF** cooldown continues, **THEN** THROTTLE feed flow as follows: 1) **IF** S/G N/R level less than 11% in all S/G's, **THEN** THROTTLE feed flow to achieve the following: __ • Minimize cooldown __ • Maintain total feed flow greater than 450 GPM. 2) **WHEN** N/R level greater than 11% in any S/G, **THEN** THROTTLE feed flow further to achieve the following: __ • Minimize cooldown __ • Maintain at least one S/G N/R level greater than 11%. 3) **IF** cooldown continues, **THEN** CLOSE the following valves: __ • All MSIVs __ • All MSIV bypass valves. __ 4) **IF** cooldown continues **AND** faulted S/G exists, **THEN** stop feeding faulted S/G.
9. **Continue to perform the actions of this enclosure as required to ensure one of the following:** __ • NC temperature - STABLE AT LESS THAN OR EQUAL TO 557°F OR __ • NC temperature - TRENDING TO 557°F.	

ATTACHMENT 8

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 16 - Page 1 of 3 **Control Room Ventilation Verification**	PAGE NO. 45 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. **Verify one train of the following equipment in operation:** __ • YC chiller __ • CR AHU-1 __ • CRA AHU-1 __ • CRA PFT-1.	**Perform the following:** __ a. Shift operating VC/YC trains. **<u>REFER TO</u>** Enclosure 17 (Shifting Operating VC/YC Trains). b. **<u>IF</u>** no train can be properly aligned, **<u>THEN</u>** dispatch operator and IAE/Maintenance to restore at least one train of VC/YC. **<u>REFER</u> <u>TO</u>** the following: __ • OP/0/A/6450/011 (Control Room Area Ventilation/Chilled Water System) __ • EM/0/A/5200/001 (Troubleshooting Cause For Improper Operation of VC/YC System).
2. **Verify the following annunciators - DARK:** __ • 1AD-18, A/8 "UNIT 1 INTAKE HI CHLORINE 1A" __ • 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE 1B" __ • 1AD-18, D/8 "UNIT 2 INTAKE HI CHLORINE 2A" __ • 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE 2B".	**<u>IF</u> chlorine odor is detected in Control Room, <u>THEN</u> perform the following based on status of given alarms:** a. **<u>IF</u>** detectors on both unit intakes in alarm, **<u>THEN</u>** perform the following: 1) Ensure the following VC intake dampers - CLOSED: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet) __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). __ 2) **<u>GO</u> <u>TO</u>** Step 4. (RNO continued on next page)

ATTACHMENT 8

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 16 - Page 2 of 3 **Control Room Ventilation Verification**	PAGE NO. 46 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. (Continued)	
	b. **<u>IF</u>** Unit 1 intake HI chlorine detector(s) in alarm, **<u>THEN</u>** perform the following: 1) Ensure the following VC dampers - CLOSED: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet). 2) Ensure the following dampers - OPEN: __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). __ 3) **<u>GO TO</u>** Step 4.
	c. **<u>IF</u>** Unit 2 intake Hi chlorine detector(s) in alarm, **<u>THEN</u>** perform the following: 1) Ensure the following VC dampers - CLOSED: __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). 2) Ensure the following dampers - OPEN: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet). __ 3) **<u>GO TO</u>** Step 4.
3. **Ensure the following VC dampers - OPEN:** __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet) __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet).	

ATTACHMENT 8

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. **Repeat this enclosure until notified by Station Management as follows:**	
__ • At least once every 8 hours	
OR	
__ • Any time VC/YC related annunciators on 1AD-18 actuate.	

ATTACHMENT 9

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK **Enclosure 1 - Page 1 of 1** **Foldout Page**	PAGE NO. **55 of 90** **Revision 42**

1. **Bleed and Feed Initiation Criteria:**

   __ • **IF** W/R level in at least 3 S/Gs are less than 24% (36% ACC), **THEN GO TO** Section C. (Operator Actions), Step 19.

__ 2. **IF AT ANY TIME a CA pump is restored after Step 7 AND prior to meeting Bleed and Feed Initiation Criteria, THEN perform Section C. (Operator Actions), Step 7.**

3. **CA Suction Source Switchover Criterion:**

   __ • **IF** 1AD-8, B/1 "UST LO LEVEL" is lit, **THEN REFER TO** AP/1/A/5500/006 (Loss of S/G Feedwater).

4. **Cold Leg Recirc Switchover Criterion:**

   __ • **IF** FWST level decreases to 20% (1AD-9, D/8 "FWST 2/4 LO LEVEL"), **THEN GO TO** EP/1/A/5000/ES-1.3 (Transfer to Cold Leg Recirculation).

5. **Position Criteria for 1NV-202B and 1NV-203A (NV Pmps A&B Recirc Isol):**

   __ • **IF** NC pressure less than 1500 PSIG **AND** NV S/I flowpath aligned, **THEN** CLOSE 1NV-202B and 1NV-203A.

   __ • **IF** NC pressure greater than 2000 PSIG, **THEN** OPEN 1NV-202B and 1NV-203A.

ATTACHMENT 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 1. **Announce "Unit 1 Safety Injection".**	
2. **Determine required notifications:**	
__ • **REFER TO** RP/0/A/5000/001 (Classification Of Emergency)	
__ • **REFER TO** RP/0/B/5000/013 (NRC Notification Requirements).	
3. **Verify Phase A Containment Isolation status as follows:**	
__ a. Phase A "RESET" lights - DARK.	__ a. Initiate Phase A Isolation.
__ b. Cont Vent "RESET" lights - DARK.	__ b. Initiate Phase A Isolation.
__ c. Monitor Light Panel Group 5 St lights on energized train(s) - LIT.	__ c. Align valves as necessary to ensure each penetration isolated by at least one isolation valve.
__ d. Ensure Phase A containment isolation signals - RESET.	
__ 4. **Verify all KC pumps - ON.**	**Perform the following for affected train(s):** __ a. Reset ECCS. __ b. Reset D/G load sequencer(s). __ c. Start affected pump(s). __ d. **IF AT ANY TIME** a B/O occurs, **THEN** restart S/I equipment previously on.

ATTACHMENT 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 5. **Verify all Unit 1 and Unit 2 RN pumps - ON.**	**Perform the following:** __ a. **<u>IF</u>** any Unit 2 RN pump is off, **<u>THEN</u>** start affected pump(s). b. **<u>IF</u>** any Unit 1 RN pump is off, **<u>THEN</u>** perform the following for affected train(s): __ 1) Reset ECCS. __ 2) Reset D/G load sequencer. __ 3) Start affected pump. __ 4) **<u>IF AT ANY TIME</u>** a B/O occurs, **<u>THEN</u>** restart S/I equipment previously on.
__ 6. **Verify S/I equipment status based on monitor light panel - IN PROPER ALIGNMENT.**	**Perform the following:** __ a. Do not isolate feedwater isolation valves in the following step. __ b. Align equipment.

ATTACHMENT 10

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK **Enclosure 4 - Page 3 of 9** **System Verification Following S/I Actuation**	PAGE NO. **68 of 90** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **Ensure proper VA System operation as follows:** • Ensure the following fans - OFF: __ • ABUXF 1A __ • ABUXF 1B. • Ensure VA System filter is in service as follows: __ • 1ABF-D-12 & 19 (VA Filter A Bypass Dampers) - CLOSED __ • 1ABF-D-5 & 20 (VA Filter B Bypass Dampers) - CLOSED. • Ensure the following fans - ON: __ • ABFXF-1A __ • ABFXF 1B.	
8. **Verify proper VC/YC operation as follows:**	
a. Verify one train of the following equipment is in operation: __ • YC chiller __ • CR AHU-1 __ • CRA AHU-1 __ • CRA PFT-1.	a. Perform the following: __ 1) Shift operating VC/YC trains. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 17 (Shifting Operating VC/YC Trains). 2) **IF** no train can be properly aligned, **THEN** dispatch operator and IAE/Maintenance to restore at least one train of VC/YC. **REFER TO** the following: __ • OP/0/A/6450/011 (Control Room Area Ventilation/Chilled Water System) __ • EM/0/A/5200/001 (Troubleshooting Cause For Improper Operation of VC/YC System).

ATTACHMENT 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. (Continued)	
b. Verify the following annunciators - DARK: __ • 1AD-18, A/8 "UNIT 1 INTAKE HI CHLORINE 1A" __ • 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE 1B" __ • 1AD-18, D/8 "UNIT 2 INTAKE HI CHLORINE 2A" __ • 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE 2B".	b. **<u>IF</u>** chlorine odor is detected in Control Room, **<u>THEN</u>** perform the following based on status of given alarms: 1) **<u>IF</u>** detectors on both unit intakes are in alarm, **<u>THEN</u>** perform the following: a) Ensure the following VC intake dampers - CLOSED: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet) __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). __ b) **<u>GO TO</u>** Step 8.d. 2) **<u>IF</u>** Unit 1 intake HI chlorine detector(s) in alarm, **<u>THEN</u>** perform the following: a) Ensure the following VC dampers - CLOSED: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet). b) Ensure the following dampers - OPEN: __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). __ c) **<u>GO TO</u>** Step 8.d. (RNO continued on next page)

ATTACHMENT 10

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK **Enclosure 4 - Page 5 of 9** **System Verification Following S/I Actuation**	PAGE NO. **70 of 90** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. (Continued)	3) **IF** Unit 2 intake Hi chlorine detector(s) in alarm, **THEN** perform the following: a) Ensure the following VC dampers - CLOSED: __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). b) Ensure the following dampers - OPEN: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet). __ c) **GO TO** Step 8.d.
c. Ensure the following VC dampers - OPEN: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet) __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). d. Repeat Step 8 of this enclosure until notified by station management as follows: __ • At least once every 8 hours OR __ • Any time VC/YC related annunciators on 1AD-18 actuate.	

ATTACHMENT 10

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK **Enclosure 4 - Page 6 of 9** **System Verification Following S/I Actuation**	PAGE NO. **71 of 90** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. **Verify proper VE System operation as follows:**	
__ a. VE fans - ON.	__ a. Start fan(s).
__ b. Annulus pressure - BETWEEN -1.4 IN. WC AND -1.8 IN. WC.	b. Perform the following: 1) **<u>IF</u>** annulus pressure is more positive than -1.4 in. WC, **<u>THEN</u>** perform the following: a) Verify flow indicated on the following indications: __ • 1VEP5180 (VE 1A Flow To Stack) __ • 1VEP5200 (VE 1B Flow To Stack). b) **<u>IF</u>** flow is not indicated, **<u>THEN</u>** dispatch operator to verify status of the following dampers based on their local indication or their operating piston rods being extended 4" to 6": __ • 1AVS-D-2 (VE A Trn Recirc Damp) (AB-603, JJ-51, Rm 500) - CLOSED __ • 1AVS-D-7 (VE B Trn Recirc Damp) (AB-603, HH-52, Rm 500) - CLOSED __ • 1AVS-D-3 (VE A Trn Exh Damp) (AB-603, JJ-52, Rm 500) - OPEN __ • 1AVS-D-8 (VE B Trn Exh Damp) (AB-603, HH-52, Rm 500) - OPEN. (RNO continued on next page)

ATTACHMENT 10

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK **Enclosure 4 - Page 7 of 9** **System Verification Following S/I Actuation**	PAGE NO. **72 of 90** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
	__ c) Consult plant engineering staff and notify IAE/Maintenance to troubleshoot and repair. **<u>REFER</u> <u>TO</u>** EM/1/A/5200/002 (Troubleshooting Cause For VE System Hi/Lo Pressure).
	__ d) **<u>GO</u> <u>TO</u>** Step 9.c.
	2) **<u>IF</u>** annulus pressure is more negative than -1.8 in. WC, **<u>THEN</u>** perform the following:
	__ a) Determine which VE train indicates highest discharge flow to stack.
	__ b) Within 2 hours, ensure VE train that indicates highest discharge flow to stack is secured.
	__ c) Consult plant engineering staff and notify IAE/Maintenance to troubleshoot and repair. **<u>REFER</u> <u>TO</u>** EM/1/A/5200/002 (Troubleshooting Cause For VE System Hi/Lo Pressure).
__ c. Repeat Step 9.b every 30 minutes until notified by station management.	

ATTACHMENT 10

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK **Enclosure 4 - Page 8 of 9** **System Verification Following S/I Actuation**	PAGE NO. **73 of 90** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 10. **Verify all S/G pressures - GREATER THAN 775 PSIG.**	**<u>IF</u> S/G pressure has decreased in an uncontrolled manner to less than 775 PSIG, <u>THEN</u> perform the following:** a. Verify Main Steam Isolation as follows: __ • All MSIVs - CLOSED __ • All MSIV bypass valves - CLOSED __ • All S/G PORVs - CLOSED. b. **<u>IF</u>** any valve is open, **<u>THEN</u>** perform the following: __ 1) Initiate Main Steam Isolation. __ 2) **<u>IF</u>** any valve is still open, **<u>THEN</u>** CLOSE valve.

ATTACHMENT 10

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK **Enclosure 4 - Page 9 of 9** **System Verification Following S/I Actuation**	PAGE NO. **74 of 90** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 11. **Record time ventilation systems are verified on following table:**

TIME	SYSTEM (VC, VE)	INITIALS

ATTACHMENT 11

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK **Enclosure 9 - Page 1 of 4** **VX and Containment Ventilation Control**	PAGE NO. **87 of 90** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE One train of VX containment air return fan is manually started and cooling is isolated to containment ventilation to gain sump level margin and avoid sump dilution due to ventilation system drains during small LOCA events.	
__ 1. **IF containment pressure goes above 3 PSIG prior to performing this enclosure, THEN return this enclosure to Control Room Supervisor.**	
2. **Start one VX Containment Air Return Fan as follows:**	
__ a. Verify Train "A" containment air return fan and damper - AVAILABLE.	__ a. **GO TO** Step 2.e.
__ b. Place "ARF-1A CONT AIR RETURN FAN" to "ON".	
__ c. **WHEN** approximately 10 seconds have elapsed, **THEN** verify ARF-D-2 (ARF-1A Ret Fan Damper) - OPEN.	c. Perform the following: __ 1) OPEN damper ARF-D-2. __ 2) **IF** ARF-D-2 is open, **THEN GO TO** Step 3. 3) **IF** ARF-D-2 remains closed, **THEN** perform the following: __ a) Stop "ARF-1A CONT AIR RETURN FAN". __ b) Do not attempt to start Train "B" containment air return fan. __ c) **WHEN** 9 minutes have elapsed, **THEN** ensure 1VX-1A (HSF-1A INLT ISOL) - CLOSED. __ d) **GO TO** Step 4.
__ d. **GO TO** Step 3.	
__ e. Place "ARF-1B CONT AIR RETURN FAN" to "ON".	

ATTACHMENT 11

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK **Enclosure 9 - Page 2 of 4** **VX and Containment Ventilation Control**	PAGE NO. **88 of 90** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. (Continued)	
__ f. **WHEN** approximately 10 seconds have elapsed, **THEN** verify ARF-D-4 (ARF-1B Ret Fan Damper) - OPEN.	f. Perform the following: __ 1) OPEN damper ARF-D-4. __ 2) **IF** ARF-D-4 is open, **THEN GO TO** Step 3. 3) **IF** ARF-D-4 remains closed, **THEN** perform the following: __ a) Stop "ARF-1B CONT AIR RETURN FAN". __ b) Do not attempt to start Train "A" containment air return fan. __ c) **WHEN** 9 minutes have elapsed, **THEN** ensure 1VX-1B (HSF-1B INLT ISOL) - CLOSED. __ d) **GO TO** Step 4.

ATTACHMENT 11

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK **Enclosure 9 - Page 3 of 4** **VX and Containment Ventilation Control**	PAGE NO. **89 of 90** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

3. **__WHEN__ containment pressure less than 0.4 PSIG, __THEN__ perform the following to prevent cycling of VX components:**

   a. Ensure the following switches in "AUTO"

   __ • "ARF-1A CONT AIR RETURN FAN"

   __ • "ARF-1B CONT AIR RETURN FAN".

   b. Ensure the following dampers - CLOSED:

   __ • ARF-D-2 (ARF-1A Ret Fan Damper)

   __ • ARF-D-4 (ARF-1B Ret Fan Damper)

   __ • 1VX-1A (HSF-1A INLT ISOL)

   __ • 1VX-2B (HSF-1B INLT ISOL).

ATTACHMENT 11

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK **Enclosure 9 - Page 4 of 4** **VX and Containment Ventilation Control**	PAGE NO. **90 of 90** **Revision 42**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. **Secure containment ventilation as follows:**	
a. Ensure the following Upper Containment Ventilation switches in "OFF": __ • VV UCVU 1A __ • VV UCVU 1B __ • VV UCVU 1C __ • VV UCVU 1D.	__ a. CLOSE 1RN-404B (Upper Cont Vent Unit Sup).
b. Ensure the following Lower Containment Ventilation switches in "OFF": __ • VV LCVU 1A __ • VV LCVU 1B __ • VV LCVU 1C __ • VV LCVU 1D.	b. Dispatch operator to trip affected AHU Breaker. __ • 1MXQ-F03A (1A Lower Containment Ventilation Unit Fan Motor) (AB-577, BB-50, Rm 496) __ • 1MXP-F03A (1B Lower Containment Ventilation Unit Fan Motor) (AB-560, BB-52, Rm 370) __ • 1MXO-F03A (1C Lower Containment Ventilation Unit Fan Motor) (AB-577, BB-52, Rm 494) __ • 1MXR-F03A (1D Lower Containment Ventilation Unit Fan Motor) (AB-560, BB-50, Rm 372)
__ 5. **Return this enclosure to Control Room Supervisor.**	

2017 INITIAL LICENSE NRC EXAM
SCENARIO # 2

Facility:	Catawba NRC Exam 2017	Scenario No.: 2	Op Test No.: 2017301
Examiners:		Operators:	SRO
			RO
			BOP

Initial Conditions: Unit 1 is at 100% power at the MOL. Unit 2 is at 100% power.

Turnover: Unit 1 is at 100% power at the MOL. Unit 2 is at 100% power. 1A CA Pump is removed from service for PMs. 1A CA Pump has been inoperable for 3 hours and is expected to be returned to service in 6 hours. Direction for the crew is to initiate a VQ release from 'A' train by completing the in-progress OP/1/A/6450/017 (Containment Air Release and Addition System) Enclosure 4.2 (Air Release Mode).

Event No.	Malf. No.	Event Type*	Event Description
1		N – BOP N – SRO	VQ Release
2	SLIM05_02	C – BOP C – SRO	Letdown Heat Exchanger Temperature Control Valve (1KC-132) Failure
3	SM002B	C – RO C – SRO ~~TS-SRO~~	S/G PORV (1SV-13) Fails Open
4	EP006C IRX009	R – RO N - BOP TS – SRO	1B GPCB Trip / No Auto Rods
5	NC013D ISE008A ISE008B	C – BOP C – SRO TS -SRO	NC System Leak (S_H Failure - Secure VQ)
6	NC013D	M – ALL	LBLOCA
7	ISE002A ISE002B	C – BOP	SI Fails to Automatically Actuate
8	CF006A	C – RO	1CF-33 (S/G 1A CF Cont Isol) Fails to Close on Feedwater Isolation
9	ND001A ND001B	C - BOP	ND Pumps Fail to Auto Start

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Scenario 2 – Summary

Initial Condition

Unit 1 is at 100% power at the MOL. Unit 2 is at 100% power.

Turnover:

Unit 1 is at 100% power at the MOL. Unit 2 is at 100% power. 1A CA Pump is removed from service for PMs. 1A CA Pump has been inoperable for 3 hours and is expected to be returned to service in 6 hours. Direction for the crew is to initiate a VQ release from ‘A’ train by completing the in-progress OP/1/A/6450/017 (Containment Air Release and Addition System) Enclosure 4.2 (Air Release Mode).

Event 1

Initiate VQ Release.

Event 2

Letdown Heat Exchanger Temperature Control Valve (1KC-132) setpoint increases causing 1KC-132 to close and causing a letdown heat exchanger outlet high temperature alarm.

Verifiable Action – BOP will take 1KC-132 to manual and throttle it open to decrease letdown temperature. If letdown temperature exceeds 136°F, then letdown heat exchanger outlet three way valve (1NV-153A) will fail to go to the VCT position (will continue flow to NV demineralizers) and the BOP will be required to manually align to the VCT.

Event 3

1B S/G PORV (1SV-13) will fail open. Crew may enter AP/1/A/5500/028 (Secondary Steam Leak) for guidance to isolate the leak. Alternatively, the crew may use OMP 1-7 (Emergency/Abnormal Procedure Implementation Guidelines) guidance to address failure.

Verifiable Action – The RO will close 1SV-28A (S/G 1B PORV Isol) to isolate the leak. RO may decrease turbine generator load to maintain reactor power < 100%.

Event 4

1B Main Generator Breaker (GEN BKR 1B) will spuriously open resulting in a turbine runback. Control Rods will fail to automatically insert. Crew will enter AP/1/A/5500/003 (Load Rejection), Case I (Switchyard Available).

Verifiable Action – OATC will manually insert Control Rods as required. BOP will borate to restore Control Rod Insertion limits. SRO will address Tech Specs.

Event 5

A Primary Coolant system leak will develop inside containment. Crew will enter AP/1/A/5500/010 (Reactor Coolant Leak), Case II (NC System Leak). Containment Ventilation Isolation Signal (S_H) will fail to actuate on high containment radiation level (EMF-38, 39).

Verifiable Action – BOP will adjust charging to maintain Pressurizer level. BOP will secure Containment Air Release (VQ). SRO will address Tech Specs.

Event 6

A Large Break LOCA will occur. Crew will enter EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) and transition to EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant).

Verifiable Action – RO will manually trip the reactor. BOP will manually initiate Safety Injection.

Event 7

Safety Injection will fail to automatically actuate on High Containment Pressure or Low Pressurizer Pressure.

Verifiable Action – BOP will manually actuate both trains of Safety Injection

Event 8
1CF-33 (S/G 1A CF Cont Isol) fails to automatically close on Feedwater Isolation Signal.

Verifiable Action – RO will manually close valve.

Event 9
Both ND Pumps will fail to automatically start on Safety Injection initiation.

Verifiable Action –SRO will direct reset of D/G sequencer and ECCS. BOP will manually start 1A and 1B ND Pumps.

***Critical Task 1* – Manually actuate at least one train of SIS-actuated safeguards before transition to E-1 occurs (E-0 Step 27 RNO d).**

***Critical Task 2* – Manually start at least one low-head ECCS pump before transition out of E-0 (E-0 Step 27 RNO d).**

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5–8)	7
2. Malfunctions after EOP entry (1–2)	3
3. Abnormal events (2–4)	4
4. Major transients (1–2)	1
5. EOPs entered/requiring substantive actions (1–2)	1
6. EOP contingencies requiring substantive actions (0–2)	0
7. Critical tasks (2–3)	2

EXERCISE GUIDE WORKSHEET

1. INITIAL CONDITIONS:

   1.1 Reset to IC # 158 and load Schedule file for Scenario 2.

START TIME:__________

✓	✓	Trigger	Instructor Action	Final	Delay	Ramp	Delete In	Event
		2	MAL-SLIM05_02 (1NVSS5590 KC-132 Raise Setpoint Pushbutton fail to position)	Button Depress-ed			:10	2
			VLV-NV035A (NV153A L/D HX DIVERSION FAIL AUTO ACTIONS)	ACTIVE				2
		3	MAL-SM002B (S/G PORV SV13 FAILURE)	100				3
		4	OVR-EP006B (GEN BKR 1B TRIP ENABLE PB)	ON				4
		4	OVR-EP006C (GEN BKR 1B TRIP PB)	ON				4
			MAL-IRX009 (RODS FAIL TO MOVE)	AUTO				4
		5	MAL-NC013D (NC COLD LEG D LEAK)	0.2				5
			MAL-ISE008A (AUTO CNT VENT SIGNAL TRN A)	BLOCK				5
			MAL-ISE008B (AUTO CNT VENT SIGNAL TRN B)	BLOCK				5
		6	MAL-NC013D (NC COLD LEG D LEAK)	27.5				6
			MAL-ISE002A (AUTO SI TRN A FAILS TO ACTUATE)	ACTIVE				7
			MAL-ISE002B (AUTO SI TRN B FAILS TO ACTUATE)	ACTIVE				7
			VLV-CF006A (CF33 CF CONT ISOL VLV 1CF033 FAIL AUTO ACTIONS)	ACTIVE				8
			MAL-ND001A (ND PUMP A FAILURE)	AUTO				9
			MAL-ND001B (ND PUMP B FAILURE)	AUTO				9
			LOA-CA017 (RACKOUT CA PUMP 1A)	RACK-OUT				
		10	LOA-CNT002 H2 ANALYZERS	BOTH	10:00			

		Ensure Red Collar is placed on 1A CA Pump

2. SIMULATOR BRIEFING

2.1 Control Room Assignments:

Position	Name
CRS	
RO	
BOP	

2.2 Give a copy of Attachment 2 (Shift Turnover Information) to the CRS.

3. EXERCISE PRESENTATION

3.1 Familiarization Period

A. Allow examinees time to familiarize themselves with the Control Board alignments.

3.2 **Scenario EVENT 1**, Initiate VQ Release

3.3 **Scenario EVENT 2**, Letdown Heat Exchanger temperature control valve (1KC-132) failure

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 2** to cause 1KC-132 to slowly close.

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for 1KC-132 or 1NV-153A, **REPEAT** the information.

3.4 **Scenario EVENT 3**, 1B S/G PORV (1SV-13) Fails Open

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 3** to cause 1B S/G PORV (1SV-13) to fail open.

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for 1SV-13, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Radiation Protection notifying of steam leak from 1SV-13 failing open, **REPEAT** the information.

3.5 **Scenario EVENT 4**, Generator Breaker 1B Trip

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 4** to cause Generator Breaker 1B to trip open.

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for Generator Breaker 1B or control rods failing to insert, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as an AO to complete shutdown of the CHDPs, **REPEAT** the information..

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as the SOC reporting on runback of Unit 1, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Radiation Protection to sample and analyze gaseous effluents referring to SLC 16.11-6, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Primary Chemistry to sample for isotopic analysis of iodine between 2-6 hours following a power change of > 15% in a 1 hour period referring to Tech Spec 3.4.16, **REPEAT** back the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Reactor Engineering reporting on runback of Unit 1, **REPEAT** the information.

3.6 **Scenario EVENT 5**, NC System Leak

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 5** to cause an NC System Leak on loop 1D.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Reactor Engineering reporting on need for shutdown of Unit 1, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Station Management for further actions, **REPORT** "Once further actions are required, station management will contact the control room."

3.7 **Scenario EVENT 6**, Large Break LOCA

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 6** to cause a Large Break LOCA on loop 1D.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as an AO to secure all ice condenser AHUs per G-1 Enclosure 11 and to place the H_2 Analyzers in service per OP/1/A/6450/010, **REPEAT** the information and **INSERT Trigger 10**.
	After 10 minutes, contact the control room and **REPORT** "All ice condenser AHUs have been secured per G-1 Enclosure 11 and the H_2 Analyzers have been placed in service per OP/1/A/6450/010."

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Radiation Protection to frisk all Unit 1 S/G cation columns for activity, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Secondary Chemistry to sample all Unit 1 S/Gs for activity, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as an AO to secure both D/Gs and place them in standby readiness per the OP, **REPEAT** the information.

Enclosure 4.2
Air Release Mode

OP/1/A/6450/017
Page 1 of 10

1. Limits and Precautions

1.1 Do **NOT** exceed Containment Pressure Limits of -0.08 psig and +0.25 psig. Tech Spec Containment Pressure Limits are -0.1 psig to +0.3 psig.

1.2 When manually operating any motor operated valve, minimize the torque applied to the handwheel.

1.3 After manual operation, maintenance, or packing adjustment of any motor operated Safety Related valve, it shall be cycled electrically to ensure reliable automatic operation.

1.4 Pressure switches for valve operation shall **NOT** be manually overridden since ice condenser doors are very sensitive to over or under pressure conditions.

1.5 When Containment Air Release Filter unit pre-filter or absolute filter differential pressure reaches 2.5 inches H_2O, the standby fan is placed in service and action initiated to replace the dirty filter(s).

1.6 A new Gaseous Waste Release (GWR) sample is required if:

- 24 hours has elapsed since the last sample.
- VQ release is automatically terminated due to a valid controlling EMF actuation. If actuation is due to an EMF spike, the release may be re-attempted twice before a new sample is required.

1.7 A VP, VQ, or Unit Vent Sample is required if:

- Rx Trip or Startup occurs.
- Rated Thermal Power change of ≥ 15% in one hour occurs followed by a Thermal Power Stabilization (power level constant at desired power level).

1.8 If in Modes 5 or 6 and automatic termination of a release is **NOT** available, actions of SLC 16.11-7 apply.

2. Initial Conditions

BB 2.1 Verify Containment Pressure > 0.09 psig.

BB 2.2 Verify Control Room Supervisor has signed and dated the appropriate sheet of the Gaseous Waste Release (GWR) Record authorizing releases:

☒ "VQ release monitored by EMF 39(L)"
☐ "VQ release monitored by EMF 36(L)"

BB 2.3 Verify Containment pressure increase is **NOT** due to a LOCA or steam line break.

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BB 2.4 Verify EMF is aligned per the "SPECIAL INSTRUCTIONS FOR RELEASE" section on the Gaseous Waste Release Permit Report.

3. Procedure

BB 3.1 Ensure the following enclosures are complete:

- ☒ Enclosure 4.4 (Auxiliary Building Valve Checklist)
- ☒ Enclosure 4.5 (Reactor Building Valve Checklist)
- ☒ Enclosure 4.6 (Auxiliary Building Independent Verification Valve Checklist)
- ☒ Enclosure 4.7 (Reactor Building Independent Verification Valve Checklist)

NOTE:	Enclosure 4.3 (Initiation and Termination of a Gaseous Waste Release Permit Report) provides information on initiation and termination of a GWR Permit Report.

3.2 Perform one of the following:

BB 3.2.1 **IF** 1EMF-39 (low range) is functional, perform the following:

BB 3.2.1.1 Verify 1EMF-39L is specified for use on the Gaseous Waste Release Permit Report.

BB 3.2.1.2 Verify 1EMF-39L is functional per SLC 16.11-7 using OP/0/A/6500/080 (EMF Output Modules).

BB 3.2.1.3 Set 1EMF-39 (low range) setpoints to the value specified in the "SETPOINT DATA" section on the Gaseous Waste Release Permit Report using OP/0/A/6500/080 (EMF Output Modules).

BB 3.2.1.4 Sign off the "EMF39(L) Functional and Source Checked" blank on the "VQ release monitored by EMF 39(L)" sheet of the Gaseous Waste Release (GWR) Record.

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N/A 3.2.2 **IF** 1EMF-39 (low range) is non-functional **AND** 1EMF-36 (low range) is to be used to monitor this release, perform the following:

_____ 3.2.2.1 Verify 1EMF-36L is specified for use on the Gaseous Waste Release Permit Report.

_____ 3.2.2.2 Verify 1EMF-36L is functional using OP/0/A/6500/080 (EMF Output Modules).

NOTE:	1EMF-36 (low range) trip setpoints are pre-established for offsite dose.

_____ 3.2.2.3 Verify trip setpoints are set to the values as specified in "SETPOINT DATA" section on the Gaseous Waste Release Permit Report using OP/0/A/6500/080 (EMF Output Modules).

_____ 3.2.2.4 Sign off the "EMF36(L) Functional and Source Checked" blank on the "VQ release monitored by EMF 36(L)" sheet of the Gaseous Waste Release (GWR) Record.

_____ 3.2.2.5 N/A the "Independent Verification (IV)" blank on the "VQ release monitored by EMF 36(L)" sheet of the Gaseous Waste Release (GWR) Record.

N/A 3.2.3 **IF** 1EMF-39L **AND** 1EMF-36L are non-functional, perform the following:

_____ 3.2.3.1 Verify EMF39L **AND** EMF36L are N/A'd on the Gaseous Waste Release Permit Report.

_____ 3.2.3.2 Verify RP has obtained grab samples per HP/0/B/1004/005 (Radioactive Gaseous Waste Release - VQ & VP System). RP contact ____________________

_____ 3.2.3.3 N/A the "EMF36(L) **AND** EMF39(L) are both non-functional" blank on the "VQ release with EMF 39(L) **AND** EMF 36(L) Non-functional" sheet of the Gaseous Waste Release (GWR) Record.

_____ 3.2.3.4 N/A the "IV" blank on the "VQ release with EMF 39(L) **AND** EMF 36(L) Non-functional" sheet of the Gaseous Waste Release (GWR) Record.

_____ 3.2.3.5 N/A steps 3.3 and 3.23.4.

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> **NOTE:**
> - Monitoring for highest count rate during release using a digital EMF chart recorder does **NOT** require an initial setup.
> - The procedure may continue while performing the following step.

BB 3.3 **IF** using the OAC to obtain the highest count rate during release, monitor the applicable OAC point:

- C1E0155 (EMF39L Containment Gas Monitor)
- C1E0135 (EMF36L Unit Vent Gas Monitor)

3.4 Adjust "1VQ-10 VQ FANS DISCH TO UNIT VENT" controller (1MC5) by performing the following:

BB 3.4.1 Depress the "A/M" pushbutton until the "A" light (auto) is illuminated.

BB 3.4.2 Verify "VQ0100.S" appears in the display window.

BB 3.4.3 Rotate the manual loader in the clockwise direction to open the valve to ≤ the "Recommended Release Rate (cfm)" on the Gaseous Waste Release Permit Report.

> **NOTE:** The person performing Step 3.5 or 3.6 shall **NOT** be the same individual who originally performed the associated actions in Steps 3.2.1.3, 3.2.1.4 or 3.4.3.

_____ 3.5 **IF** 1EMF-39L is functional, perform the following:

_____ IV 3.5.1 Independently verify trip setpoints are set to the values as specified in "SETPOINT DATA" section on the Gaseous Waste Release Permit Report using OP/0/A/6500/080 (EMF Output Modules).

_____ IV 3.5.2 Sign off the "Independent Verification (IV)" blank on the "VQ release monitored by EMF 39(L)" sheet of the Gaseous Waste Release (GWR) Record.

_____ IV 3.6 Independently verify "1VQ-10 VQ FANS DISCH TO UNIT VENT" controller is set to ≤ the "Recommended Release Rate (cfm)" on the Gaseous Waste Release Permit Report.

3.7 Reset Totalizer on "1VQ-10 VQ FANS DISCH TO UNIT VENT" controller (1MC5) by performing the following:

_____ 3.7.1 Depress the "D" pushbutton until "VQ0100.T" appears in the display window.

_____ 3.7.2 Depress the "Reset Total" pushbutton and verify a "0" appears in the display window.

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_____ 3.8 **IF AT ANY TIME** during the release using 1EMF-39 all of the following conditions are met, immediately terminate the release.

- OAC point C1E0155 (EMF39L Containment Gas Monitor) is being used to monitor release per Step 3.3.
- 1EMF-39 digital chart recorder 1MICR6640 is out of service.
- Loss of Unit 1 OAC.

N/A 3.9 **IF AT ANY TIME** during the release using 1EMF-36 all of the following conditions are met, immediately terminate the release.

- OAC point C1E0135 (EMF36L Unit Vent Gas Monitor) is being used to monitor release per Step 3.3.
- 1EMF-36 digital chart recorder 1MICR6650 is out of service.
- Loss of Unit 1 OAC.

3.10 Open the following valves (1MC5):
Record time first valve is opened ________

_____ • 1VQ-2A (VQ Fan Suct From Cont Isol)
_____ • 1VQ-3B (VQ Fan Suct From Cont Isol)

N/A 3.11 **IF** 1EMF-39L **AND** 1EMF-36L are non-functional, independently verify the following valves are open:

_____ IV • 1VQ-2A (VQ Fan Suct From Cont Isol)
_____ IV • 1VQ-3B (VQ Fan Suct From Cont Isol)

CAUTION:	Operation of VQ Fans below 120 cfm will produce surge noise and vibration. Operation below 50 cfm results in heat buildup and may lead to fan failure.

3.12 Place one VQ train in service as follows (1MC5):

_____ 3.12.1 **IF** placing A train in service, perform the following:

_____ 3.12.1.1 Place "VQ Filt Htr A" in the "AUTO" position.

_____ 3.12.1.2 Start "Cont Air Rel Fan 1A".

N/A 3.12.2 **IF** placing B train in service, perform the following:

_____ 3.12.2.1 Place "VQ Filt Htr B" in the "AUTO" position.

_____ 3.12.2.2 Start "Cont Air Rel Fan 1B".

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3.13 Perform the following:

NOTE:	Step 3.13.2 may be performed prior to Step 3.13.1.

_____ 3.13.1 Record the VQ start date/time on the following:

- ☐ Appropriate Gaseous Waste Release (GWR) Record
- ☐ Control Room Log

_____ 3.13.2 Enter "0" in the "Initial Integrator Reading" blank of the appropriate Gaseous Waste Release (GWR) Record.

NOTE:	Containment pressure is monitored to ensure 1VQ-10 (VQ Fans Disch To Unit Vent) closes at 0 psig to prevent a negative pressure inside containment.

_____ 3.14 **IF AT ANY TIME** during the release the OAC **OR** Computer Point C1P1112 (Average Containment Pressure, Best) is out of service, record containment pressure as read on 1VQP5040 (Containment Pressure) on 1MC5 every 30 minutes in the Control Room Log for the duration of the VQ Release. {PIP 93-0074}

_____ 3.15 **IF** the VQ fan does **NOT** automatically shutdown at approximately 0 psig, perform the following:

- N/A Step 3.16.
- Perform Step 3.17.

3.16 **WHEN** Containment pressure decreases to approximately 0 psig, verify that "1VQ-10 VQ FANS DISCH TO UNIT VENT" closes by performing the following:

_____ 3.16.1 Depress the "D" pushbutton until "VQ0100.P" appears in the display window.

_____ 3.16.2 Verify no flow indicated on the controller display window.

NOTE:	Solenoid 1VQSV0100 (VQ Containment Purge Flow Sol) will **NOT** reset 1VQSS0100 (VQ Fans Disch To Unit Vent) until a low containment pressure (lower containment pressure greater than 0 psig) or high radiation signal condition (EMF35 or EMF36) is no longer present.

3.17 Reset solenoid 1VQSV0100 (VQ Containment Purge Flow Sol) by performing the following at"1VQ-10 VQ FANS DISCH TO UNIT VENT" controller:

_____ 3.17.1 Depress the "A/M" pushbutton until the "M" light (manual) is illuminated.

_____ 3.17.2 Verify "VQ0100.V" appears in the display window.

_____ 3.17.3 Rotate the manual loader counterclockwise until the display reads ≤ 0.

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3.18 Secure the VQ train placed in service in Step 3.12 as follows:

_____ 3.18.1 **IF** securing A train, perform the following:

_____ 3.18.1.1 Ensure "Cont Air Rel Fan 1A" has stopped.

_____ 3.18.1.2 Place "VQ Filt Htr A" in the "OFF" position.

_____ 3.18.2 **IF** securing B train, perform the following:

_____ 3.18.2.1 Ensure "Cont Air Rel Fan 1B" has stopped.

_____ 3.18.2.2 Place "VQ Filt Htr B" in the ""OFF" position.

3.19 Close the following valves:
Record time both valves are closed ________

_____ • 1VQ-2A (VQ Fan Suct From Cont Isol)
_____ • 1VQ-3B (VQ Fan Suct From Cont Isol)

_____ 3.20 **IF** 1EMF-39L **AND** 1EMF-36L are non-functional, independently verify the following valves are closed:

_____ IV • 1VQ-2A (VQ Fan Suct From Cont Isol)
_____ IV • 1VQ-3B (VQ Fan Suct From Cont Isol)

3.21 Obtain the totalized flow by performing the following:

_____ 3.21.1 On "1VQ-10 VQ FANS DISCH TO UNIT VENT" controller, depress the display ("D") pushbutton until "VQ0100.T" (Totalized Flow) is displayed.

_____ 3.21.2 Record the totalizer reading _______________

_____ 3.22 Record the VQ terminate date/time on the Control Room Log.

NOTE: Enclosure 4.3 (Initiation and Termination of a Gaseous Waste Release Permit Report) provides information on initiation and termination of a GWR Permit Report.

3.23 Perform the following on the appropriate Gaseous Waste Release (GWR) Record:

_____ 3.23.1 Record the VQ terminate date/time.

_____ 3.23.2 Record totalizer value from Step 3.21.2 in "Final Integrator Reading" blank.

_____ 3.23.3 Record the "Final Integrator Reading" value in the 'Volume" blank.

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Event Description:	Initiate a VQ Release						

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3.23.4 Enter the "Highest EMF Reading" during the release from <u>one</u> of the following:

_____ 3.23.4.1 Highest reading from the OAC.

<u>OR</u>

3.23.4.2 Perform the following on the applicable digital EMF chart recorder:

_____ A. Depress the "Historical" icon. (Located at bottom of screen, left of keyboard icon)

_____ B. Select "Memory".

_____ C. Select "Start of History". (Binocular icon)

_____ D. Select "Search by Time".

_____ E. Enter the start date and start time.

_____ F. Select "Search".

NOTE: Time intervals per inch can be changed by depressing the "+" or "-" buttons.

_____ G. While viewing the digital values on the left side of the screen, scroll across the trend by depressing the ">" or ">>" buttons and obtain the highest reading.

_____ H. Depress the "Historical" icon to exit history.

_____ 3.23.5 Sign the "Control Room Operator" blank.

_____ 3.24 **<u>IF</u>** the OAC was used to monitor release per Step 3.3, ensure Step 3.3 has been signed off.

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Event Description:	Initiate a VQ Release							

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_____ 3.25 **IF** 1EMF-39L was used for this release, perform the following to reset EMF trip setpoints:

_____ 3.25.1 **IF** in Mode 5, 6, or No Mode **AND** 1EMF39L reading ≤ 6.96E+2 cpm, the trip setpoints shall be as follows:

- Trip 2 = 1.16E+3 cpm
- Trip 1 = 8.12E+2 cpm

_____ 3.25.2 **IF** in Mode 5, 6, or No Mode **AND** 1EMF39L reading > 6.96E+2 cpm, contact RP for the trip setpoints.

_____ 3.25.3 **IF** in Mode 1, 2, 3, or 4, the trip setpoints shall be set and recorded as follows:

- Trip 2 = 3 X (Containment Atmosphere Activity as indicated by the EMF) = ________ cpm
- Trip 1 = Trip 2 X .70 = ________ cpm

_____ 3.25.4 Reset 1EMF-39 (low range) trip setpoints using OP/0/A/6500/080 (EMF Output Modules).

_____ 3.25.5 Signoff "EMF39(L) Setpoints reset to non-release value" blank on the "VQ release monitored by EMF 39(L)" sheet of the Gaseous Waste Release (GWR) Record.

NOTE:	The person performing Step 3.26 or 3.27 shall **NOT** be the same individual who originally performed the associated actions in steps 3.17.3 or 3.25.

_____ IV 3.26 **IF** 1EMF-39L is functional, independently verify trip setpoints are reset as described in Step 3.25 using OP/0/A/6500/080 (EMF Output Modules).

3.27 Independently verify "1VQ-10 VQ FANS DISCH TO UNIT VENT" controller is reset by performing the following:

_____ IV 3.27.1 On "1VQ-10 VQ FANS DISCH TO UNIT VENT" controller depress the "D" pushbutton until "VQ0100.V" appears in the display window.

_____ IV 3.27.2 Display reads ≤ 0.

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Event Description:	Initiate a VQ Release						

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_____ 3.28 **IF** 1EMF-36L was used for this release, perform the following:

_____ 3.28.1 The 1EMF-36L trip setpoints shall be as follows:

- Trip 2 = 1.50E+2 cpm plus existing reading **NOT** to exceed 8.36E+3 cpm
- Trip 1 = Trip 2 times 0.7 cpm
  OR
- Setpoints as provided by RP

_____ 3.28.2 Sign the "EMF36(L) Setpoints per OPS Setpoint Log" blank on the "VQ release monitored by EMF 36(L)" sheet of the Gaseous Waste Release (GWR) Record.

3.29 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

Note To Evaluator:

This is the end of Event 1. At the Lead Evaluators discretion, the scenario may continue by having the booth operator INSERT Trigger 2 for Event 2 (Letdown Heat Exchanger Temperature Control Valve (1KC-132) Failure).

Op Test No.:	301	Scenario #	2	Event #	2	Page	19 of 136
Event Description:	Letdown Heat Exchanger Temperature Control Valve (1KC-132) Failure						

Control Room Indications
1AD-7, F/3 "LETDN HX OUTLET HI TEMP" - LIT
1KC-132 (Letdn Hx Otlt Temp Ctrl) closing
Letdown temperature on 1NVPT5590 increasing

Note To Evaluator:

The crew response for this failure can be found in the annunciator response for 1AD-7, F/3 on the following page. The failure is on the setpoint increase button on the controller for 1KC-132 and will delete after 10 seconds. The crew may either take manual control of 1KC-132 or may decrease the setpoint on the controller for 1KC-132 to increase cooling flow to the Letdown Heat Exchanger. If letdown temperature exceeds 136°F, then letdown 3-way valve 1NV-153A should bypass the mixed bed demineralizers. This is also failed, so crew may need to take 1NV-153A to the VCT position to manually bypass the demineralizers.

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Event Description: Letdown Heat Exchanger Temperature Control Valve (1KC-132) Failure

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LETDN HX OUTLET HI TEMP **F/3**

SETPOINT: 128°F

ORIGIN:	**Instrument**	**DCS**	**Description**
	1NVPT5590	1NVAA5590	LETDOWN HX OTLT TEMP

PROBABLE CAUSE:
1. Letdown flow too high
2. 1KC-132 (Letdn Hx Otlt Temp Ctrl) (controlled by 1NVSS5590) malfunction

AUTOMATIC ACTIONS: IF letdown temp. continues to rise, at 136°F 1NV-153A (Ltdn Hx Otlt 3-Way Vlv) will divert Letdown to volume control tank.

IMMEDIATE ACTIONS:
1. IF due to hi letdown flow, reduce flow rate by removing orifices from service and/or taking manual control of 1NV-148 (Letdn Press Control Valve) as necessary.
2. IF due to a low KC flow, attempt to restore normal flow, by taking manual control of 1KC-132 (Letdn Hx Otlt Temp Ctrl).
3. IF KC flow CANNOT be restored to Letdown Heat Exchanger, refer to AP/1/A/5500/021 (Loss of Component Cooling).

SUPPLEMENTARY ACTIONS:
1. Ensure letdown flow does NOT exceed 120 gpm.
2. Ensure ND letdown flow in Modes 5, 6 or No Mode does NOT exceed 185 gpm.
3. Verify that 1NV-148 (Letdn Press Control) is maintaining proper back pressure of 350 psig.
4. IF letdown temperature exceeds 136°F, ensure 1NV-153A (Ltdn Hx Otlt 3-Way Vlv) diverts flow to the VCT.
   4.1 WHEN letdown temperature decreases below 136°F, ensure 1NV-153A (Ltdn Hx Otlt 3-Way Vlv) directs letdown flow to the NV demineralizers.

NOTE: Completion of the evaluation/inspection in the following step shall NOT delay a return to normal operation.

5. IF KC flow is lost to the Letdown Hx for greater than 30 seconds, contact Engineering to evaluate/inspect for any possible damage due to water hammer.

REFERENCES:
1. CN-1554-01.06
2. CN-1573-01.02

Note To Evaluator:

This is the end of Event 2. At the Lead Evaluators discretion, the scenario may continue by having the booth operator INSERT Trigger 3 for Event 3 (1B S/G PORV (1SV-13) Fails Open).

Op Test No.:	301	Scenario #	2	Event #	3	Page	21 of 136
Event Description:	1B S/G PORV (1SV-13) Fails Open						

Control Room Indications
OAC Alarm for 1SV-13 - OPEN
Main Steam Header Pressure - DECREASING
Turbine Generator Electrical Load - DECREASING
Reactor Power - INCREASING
RED OPEN light for 1SV-13 - LIT

Note To Evaluator:

Crew may decide to invoke OMP 1-7 guidance to isolate a known leak and not enter AP/28 (Secondary Steam Leak). AP/28 is included in this guide beginning on the following page.

Op Test No.:	301	Scenario #	2	Event #	3	Page	22 of 136
Event Description:	1B S/G PORV (1SV-13) Fails Open						

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	**Enclosure 1 is included as Attachment 4.**
__ 1. **Monitor Enclosure 1 (Foldout Page).**	
__ 2. **Verify turbine - ONLINE.**	__ **GO TO Step 6.**
3. **Verify the following:**	**Perform the following:**
__ • Reactor power - LESS THAN OR EQUAL TO 100% POWER	__ a. Select "MANUAL" on turbine control panel.
__ • T-Avg - WITHIN 1.5°F OF T-Ref.	b. Depress "CONTROL VALVES LOWER" pushbutton and reduce turbine load to maintain: __ • Reactor power - LESS THAN OR EQUAL TO 100% POWER __ • T-Avg - WITHIN 1.5°F OF T-Ref.
4. **Verify proper reactor response as follows:** __ • Control rods - IN AUTO AND STEPPING IN __ • P/R neutron flux - DECREASING.	__ **IF T-Avg greater than 1.5°F higher than T-Ref, THEN insert control rods as required to maintain T-Avg within 1°F of T-Ref.**
__ 5. **IF AT ANY TIME reactor power greater than 100%, THEN perform Step 3 RNO.**	
__ 6. **Verify Pzr level - STABLE OR INCREASING.**	**Perform the following:** __ a. Maintain charging flow less than 180 GPM. (RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	

__ b. THROTTLE 1NV-294 (NV Pmps A&B Disch Flow Ctrl) to stabilize Pzr level.

__ c. IF Pzr level stable OR increasing, THEN GO TO Step 7.

d. IF Pzr level continues to decrease, THEN perform the following:

1) Reduce letdown flow to 45 GPM as follows:

a) IF 1NV-10A (Letdn Orif 1B Otlt Cont Isol) open, THEN perform the following:

__ (1) Control 1NV-148 (Letdn Press Control) to establish letdown pressure between 375 - 400 PSIG.

__ (2) THROTTLE 1NV-849 (Letdn Flow Var Orif Ctrl) for 45 GPM letdown flow.

__ (3) WHEN 45 GPM letdown flow established, THEN adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure at 350 PSIG.

__ (4) WHEN letdown pressure stable at 350 PSIG, THEN place 1NV-148 (Letdn Press Control) in auto.

(RNO continued on next page)

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Event Description:	1B S/G PORV (1SV-13) Fails Open		

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	b) <u>IF</u> 1NV-13A (Letdn Orif 1A Otlt Cont Isol) open, <u>THEN</u> perform the following: __ (1) Control 1NV-148 (Letdn Press Control) to establish letdown pressure between 150 - 200 PSIG. __ (2) OPEN 1NV-11A (Letdn Orif 1C Otlt Cont Isol). __ (3) Adjust 1NV-148 (Letdn Press Control) to establish letdown pressure between 375 - 400 PSIG. __ (4) CLOSE 1NV-13A (Letdn Orif 1A Otlt Cont Isol). __ (5) Adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure at 350 PSIG. __ (6) <u>WHEN</u> letdown pressure stable at 350 PSIG, <u>THEN</u> place 1NV-148 (Letdn Press Control) in auto. __ 2) <u>IF</u> Pzr level stable <u>OR</u> increasing, <u>THEN</u> <u>GO</u> <u>TO</u> Step 7. (RNO continued on next page)

Op Test No.:	301	Scenario #	2	Event #	3	Page	25 of 136
Event Description:	1B S/G PORV (1SV-13) Fails Open						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	3) IF Pzr level continues to decrease OR Pzr level cannot be maintained greater than 11%, THEN perform the following: __ a) Trip Unit 1 reactor. b) CLOSE the following valves: __ • All MSIVs __ • All MSIV bypass valves. __ c) Initiate S/I. __ d) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).
__ 7. **IF AT ANY TIME while in this procedure Pzr level decreasing in an uncontrolled manner, THEN RETURN TO Step 6.**	
8. **IF AT ANY TIME VCT level goes below 23%, THEN align NV pump suction to FWST as follows:** a. OPEN the following valves: __ • 1NV-252A (NV Pumps Suct From FWST) __ • 1NV-253B (NV Pumps Suct From FWST). b. CLOSE the following valves: __ • 1NV-188A (VCT Otlt Isol) __ • 1NV-189B (VCT Otlt Isol).	

Op Test No.:	301	Scenario #	2	Event #	3	Page	26 of 136
Event Description:	1B S/G PORV (1SV-13) Fails Open						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. **Attempt to identify and isolate leak as follows:**	
a. Verify the following conditions - NORMAL: __ • Containment temperature __ • Containment pressure __ • Containment humidity __ • Containment floor & equipment sump level.	a. Perform the following: __ 1) Evacuate containment. 2) Perform the following: __ a) Start all lower containment ventilation units in low speed. __ b) Start all upper containment ventilation units. __ c) Place all upper and lower containment ventilation units in "MAX" cooling. 3) <u>IF AT ANY TIME</u> containment pressure reaches 1.2 PSIG, <u>**THEN**</u> perform the following: __ a) Ensure Unit 1 reactor tripped. __ b) Ensure S/I initiated. c) CLOSE the following valves: __ • All MSIVs __ • All MSIV bypass valves. __ d) <u>GO TO</u> EP/1/A/5000/E-0 (Reactor Trip or Safety Injection). __ 4) <u>GO TO</u> Step 10.
__ b. Dispatch operators to locate and identify source of steam leak.	

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Event Description:	1B S/G PORV (1SV-13) Fails Open						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
__ c. Verify S/G PORVs - CLOSED.	c. IF S/G pressure less than 1090 PSIG, THEN perform the following: __ 1) CLOSE affected S/G PORV. 2) IF S/G PORV still open, THEN perform the following: __ a) CLOSE affected S/G PORV isolation valve. N/A b) IF S/G PORV isolation valve still open, THEN dispatch operator to close S/G PORV isolation valve.
__ d. Verify condenser dump valves - CLOSED.	d. IF steam dumps required to be closed, THEN perform the following: 1) Select "OFF RESET" on the following switches: __ • "STEAM DUMP INTLK BYP TRN A" __ • "STEAM DUMP INTLK BYP TRN B". __ 2) IF valve will not close, THEN dispatch operator to close affected condenser dump valve isolation valve. (RNO continued on next page)

Op Test No.: 301 Scenario # 2 Event # 3	Page 28 of 136
Event Description: 1B S/G PORV (1SV-13) Fails Open	

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK	PAGE NO. 8 of 41 Revision 8

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	3) **WHEN** leaking condenser dump valve isolated **OR** repaired, **THEN** return the following switches to "ON": __ • "STEAM DUMP INTLK BYP TRN A" __ • "STEAM DUMP INTLK BYP TRN B".
__ e. Verify atmospheric dump valves - CLOSED.	e. **IF** steam dumps required to be closed, **THEN** perform the following: 1) Select "OFF RESET" on the following switches: __ • "STEAM DUMP INTLK BYP TRN A" __ • "STEAM DUMP INTLK BYP TRN B". __ 2) **IF** valve will not close, **THEN** CLOSE affected atmospheric dump valve isolation valve. __ 3) **IF** isolation valve will not close, **THEN** dispatch operator to fail air to affected atmospheric dump valve. 4) **WHEN** leaking atmospheric dump valve isolated **OR** repaired, **THEN** return the following switches to "ON": __ • "STEAM DUMP INTLK BYP TRN A" __ • "STEAM DUMP INTLK BYP TRN B".

Op Test No.:	301	Scenario #	2	Event #	3	Page	29 of 136
Event Description:	1B S/G PORV (1SV-13) Fails Open						

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK	PAGE NO. 9 of 41 Revision 8

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
__ f. Verify CA PMP #1 - OFF.	__ f. **IF** operation of CA PMP #1 causing uncontrolled cooldown **AND** flow from CA PMP #1 not required, **THEN** stop CA PMP #1.
N/A g. **IF** leak suspected to be in a doghouse, **THEN** CLOSE the following valves: • Outside DH: __ • 1SM-77A (S/G 1A Otlt Hdr Bldwn C/V) __ • 1SM-74B (S/G 1D Otlt Hdr Bldwn C/V). OR • Inside DH: __ • 1SM-76B (S/G 1B Otlt Hdr Bldwn C/V) __ • 1SM-75A (S/G 1C Otlt Hdr Bldwn C/V).	
10. **Determine required notifications:** __ • **REFER TO** RP/0/A/5000/001 (Classification Of Emergency) __ • **REFER TO** RP/0/B/5000/013 (NRC Notification Requirements).	
__ 11. **Notify RP of leak.**	
__ 12. **Verify - LEAK ISOLATED.**	__ **GO TO Step 14.**

Op Test No.:	301	Scenario #	2	Event #	3	Page	30 of 136
Event Description:	1B S/G PORV (1SV-13) Fails Open						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 13. **Determine long term plant status. RETURN TO procedure and step in effect.**	**Note To Evaluator:** **At this point the steam leak is isolated and the plant is stable. This is the end of Event 3. At the Lead Evaluators discretion, the scenario may continue by having the booth operator Insert Trigger 4 for Event 4 (Generator Breaker 1B Trip).**
__ 14. **Verify UST level - STABLE OR INCREASING.**	__ b. Notify Secondary Chemistry of increased makeup.
15. **Evaluate unit shutdown as follows:**	
__ a. Verify Unit 1 status - IN MODE 1 OR 2.	__ a. GO TO Step 18.
b. Determine if Unit 1 shutdown or load reduction warranted based on the following criteria:	Technical Specification 3.4.7, Condition A, was added to form ES-D-2 for this event.
__ • Size of leak	
__ • Location of leak	
__ • Rate of depletion of secondary inventory	
__ • Steam leak cannot be isolated or repaired at power	
__ • OSM judgment	
__ • IF steam leaking from secondary heater relief OR MSR relief valve, THEN reducing turbine load may reduce pressure enough to close relief valve.	
__ • IF turbine trip will isolate steam leak, THEN it may be desirable to perform an orderly shutdown of the turbine and maintain reactor power in Mode 1.	

Op Test No.:	301	Scenario #	2	Event #	4	Page	31 of 136
Event Description:	Generator Breaker 1B Trip / Control Rods Fail To Auto Insert						

Control Room Indications
1AD-11, C/1 "GEN BKR A OVER CURRENT" - LIT
1AD-1, D/6 "EHC SYSTEM FAULT" - LIT
1AD-1, F/4 "TURB RUNBACK INITIATED" - LIT
Turbine Generator MW output – RAPIDLY DECREASING
Reactor Power - DECREASING

Op Test No.: 301	Scenario # 2	Event # 4	Page 32 of 136
Event Description:	Generator Breaker 1B Trip / Control Rods Fail To Auto Insert		

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 3 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. **Verify turbine load - DECREASING IN AUTOMATIC.**	**Perform the following:** __ a. Select "MANUAL" on turbine control panel. __ b. Depress "CONTROL VALVES LOWER" pushbutton and reduce turbine load as required.
2. **Verify proper reactor response:** __ • Control rods - IN "AUTO" AND STEPPING IN __ • P/R neutron flux - DECREASING.	__ **IF T-Avg is greater than 1.5°F higher than T-Ref, THEN insert control rods as required to maintain T-Avg within 1°F of T-Ref.** **Crew may elect to use AP/1/A/5500/015 to address failure of rods to move. This procedure is included as Attachment 3.**
3. **Verify proper steam dump operation as follows:**	
__ a. Verify T-Ref instrumentation - AVAILABLE.	__ a. IF T-Avg Coastdown is in progress, THEN determine T-Ref from table. REFER TO Enclosure 4 (T-Ref Value Following Runback/Power Reduction).
__ b. "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT.	b. Perform the following: __ 1) Operate S/G PORVs as necessary to maintain T-Avg at T-Ref. __ 2) GO TO Step 4.

Op Test No.:	301	Scenario #	2	Event #	4	Page	33 of 136
Event Description:	Generator Breaker 1B Trip / Control Rods Fail To Auto Insert						

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 4 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. (Continued)	
c. Verify the following: __ • "C-7A LOSS OF LOAD INTLK COND DUMP" status light (1SI-18) - LIT. __ • Steam dump valves - MODULATING.	c. IF steam dump valves are closed AND T-Avg is 3°F greater than T-Ref, THEN: __ 1) Place "STM DUMP CTRL" in manual. __ 2) Adjust "STM DUMP CTRL" to 0% demand. __ 3) Place the steam dumps in pressure mode. __ 4) Operate condenser steam dump valves to maintain T-Avg at T-Ref. __ 5) IF steam dump valves fail to operate, THEN dump steam as necessary from available S/G PORVs to maintain T-Avg at T-Ref.
__ d. T-Avg - DECREASING TO T-REF.	d. Perform the following: __ 1) Place "STM DUMP CTRL" in manual. __ 2) Adjust "STM DUMP CTRL" to 0% demand. __ 3) Place the steam dumps in pressure mode. __ 4) Operate condenser steam dump valves to maintain T-Avg at T-Ref. __ 5) IF steam dump valves fail to operate, THEN dump steam as necessary from available S/G PORVs to maintain T-Avg at T-Ref.

Op Test No.:	301	Scenario #	2	Event #	4	Page	34 of 136

Event Description: Generator Breaker 1B Trip / Control Rods Fail To Auto Insert

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 5 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. **Verify Pzr PORV and Pzr spray valve status as follows:**	
__ a. All Pzr PORVs - CLOSED.	a. IF Pzr pressure is less than 2315 PSIG, **THEN**: __ 1) CLOSE Pzr PORV(s). __ 2) IF any Pzr PORV cannot be closed, THEN close its isolation valve. 3) IF Pzr PORV isolation valve cannot be closed, **THEN**: __ a) Trip reactor. __ b) GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).
__ b. Normal Pzr spray valves - CLOSED.	b. IF Pzr pressure is less than 2150 PSIG, **THEN**: __ 1) CLOSE the affected spray valve(s). __ 2) REFER TO AP/1/A/5500/011 (Pressurizer Pressure Anomalies).

Op Test No.:	301	Scenario #	2	Event #	4	Page	35 of 136
Event Description:	Generator Breaker 1B Trip / Control Rods Fail To Auto Insert						

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 6 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. **Verify proper CM System operation as follows:**	
__ a. <u>WHEN</u> reactor power is less than 75%, <u>THEN</u> ensure both C-htr drain pumps - OFF.	
__ b. Verify reactor power - GREATER THAN 56% PRIOR TO THE EVENT.	__ b. <u>GO TO</u> Step 6.
__ c. Verify standby hotwell pump(s) - ON.	__ c. Start standby hotwell pump(s) as necessary.
__ d. Verify standby condensate booster pump(s) - ON.	__ d. Start standby condensate booster pump(s) as necessary.
6. **Verify the following generator alarms - DARK:**	__ **Ensure turbine generator load - REDUCED TO APPROXIMATELY 48% AND THE ALARM CLEARS.**
__ • 1AD-11, C/1 "GEN BKR A OVER CURRENT"	
__ • 1AD-11, F/1 "GEN BKR B OVER CURRENT".	

Op Test No.:	301	Scenario #	2	Event #	4	Page	36	of	136
Event Description:	Generator Breaker 1B Trip / Control Rods Fail To Auto Insert								

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 7 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **Verify S/G levels are adequate as follows:** __ • All S/G low level alert alarms (1AD-4) - DARK __ • All S/G low CF flow alarms (1AD-4) - DARK.	**Perform the following:** __ a. Ensure feedwater regulating valves - MODULATING TO CONTROL S/G LEVELS AT PROGRAM SETPOINT. b. IF any S/G(s) N/R level is decreasing in an uncontrolled manner, THEN: __ 1) Trip reactor. __ 2) GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).
__ 8. **Verify reactor power - GREATER THAN 20%.**	**Perform the following:** __ a. Place "CRD BANK SELECT" switch in manual. __ b. Maintain control rods above insertion limits. __ c. Operate control rods to stabilize reactor power between 6%-10%. d. IF AT ANY TIME reactor power is less than or equal to 5%, THEN perform the following: __ 1) Ensure turbine - TRIPPED. __ 2) Concurrently insert control rods to shutdown the reactor. REFER TO OP/1/A/6150/008 (Rod Control). __ 3) GO TO AP/1/A/5500/002 (Turbine Generator Trip). __ e. GO TO Step 10.
__ 9. **IF AT ANY TIME reactor power is less than or equal to 20%, THEN perform Step 8 RNO.**	

Op Test No.:	301	Scenario #	2	Event #	4	Page	37 of 136

Event Description: Generator Breaker 1B Trip / Control Rods Fail To Auto Insert

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 8 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 10. Verify AS header pressure - GREATER THAN OR EQUAL TO 140 PSIG.	__ Adjust 1AS-2 (Main Stm To Aux Steam) as required to maintain AS header pressure between 140 PSIG and 150 PSIG.
__ 11. Adjust 1TL-4 (Stm Seal Reg Byp) as necessary to maintain steam seal pressure between 4 PSIG - 6 PSIG.	
__ 12. Monitor Enclosure 3 (Rod Insertion Limit Boration).	**Enclosure 3 is included as Attachment 5.**

Op Test No.:	301	Scenario #	2	Event #	4	Page	38 of 136
Event Description:	Generator Breaker 1B Trip / Control Rods Fail To Auto Insert						

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 9 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 13. **Verify reactor power - LESS THAN 30%.**	**Perform the following:**
	N/A a. IF the runback target load is less than 30%, THEN:
	__ 1) WHEN time and personnel permit, THEN perform applicable steps of OP/1/A/6100/003 (Controlling Procedure For Unit Operation).
	__ 2) Do not continue in this procedure until reactor power is less than 30%.
	__ 3) WHEN reactor power is less than 30%, THEN GO TO Step 14.
	b. WHEN the appropriate runback target load is reached, THEN:
Note To Evaluator: **The Unit should be stabilized at approximately 48%.**	__ 1) Stabilize unit at appropriate power level.
	__ 2) Maintain control rods above insertion limits.
	3) Adjust the following as required to maintain T-Avg within 1°F of T-Ref: __ • Turbine load __ • Control rods __ • Boron concentration.
	__ c. GO TO Step 15.

Op Test No.:	301	Scenario #	2	Event #	4	Page	39 of 136
Event Description:	Generator Breaker 1B Trip / Control Rods Fail To Auto Insert						

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 10 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 14. **Verify the "RESET" light on "AMSAC FOR CF VALVES" switch - DARK.**	**Perform the following:** __ a. <u>IF</u> turbine impulse pressure is less than 190 PSIG, <u>THEN</u> notify IAE to correct the cause of the AMSAC failure to deactivate. __ b. Depress the "BYPASS" pushbutton on "AMSAC FOR CF VALVES" switch. __ c. <u>WHEN</u> 2 minutes has elapsed, <u>THEN</u> verify "RESET" light on "AMSAC FOR CF VALVES" switch has remained dark.

Op Test No.:	301	Scenario #	2	Event #	4	Page	40	of 136
Event Description:	Generator Breaker 1B Trip / Control Rods Fail To Auto Insert							

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 11 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15. **Verify the following PCBs - CLOSED:** __ • Generator breaker 1A __ • Generator breaker 1B __ • PCB 14 __ • PCB 15 __ • PCB 17 __ • PCB 18.	<u>NOTE</u> When separated from the grid the turbine reverts to speed control. **Perform the following:** N/A a. <u>IF</u> both generator PCBs are open, <u>THEN</u> ensure main turbine speed - MAINTAINED BETWEEN 1792 AND 1807 RPM. N/A b. <u>IF</u> the turbine generator is separated from the grid, <u>THEN</u>: __ 1) Ensure main turbine speed - MAINTAINED BETWEEN 1792 AND 1807 RPM. __ 2) Ensure main generator voltage - MAINTAINED BETWEEN 21 KV AND 23 KV. N/A c. <u>IF</u> load rejection caused by loss of main busline 1A or 1B, <u>THEN</u>: 1) Notify Transmission Control Center (TCC), using one of the following methods, to investigate and repair cause of the loss of busline: __ • 704-382-9403 __ • 704-382-9404 __ • 704-399-9744 __ • 704-382-4413 (System Operating Center). __ 2) <u>WHEN</u> notified by TCC that the affected busline is ready to be re energized, <u>THEN</u> restore power to the affected busline. <u>REFER TO</u> Enclosure 1 (Offsite Power Restoration).

Op Test No.:	301	Scenario #	2	Event #	4	Page	41 of 136
Event Description:	Generator Breaker 1B Trip / Control Rods Fail To Auto Insert						

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 12 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 16. **Adjust power factor as necessary. REFER TO Unit 1 Revised Data Book Figure 43.**

17. **WHEN the appropriate runback target load is reached, THEN:**

- __ Stabilize unit at appropriate power level.
- __ Maintain control rods above insertion limits.
- Adjust the following as required to maintain T-Avg within 1°F of T-Ref:
  - __ Turbine load
  - __ Control rods
  - __ Boron concentration.

__ 18. **Notify System Operating Center (SOC) using the red dispatcher telephone of current unit status.**

__ 19. **Determine and correct cause of load rejection.**

Op Test No.:	301	Scenario #	2	Event #	4	Page	42 of 136
Event Description:	Generator Breaker 1B Trip / Control Rods Fail To Auto Insert						

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 13 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20. **Shut down unnecessary plant equipment as follows:**	
a. Restore CM and CF as follows:	
__ 1) Verify C-htr drain pumps - ON.	__ 1) WHEN time and manpower permit, THEN complete the shutdown of the C-htr drain pumps. REFER TO OP/1/B/6250/004 (Feedwater Heater Vents, Drains and Bleed System).
__ 2) Verify both CF Pumps - IN SERVICE.	__ 2) GO TO Step 20.b.
__ 3) Shutdown one CF pump as necessary. REFER TO OP/1/A/6250/001 (Condensate and Feedwater System).	
__ 4) Shutdown excess Condensate Booster Pumps. REFER TO OP/1/A/6250/001 (Condensate and Feedwater System).	
__ 5) Shutdown excess Hotwell Pumps. REFER TO OP/1/A/6250/001 (Condensate and Feedwater System).	
__ b. RC pump(s) and cooling tower fans. REFER TO OP/1/B/6400/001A (Condenser Circulating Water System).	
21. **Reset steam dump valves as follows:**	
__ a. Verify reactor power - STABLE.	a. Perform the following: __ 1) WHEN reactor power is stable, THEN perform Steps 21.b through 21.g. (RNO continued on next page)

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Event Description: Generator Breaker 1B Trip / Control Rods Fail To Auto Insert

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 14 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21. (Continued)	
	__ 2) GO TO Step 22.
__ b. Verify steam dump valves - IN "T-AVG" MODE.	b. Perform the following: 1) IF using S/G PORVs, THEN: __ a) WHEN T-Avg is within 1°F of T-Ref AND stable, THEN close S/G PORVs. __ b) GO TO Step 21.d. 2) WHEN T-Avg is within 1°F of T-Ref AND stable, THEN: __ a) Ensure steam dumps - CLOSED. __ b) Perform Steps 21.d through 21.g. __ 3) GO TO Step 22.
__ c. Verify steam dump valves - CLOSED.	c. Perform the following: __ 1) WHEN steam dump valves are closed, THEN perform Steps 21.d through 21.g. __ 2) GO TO Step 22.
__ d. Reset steam dump valves.	
e. Verify the following status lights (1SI-18) - DARK: __ • "C-7A LOSS OF LOAD INTLK COND DUMP" __ • "C-7B LOSS OF LOAD INTLK ATMOS DUMP".	

Op Test No.:	301	Scenario #	2	Event #	4	Page	44 of 136
Event Description:	Generator Breaker 1B Trip / Control Rods Fail To Auto Insert						

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 15 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21. (Continued)	
__ f. IF "T-AVG" mode of operation is available, THEN ensure steam dump valves in "T-AVG" mode.	
__ g. Verify "STM DUMP CTRL" - IN AUTO.	__ g. IF steam dumps are in "T-AVG" mode, THEN place "STM DUMP CTRL" in auto.
__ 22. **Verify reactor power - GREATER THAN 15%.**	__ **Transfer feed flow to CA nozzles. REFER TO Enclosure 2 (Transferring Feed Flow From CF To CA Nozzles).**
__ 23. **Verify CA pumps - OFF.**	**Perform the following:** __ a. WHEN CA is no longer needed to feed S/G(s), THEN shutdown the CA System following the automatic start and return CA System to standby readiness. REFER TO OP/1/A/6250/002 (Auxiliary Feedwater System). __ b. Re-establish S/G blowdown. REFER TO OP/1/A/6250/008 (Steam Generator Blowdown).
__ 24. **Verify reactor power change - GREATER THAN OR EQUAL TO 15% IN A 1 HOUR PERIOD.**	__ **GO TO Step 26.**

Op Test No.:	301	Scenario #	2	Event #	4	Page	45 of 136
Event Description:	Generator Breaker 1B Trip / Control Rods Fail To Auto Insert						

CNS AP/1/A/5500/003	LOAD REJECTION Case I Switchyard Available	PAGE NO. 16 of 40 Revision 41

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

25. **Notify the following sections to take appropriate samples:**

__ • Radiation Protection to sample and analyze gaseous effluents. REFER TO Selected Licensee Commitments Manual, Section 16.11-6.

__ • Primary Chemistry to sample for isotopic analysis of iodine. REFER TO Tech Specs 3.4.16 (Sample must be taken between 2 hours and 6 hours following last power change greater than or equal to 15% rated thermal power within a 1 hour period).

26. **Ensure compliance with appropriate Tech Specs:**

N/A • 3.1.1 (Shutdown Margin (SDM))

__ • 3.1.6 (Control Bank Insertion Limits)

N/A • 3.8.1 (AC Sources - Operating)

N/A • SLC 16.8-2 (230 KV Switchyard Systems).

> **Tech Spec 3.1.6:**
> - **Condition A applies to Initiate Boration to restore SDM to within limit in 1 hour AND Restore control bank to within limits in 2 hours.**

__ 27. **Notify Reactor Group Engineer of occurrence.**

__ 28. **Determine long term plant status. RETURN TO OP/1/A/6100/003 (Controlling Procedure For Unit Operation).**

END

> **Note To Evaluator:**
>
> **This is the end of Event 4. At the Lead Evaluators discretion, the scenario may continue by having the booth operator INSERT Trigger 5 for Event 5 (NC System Leak).**

Op Test No.:	301	Scenario #	2	Event #	5	Page	46 of 136
Event Description:	NC System Leak						

Control Room Indications
1RAD-1, A/1 "1EMF-38 CONTAINMENT PART HI RAD" - LIT
1RAD-1, B/1 "1 EMF 39 CONTAINMENT GAS HI RAD" - LIT
Pressurizer Level - DECREASING
Pressurizer Pressure - DECREASING
Containment Floor and Equipment Sump Levels - INCREASING

Op Test No.:	301	Scenario #	2	Event #	5	Page	47 of 136
Event Description:	NC System Leak						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 57 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. Monitor Enclosure 2 (Case II NC System Leak Foldout Page).	**Enclosure 2 is included as Attachment 6.**
__ 2. **Verify unit in Mode 5 OR Mode 6.**	__ GO TO Step 4.
3. **Ensure containment integrity as required:**	
__ a. IF leak known to be in Auxiliary Building, THEN GO TO Step 4.	
__ b. Initiate Containment Closure.	
__ c. Initiate additional action as required to ensure Containment Equipment Hatch - CLOSED.	
__ d. Initiate additional action as required to ensure Containment Air Locks - CLOSED.	
__ e. Initiate Containment Evacuation.	
__ 4. **Verify Pzr level - STABLE OR INCREASING.**	**Perform the following:** __ a. Maintain charging flow less than 180 GPM. __ b. THROTTLE 1NV-294 (NV Pmps A&B Disch Flow Ctrl) to stabilize Pzr level. __ c. IF Pzr level is stable OR increasing, THEN GO TO Step 5. (RNO continued on next page)

Op Test No.:	301	Scenario #	2	Event #	5	Page	48 of 136
Event Description:	NC System Leak						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 58 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
	d. IF Pzr level continues to decrease, THEN perform the following: 1) Reduce letdown flow to 45 GPM as follows: a) IF 1NV-10A (Letdn Orif 1B Otlt Cont Isol) open, THEN perform the following: __ (1) Control 1NV-148 (Letdn Press Control) to establish letdown pressure between 375 - 400 PSIG. __ (2) THROTTLE 1NV-849 (Letdn Flow Var Orif Ctrl) for 45 GPM letdown flow. __ (3) WHEN 45 GPM letdown flow established, THEN adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure at 350 PSIG. __ (4) WHEN letdown pressure is stable at 350 PSIG, THEN place 1NV-148 (Letdn Press Control) in auto.
	(RNO continued on next page)

Op Test No.:	301	Scenario #	2	Event #	5	Page	49 of 136
Event Description:	NC System Leak						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 59 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4. (Continued)

N/A b) IF 1NV-13A (Letdn Orif 1A Otlt Cont Isol) open, THEN perform the following:

__ (1) Control 1NV-148 (Letdn Press Control) to establish letdown pressure between 150 - 200 PSIG.

__ (2) OPEN 1NV-11A (Letdn Orif 1C Otlt Cont Isol).

__ (3) Adjust 1NV-148 (Letdn Press Control) to establish letdown pressure between 375 - 400 PSIG.

__ (4) CLOSE 1NV-13A (Letdn Orif 1A Otlt Cont Isol).

__ (5) Adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure at 350 PSIG.

__ (6) WHEN letdown pressure is stable at 350 PSIG, THEN place 1NV-148 (Letdn Press Control) in auto.

N/A 2) IF Pzr level continues to decrease, THEN ensure the following valves closed:

- __ 1NV-10A (Letdn Orif 1B Otlt Cont Isol)
- __ 1NV-11A (Letdn Orif 1C Otlt Cont Isol)
- __ 1NV-13A (Letdn Orif 1A Otlt Cont Isol).

__ 3) IF Pzr level is stable OR increasing, THEN GO TO Step 5.

(RNO continued on next page)

Op Test No.:	301	Scenario #	2	Event #	5	Page	50	of 136
Event Description:	NC System Leak							

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 60 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	4) IF Pzr level continues to decrease OR cannot be maintained greater than 4%, THEN perform the following: a) IF in Modes 1, 2, or 3 with CLAs in service, THEN perform the following: __ (1) Trip reactor. __ (2) WHEN reactor trip verified, THEN initiate S/I. __ (3) GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection). __ b) IF in Mode 3 with CLAs isolated OR in Mode 4, THEN GO TO AP/1/A/5500/027 (Shutdown LOCA). __ c) IF NC temperature less than or equal to 200°F, THEN GO TO AP/1/A/5500/019 (Loss Of Residual Heat Removal System), while continuing in this procedure as time allows.
__ 5. **IF AT ANY TIME Pzr level decreases in an uncontrolled manner or cannot be maintained greater than 4%, THEN GO TO Step 4.**	

Op Test No.:	301	Scenario #	2	Event #	5	Page	51	of 136
Event Description:	NC System Leak							

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 61 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 6. **Verify Pzr/NC pressure - TRENDING TO OR STABLE AT DESIRED PRESSURE.**	**Perform the following:** __ a. <u>IF</u> Pzr level is greater than 17%, <u>THEN</u> ensure Pzr heaters on as required. __ b. Ensure Pzr spray valves - CLOSED. __ c. Ensure all Pzr PORVs - CLOSED. __ d. <u>IF</u> any Pzr PORV is leaking or has not reseated, <u>THEN</u> CLOSE its associated Pzr PORV isolation valve. e. <u>IF</u> Pzr/NC pressure is decreasing in an uncontrolled manner, <u>THEN</u> perform the following: 1) <u>IF</u> in Mode 1, 2 or 3 with CLAs in service, <u>THEN</u> perform the following: __ a) Initiate S/I. __ b) <u>GO TO</u> EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection). __ 2) <u>IF</u> in Mode 3 with CLAs isolated <u>OR</u> in Mode 4, <u>THEN</u> <u>GO TO</u> AP/1/A/5500/027 (Shutdown LOCA). __ 3) <u>IF</u> in Mode 5, <u>THEN</u> <u>GO TO</u> AP/1/A/5500/019 (Loss of Residual Heat Removal System).
__ 7. **Dispatch operator(s) to locate and isolate NC System leak.**	
__ 8. **Verify proper VC/YC system operation. <u>REFER TO</u> Enclosure 11 (Control Room Ventilation System Verification).**	**Enclosure 11 is included as Attachment 7.**

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Event Description: NC System Leak	

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 62 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. **IF AT ANY TIME 1AD-7, I/1 "VCT LO LVL" alarm - LIT, THEN align NV pump suction to FWST as follows:**	
__ a. OPEN 1NV-252A (NV Pumps Suct From FWST).	
__ b. OPEN 1NV-253B (NV Pumps Suct From FWST).	
__ c. CLOSE 1NV-188A (VCT Otlt Isol).	
__ d. CLOSE 1NV-189B (VCT Otlt Isol).	
e. IF Reactor trip breakers are closed, THEN perform the following:	
__ 1) Continue concurrent use of this procedure for the NC leak.	
__ 2) Trip reactor.	
__ 3) IF Unit was in Mode 3 below 1955 PSIG, THEN GO TO AP/1/A/5500/005 (Reactor Trip or Inadvertent S/I Below P-11).	
__ 4) GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).	

Op Test No.:	301	Scenario #	2	Event #	5	Page	53 of 136
Event Description:	NC System Leak						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 63 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **Determine NC leak rate by any of the following methods:** __ • Compare charging flow and letdown flow OR __ • Monitor OAC NV Graphic OR __ • Initiate OAC Program "NSNCLEAK" OR __ • Monitor OAC point EROPLEAK OR __ • Monitor OAC point C1P0976 (Gross NC System Leak Rate, Ten Min Run Avg).	**<u>Note To Evaluator:</u>** **NC System leak should be quantified to be approximately 75 GPM. In order to accurately quantify the leak, the crew must maintain Pressurizer Level and NC temperature stable.**

Op Test No.:	301	Scenario #	2	Event #	5	Page	54	of 136
Event Description:	NC System Leak							

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 64 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. **Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual:**	
N/A • 3.4.4 RCS Loops-Modes 1 and 2	
N/A • 3.4.5 RCS Loops-Mode 3	
N/A • 3.4.6 RCS Loops-Mode 4	
N/A • 3.4.12 Low Temperature Overpressure Protection (LTOP) System	
__ • 3.4.13 (RCS Operational Leakage)	Tech Spec 3.4.13: • Condition A applies to reduce LEAKAGE to within limits in 4 hours or be Mode 3 in the following 6 hours. Tech Spec 3.6.4: • Condition A applies to restore containment pressure to within limits in 1 hour or be in Mode 3 in the following 6 hours. SLC 16.7-9: • Condition B applies to declare the Standby Makeup Pump non-functional immediately and restore SSS to FUNCTIONAL status in 7 days.
N/A • 3.4.14 (RCS Pressure Isolation Valve (PIV) Leakage)	
N/A • 3.5.5 (Seal Injection Flow)	
N/A • 3.6.3 Containment Isolation Valves	
__ • 3.6.4 Containment Pressure	
N/A • 3.6.5 Containment Air Temperature	
N/A • 3.7.17 (Secondary Specific Activity)	
__ • SLC 16.7-9 (Standby Shutdown System).	

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CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 65 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. **Verify auxiliary building radiation is normal as follows:**	**Perform the following:**
__ • EMF-41 (Aux Bldg Ventilation) - TRIP 1 LIGHT DARK AND COUNTRATE STABLE.	**NOTE** • Annunciator response for EMF-41 Hi Rad lists EMF-41 sample locations.
__ • All area monitor EMF trip 1 lights - DARK.	• VA OAC graphic contains EMF-41 sample point readouts.
	__ a. Ensure operator(s) - DISPATCHED TO IDENTIFY AND ISOLATE LEAK.
	__ b. IF EMF-41 (Aux Bldg Ventilation) indication is increasing OR in alarm, THEN notify RP of affected area(s).
	__ c. IF any area monitor EMF is in alarm, THEN notify RP of the affected area(s).

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Event Description:	NC System Leak						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 66 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE Letdown flow and pressure are monitored between Letdown HX and 1NV-148 (Letdn Press Control).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 13. **Verify letdown line - INTACT.**	**IF letdown isolation is required to stop the NC System leak, THEN perform the following:** a. Ensure the following valves - CLOSED: __ • 1NV-11A (Letdn Orif 1C Otlt Cont Isol) __ • 1NV-13A (Letdn Orif 1A Otlt Cont Isol) __ • 1NV-10A (Letdn Orif 1B Otlt Cont Isol) __ • 1NV-1A (NC Letdn To Regen Hx Isol) __ • 1NV-2A (NC Letdn To Regen Hx Isol). b. IF Pzr level is still decreasing, THEN perform the following: __ 1) CLOSE 1NV-15B (Letdn Cont Isol). __ 2) IF Pzr level is still decreasing, THEN GO TO Step 14. __ c. Establish excess letdown. REFER TO OP/1/A/6200/001 (Chemical and Volume Control System).

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Event Description:	NC System Leak						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 67 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE A significant NC leak into thermal barrier Hx may result in KC flow indicating lower than normal after the thermal barrier is filled with steam.	
14. **Verify the following NC pump thermal barrier alarms - DARK:**	**Perform the following:**
	a. Ensure valve for affected NC pump(s) - CLOSED:
__ • 1AD-6, E/1, "NCP A THERMAL BARRIER KC OUTLET HI/LO FLOW"	__ • 1KC-394A (NC Pump 1A Therm Bar Otlt)
__ • 1AD-6, E/2, "NCP B THERMAL BARRIER KC OUTLET HI/LO FLOW"	__ • 1KC-364B (NC Pump 1B Therm Bar Otlt)
__ • 1AD-6, E/3, "NCP C THERMAL BARRIER KC OUTLET HI/LO FLOW"	__ • 1KC-345A (NC Pump 1C Therm Bar Otlt)
__ • 1AD-6, E/4, "NCP D THERMAL BARRIER KC OUTLET HI/LO FLOW".	__ • 1KC-413B (NC Pump 1D Therm Bar Otlt).
	(RNO continued on next page)

Op Test No.:	301	Scenario #	2	Event #	5	Page	58 of 136
Event Description:	NC System Leak						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 68 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. (Continued)	

b. IF valve for affected NC pump will not close, THEN perform the following:

1) IF in Mode 1 or 2, THEN perform the following:

__ a) Place steam dumps in pressure mode.

__ b) Trip reactor.

__ c) WHEN reactor power is less than 5%, THEN trip all NC pumps.

d) WHEN NC pumps are tripped, THEN perform the following:

__ (1) Dispatch operator with radio to standby at 1KC-425A (NC Pumps Ret Hdr Cont Isol) (AB-588, GG-52, Rm 419) (Ladder needed).

__ (2) CLOSE 1KC-425A (NC Pumps Ret Hdr Cont Isol) from Control Room.

__ (3) IF 1KC-425A (NC Pumps Ret Hdr Cont Isol) will not close completely from Control Room, THEN notify dispatched operator to close 1KC-425A (NC Pumps Ret Hdr Cont Isol) (AB-588, GG-52, Rm 419) (Ladder needed).

__ (4) WHEN 1KC-425A (NC Pumps Ret Hdr Cont Isol) has been closed, THEN CLOSE 1KC-424B (NC Pumps Ret Hdr Cont Isol).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. (Continued)	

__ (5) **WHEN** 1KC-425A (NC Pumps Ret Hdr Cont Isol) is closed, **THEN** notify dispatched operator to return.

(6) CLOSE the following valves:

- __ 1KC-338B (NC Pumps Sup Hdr Cont Isol)
- __ 1KC-430A (Rx Bldg Drn Hdr Cont Isol)
- __ 1KC-429B (Rx Bldg Drn Hdr Cont Isol).

__ e) GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).

__ 2) Trip all NC pumps.

(RNO continued on next page)

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Event Description:	NC System Leak						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 70 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. (Continued)	

3) Perform the following:

__ a) Dispatch operator with radio to standby at 1KC-425A (NC Pumps Ret Hdr Cont Isol) (AB-588, GG-52, Rm 419) (Ladder needed).

__ b) CLOSE 1KC-425A (NC Pumps Ret Hdr Cont Isol) from Control Room.

__ c) <u>IF</u> 1KC-425A (NC Pumps Ret Hdr Cont Isol) will not close completely from Control Room, <u>THEN</u> notify dispatched operator to close 1KC-425A (NC Pumps Ret Hdr Cont Isol) (AB-588, GG-52, Rm 419) (Ladder needed).

__ d) <u>WHEN</u> 1KC-425A (NC Pumps Ret Hdr Cont Isol) has been closed, <u>THEN</u> CLOSE 1KC-424B (NC Pumps Ret Hdr Cont Isol).

__ e) <u>WHEN</u> 1KC-425A (NC Pumps Ret Hdr Cont Isol) is closed, <u>THEN</u> notify dispatched operator to return.

f) CLOSE the following valves:

- __ 1KC-338B (NC Pumps Sup Hdr Cont Isol)
- __ 1KC-430A (Rx Bldg Drn Hdr Cont Isol)
- __ 1KC-429B (Rx Bldg Drn Hdr Cont Isol).

__ 4) <u>REFER TO</u> AP/1/A/5500/004 (Loss of Reactor Coolant Pump).

__ 5) <u>GO TO</u> Step 15.

(RNO continued on next page)

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CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 71 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

14. (Continued)

c. Verify conditions for continued NC pump operation as follows:

__ • #1 seal outlet temperature - LESS THAN 235°F

__ • Lower bearing temperature - LESS THAN 225°F.

d. IF AT ANY TIME conditions for continued NC pump operation cannot be maintained, THEN perform the following:

1) IF in Mode 1 or 2, THEN perform the following:

__ a) IF all NC pumps affected, THEN place steam dumps in pressure mode.

__ b) Trip reactor.

__ c) WHEN reactor power is less than 5%, THEN trip affected NC pump(s).

__ d) GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).

__ 2) Trip affected NC pump. REFER TO AP/1/A/5500/04 (Loss Of Reactor Coolant Pump).

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CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 72 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 15. **Verify 1EMF-46A and 1EMF-46B (Component Cooling) - TRIP 1 LIGHTS DARK AND COUNTRATE STABLE.**	**Perform the following:** __ a. Monitor KC surge tank levels. __ b. Notify RP and Chemistry to monitor KC System activity. __ c. IF AT ANY TIME the leak is identified in the KC System, THEN contact Station Management to evaluate isolating specific KC system loads.
16. **Verify containment conditions are normal as follows:** • Containment EMF - TRIP 1 LIGHTS DARK AND COUNTRATE STABLE: __ • 1EMF-38 (Containment Particulate) __ • 1EMF-39 (Containment Gas). __ • Containment floor and equipment sump level(s) - STABLE.	__ **Stop any VQ release in progress. REFER TO OP/1/A/6450/017 (Containment Air Release and Addition System).**
17. **Verify NCDT conditions are normal as follows:** __ • NCDT pressure - STABLE __ • NCDT level - STABLE __ • NCDT discharge flow - EQUAL TO RECIRC FLOW __ • NCDT temperature - STABLE.	__ **Monitor inputs to NCDT. REFER TO Enclosure 9 (Possible NC System Leakage Paths To NCDT).**

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CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 73 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18. **Verify PRT conditions are normal as follows:** __ • PRT pressure - LESS THAN 8 PSIG __ • PRT level - LESS THAN 89% __ • PRT temperature - LESS THAN 130°F.	__ **Monitor inputs to PRT. REFER TO Enclosure 10 (Possible NC System Leakage Paths To PRT).**
19. **Determine required notifications:** __ • REFER TO RP/0/A/5000/001 (Classification Of Emergency) __ • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).	

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Event Description:	NC System Leak						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case II NC System Leak	PAGE NO. 74 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 20. **Verify NC System leak - ISOLATED.**	**IF shutdown is required, THEN perform the following:**
	__ a. Notify Reactor Group Engineer of occurrence.
	b. IF reactor power greater than 15%, THEN perform the following:
	1) Initiate unit shutdown. REFER TO:
	__ • OP/1/A/6100/003 (Controlling Procedure For Unit Operation)
	OR
	__ • AP/1/A/5500/009 (Rapid Downpower).
	__ 2) Ensure adequate shutdown margin is maintained. REFER TO ROD Book, Section 5.11.
	__ 3) GO TO Step 21.
	c. IF reactor power is less than 15%, THEN perform the following:
	__ 1) Initiate unit shutdown. REFER TO OP/1/A/6100/002 (Controlling Procedure For Unit Shutdown).
	__ 2) Ensure adequate shutdown margin is maintained. REFER TO ROD Book, Section 5.11.
__ 21. **Consult with Station Management for further actions.**	
__ 22. **Determine long term plant status. RETURN TO procedure in effect.**	

Note To Evaluator:

It is not required for this scenario for the crew to initiate shutdown of Unit 1. This is the end of Event 5. At the Lead Evaluators discretion, the scenario may continue by having the booth operator INSERT Trigger 6 for Event 6 (Large Break LOCA).

END

Op Test No.:	301	Scenario #	2	Event #	6, 7, 8, 9	Page	65 of 136
Event Description:	LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start						

Control Room Indications
1FO-1, D/5 "HI CONT PRESS S/I RX TRIP" - LIT
DRPI Rod Bottom Lights - LIT
Pressurizer Level – DECREASING RAPIDLY
Pressurizer Pressure – DECREASING RAPIDLY
Neutron Flux Level – DECREASING RAPIDLY

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Event Description:	LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start						

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 4 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. Monitor Enclosure 1 (Foldout Page).	**Enclosure 1 is included as Attachment 8.**
2. **Verify Reactor Trip:**	**Perform the following:**
__ • All rod bottom lights - LIT	__ a. Trip reactor.
__ • All reactor trip and bypass breakers - OPEN	b. IF reactor will not trip, THEN concurrently:
__ • I/R power - DECREASING.	__ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).
	__ • GO TO EP/1/A/5000/FR-S.1 (Response to Nuclear Power Generation/ATWS).
3. **Verify Turbine Trip:**	**Perform the following:**
__ • All turbine stop valves - CLOSED	__ a. Trip turbine.
	b. IF turbine will not trip, THEN:
	__ 1) Depress "MANUAL" pushbutton on turbine control panel.
	__ 2) Rapidly CLOSE control valves by simultaneously depressing "CONTROL VALVE LOWER" and "FAST RATE" pushbuttons.
	3) IF control valves will not close, THEN CLOSE:
	__ • All MSIVs
	__ • All MSIV bypass valves.

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Event Description: LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 5 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 4. **Verify 1ETA and 1ETB - ENERGIZED.**	**Perform the following:** __ a. <u>IF</u> 1ETA <u>AND</u> 1ETB de-energized, <u>THEN</u> <u>GO TO</u> EP/1/A/5000/ECA-0.0 (Loss of All AC Power). __ b. <u>WHEN</u> time allows, <u>THEN</u> attempt to restore power to de-energized switchgear while continuing with this procedure. <u>REFER TO</u> AP/1/A/5500/007 (Loss of Normal Power).
5. **Verify S/I actuated:**	
__ a. "SAFETY INJECTION ACTUATED" status light (1SI-13) - LIT.	a. Perform the following: 1) Verify conditions requiring S/I: __ • Pzr pressure - LESS THAN 1845 PSIG OR __ • Containment pressure - GREATER THAN 1.2 PSIG. Critical Task #1 __ 2) <u>IF</u> S/I required, <u>THEN</u> initiate S/I. N/A 3) <u>IF</u> S/I not required, <u>THEN</u> concurrently: __ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ • <u>GO TO</u> EP/1/A/5000/ES-0.1 (Reactor Trip Response).
__ b. Both E/S load sequencer actuated status lights (1SI-14) - LIT.	__ b. Initiate S/I.

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Event Description:	LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start						

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 6 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 6. **Announce "Unit 1 Safety Injection".**	
7. **Determine required notifications:**	
__ • REFER TO RP/0/A/5000/001 (Classification Of Emergency)	
__ • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).	
__ 8. **Verify all Feedwater Isolation status lights (1SI-5) - LIT.**	**Perform the following:** __ a. Initiate Feedwater Isolation. __ b. IF proper status light indication not obtained, THEN CLOSE valves.
9. **Verify Phase A Containment Isolation status as follows:**	
__ a. Phase A "RESET" lights - DARK.	__ a. Initiate Phase A Isolation.
__ b. Monitor Light Panel Group 5 St lights on energized train(s) - LIT.	__ b. Align valves as necessary to ensure each penetration isolated by at least one isolation valve.
10. **Verify proper Phase B actuation as follows:**	
__ a. Verify Containment pressure - HAS REMAINED LESS THAN 3 PSIG.	a. Perform the following: 1) Verify Phase B Isolation actuated as follows: __ a) Phase B Isolation "RESET" lights - DARK.
	(RNO continued on next page)

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CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 7 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

10. (Continued)

N/A b) IF Phase B Isolation "RESET" lights lit, THEN initiate Phase B Isolation.

c) Verify following monitor light panel lights - LIT:

__ • Group 1 Sp lights

__ • Group 5 Sp lights

__ • Group 5 St light L/11.

N/A d) IF monitor light panel not in correct alignment, THEN ensure correct alignment.

__ 2) Stop all NC pumps.

__ 3) Maintain seal injection flow.

__ 4) Energize H_2 igniters.

5) Dispatch operator to perform the following:

__ a) Secure all ice condenser air handling units. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 11 (Securing All Ice Condenser Units).

__ b) Place containment H_2 analyzers in service. REFER TO OP/1/A/6450/010 (Containment Hydrogen Control Systems).

__ 6) WHEN 9 minutes elapsed, THEN verify proper VX system operation. REFER TO Enclosure 5 (VX System Operation).

Enclosure 5 is included as Attachment 9.

__ 7) GO TO Step 11.

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Event Description:	LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start						

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 8 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
__ b. IF AT ANY TIME containment pressure exceeds 3 PSIG while in this procedure, THEN perform Step 10.a.	
11. Verify proper CA pump status as follows:	
__ a. Motor driven CA pumps - ON.	a. Perform the following for affected train(s): __ 1) Reset ECCS. __ 2) Reset D/G load sequencer(s). __ 3) Start affected pump(s). __ 4) IF AT ANY TIME B/O occurs, THEN restart S/I equipment previously on.
__ b. 3 S/G N/R levels - GREATER THAN 11%.	b. Perform the following: __ 1) Place CA PMP #1 control switch to ON. __ 2) Ensure CA Pump #1 - RUNNING.
12. Verify all of the following S/I pumps - ON: __ • NV pumps __ • ND pumps __ • NI pumps.	**Perform the following for affected train(s):** __ a. Reset ECCS. __ b. Reset D/G load sequencer(s). __ c. Start affected pump(s). Critical Task #2 __ d. IF AT ANY TIME B/O occurs, THEN restart S/I equipment previously on.

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Event Description: LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 13. **Verify all KC pumps - ON.**	**Perform the following for affected train(s):** __ a. Reset ECCS. __ b. Reset D/G load sequencer(s). __ c. Start affected pump(s). __ d. <u>IF</u> <u>AT ANY TIME</u> B/O occurs, <u>THEN</u> restart S/I equipment previously on. __ e. <u>IF</u> KC flow cannot be established to NC pumps, <u>THEN</u> stop all NC pumps.
__ 14. **Verify all Unit 1 and Unit 2 RN pumps - ON.**	**Perform the following:** __ a. <u>IF</u> any Unit 2 RN pump off, <u>THEN</u> start affected pump(s). b. <u>IF</u> any Unit 1 RN pump off, <u>THEN</u> perform the following for affected train(s): __ 1) Reset ECCS. __ 2) Reset D/G load sequencer(s). __ 3) Start affected pump(s). __ 4) <u>IF</u> <u>AT ANY TIME</u> B/O occurs, <u>THEN</u> restart S/I equipment previously on.
15. **Verify proper ventilation systems operation as follows:** __ • <u>REFER TO</u> Enclosure 2 (Ventilation System Verification). __ • Notify Unit 2 operator to perform Enclosure 3 (Opposite Unit Ventilation Verification).	**Enclosure 2 is included as Attachment 10.**

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Event Description: LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 10 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 16. **Verify all S/G pressures - GREATER THAN 775 PSIG.**	**Perform the following:** a. Verify Main Steam Isolation as follows: __ • All MSIVs - CLOSED __ • All MSIV bypass valves - CLOSED __ • All S/G PORVs - CLOSED. b. IF any valve open, THEN perform the following: __ 1) Initiate Main Steam Isolation. __ 2) IF any valve still open, THEN CLOSE valve.
17. **Verify proper S/I flow as follows:**	
__ a. "NV S/I FLOW" - INDICATING FLOW.	__ a. Start NV pump(s) and align valves.
__ b. NC pressure - LESS THAN 1620 PSIG.	b. Perform the following: __ 1) Ensure ND pump miniflow valve on operating ND pump(s) - OPEN. 2) IF ND pump miniflow valve(s) cannot be opened, THEN perform the following for affected train(s): __ a) Reset ECCS. __ b) Reset D/G load sequencer. __ c) Stop ND pump. __ d) IF AT ANY TIME B/O occurs, THEN restart S/I equipment previously on. __ e) IF AT ANY TIME NC pressure decreases to less than 285 PSIG in an uncontrolled manner, THEN restart the ND pump. (RNO continued on next page)

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Event Description: LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 11 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17. (Continued)	
	__ 3) GO TO Step 18.
__ c. NI pumps - INDICATING FLOW.	__ c. Start NI pump(s) and align valves.
__ d. NC pressure - LESS THAN 285 PSIG.	d. Perform the following: __ 1) Ensure ND pump miniflow valve on operating ND pump(s) - OPEN. 2) IF ND pump miniflow valve(s) cannot be opened, THEN perform the following for affected train(s): __ a) Reset ECCS. __ b) Reset D/G load sequencer. __ c) Stop ND pump. __ d) IF AT ANY TIME B/O occurs, THEN restart S/I equipment previously on. __ e) IF AT ANY TIME NC pressure decreases to less than 285 PSIG in an uncontrolled manner, THEN restart the ND pump. __ 3) GO TO Step 18.
__ e. ND pumps - INDICATING FLOW TO C-LEGS.	__ e. Start ND pump(s) and align valves.

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CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 12 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 18. **WHEN time and manpower permit (within two hours of event), THEN monitor Spent Fuel Pool level and temperature. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 1 (Unit 1 Spent Fuel Pool Monitoring).**	**G-1 Enclosure 1 is included as Attachment 12.**
19. Control S/G levels as follows:	
__ a. Verify total CA flow - GREATER THAN 450 GPM.	a. Perform the following: 1) IF N/R level in all S/Gs less than 11% (29% ACC), THEN perform the following: __ • Start CA pumps __ • Ensure correct valve alignment. 2) IF N/R level in all S/Gs less than 11% (29% ACC) AND feed flow greater than 450 GPM cannot be established, THEN concurrently: __ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ • GO TO EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink).
__ b. WHEN each S/G N/R level greater than 11% (29% ACC), THEN control feed flow to maintain that S/G N/R level between 11% (29% ACC) and 50%.	**Note To Evaluator:** **Containment pressure has exceeded 3 PSIG, so crew should use ACC numbers in ( ) in all steps that they are included.**
__ 20. **Verify all CA isolation valves - OPEN.**	__ **OPEN valve(s).**

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CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 13 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 21. **Verify S/I equipment status based on monitor light panel - IN PROPER ALIGNMENT.**	__ **Align equipment.**

NOTE Enclosure 4 (NC Temperature Control) shall remain in effect until subsequent procedures provide alternative NC temperature control guidance.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 22. Control NC temperature. REFER TO Enclosure 4 (NC Temperature Control).	**Enclosure 4 is included as Attachment 11.**
23. **Verify Pzr PORV and Pzr Spray Valve status as follows:**	
__ a. All Pzr PORVs - CLOSED.	a. IF Pzr pressure less than 2315 PSIG, THEN perform the following: __ 1) CLOSE Pzr PORV(s). __ 2) IF any Pzr PORV cannot be closed, THEN CLOSE its isolation valve. 3) IF 1NC-32B OR 1NC-34A cannot be closed OR isolated, THEN perform the following: a) Align N_2 to PORVs by opening the following valves: __ • 1NI-438A (Emer N2 From CLA A To 1NC-34A) __ • 1NI-439B (Emer N2 From CLA B To 1NC-32B). __ b) CLOSE affected Pzr PORV. (RNO continued on next page)

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Event Description:	LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

23. (Continued)

4) IF any Pzr PORV cannot be closed OR isolated, THEN perform the following:

__ a) Energize H_2 igniters.

b) Dispatch operator to perform the following:

__ (1) Secure all ice condenser air handling units. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 11 (Securing All Ice Condenser Units).

__ (2) Place containment H2 analyzers in service. REFER TO OP/1/A/6450/010 (Containment Hydrogen Control Systems).

c) IF both the following conditions exist,

__ • Containment pressure - HAS REMAINED LESS THAN 3 PSIG

__ • Containment pressure - BETWEEN 1 PSIG AND 3 PSIG

__ THEN start one VX fan and secure normal containment ventilation. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 18 (VX and Containment Ventilation Control).

(RNO continued on next page)

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CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 15 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. (Continued)	
	d) Concurrently: __ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ • GO TO EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant).
__ b. Normal Pzr spray valves - CLOSED.	b. IF Pzr pressure less than 2150 PSIG, THEN perform the following: __ 1) CLOSE spray valve(s). 2) IF spray valve(s) cannot be closed, THEN perform the following: __ a) Stop NC pumps 1A and 1B. __ b) IF both 1C AND 1D NC pumps on, THEN stop one additional pump.
__ c. At least one Pzr PORV isolation valve - OPEN.	__ c. IF power available, THEN OPEN one Pzr PORV isolation valve unless it was closed to isolate an open Pzr PORV.
__ 24. **Verify NC subcooling based on core exit T/Cs - GREATER THAN 0°F.**	**IF any NV OR NI pump on, THEN perform the following:** __ a. Ensure all NC pumps - OFF. __ b. Maintain seal injection flow.

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CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 16 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25. **Verify main steamlines intact:** __ • All S/G pressures - STABLE OR INCREASING __ • ALL S/Gs - PRESSURIZED.	**IF pressure in any S/G decreasing in an uncontrolled manner OR any S/G depressurized, THEN perform the following:** __ a. Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ b. GO TO EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).
26. **Verify S/G tubes intact as follows:** • Verify the following EMF trip 1 lights - DARK: __ • 1EMF-33 (Condenser Air Ejector Exhaust) __ • 1EMF-26 (Steamline 1A) __ • 1EMF-27 (Steamline 1B) __ • 1EMF-28 (Steamline 1C) __ • 1EMF-29 (Steamline 1D). __ • All S/G levels - STABLE OR INCREASING IN A CONTROLLED MANNER.	**IF any EMF trip 1 light lit OR any S/G level increasing in an uncontrolled manner, THEN concurrently:** __ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ • GO TO EP/1/A/5000/E-3 (Steam Generator Tube Rupture).

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Event Description: LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 17 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27. **Verify NC System intact as follows:**	**Perform the following:**
__ • Containment pressure - LESS THAN 1 PSIG.	__ a. Energize H_2 igniters.
__ • IF normal off-site power available, THEN verify containment pressure less than 0.3 PSIG.	b. Dispatch operator to perform the following:
• Containment high range EMFs - LESS THAN 3 R/HR:	__ 1) Secure all ice condenser air handling units. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 11 (Securing All Ice Condenser Units).
__ • 1EMF-53A (Containment Trn A) __ • 1EMF-53B (Containment Trn B).	__ 2) Place containment H2 analyzers in service. REFER TO OP/1/A/6450/010 (Containment Hydrogen Control Systems).
• Containment EMF trip 1 lights - DARK:	N/A c. IF both the following conditions exist,
__ • 1EMF-38 (Containment Particulate) __ • 1EMF-39 (L) (Containment Gas (Lo Range)).	__ • Containment pressure - HAS REMAINED LESS THAN 3 PSIG
__ • Containment sump level - STABLE.	__ • Containment pressure - BETWEEN 1 PSIG AND 3 PSIG
	__ THEN start one VX fan and secure normal containment ventilation. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 18 (VX and Containment Ventilation Control).
	d. Concurrently:
	__ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).
	__ • GO TO EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant).

Note To Evaluator:

An ORANGE path condition may exist at this time on the NC Integrity CSF due to the cooldown of the NC System. If so, the crew will transition to FR-P.1 at this time, but will transition back to procedure and step in effect at the first step due to Large Break LOCA conditions existing.

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CNS EP/1/A/5000/FR-P.1	RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION	PAGE NO. 2 of 48 Revision 25

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. **Verify NC pressure - GREATER THAN 285 PSIG.**	__ **IF ND flow to C-Legs is greater than 675 GPM, THEN RETURN TO procedure and step in effect.**
	Note To Evaluator: **The crew will now transition to E-1.**
__ 2. **Monitor Enclosure 1 (Foldout Page).**	
__ 3. **Verify all NC T-Colds - STABLE OR INCREASING.**	**Attempt to stop NC System cooldown as follows:** __ a. Ensure all S/G PORVs - CLOSED. __ b. IF any S/G PORV cannot be closed, THEN CLOSE its isolation valve. __ c. Ensure all steam dump valves - CLOSED. __ d. IF ND is in RHR mode, THEN stop any cooldown from ND System. e. Identify faulted S/G(s) as follows: __ • Any S/G pressure - DECREASING IN AN UNCONTROLLED MANNER OR __ • Any S/G - DEPRESSURIZED. (RNO continued on next page)

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Event Description: LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start

CNS EP/1/A/5000/E-1	LOSS OF REACTOR OR SECONDARY COOLANT	PAGE NO. 2 of 35 Revision 30

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. **Monitor Enclosure 1 (Foldout Page).**	**Enclosure 1 is included as Attachment 13.**
__ 2. **Verify NC subcooling based on core exit T/Cs - GREATER THAN 0°F.**	**IF any NV OR NI pump on, THEN perform the following:** __ a. Ensure all NC pumps - OFF. __ b. Maintain seal injection flow.
3. **Verify main steamlines intact:** __ • All S/G pressures - STABLE OR INCREASING __ • All S/Gs - PRESSURIZED.	**IF pressure in any S/G decreasing in an uncontrolled manner OR depressurized, THEN perform the following:** a. IF any faulted S/G(s) feedlines OR steamlines not isolated, THEN perform the following: __ 1) IF EP/1/A/5000/E-2 (Faulted Steam Generator Isolation) has been performed for affected S/G, THEN GO TO Step 3, RNO b. __ 2) GO TO EP/1/A/5000/E-2 (Faulted Steam Generator Isolation). b. IF affected S/G(s) faulted outside containment, THEN request RP to perform the following: __ 1) Monitor area of steam fault for radiation. __ 2) Notify Control Room of any abnormal radiation conditions.

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Event Description:	LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start								

CNS EP/1/A/5000/E-1	LOSS OF REACTOR OR SECONDARY COOLANT	PAGE NO. **3 of 35** **Revision 30**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. **Control intact S/G N/R levels as follows:**	
__ a. Verify N/R level in any intact S/Gs - GREATER THAN 11% (29% ACC).	__ a. Maintain total feed flow greater than 450 GPM until any intact S/G N/R level greater than 11% (29% ACC).
__ b. THROTTLE feed flow to maintain all intact S/G N/R levels between 11% (29% ACC) and 50%.	__ b. **IF** N/R level in any S/G continues to increase in uncontrolled manner, **THEN GO TO** EP/1/A/5000/E-3 (Steam Generator Tube Rupture).
5. **Reset the following:**	
__ a. ECCS.	__ a. Locally reset ECCS. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 4 (ECCS Master Reset).
__ b. D/G load sequencers.	b. Dispatch operator to open affected sequencer(s) control power breaker: __ • 1EDE-F01F (Diesel Generator Load Sequencer Panel 1DGLSA) (AB-577, BB-46, Rm 496) __ • 1EDF-F01F (Diesel Generator Load Sequencer Panel 1DGLSB) (AB-560, BB-46, Rm 372).
__ c. Phase A.	
__ d. Phase B.	
__ e. **IF AT ANY TIME** B/O occurs, **THEN** restart S/I equipment previously on.	

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Event Description: LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start

CNS EP/1/A/5000/E-1	LOSS OF REACTOR OR SECONDARY COOLANT	PAGE NO. **4 of 35** **Revision 30**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. **Establish VI to Containment as follows:** __ • Ensure 1VI-77B (VI Cont Isol) - OPEN __ • Verify VI pressure - GREATER THAN 85 PSIG.	**Perform the following:** a. Align N_2 to Pzr PORVs by opening the following valves: __ • 1NI-438A (Emer N2 From CLA A To 1NC-34A) __ • 1NI-439B (Emer N2 From CLA B To 1NC-32B). b. **IF** VI pressure less than 85 PSIG, **THEN** perform the following: __ 1) Dispatch operator to ensure proper VI compressor operation. __ 2) Restore VI while continuing with this procedure. **REFER TO** AP/0/A/5500/022 (Loss of Instrument Air).
7. **Verify secondary radiation - NORMAL:** a. Ensure the following signals - RESET: __ 1) CA system valve control. __ 2) KC NC NI NM St signals. __ b. Align all S/Gs for Chemistry sampling. c. Perform at least one of the following: __ • Notify Chemistry to sample all S/Gs for activity. OR __ • Notify RP to frisk all cation columns for activity.	

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CNS EP/1/A/5000/E-1	LOSS OF REACTOR OR SECONDARY COOLANT	PAGE NO. 5 of 35 Revision 30

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. (Continued)	
d. Verify the following EMF trip 1 lights - DARK: __ • 1EMF-33 (Condenser Air Ejector Exhaust) __ • 1EMF-26 (Steamline 1A) __ • 1EMF-27 (Steamline 1B) __ • 1EMF-28 (Steamline 1C) __ • 1EMF-29 (Steamline 1D).	__ d. **<u>GO TO</u>** EP/1/A/5000/E-3 (Steam Generator Tube Rupture).
e. Verify all S/Gs - INTACT: __ • All S/G pressures - STABLE OR INCREASING __ • All S/Gs - PRESSURIZED.	e. **<u>IF</u>** any S/G(s) faulted outside containment, **<u>THEN</u>** request RP to perform the following: __ • Monitor area of steam fault for radiation __ • Notify Control Room of any abnormal radiation conditions.
__ f. **<u>WHEN</u>** activity results reported, **<u>THEN</u>** verify all S/Gs indicate no activity.	f. Perform the following: __ 1) Notify station management to evaluate S/G(s) activity results. __ 2) **<u>IF</u>** S/G(s) activity indicate SGTR, **<u>THEN GO TO</u>** EP/1/A/5000/E-3 (Steam Generator Tube Rupture).

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CNS EP/1/A/5000/E-1	LOSS OF REACTOR OR SECONDARY COOLANT	PAGE NO. **6 of 35** **Revision 30**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. **Verify Pzr PORVs and Isolation Valves:**	
__ a. Power to all Pzr PORV isolation valves - AVAILABLE.	__ a. Evaluate cause of power loss and initiate actions to restore power to affected isolation valve(s).
__ b. All Pzr PORVs - CLOSED.	b. **IF** Pzr pressure less than 2315 PSIG, **THEN** perform the following: __ 1) CLOSE Pzr PORV(s). __ 2) **IF** any Pzr PORV cannot be closed, **THEN** CLOSE its isolation valve. 3) **IF** 1NC-32B **OR** 1NC-34A cannot be closed **OR** isolated, **THEN** perform the following: a) Align N_2 to PORVs by opening the following valves: __ • 1NI-438A (Emer N2 From CLA A To 1NC-34A) __ • 1NI-439B (Emer N2 From CLA B To 1NC-32B). __ b) CLOSE affected Pzr PORV.
__ c. Any Pzr PORV isolation valve - OPEN.	__ c. OPEN one Pzr PORV isolation valve unless it was closed to isolate an open Pzr PORV.
__ d. **IF AT ANY TIME** any Pzr PORV opens due to high pressure, **THEN** after Pzr pressure decreases to less than 2315 PSIG, ensure PORV closes or isolated.	

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CNS EP/1/A/5000/E-1	LOSS OF REACTOR OR SECONDARY COOLANT	PAGE NO. 7 of 35 Revision 30

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. **Verify S/I termination criteria:**	
__ a. NC subcooling based on core exit T/Cs - GREATER THAN 0°F.	__ a. **GO TO** Step 9.f.
b. Secondary heat sink: __ • Any intact S/G N/R level - GREATER THAN 11% (29% ACC) OR __ • Total feed flow to intact S/Gs - GREATER THAN 450 GPM.	__ b. **GO TO** Step 9.f.
__ c. NC pressure - STABLE OR INCREASING.	__ c. **GO TO** Step 9.f.
__ d. Pzr level - GREATER THAN 11% (30% ACC).	d. Perform the following: __ 1) **IF** NC pressure increasing **AND** normal Pzr spray available, **THEN** attempt to stabilize NC pressure using normal Pzr spray. __ 2) **GO TO** Step 9.f.
__ e. **GO TO** EP/1/A/5000/ES-1.1 (Safety Injection Termination).	
__ f. Monitor S/I termination criteria. **REFER TO** Enclosure 2 (S/I Termination Criteria).	
__ g. **IF AT ANY TIME** S/I termination criteria met while in this procedure, **THEN RETURN TO** Step 9.	

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CNS EP/1/A/5000/E-1	LOSS OF REACTOR OR SECONDARY COOLANT	PAGE NO. 8 of 35 Revision 30

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **Determine if ND pumps should be stopped:**	
__ a. NC pressure - GREATER THAN 285 PSIG.	__ a. **<u>GO</u> <u>TO</u>** Step 12.
__ b. NC pressure - STABLE OR INCREASING.	__ b. **<u>GO</u> <u>TO</u>** Step 11.
__ c. Any ND pump - ON.	__ c. **<u>GO</u> <u>TO</u>** Step 10.f.
__ d. Any running ND pump suction - ALIGNED TO FWST.	__ d. **<u>GO</u> <u>TO</u>** Step 11.
__ e. Stop ND pump(s) with suction aligned to FWST.	
__ f. **<u>IF AT ANY TIME</u>** NC pressure decreases to less than 285 PSIG in uncontrolled manner, **<u>THEN</u>** restart ND pumps.	
11. **Verify NC and S/G pressures as follows:**	
__ a. All S/G pressures - STABLE OR INCREASING.	__ a. **<u>IF</u>** S/G pressure decreasing due to faulted S/G, **<u>THEN</u> <u>RETURN</u> <u>TO</u>** Step 1.
__ b. NC pressure - STABLE OR DECREASING.	__ b. **<u>RETURN</u> <u>TO</u>** Step 1.

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CNS EP/1/A/5000/E-1	LOSS OF REACTOR OR SECONDARY COOLANT	PAGE NO. 9 of 35 Revision 30

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. **Verify D/Gs should be stopped:**	
__ a. Any D/G - ON.	__ a. **GO TO** Step 13.
b. Verify 1ETA energized by offsite power as follows: __ • "D/G 1A BKR TO ETA" - OPEN __ • 1ETA - ENERGIZED.	b. Perform the following: __ 1) Attempt to restore offsite power to affected switchgear. **REFER TO** AP/1/A/5500/007 (Loss of Normal Power). __ 2) **GO TO** Step 12.d.
__ c. Dispatch operator to stop 1A D/G and place in standby readiness. **REFER TO** OP/1/A/6350/002 (Diesel Generator Operation).	
d. Verify 1ETB energized by offsite power as follows: __ • "D/G 1B BKR TO ETB" - OPEN __ • 1ETB - ENERGIZED.	d. Perform the following: __ 1) Attempt to restore offsite power to affected switchgear. **REFER TO** AP/1/A/5500/007 (Loss of Normal Power). __ 2) **GO TO** Step 13.
__ e. Dispatch operator to stop 1B D/G and place in standby readiness. **REFER TO** OP/1/A/6350/002 (Diesel Generator Operation).	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. **Obtain containment H_2 concentration as follows:**	
__ a. Ensure operator dispatched to secure all ice condenser air handling units. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 11 (Securing All Ice Condenser Units).	
__ b. Verify containment H_2 analyzers - IN SERVICE.	b. Perform the following: __ 1) Dispatch operator to place containment H_2 analyzers in service. **REFER TO** OP/1/A/6450/010 (Containment Hydrogen Control Systems). __ 2) **WHEN** H_2 analyzers in service, **THEN** perform Steps 13.c through 13.e. __ 3) **GO TO** Step 14.
__ c. Verify containment H_2 concentration - LESS THAN 6%.	c. Perform the following: __ 1) Obtain recommendation from station management for method to reduce H_2 concentration. __ 2) **GO TO** Step 14.
__ d. Verify H_2 Igniters - ON.	d. **WHEN** the following criteria met, **THEN** energize H_2 igniters (1MC-7): __ • Ice condenser air handling units - SECURED __ • H_2 concentration - LESS THAN 6%.
__ e. Verify containment H_2 concentration - LESS THAN 0.5%.	__ e. Dispatch operator to place H_2 recombiners in service. **REFER TO** OP/1/A/6450/010 (Containment Hydrogen Control Systems).

Op Test No.:	301	Scenario #	2	Event #	6, 7, 8, 9	Page	90 of 136
Event Description:	LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start						

CNS EP/1/A/5000/E-1	LOSS OF REACTOR OR SECONDARY COOLANT	PAGE NO. **11 of 35** **Revision 30**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. **Initiate evaluation of plant status as follows:**	
a. Verify cold leg recirc capability from at least one train: • A Train: __ • 1A ND pump - AVAILABLE __ • 1NI-185A (ND Pump 1A Cont Sump Suct) - POWER AVAILABLE. OR • B Train: __ • 1B ND pump - AVAILABLE __ • 1NI-184B (ND Pump 1B Cont Sump Suct) - POWER AVAILABLE.	__ a. **IF** cold leg recirc capability not available from either train, **THEN GO TO** EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation).

Op Test No.:	301	Scenario #	2	Event #	6, 7, 8, 9	Page	91	of	136
Event Description:	LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start								

CNS EP/1/A/5000/E-1	LOSS OF REACTOR OR SECONDARY COOLANT	PAGE NO. 12 of 35 Revision 30

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. (Continued)	
b. Determine if leak in auxiliary building as follows:	
1) Verify auxiliary building radiation: __ • All area monitor EMF trip 1 lights - DARK __ • EMF-41 (Aux Bldg Ventilation) trip 1 light - DARK.	1) Evaluate cause of abnormal conditions as follows: a) Monitor the following to determine location of activity: __ • OAC EMF alarms __ • OAC VA Graphic __ • Area monitor EMFs. __ b) Dispatch operator to locate potential leak. __ c) **IF** cause of alarm LOCA outside containment, **THEN** **GO TO** EP/1/A/5000/ECA-1.2 (LOCA Outside Containment).

NOTE The following step is checking for a significant NC leak into the ND system.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2) Verify NC to ND pressure boundary intact as follows: __ • ND Pressure - NORMAL __ • ND Temperature - NORMAL __ • ND Flow - NORMAL.	__ 2) **IF** ND system parameters indicate LOCA outside containment, **THEN** **GO TO** EP/1/A/5000/ECA-1.2 (LOCA Outside Containment).

Op Test No.: 301	Scenario # 2	Event # 6, 7, 8, 9	Page 92 of 136				

Event Description: LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start

CNS EP/1/A/5000/E-1	LOSS OF REACTOR OR SECONDARY COOLANT	PAGE NO. 13 of 35 Revision 30

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. (Continued)	
c. Determine if NC leaking into KC system as follows: __ • 1EMF-46A (COMPONENT COOLING TRAIN A) trip 1 light - DARK __ • 1EMF-46B (COMPONENT COOLING TRAIN B) trip 1 light - DARK.	c. Perform the following: __ 1) Verify all NC pump KC thermal barrier flows on OAC (KC graph - turn on code "KCRX") - LESS THAN 60 GPM. __ 2) **IF** any NC pump KC thermal barrier flow greater than 60 gpm, **THEN** isolate failed NC pump thermal barrier. **REFER TO** Enclosure 3 (Thermal Barrier Leak Isolation).
__ d. Ensure KC NC NI NM St signals - RESET.	
__ e. **WHEN** TSC staffed, **THEN** notify TSC to perform Enclosure 4 (TSC Actions).	
15. **Determine if NC system cooldown and depressurization required as follows:**	
__ a. NC pressure - GREATER THAN 285 PSIG.	__ a. **IF** ND flow to C-Legs greater than 675 GPM, **THEN GO TO** Step 16.
__ b. **GO TO** EP/1/A/5000/ES-1.2 (POST LOCA Cooldown and Depressurization).	

Op Test No.:	301	Scenario #	2	Event #	6, 7, 8, 9	Page	93	of	136
Event Description:	LBLOCA / Failure of S/I to Actuate / 1CF-33 Fails to Close / Both ND Pumps Fail to Start								

CNS EP/1/A/5000/E-1	LOSS OF REACTOR OR SECONDARY COOLANT	PAGE NO. 14 of 35 Revision 30

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 16. **Verify Containment pressure - GREATER THAN 3 PSIG.**	**Perform the following:**
	__ a. **IF** starting of any VX fan previously attempted, **THEN GO TO** Step 17.
	b. **IF AT ANY TIME** both of the following conditions exist, **THEN** start one VX fan and secure normal containment ventilation. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 18 (VX and Containment Ventilation Control):
	__ • Containment pressure - HAS REMAINED LESS THAN 3 PSIG
	__ • Containment pressure - BETWEEN 1 PSIG **AND** 3 PSIG.
17. **Determine if transfer to Cold Leg Recirc required as follows:**	
__ a. FWST level - LESS THAN 20% (1AD-9, D/8 "FWST 2/4 LO LEVEL" lit).	__ a. **RETURN TO** Step 14.
__ b. S/I systems - ALIGNED FOR COLD LEG RECIRC.	__ b. **GO TO** EP/1/A/5000/ES-1.3 (Transfer to Cold Leg Recirculation).

Note To Evaluator:

At this point the crew will loop in E-1 until transfer to Cold Leg Recirculation is required. All critical tasks for this scenario are complete, and at the discretion of the Lead Evaluator, the scenario may be terminated by having the booth operator place the simulator in FREEZE.

Attachment List

Scenario 2

ATTACHMENT 1 -	Crew Critical Task Summary
ATTACHMENT 2 -	Shift Turnover Information
ATTACHMENT 3 -	AP/1/A/5500/015 Case I (Failure Of Rods To Move)
ATTACHMENT 4 -	AP/1/A/5500/028 Enclosure 1 (Foldout Page)
ATTACHMENT 5 -	AP/1/A/5500/003 Enclosure 3 (Rod Insertion Limit Boration)
ATTACHMENT 6 -	AP/1/A/5500/010 Enclosure 2 (Case II NC System Leak Foldout Page)
ATTACHMENT 7 -	AP/1/A/5500/010 Enclosure 11 (Control Room Ventilation System Verification)
ATTACHMENT 8 -	EP/1/A/5000/E-0 Enclosure 1 (Foldout Page)
ATTACHMENT 9 -	EP/1/A/5000/E-0 Enclosure 5 (VX System Operation)
ATTACHMENT 10 -	EP/1/A/5000/E-0 Enclosure 2 (Control Room Ventilation Verification)
ATTACHMENT 11 -	EP/1/A/5000/E-0 Enclosure 4 (NC Temperature Control)
ATTACHMENT 12 -	EP/1/A/5000/G-1 Enclosure 1 (Spent Fuel Pool Monitoring)
ATTACHMENT 13 -	EP/1/A/5000/E-1 Enclosure 1 (Foldout Page)

ATTACHMENT 1

CREW CRITICAL TASK SUMMARY			
SAT	**UNSAT**	**CT #**	**CRITICAL TASK**
		1	Manually actuate at least one train of SIS-actuated safeguards before transition to E-1 occurs (E-0 Step 27 RNO d).
		2	Manually start at least one low-head ECCS pump before transition out of E-0 (E-0 Step 27 RNO d).

Comments:

ATTACHMENT 2

SHIFT TURNOVER INFORMATION			
Unit 1 Status			
Power Level	**Power History**	**NCS Boron**	**Xenon**
100 **%**	MOL	860 PPM	per OAC
Controlling Procedure			
• OP/1/A/6100/003 (Controlling Procedure for Unit Operation), Enclosure 4.3 (Unit Operation Between 85% and 100% Power). The steps for 100% power are complete.			
Other Information Needed to Assume the Shift			
• Unit 1 is at 100% power at the MOL. Unit 2 is at 100% power. 1A CA Pump is removed from service for PMs. 1A CA Pump has been inoperable for 3 hours and is expected to be returned to service in 6 hours. Direction for the crew is to initiate a VQ release from 'A' train by completing the in-progress OP/1/A/6450/017 (Containment Air Release and Addition System) Enclosure 4.2 (Air Release Mode).			
AOs Available			
Seven AOs are available as listed on the status board			
METEOROLOGICAL CONDITIONS			
• Upper wind direction = 315 degrees, speed = 3 mph • Lower wind direction = 315 degrees, speed = 4.5 mph • Forecast calls for clear skies over the next 24 hours.			

ATTACHMENT 3

CNS AP/1/A/5500/015	ROD CONTROL MALFUNCTIONS Case I Failure Of Rods To Move	PAGE NO. 2 of 11 Revision 14

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. **Verify plant conditions - STABLE.**	**Perform the following:** __ a. IF load rejection in progress, THEN do not continue in this procedure until plant conditions are stable. b. IF power decrease in progress, THEN perform the following: __ 1) Determine if power decrease can be stopped. 2) IF power decrease can be stopped, THEN perform the following: __ a) Stop power decrease. __ b) Observe Caution prior to Step 2 and GO TO Step 2. (RNO continued on next page)

ATTACHMENT 3

CNS AP/1/A/5500/015	ROD CONTROL MALFUNCTIONS Case I Failure Of Rods To Move	PAGE NO. 3 of 11 Revision 14

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. (Continued)	3) IF power decrease must continue, THEN perform the following: • IF auto and manual rod control not available, THEN perform one of the following: __ • Borate to maintain T-Avg at T-Ref and RETURN TO procedure in effect. OR __ • Trip reactor and GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection). • IF auto or manual rod control available, THEN perform the following: a) IF AT ANY TIME two or more rods are misaligned by greater than 24 steps, THEN: __ (1) Trip Reactor. __ (2) GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection). __ b) WHEN plant conditions are stable, THEN observe Caution prior to Step 2 and GO TO Step 2. __ c) RETURN TO procedure in effect. __ c. IF power increase in progress, THEN stop power increase.

ATTACHMENT 3

CNS AP/1/A/5500/015	ROD CONTROL MALFUNCTIONS Case I Failure Of Rods To Move	PAGE NO. 4 of 11 Revision 14

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

<u>CAUTION</u> **Rods may be dropped if there is a logic cabinet failure and rod movement is attempted.**

__ 2. **Ensure "CRD BANK SELECT" switch - IN MANUAL.**

3. **Adjust the following as necessary to maintain T-Avg within 1°F of T-Ref:**

- __ Turbine load
- __ NC System boron concentration.

ATTACHMENT 3

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. **Verify Rod Control system failure:**	
__ a. 1AD-2, A/10 "ROD CONTROL URGENT FAILURE" - LIT.	a. Verify controlling rod bank(s) operate in manual mode as follows: __ 1) Record the initial control bank positions: A ___ B ___ C ___ D ___ __ 2) Reposition the affected rods 6 to 10 steps. 3) Verify proper rod movement as follows: __ • Controlling bank repositions on demand. __ • Proper bank overlap is maintained. __ 4) Return the affected rod bank(s) to initial position. __ 5) <u>IF</u> required, <u>THEN</u> rods may be moved in manual. __ 6) <u>GO TO</u> Step 6.
__ b. Do not move rods.	
5. **Dispatch operator to verify rod control cabinet alarms.**	
__ a. Verify "URGENT ALARM" - ON LOGIC CABINET.	__ a. <u>GO TO</u> Step 5.c.
__ b. <u>GO TO</u> Step 6.	

ATTACHMENT 3

CNS AP/1/A/5500/015	ROD CONTROL MALFUNCTIONS Case I Failure Of Rods To Move	PAGE NO. 6 of 11 Revision 14

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. (Continued) __ c. Verify "URGENT FAILURE" - ON POWER CABINETS OF CONTROLLING BANK(S).	**NOTE** Operation of control rods in "BANK SELECT" is undesirable, and should only be used if Turbine and Boron controls are not effective. c. IF operation of control rods in "BANK SELECT" is required, THEN perform the following: __ 1) Notify the reactor engineer that control rods will be operated in "BANK SELECT". **NOTE** Key #14 is required for the following step. 2) Verify light on circuit card "K1", in all Power Cabinets - DARK __ • 1ERCC0001 (Power Cab 1AC) __ • 1ERCC0004 (Power Cab 2AC) __ • 1ERCC0005 (Power Cab SCDE) __ • 1ERCC0003 (Power Cab 2BD) __ • 1ERCC0002 (Power Cab 1BD). __ 3) Do not continue in this procedure until all "K1" lights have been verified. __ 4) IF any "K1" light is lit, THEN GO TO Step 6. __ 5) Record all control rods step demand positions in the control room log. __ 6) Select the controlling bank in the "BANK SELECT" mode. (RNO continued on next page)

ATTACHMENT 3

CNS AP/1/A/5500/015	ROD CONTROL MALFUNCTIONS Case I Failure Of Rods To Move	PAGE NO. 7 of 11 Revision 14

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. (Continued)	**CAUTION** **The "ROD CTRL ALARM RESET" should not be depressed for greater than one second.**
	__ 7) Ensure "ROD CTRL ALARM" is reset.
	CAUTION **When control rods are operated in "BANK SELECT", the automatic bank overlap is defeated.**
	__ 8) Maintain proper bank overlap.
	__ 9) Observe rod insertion limits.
	__ 10) Move control rods as required to maintain T-Avg within 1°F of T-Ref.
__ 6. **Notify IAE to investigate problem.**	
7. **Ensure compliance with appropriate Tech Specs:** __ • 3.1.1 (Shutdown Margin (SDM)) __ • 3.1.4 (Rod Group Alignment Limits) __ • 3.1.5 (Shutdown Bank Insertion Limits) __ • 3.1.6 (Control Bank Insertion Limits) __ • 3.3.1 (Reactor Trip Instrumentation).	

ATTACHMENT 3

CNS AP/1/A/5500/015	ROD CONTROL MALFUNCTIONS Case I Failure Of Rods To Move	PAGE NO. 8 of 11 Revision 14

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

8. **Determine required notifications:**

__ • REFER TO RP/0/A/5000/001 (Classification Of Emergency)

__ • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).

9. **WHEN rod control problem is repaired, THEN perform the following:**

__ a. IF rods were operated in "BANK SELECT", THEN request reactor engineer guidance prior to returning rods to "AUTO".

__ b. Ensure T-Avg - WITHIN 1°F OF T-REF.

__ c. WHEN desired, THEN place control rods in "AUTO".

__ d. Ensure steam dumps - IN DESIRED MODE FOR EXISTING PLANT CONDITIONS.

__ 10. **Determine long term plant status. RETURN TO procedure in effect.**

END

ATTACHMENT 4

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK Enclosure 1 - Page 1 of 2 **Foldout Page**	PAGE NO. 24 of 41 Revision 8

1. **Reactor trip criteria:**

   IF any of the following conditions exist:

   __ • Steam leak endangering personnel or jeopardizing plant equipment

   __ • S/G levels - DECREASING IN AN UNCONTROLLED MANNER

   __ • Tavg 5°F less than T-Ref **AND** decreasing in an uncontrolled manner

   __ • Reactor power - INCREASING IN AN UNCONTROLLED MANNER

   __ • Secondary condensate inventory - DECREASING IN AN UNCONTROLLED MANNER.

   THEN perform the following:

   __ a. Trip Unit 1 reactor.

   b. CLOSE the following valves:

   __ • All MSIVs

   __ • All MSIV bypass valves.

   __ c. GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).

ATTACHMENT 4

2. **Uncontrolled cooldown:**

   IF Tavg less than 554°F AND decreasing, THEN perform one of the following:

   - IF reactor power less than 1%, THEN perform the following:
     - a. CLOSE the following valves:
       - __ • All MSIVs
       - __ • All MSIV bypass valves.
     - b. IF cooldown continues, THEN perform the following:
       - __ 1) Trip Unit 1 reactor.
       - __ 2) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).
   - IF reactor power less than 69%, THEN perform the following:
     - __ a. Trip Unit 1 turbine.
     - b. IF cooldown continues, THEN perform the following:
       - __ 1) Trip Unit 1 reactor.
       - 2) CLOSE the following valves:
         - __ • All MSIVs
         - __ • All MSIV bypass valves.
       - __ 3) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).
     - __ c. REFER TO AP/1/A/5500/002 (Turbine Generator Trip).

__ 3. **IF steam leak size increases, THEN RETURN TO C. (Operator Actions), Step 2.**

ATTACHMENT 5

CNS AP/1/A/5500/003	LOAD REJECTION Enclosure 3 - Page 1 of 1 **Rod Insertion Limit Boration**	PAGE NO. 39 of 40 Revision 41

CAUTION **Failure to initiate boration within one hour of exceeding rod insertion limits may violate Tech Spec 3.1.6.**

NOTE
- OAC point C1L4409 (Ctrl Bank Tech Spec Insertion Lmt Reached) and R.O.D Book (Section 2.2) provide rod insertion limit indication.
- The "Reactivity Data Sheet" provides boration data to restore control rods above rod insertion limits.

1. **IF the control rods cannot be maintained above the rod insertion limits, THEN perform the following:**

__ a. Stop any dilutions in progress.

__ b. Borate NC system as required, to restore rods above insertion limits.

__ c. Ensure control rods restored above insertion limits within 2 hours of exceeding limits.

__ d. Ensure compliance with Tech Spec 3.1.6 (Control Bank Insertion Limits).

ATTACHMENT 6

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Enclosure 2 - Page 1 of 1 **Case II NC System Leak Foldout Page**	PAGE NO. 76 of 158 Revision 57

Case II (NC System Leak) Safety Injection Initiation Criteria:

a. IF Pzr level cannot be maintained greater than 4% OR Pzr/NC pressure is decreasing in an uncontrolled manner, THEN perform the following:

1) IF in Mode 1, 2 or 3 with CLAs in service, THEN perform the following:

__ a) Trip reactor.

__ b) WHEN reactor trip verified, THEN initiate S/I.

__ c) GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).

__ 2) IF in Mode 3 with CLAs isolated OR in Mode 4, THEN GO TO AP/1/A/5500/027 (Shutdown LOCA).

__ 3) IF in Mode 5, THEN GO TO AP/1/A/5500/019 (Loss of Residual Heat Removal System).

ATTACHMENT 7

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. **Verify one train of the following equipment is in operation:** __ • YC chiller __ • CR AHU-1 __ • CRA AHU-1 __ • CRA PFT-1.	**Perform the following:** __ a. Shift operating VC/YC trains. REFER TO Enclosure 12 (Shifting Operating VC/YC Train). b. IF no train can be properly aligned, THEN dispatch operator and IAE/Maintenance to restore at least one train of VC/YC. REFER TO the following: __ • OP/0/A/6450/011 (Control Room Area Ventilation/Chilled Water System) __ • EM/0/A/5200/001 (Troubleshooting Cause For Improper Operation of VC/YC System).
2. **Verify the following annunciators - DARK:** __ • 1AD-18, A/8 "UNIT 1 INTAKE HI CHLORINE 1A" __ • 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE 1B" __ • 1AD-18, D/8 "UNIT 2 INTAKE HI CHLORINE 2A" __ • 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE 2B".	**IF chlorine odor is detected in Control Room, THEN perform the following based on the status of given alarms:** a. IF detectors on both unit intakes are in alarm, THEN perform the following: 1) Ensure the following VC intake dampers - CLOSED: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet) __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). __ 2) GO TO Step 4. (RNO continued on next page)

ATTACHMENT 7

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. (Continued)	
	b. IF Unit 1 intake HI chlorine detector(s) in alarm, THEN perform the following: 1) Ensure the following VC dampers - CLOSED: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet). 2) Ensure the following dampers - OPEN: __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). __ 3) GO TO Step 4.
	c. IF Unit 2 intake Hi chlorine detector(s) in alarm, THEN perform the following: 1) Ensure the following VC dampers - CLOSED: __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). 2) Ensure the following dampers - OPEN: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet). __ 3) GO TO Step 4.
3. **Ensure the following VC dampers - OPEN:** __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet) __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet).	

ATTACHMENT 7

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Enclosure 11 - Page 3 of 3 **Control Room Ventilation System Verification**	PAGE NO. 149 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4. **Repeat this enclosure until notified by Station Management as follows:**

__ • At least once every 8 hours

OR

__ • Any time VC/YC related annunciators on 1AD-18 actuate.

ATTACHMENT 8

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 1 of 2 **Foldout Page**	PAGE NO. 32 of 47 Revision 42

1. **NC Pump Trip Criteria:**

   - IF the following conditions satisfied, **THEN** trip all NC pumps while maintaining seal injection flow:

     - Any NV or NI pump - ON
     - NC subcooling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F
     - Reactor power - LESS THAN 5%.

2. **CA Suction Source Switchover Criterion:**

   - IF 1AD-8, B/1 "UST LO LEVEL" lit, **THEN REFER TO** AP/1/A/5500/006 (Loss of S/G Feedwater).

3. **Position Criteria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol):**

   - IF NC pressure less than 1500 PSIG **AND** NV S/I flowpath aligned, **THEN** CLOSE 1NV-202B and 1NV-203A.
   - IF NC pressure greater than 2000 PSIG, **THEN** OPEN 1NV-202B and 1NV-203A.

4. **Ruptured S/G CA Isolation Criteria:**

   - IF both the following conditions met, **THEN** stop CA flow to affected S/G:

     - Level increasing in an uncontrolled manner or radiation level in that S/G abnormal
     - N/R level - GREATER THAN 11% (29% ACC).

ATTACHMENT 8

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 2 of 2 **Foldout Page**	PAGE NO. 33 of 47 Revision 42

5. **Faulted S/G CA isolation Criteria:**
   - IF all the following conditions met, THEN stop CA flow to affected S/G:
     - S/G pressure decreasing in an uncontrolled manner or completely depressurized
     - Only one S/G diagnosed as faulted
     - Secondary heat sink criteria met:
       - Total CA flow - GREATER THAN 450 GPM

       OR
       - ANY S/G(s) N/R level - GREATER THAN 11%(29% ACC).

6. **NS Pump Trip Criterion:**
   - IF NS pump in recirc and S/I occurs, THEN perform one of the following:
     - IF train affected ECCS and D/G load sequencer - RESET, THEN stop NS pump.

     OR
     - WHEN sequencer loading complete, THEN perform the following for affected train:
       a. Notify Control Room Supervisor.
       b. Reset ECCS.
       c. Reset D/G load sequencer.
       d. Secure NS pump.
       e. IF AT ANY TIME B/O occurs, THEN restart S/I equipment previously on.

ATTACHMENT 9

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 5 - Page 1 of 1 **VX System Operation**	PAGE NO. 47 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. **Verify the following containment air return fan dampers - OPEN:** __ • ARF-D-2 (ARF-1A Ret Fan Damper) (1MD-4, I/5) __ • ARF-D-4 (ARF-1B Ret Fan Damper) (1MD-4, I/8).	__ **IF equipment not in proper alignment, THEN align equipment.**
2. **Verify the following equipment alignment:** __ • 1VX-1A (HSF-1A Inlt Isol) (1MD-4, I/6) - OPEN __ • 1VX-2B (HSF-1B Inlt Isol) (1MD-4, I/7) - OPEN __ • ARF-1A (Cont Air Return Fan) (1MD-4, I/3) - ON __ • ARF-1B (Cont Air Return Fan) (1MD-4, I/10) - ON __ • HSF-1A (H_2 Skimmer Fan) (1MD-4, I/4) - ON __ • HSF-1B (H_2 Skimmer Fan) (1MD-4, I/9) - ON.	**IF equipment not in proper alignment, THEN perform the following:** a. IF containment pressure less than 0.3 PSIG, THEN verify the following Monitor Light Panel Group 1 Sp lights - DARK: __ • I/3 __ • I/10. __ b. Align or start affected component(s). __ c. IF any VX System equipment cannot be started, THEN REFER TO OP/1/A/6450/010 (Containment Hydrogen Control Systems), for further actions.
3. **Verify containment air return fans operate as containment pressure changes as follows:** __ • IF AT ANY TIME containment pressure greater than 0.9 PSIG, THEN ensure containment air return fans - ON. __ • IF AT ANY TIME containment pressure less than 0.3 PSIG, THEN ensure containment air return fans - OFF.	

ATTACHMENT 10

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 1 of 7 **Ventilation System Verification**	PAGE NO. 34 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. **Verify proper VC/YC operation as follows:**	
a. Verify one train of the following equipment in operation: __ • YC chiller __ • CR AHU-1 __ • CRA AHU-1 __ • CRA PFT-1.	a. Perform the following: __ 1) Shift operating VC/YC trains. <u>REFER TO</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 17 (Shifting Operating VC/YC Trains). 2) <u>IF</u> no train can be properly aligned, <u>THEN</u> dispatch operator and IAE/Maintenance to restore at least one train of VC/YC. <u>REFER TO</u> the following: __ • OP/0/A/6450/011 (Control Room Area Ventilation/Chilled Water System) __ • EM/0/A/5200/001 (Troubleshooting Cause For Improper Operation of VC/YC System).

ATTACHMENT 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. (Continued)	
b. Verify the following alarms - DARK: __ • 1AD-18, A/8 "UNIT 1 INTAKE HI CHLORINE 1A" __ • 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE 1B" __ • 1AD-18, D/8 "UNIT 2 INTAKE HI CHLORINE 2A" __ • 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE 2B".	b. <u>IF</u> chlorine odor detected in the Control Room, <u>THEN</u> perform the following based on the status of given alarms: 1) <u>IF</u> detectors on both unit intakes in alarm, <u>THEN</u> perform the following: a) Ensure the following VC intake dampers - CLOSED: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet) __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). __ b) <u>GO TO</u> Step 1.d. 2) <u>IF</u> Unit 1 intake HI chlorine detector(s) in alarm, <u>THEN</u> perform the following: a) Ensure the following VC dampers - CLOSED: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet). b) Ensure the following dampers - OPEN: __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). __ c) <u>GO TO</u> Step 1.d. (RNO continued on next page)

ATTACHMENT 10

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 3 of 7 **Ventilation System Verification**	PAGE NO. 36 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. (Continued)	
	3) <u>IF</u> Unit 2 intake Hi chlorine detector(s) in alarm, <u>THEN</u> perform the following: a) Ensure the following VC dampers - CLOSED: __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). b) Ensure the following dampers - OPEN: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet). __ c) <u>GO TO</u> Step 1.d.
c. Ensure the following VC dampers - OPEN: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet) __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). d. Repeat Step 1 of this enclosure until notified by station management as follows: __ • At least once every 8 hours OR __ • Any time VC/YC related annunciators on 1AD-18 actuate.	

ATTACHMENT 10

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 4 of 7 **Ventilation System Verification**	PAGE NO. 37 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2. **Ensure proper VA System operation as follows:**

- Ensure the following fans - OFF:

__ • ABUXF 1A
__ • ABUXF 1B.

- Ensure VA System filter in service as follows:

__ • 1ABF-D-12 & 19 (VA Filter A Bypass Dampers) - CLOSED

__ • 1ABF-D-5 & 20 (VA Filter B Bypass Dampers) - CLOSED.

- Ensure the following fans - ON:

__ • ABFXF-1A
__ • ABFXF 1B.

ATTACHMENT 10

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 5 of 7 **Ventilation System Verification**	PAGE NO. 38 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. **Verify proper VE System operation as follows:**	
__ a. VE fans - ON.	__ a. Start fan(s).
__ b. Annulus pressure - BETWEEN -1.4 IN. WC AND -1.8 IN. WC.	b. Perform the following: 1) <u>IF</u> annulus pressure more positive than -1.4 in. WC, <u>THEN</u> perform the following: a) Verify flow indicated on the following indications: __ • 1VEP5180 (VE 1A Flow To Stack) __ • 1VEP5200 (VE 1B Flow To Stack). b) <u>IF</u> flow not indicated, <u>THEN</u> dispatch operator to verify status of the following dampers based on their local indication or their operating piston rods being extended 4" to 6": __ • 1AVS-D-2 (VE A Trn Recirc Damp) (AB-603, JJ-51, Rm 500) - CLOSED __ • 1AVS-D-7 (VE B Trn Recirc Damp) (AB-603, HH-52, Rm 500) - CLOSED __ • 1AVS-D-3 (VE A Trn Exh Damp) (AB-603, JJ-52, Rm 500) - OPEN __ • 1AVS-D-8 (VE B Trn Exh Damp) (AB-603, HH-52, Rm 500) - OPEN. (RNO continued on next page)

ATTACHMENT 10

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 6 of 7 **Ventilation System Verification**	PAGE NO. 39 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. (Continued)	
	__ c) Consult plant engineering staff and notify IAE/Maintenance to troubleshoot and repair. REFER TO EM/1/A/5200/002 (Troubleshooting Cause For VE System Hi/Lo Pressure).
	__ d) GO TO Step 3.c.
	2) IF annulus pressure more negative than -1.8 in. WC, THEN perform the following:
	__ a) Determine which VE train indicates highest discharge flow to stack.
	__ b) Within 2 hours, ensure VE train that indicates highest discharge flow to stack secured.
	__ c) Consult plant engineering staff and notify IAE/Maintenance to troubleshoot and repair. REFER TO EM/1/A/5200/002 (Troubleshooting Cause For VE System Hi/Lo Pressure).
__ c. Repeat Step 3.b every 30 minutes until notified by station management.	

ATTACHMENT 10

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 7 of 7 **Ventilation System Verification**	PAGE NO. 40 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 4. **Record time ventilation systems verified on following table:**

TIME	SYSTEM (VC, VE)	INITIALS

ATTACHMENT 11

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 1 of 5 **NC Temperature Control**	PAGE NO. 42 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. **Verify any NC pump - ON.**	**Perform the following:** a. Use NC T-Colds to determine NC temperature as required in subsequent steps. b. GO TO Step 4.
2. **Use NC T-Avg to determine NC temperature as required in subsequent steps.**	
3. **IF AT ANY TIME all NC pumps tripped, THEN use NC T-Colds to determine NC temperature as required in subsequent steps.**	
4. **Verify one of the following:** • NC temperature - STABLE AT LESS THAN OR EQUAL TO 557°F OR • NC temperature - TRENDING TO 557°F.	GO TO **Step 8.**
5. **Continue to monitor NC temperature.**	
6. **Notify Control Room Supervisor of NC temperature control status.**	

ATTACHMENT 11

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 2 of 5 **NC Temperature Control**	PAGE NO. 43 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **Do not continue in this enclosure until one of the following occurs:** • NC temperature - GREATER THAN 557°F AND INCREASING IN AN UNCONTROLLED MANNER OR • NC temperature - GREATER THAN 557°F AND STABLE OR • NC temperature - LESS THAN 557°F AND DECREASING IN AN UNCONTROLLED MANNER.	

ATTACHMENT 11

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. **Verify NC temperature - LESS THAN 557°F AND DECREASING.**	**Perform the following:** a. IF NC temperature greater than 557°F AND increasing, THEN stabilize NC temperature at 557°F as follows: 1) IF steam dumps available, THEN use steam dumps. 2) IF steam dumps not available, THEN use S/G PORVs. b. IF the following conditions exist: • NC temperature greater than 557°F and stable • Time and manpower available, THEN stabilize NC temperature at 557°F as follows: 1) IF steam dumps available, THEN use steam dumps. 2) IF steam dumps not available, THEN use S/G PORVs. c. GO TO Step 10.
9. **Attempt to stop the NC cooldown as follows:**	
a. Ensure all steam dumps - CLOSED.	
b. Ensure all S/G PORVs - CLOSED.	b. IF any S/G PORV cannot be closed, THEN CLOSE its isolation valve.
c. Ensure S/G blowdown isolated.	

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 4 of 5 **NC Temperature Control**	PAGE NO. 45 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
d. CLOSE the following valves: • 1SM-77A (S/G 1A Otlt Hdr Bldwn C/V) • 1SM-76B (S/G 1B Otlt Hdr Bldwn C/V) • 1SM-75A (S/G 1C Otlt Hdr Bldwn C/V) • 1SM-74B (S/G 1D Otlt Hdr Bldwn C/V).	
e. Verify MSR Second Stage steam supply valves - CLOSED • 1HM-1 (MSRH 1A&1B SSRH Stm Source) • 1HM-2 (MSRH 1C&1D SSRH Stm Source).	e. Perform the following: 1) CLOSE MSR Second Stage steam supply valve(s). 2) <u>IF</u> steam flowpath cannot be isolated from Control Room, <u>THEN</u> CLOSE the following valves: • All MSIVs • All MSIV bypass valves.
f. Depress and hold "S/V BEFORE SEAT DRN" "CLOSE" pushbutton (1MC-3) to close the following valves: • 1SM-41 (Stop Vlv #1 Before Seat Drn) • 1SM-44 (Stop Vlv #2 Before Seat Drn) • 1SM-43 (Stop Vlv #3 Before Seat Drn) • 1SM-42 (Stop Vlv #4 Before Seat Drn).	

ATTACHMENT 11

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 5 of 5 **NC Temperature Control**	PAGE NO. 46 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
g. Verify NC cooldown - STOPPED.	g. __IF__ cooldown continues, __THEN__ THROTTLE feed flow as follows: 1) __IF__ S/G N/R level less than 11% (29% ACC) in all S/G's, __THEN__ THROTTLE feed flow to achieve the following: • Minimize cooldown • Maintain total feed flow greater than 450 GPM. 2) __WHEN__ N/R level greater than 11% (29% ACC) in any S/G, __THEN__ THROTTLE feed flow further to achieve the following: • Minimize cooldown • Maintain at least one S/G N/R level greater than 11% (29% ACC). 3) __IF__ cooldown continues, __THEN__ CLOSE the following valves: • All MSIVs • All MSIV bypass valves.
10. **Continue to perform actions of this enclosure as required to ensure one of the following:** • NC temperature - STABLE AT LESS THAN OR EQUAL TO 557°F. OR • NC temperature - TRENDING TO 557°F.	
11. **Notify Control Room Supervisor of NC temperature control status.**	

ATTACHMENT 12

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 1 - Page 1 of 8 **Unit 1 Spent Fuel Pool Monitoring**	PAGE NO. 3 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. **Review the following considerations for Spent Fuel Pool monitoring:**	
__ • Control Room temperature indication 1KFP5130 is a non-safety instrument loop. Guidance is provided for local temperature verification if access to Spent Fuel Pool available.	
__ • Normal level indication 1KFP5120 is a non-safety instrument loop powered from 1RPA. Guidance is provided for local temperature verification if access to Spent Fuel Pool available.	
__ • If a loss of all AC Power is anticipated to last greater than 6 hrs, portable Spent Fuel Pool level and temperature instrumentation can be installed if access to Spent Fuel Pool available.	
__ • Seismic event may cause loss of Spent Fuel Pool inventory due to "splashing" of water.	
2. **Monitor Unit 1 KF pump motor cooling as follows:**	
a. Verify the following: __ • KF PUMP A MTR CLR HI TEMP (1AD-13 D/6) - DARK. __ • KF PUMP B MTR CLR HI TEMP (1AD-13 D/7) - DARK.	__ a. Ensure affected Unit 1 KF pump(s) - OFF.
__ b. **<u>IF AT ANY TIME</u>** KF PUMP MTR CLR HI TEMP annunciator(s) lit, **<u>THEN</u>** perform Step 2.a.	
__ 3. **<u>IF AT ANY TIME</u> Spent Fuel Pool level <u>AND</u> temperature indications unavailable in Control Room, <u>THEN</u> dispatch operator to monitor Unit 1 Spent Fuel Pool. <u>GO TO</u> Enclosure 24 (Local Spent Fuel Pool Monitoring).**	

ATTACHMENT 12

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 1 - Page 2 of 8 **Unit 1 Spent Fuel Pool Monitoring**	PAGE NO. 4 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE Steps 4 and 5 may be performed concurrently.

4. **Monitor Unit 1 Spent Fuel Pool level as follows:**

__ a. Verify Spent Fuel Pool level indication in Control Room - AVAILABLE.

__ a. **GO TO** Step 4.e.

__ b. Verify Spent Fuel Pool level greater than - 39 ft.

b. Notify Control Room Supervisor of the following:

__ 1) Unit 1 Spent Fuel Pool level.

__ 2) **REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).

__ c. Record Unit 1 Spent Fuel Pool level in the following table:

Time	Unit 1 SFP Level	Time	Unit 1 SFP Level	Time	Unit 1 SFP Level

__ d. **GO TO** Step 5 .

ATTACHMENT 12

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 1 - Page 3 of 8 **Unit 1 Spent Fuel Pool Monitoring**	PAGE NO. 5 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
e. Determine Spent Fuel Pool level as follows:	
__ 1) Dispatch operator and RP to determine if Unit 1 Spent Fuel Pool area accessible.	
2) **WHEN** Unit 1 Spent Fuel Pool area accessibility determined, **THEN** perform the following:	
__ a) Verify Unit 1 Spent Fuel Pool area - ACCESSIBLE.	a) Notify Station Management to perform the following: __ (1) Evaluate alternate method to monitor Unit 1 Spent Fuel Pool level. __ (2) **IF AT ANY TIME** Unit 1 level estimated less than - 39 ft, **THEN REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level). __ (3) **GO TO** Step 5.
b) Notify dispatched operator to perform the following:	
(1) Determine Spent Fuel Pool level using the following reference points:	
__ • Top of skimmer trough is 40 Ft	
__ • 1 Ft below lip of skimmer trough is 39 Ft	
__ • Centerline of KF pump suction strainer is 37.5 Ft.	
__ (2) Report level determination to Control Room.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
c) **WHEN** operator reports level, **THEN** perform the following:	
__ (1) Verify level greater than -39 ft.	(1) Notify Control Room Supervisor of the following: __ 1. Unit 1 Spent Fuel Pool level. __ 2. **REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).
__ (2) Record Unit 1 Spent Fuel Pool level in the following table:	

Time	Unit 1 SFP Level	Time	Unit 1 SFP Level	Time	Unit 1 SFP Level

ATTACHMENT 12

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. **Monitor Unit 1 Spent Fuel Pool temperature as follows:**	
__ a. Verify Spent Fuel Pool temperature indication in Control Room - AVAILABLE.	__ a. **GO TO** Step 5.e.
__ b. Verify Spent Fuel Pool temperature less than - 125°F.	b. Notify Control Room Supervisor of the following: __ 1) Unit 1 Spent Fuel Pool temperature. __ 2) **REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).
__ c. Record Unit 1 Spent Fuel Pool temperature in the following table:	

Time	Unit 1 SFP Temp	Time	Unit 1 SFP Temp	Time	Unit 1 SFP Temp

__ d. **GO TO** Step 6.

ATTACHMENT 12

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. (Continued)	
e. Determine Spent Fuel Pool temperature as follows:	
__ 1) Verify access to Unit 1 Spent Fuel Pool area previously determined.	1) Perform the following: __ a) Dispatch operator and RP to determine if Unit 1 Spent Fuel Pool area accessible. __ b) **WHEN** Unit 1 Spent Fuel Pool area accessibility determined, **THEN** perform Steps 5.e.2 through 5.e.4. __ c) **GO TO** Step 6.
__ 2) Verify Unit 1 Spent Fuel Pool area - ACCESSIBLE.	2) Notify station management to perform the following: __ a) Evaluate alternate method to monitor Unit 1 Spent Fuel Pool temperature. __ b) **IF AT ANY TIME** Unit 1 temperature estimated greater than - 125°F, **THEN REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level). __ c) **GO TO** Step 6.
3) Notify dispatched operator to determine Unit 1 Spent Fuel Pool temperature as follows: __ a) Obtain infrared thermometer from OSC "Emergency Supply Cabinet". __ b) Scan Spent Fuel Pool surface for highest reading. __ c) Report temperature determination to Control Room.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. (Continued)	
4) **<u>WHEN</u>** operator reports temperature, **<u>THEN</u>** perform the following:	
__ a) Verify Spent Fuel Pool temperature - LESS THAN 125°F.	a) Notify Control Room Supervisor of the following: __ (1) Unit 1 Spent Fuel Pool temperature. __ (2) **<u>REFER TO</u>** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).
__ b) Record Unit 1 Spent Fuel Pool temperature in the following table:	

Time	Unit 1 SFP Temp	Time	Unit 1 SFP Temp	Time	Unit 1 SFP Temp

__ 6. **Notify Control Room Supervisor of Unit 1 Spent Fuel Pool level and temperature.**

ATTACHMENT 12

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 1 - Page 8 of 8 **Unit 1 Spent Fuel Pool Monitoring**	PAGE NO. 10 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 7. **Verify AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level) - IMPLEMENTED.**	**IF AT ANY TIME Unit 1 Spent Fuel Pool cooling NOT established prior to reaching either of the following conditions, THEN notify Control Room Supervisor, REFER TO AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level):** __ • Unit 1 Spent Fuel Pool greater than - 125°F. __ • Unit 1 Spent Fuel Pool level less than - 39 ft.
__ 8. **Repeat this enclosure every 2 hours until notified by station management.**	

ATTACHMENT 13

CNS EP/1/A/5000/E-1	LOSS OF REACTOR OR SECONDARY COOLANT **Enclosure 1 - Page 1 of 3** **Foldout Page**	PAGE NO. **24 of 35** **Revision 30**

1. **NC Pump Trip Criteria:**

   - **IF** the following conditions satisfied, **THEN** trip all NC pumps while maintaining seal injection flow:

     - Any NV or NI pump - DELIVERING S/I FLOW TO NC SYSTEM
     - NC subcooling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F.

2. **S/I Reinitiation Criteria:**

   - **IF** NC subcooling based on core exit T/Cs less than 0°F **OR** Pzr level cannot be maintained greater than 11% (30% ACC), **THEN** perform the following as necessary to restore subcooling and level:

     - Start one or more S/I pumps.
     - Realign NV S/I flow path. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 14 (NV Alignment To S/I Mode).

3. **Secondary Integrity Criteria:**

   - **IF** any unisolated S/G pressure decreasing in uncontrolled manner **OR** completely depressurized, **THEN GO TO** EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).

4. **SGTR Transition Criteria:**

   - **IF** any SG level increases in uncontrolled manner **OR** any SG has abnormal radiation, **THEN** perform the following:

   a. Perform the following as necessary to maintain NC subcooling based on core exit T/Cs greater than 0°F and Pzr level greater than 11% (30% ACC):

      - Start one or more S/I pumps
      - Realign NV S/I flow path. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 14 (NV Alignment To S/I Mode).

   b. **GO TO** EP/1/A/5000/E-3 (Steam Generator Tube Rupture).

ATTACHMENT 13

CNS EP/1/A/5000/E-1	LOSS OF REACTOR OR SECONDARY COOLANT **Enclosure 1 - Page 2 of 3** **Foldout Page**	PAGE NO. **25 of 35** **Revision 30**

5. **1AD-9, C/8 "FWST PRE-LO LEVEL" (27%) LIT Alarm Actions:**

   a. Verify at least one of the following annunciators - LIT:

   - 1AD-20, B/2 "CONT. SUMP LEVEL >2.5 ft"

     OR

   - 1AD-21, B/2 "CONT. SUMP LEVEL >2.5 ft".

   b. **IF** both alarms dark, **THEN** perform the following for ND pumps with suction aligned to FWST or Containment Sump:

   1) Ensure the following - RESET:
      - ECCS
      - D/G Load Sequencers.

   2) Stop ND pumps.

   3) **IF** ND pump(s) will not stop, **THEN** perform the following for affected train(s):

      - ND Train 1A:
        a) Place "PWR DISCON FOR 1NI-173A" switch in "ENABLE".

        b) CLOSE 1NI-173A (ND Hdr 1A To Cold Legs C&D).

        c) CLOSE 1ND-32A (ND Train 1A Hot Leg Inj Isol).

      - ND Train 1B:

        a) Place "PWR DISCON FOR 1NI-178B" switch in "ENABLE".

        b) CLOSE 1NI-178B (ND Hdr 1B To Cold Legs A&B).

        c) CLOSE 1ND-65B (ND Train 1B Hot Leg Inj Isol).

   4) Do not restart either ND pump until at least one "CONT. SUMP LEVEL >2.5 ft" annunciator - LIT.

   5) Ensure "S/I Reinitiation Criteria" of this foldout page monitored to determine if additional NV or NI SI flow needed.

6. **Cold Leg Recirc Switchover Criterion:**

   - **IF** FWST level decreases to 20% (1AD-9, D/8 "FWST 2/4 LO LEVEL"), **THEN GO TO** EP/1/A/5000/ES-1.3 (Transfer to Cold Leg Recirculation).

ATTACHMENT 13

CNS EP/1/A/5000/E-1	LOSS OF REACTOR OR SECONDARY COOLANT **Enclosure 1 - Page 3 of 3** **Foldout Page**	PAGE NO. **26 of 35** **Revision 30**

7. **CA Suction Source Switchover Criterion:**

   - **IF** 1AD-8, B/1 "UST LO LEVEL" lit, **THEN REFER TO** AP/1/A/5500/006 (Loss of S/G Feedwater).

8. **Position Criteria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol):**

   - **IF** NC pressure less than 1500 PSIG **AND** NV S/I flowpath aligned, **THEN** CLOSE 1NV-202B and 1NV-203A.
   - **IF** NC pressure greater than 2000 PSIG, **THEN** OPEN 1NV-202B and 1NV-203A.

2017 INITIAL LICENSE NRC
SCENARIO # 3

Facility: Catawba NRC Exam 2017	Scenario No.: 3	Op Test No.: 2017301	
Examiners:		Operators:	SRO
			RO
			BOP
Initial Conditions:	Unit 1 is at 50% power at the EOL. Unit 2 is at 100% power.		
Turnover:	Unit 1 is at 50% power at the EOL. Unit 2 is at 100% power. 1A CA Pump is removed from service for PMs. 1A CA Pump has been inoperable for 3 hours and is expected to be returned to service in 6 hours. Direction for the crew is to maintain present plant conditions.		

Event No.	Malf. No.	Event Type*	Event Description
1	IDE003I	C – RO C – SRO	Condenser Dump Valve (1SB-27) Failure
2	EGB004C	C – RO C - SRO	Voltage Regulator Failure
3	KC027	C – BOP TS – SRO	1A2 KC Pump Trip
4	SG001B	C – BOP TS – SRO	1B S/G Tube Leak / Automatic Blowdown Isolation Failure
5	SG001B	N – BOP N – SRO R – RO	AP/09 Rapid Downpower
6	SG001B	M – ALL	1B S/G Tube Rupture
7	ISE007A ISE007B	C – RO	CF Isolation Failure
8	ISE038	C – BOP	B Train Phase A Isolation Failure

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Scenario 3 – Summary

Initial Condition
Unit 1 is at 50% power at the EOL. Unit 2 is at 100% power.

Turnover:
Unit 1 is at 50% power at the EOL. Unit 2 is at 100% power. 1A CA Pump is removed from service for PMs. 1A CA Pump has been inoperable for 3 hours and is expected to be returned to service in 6 hours. Direction for the crew is to maintain present plant conditions.

Event 1
1SB-27 (SM Byp to Cond Ctrl #27) will fail open. Crew may enter AP/1/A/5500/028 (Secondary Steam Leak) for guidance to isolate the leak. Alternatively, the crew may use OMP 1-7 (Emergency/Abnormal Procedure Implementation Guidelines) guidance to address failure.

Verifiable Action – The RO will place Steam Dump Control switches to “Off-Reset”.

Event 2
A failure on the Unit 1 Voltage Regulator will cause Generator Voltage to increase until the limiter becomes active and stops the increase. Crew may enter AP/1/A/5500/037 (Generator Voltage and Electric Grid Disturbances) Case I (Abnormal Generator or Grid Voltage).

Verifiable Action – The RO will manually decrease voltage back to the requirements of the voltage schedule .

Event 3
1A2 KC pump will trip. Crew will enter AP/1/A/5500/021 (Loss of Component Cooling Water) and start an available KC pump.

Verifiable Action – BOP will start an available KC pump.

Event 4
1B S/G Tube leak will develop. 1B S/G Blowdown will fail to isolate on 1EMF-33 (Condenser Air Ejector) Trip 2 actuation. Crew will enter AP/1/A/5500/010 (Reactor Coolant Leak), Case I (NC System Leak).

Verifiable Action – BOP will manually isolate 1B S/G Blowdown, re-align condenser air ejector offgas to filtered ventilation, and adjust charging to maintain Pressurizer level. SRO will address Tech Specs.

Event 5
Crew will begin a rapid downpower per AP/1/A/5500/009 (Rapid Downpower) due to the SGTL.

Verifiable Action – RO will input a Target and Load Rate into the turbine control panel and place the Main Turbine in ‘GO’. BOP will perform a boration for a normal evolution.

Event 6
1B S/G Tube Leak will transition to a Rupture. Crew will enter EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) and transition to EP/1/A/5000/E-3 (Steam Generator Tube Rupture)

Verifiable Action – Crew will cooldown, depressurize, and terminate Safety Injection.

Event 7
Both trains of Automatic Feedwater Isolation will fail to actuate on Safety Injection.

Verifiable Action – RO will manually actuate A and B Train Main Feedwater Isolation.

Event 8
Phase A Isolation (Train B) will fail to automatically initiate on Safety Injection signal.

Verifiable Action – BOP will manually initiate B train Phase A Isolation signal.

***Critical Task 1* – Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs.**

***Critical Task 2* – Establish/maintain an RCS temperature so that transition from E-3 does not occur because the RCS temperature is in either of the following conditions**

- ***Too high to maintain the minimum required subcooling***
- ***Below the RCS temperature that causes and extreme (red path) or a severe (orange path) challenge to the subcriticality and/or integrity status tree.***

***Critical Task 3* – Depressurize RCS to meet SI termination criteria before water release occurs from the ruptured S/G PORV (1125 PSIG) or safety (prior to S/G NR level reaching 100% and an associated S/G PORV (1125 PSIG) or Safety Valve open).**

***Critical Task 4* – Start a KC pump prior to any NCP motor bearing temperature exceeding 195°F.**

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5–8)	7
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	4
4. Major transients (1–2)	1
5. EOPs entered/requiring substantive actions (1–2)	1
6. EOP contingencies requiring substantive actions (0–2)	0
7. Critical tasks (2–3)	3

EXERCISE GUIDE WORKSHEET

1. INITIAL CONDITIONS:

1.1 Reset to IC # 23 and load Schedule for Scenario 3.

START TIME:__________

✓	✓	Trigger	Instructor Action	Final	Delay	Ramp	Delete In	Event
		1	MAL-IDE003I (STEAM DUMP VLV SB27 FAIL TO POSITION)	100		:05		1
		10	MAL-IDE003I (STEAM DUMP VLV SB27 FAIL TO POSITION)	100			:01	1
		12	LOA-IDE009 (SB26 – INLET ISOL)	0	5:00	:05		1
		2	OVR-EGB004C (VOLTAGE ADJUST RAISE PB)	ON			:10	2
		3	LOA-KC028 (RACKOUT KC PMP 1A2)	RACK-OUT				3
		4	MAL-SG001B (S/G B TUBE LEAK)	75		:30		4
			VLV-BB002 (BB73-S/G B BLOWDOWN CTRL VLV FAIL AUTO ACTIONS)	ACTIVE				4
		6	MAL-SG001B (S/G B TUBE LEAK)	400		:30		6
			MAL-ISE007A (AUTO CF ISOL SIGNAL TRN A)	BLOCK				7
			MAL-ISE007B (AUTO CF ISOL SIGNAL TRN B)	BLOCK				7
			MAL-ISE003B (AUTO PHASE A ISOL SIGNAL TRN B)	BLOCK				8
			LOA-CA017 (RACKOUT CA PUMP 1A)	RACK-OUT				
		14	LOA-CA011 (SA3 – S/G 1B TO CAPT ISOL)	0	4:30	:30		
		Ensure EVENT 10 = x02i184I | x02i186I (Steam Dump Select OFF Either Train)						
		Ensure Red Collar is placed on 1A CA Pump						

2. SIMULATOR BRIEFING

   2.1 Control Room Assignments:

Position	Name
CRS	
RO	
BOP	

   2.2 Give a copy of Attachment 2 (Shift Turnover Information) to the CRS.

3. EXERCISE PRESENTATION

   3.1 Familiarization Period

      A. Allow examinees time to familiarize themselves with the Control Board alignments.

   3.2 **Scenario EVENT 1**, Condenser Dump Valve (1SB-27) Fails Open

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 1** to cause Condenser Dump Valve (1SB-27) to fail open.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as an AO or Unit Supervisor to create a clearance to isolate 1SB-27, **REPEAT** the information and **INSERT Trigger 12**.
	After 5 minutes, contact the control room and **REPORT** “1SB-26 is manually closed to isolate 1SB-27.”

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate a W/R and NCR for 1SB-27, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Radiation Protection notifying of steam leak from 1SB-27 failing open, **REPEAT** the information.

   3.3 **Scenario EVENT 2**, Generator Voltage Regulator Failure

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 2** to cause a Generator Voltage Regulator Failure.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as TCC to monitor Real Time Contingency Analysis and report the results to the Control Room Supervisor, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as SOC asking for voltage requirement, **REPORT** "Adjust voltage per the voltage operating schedule."

3.4 **Scenario EVENT 3**, 1A2 KC Pump Trip

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 3** to cause 1A2 KC pump to trip.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as AO to perform a post start checkout of the KC pump, after 3 minutes **REPORT** "KC pump____ looks good for continued operation".

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for 1A2 KC pump, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Unit 2 control room to verify that one KC heat exchanger is aligned to provide miniflow for the RN system, **REPORT** "2B KC heat exchanger outlet mode switch is in MINIFLOW".

3.5 **Scenario Event 4**, 1B S/G Tube Leak / Automatic BB isolation failure

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 4** to cause a 1B S/G Tube Leak.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Radiation Protection to frisk all Unit 1 S/G cation columns for activity, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Secondary Chemistry to sample all Unit 1 S/Gs for activity, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Secondary Chemistry to inform of CM polishing demineralizers being bypassed, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Radiation Protection to notify of current size of the leak and to perform HP/0/B/1009/003, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Engineering to notify of the S/G Tube Leak, **REPEAT** the information.

3.6 **Scenario Event 5**, Rapid Downpower

3.7 **Scenario Events 6, 7, 8,** 1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 6** to cause a 1B S/G Tube Rupture.

✓	BOOTH INSTRUCTOR ACTION
	If dispatched as an AO to unlock and close 1SA-1, **REPEAT** the information and **INSERT Trigger 14**.
	After 5 minutes, contact the control room and **REPORT** "1SA-1 is unlocked and closed."

Op Test No.:	301	Scenario #	3	Event #	1	Page	9 of 171
Event Description:	Condenser Dump Valve (1SB-27) Fails Open						

Note To Evaluator:

At the discretion of the Lead Evaluator, the scenario may begin by having the booth operator INSERT Trigger 1 for Event 1 (Condenser Dump Valve 1SB-27 Fails Open). The crew may elect to invoke OMP 1-7 guidance to isolate a known leak and elect to not enter AP/28 (Steam Leak). AP/28 actions are included in this guide beginning on the next page.

Control Room Indications
OAC Alarm for 1SB-27 - OPEN
Main Steam Header Pressure - DECREASING
Turbine Generator Electrical Load - DECREASING
Reactor Power - INCREASING
RED OPEN light for 1SB-27 - LIT

Op Test No.:	301	Scenario #	3	Event #	1	Page	10	of	171
Event Description:	Condenser Dump Valve (1SB-27) Fails Open								

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK	PAGE NO. 2 of 41 Revision 8

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	**Enclosure 1 is included as Attachment 3.**
__ 1. Monitor Enclosure 1 (Foldout Page).	
__ 2. **Verify turbine - ONLINE.**	__ **GO TO Step 6.**
3. **Verify the following:** __ • Reactor power - LESS THAN OR EQUAL TO 100% POWER __ • T-Avg - WITHIN 1.5°F OF T-Ref.	**Perform the following:** __ a. Select "MANUAL" on turbine control panel. b. Depress "CONTROL VALVES LOWER" pushbutton and reduce turbine load to maintain: __ • Reactor power - LESS THAN OR EQUAL TO 100% POWER __ • T-Avg - WITHIN 1.5°F OF T-Ref.
4. **Verify proper reactor response as follows:** __ • Control rods - IN AUTO AND STEPPING IN __ • P/R neutron flux - DECREASING.	__ **IF T-Avg greater than 1.5°F higher than T-Ref, THEN insert control rods as required to maintain T-Avg within 1°F of T-Ref.**
__ 5. **IF AT ANY TIME reactor power greater than 100%, THEN perform Step 3 RNO.**	
__ 6. **Verify Pzr level - STABLE OR INCREASING.**	**Perform the following:** __ a. Maintain charging flow less than 180 GPM. (RNO continued on next page)

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Event Description:	Condenser Dump Valve (1SB-27) Fails Open						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	

__ b. THROTTLE 1NV-294 (NV Pmps A&B Disch Flow Ctrl) to stabilize Pzr level.

__ c. IF Pzr level stable OR increasing, THEN GO TO Step 7.

d. IF Pzr level continues to decrease, THEN perform the following:

1) Reduce letdown flow to 45 GPM as follows:

a) IF 1NV-10A (Letdn Orif 1B Otlt Cont Isol) open, THEN perform the following:

__ (1) Control 1NV-148 (Letdn Press Control) to establish letdown pressure between 375 - 400 PSIG.

__ (2) THROTTLE 1NV-849 (Letdn Flow Var Orif Ctrl) for 45 GPM letdown flow.

__ (3) WHEN 45 GPM letdown flow established, THEN adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure at 350 PSIG.

__ (4) WHEN letdown pressure stable at 350 PSIG, THEN place 1NV-148 (Letdn Press Control) in auto.

(RNO continued on next page)

Op Test No.:	301	Scenario #	3	Event #	1	Page	12	of 171
Event Description:	Condenser Dump Valve (1SB-27) Fails Open							

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK	PAGE NO. 4 of 41 Revision 8

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	b) **IF** 1NV-13A (Letdn Orif 1A Otlt Cont Isol) open, **THEN** perform the following: __ (1) Control 1NV-148 (Letdn Press Control) to establish letdown pressure between 150 - 200 PSIG. __ (2) OPEN 1NV-11A (Letdn Orif 1C Otlt Cont Isol). __ (3) Adjust 1NV-148 (Letdn Press Control) to establish letdown pressure between 375 - 400 PSIG. __ (4) CLOSE 1NV-13A (Letdn Orif 1A Otlt Cont Isol). __ (5) Adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure at 350 PSIG. __ (6) **WHEN** letdown pressure stable at 350 PSIG, **THEN** place 1NV-148 (Letdn Press Control) in auto. __ 2) **IF** Pzr level stable **OR** increasing, **THEN GO TO** Step 7. (RNO continued on next page)

Op Test No.:	301	Scenario #	3	Event #	1	Page	13 of 171
Event Description:	Condenser Dump Valve (1SB-27) Fails Open						

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK	PAGE NO. 5 of 41 Revision 8

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	3) <u>IF</u> Pzr level continues to decrease <u>OR</u> Pzr level cannot be maintained greater than 11%, <u>THEN</u> perform the following: __ a) Trip Unit 1 reactor. b) CLOSE the following valves: __ • All MSIVs __ • All MSIV bypass valves. __ c) Initiate S/I. __ d) <u>GO TO</u> EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).
__ 7. **<u>IF AT ANY TIME</u> while in this procedure Pzr level decreasing in an uncontrolled manner, <u>THEN RETURN TO</u> Step 6.**	
8. **<u>IF AT ANY TIME</u> VCT level goes below 23%, <u>THEN</u> align NV pump suction to FWST as follows:** a. OPEN the following valves: __ • 1NV-252A (NV Pumps Suct From FWST) __ • 1NV-253B (NV Pumps Suct From FWST). b. CLOSE the following valves: __ • 1NV-188A (VCT Otlt Isol) __ • 1NV-189B (VCT Otlt Isol).	

Op Test No.:	301	Scenario #	3	Event #	1	Page	14	of	171
Event Description:	Condenser Dump Valve (1SB-27) Fails Open								

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK	PAGE NO. 6 of 41 Revision 8

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. **Attempt to identify and isolate leak as follows:**	
a. Verify the following conditions - NORMAL:	a. Perform the following:
	__ 1) Evacuate containment.
__ • Containment temperature	2) Perform the following:
__ • Containment pressure	__ a) Start all lower containment ventilation units in low speed.
__ • Containment humidity	__ b) Start all upper containment ventilation units.
__ • Containment floor & equipment sump level.	__ c) Place all upper and lower containment ventilation units in "MAX" cooling.
	3) IF AT ANY TIME containment pressure reaches 1.2 PSIG, THEN perform the following:
	__ a) Ensure Unit 1 reactor tripped.
	__ b) Ensure S/I initiated.
	c) CLOSE the following valves:
	__ • All MSIVs
	__ • All MSIV bypass valves.
	__ d) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).
	__ 4) GO TO Step 10.
__ b. Dispatch operators to locate and identify source of steam leak.	

Op Test No.:	301	Scenario #	3	Event #	1	Page	15 of 171
Event Description:	Condenser Dump Valve (1SB-27) Fails Open						

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK	PAGE NO. 7 of 41 Revision 8

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
__ c. Verify S/G PORVs - CLOSED.	c. IF S/G pressure less than 1090 PSIG, THEN perform the following: __ 1) CLOSE affected S/G PORV. 2) IF S/G PORV still open, THEN perform the following: __ a) CLOSE affected S/G PORV isolation valve. __ b) IF S/G PORV isolation valve still open, THEN dispatch operator to close S/G PORV isolation valve.
__ d. Verify condenser dump valves - CLOSED.	d. IF steam dumps required to be closed, THEN perform the following: 1) Select "OFF RESET" on the following switches: __ • "STEAM DUMP INTLK BYP TRN A" __ • "STEAM DUMP INTLK BYP TRN B". N/A 2) IF valve will not close, THEN dispatch operator to close affected condenser dump valve isolation valve. (RNO continued on next page)

Op Test No.: 301	Scenario # 3	Event # 1	Page 16 of 171				
Event Description:	Condenser Dump Valve (1SB-27) Fails Open						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
	3) **WHEN** leaking condenser dump valve isolated **OR** repaired, **THEN** return the following switches to "ON": __ • "STEAM DUMP INTLK BYP TRN A" __ • "STEAM DUMP INTLK BYP TRN B".
__ e. Verify atmospheric dump valves - CLOSED.	e. **IF** steam dumps required to be closed, **THEN** perform the following: 1) Select "OFF RESET" on the following switches: __ • "STEAM DUMP INTLK BYP TRN A" __ • "STEAM DUMP INTLK BYP TRN B". __ 2) **IF** valve will not close, **THEN** CLOSE affected atmospheric dump valve isolation valve. __ 3) **IF** isolation valve will not close, **THEN** dispatch operator to fail air to affected atmospheric dump valve. 4) **WHEN** leaking atmospheric dump valve isolated **OR** repaired, **THEN** return the following switches to "ON": __ • "STEAM DUMP INTLK BYP TRN A" __ • "STEAM DUMP INTLK BYP TRN B".

Op Test No.:	301	Scenario #	3	Event #	1	Page	17 of 171
Event Description:	Condenser Dump Valve (1SB-27) Fails Open						

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK	PAGE NO. 9 of 41 Revision 8

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
__ f. Verify CA PMP #1 - OFF.	__ f. IF operation of CA PMP #1 causing uncontrolled cooldown AND flow from CA PMP #1 not required, THEN stop CA PMP #1.
N/A g. IF leak suspected to be in a doghouse, THEN CLOSE the following valves: • Outside DH: __ • 1SM-77A (S/G 1A Otlt Hdr Bldwn C/V) __ • 1SM-74B (S/G 1D Otlt Hdr Bldwn C/V). OR • Inside DH: __ • 1SM-76B (S/G 1B Otlt Hdr Bldwn C/V) __ • 1SM-75A (S/G 1C Otlt Hdr Bldwn C/V).	
10. **Determine required notifications:** __ • REFER TO RP/0/A/5000/001 (Classification Of Emergency) __ • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).	
__ 11. **Notify RP of leak.**	
__ 12. **Verify - LEAK ISOLATED.**	__ **GO TO Step 14.**

Op Test No.:	301	Scenario #	3	Event #	1	Page	18	of	171
Event Description:	Condenser Dump Valve (1SB-27) Fails Open								

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK	PAGE NO. 10 of 41 Revision 8

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 13. Determine long term plant status. RETURN TO procedure and step in effect.	
Note To Evaluator: This ends Event 1. At the Lead Evaluators discretion, the scenario may continue by having the booth operator INSERT Trigger 2 for Event 2 (Generator Voltage Regulator Failure).	**Perform the following:** __ a. Initiate makeup to UST. __ b. Notify Secondary Chemistry of increased makeup.
15. **Evaluate unit shutdown as follows:**	
__ a. Verify Unit 1 status - IN MODE 1 OR 2.	__ a. GO TO Step 18.
b. Determine if Unit 1 shutdown or load reduction warranted based on the following criteria: __ • Size of leak __ • Location of leak __ • Rate of depletion of secondary inventory __ • Steam leak cannot be isolated or repaired at power __ • OSM judgment __ • IF steam leaking from secondary heater relief OR MSR relief valve, THEN reducing turbine load may reduce pressure enough to close relief valve. __ • IF turbine trip will isolate steam leak, THEN it may be desirable to perform an orderly shutdown of the turbine and maintain reactor power in Mode 1.	

Op Test No.:	301	Scenario #	3	Event #	2	Page	19	of	171
Event Description:	Generator Voltage Regulator Failure								

Control Room Indications
OAC alarm for Generator Voltage High
Generator Voltage - INCREASING

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. Verify Generator - TIED TO GRID.	Perform the following: NOTE Shared systems (RN, VC, YC, VA) require an operable normal power source to be operable. a. IF notified by TCC that degraded switchyard (grid) voltage conditions exist, THEN ensure compliance with the following Tech Specs. REFER TO PT/1/A/4350/002C (Available Power Source Operability Check). __ • 3.8.1 (AC Sources - Operating) __ • 3.7.8 (Nuclear Service Water System (NSWS) __ • 3.7.10 (Control Room Area Ventilation System (CRAVS)) __ • 3.7.11 (Control Room Area Chilled Water System (CRACWS)) __ • 3.7.12 (Auxiliary Building Filtered Ventilation System ABFVS)). __ b. RETURN TO procedure and step in effect.
2. Verify Generator MVARs - EXCEED GENERATOR CAPABILITY CURVE limits. REFER TO one of the following: __ • GENCAP (OAC Graphic Display) __ • Enclosure 1 (Unit 1 Generator Capability Curves) **Enclosure 1 can be found as Attachment 5.**	Perform the following: __ a. IF AT ANY TIME GENERATOR CAPABILITY CURVE limits exceeded, THEN GO TO Step 3. __ b. Observe Note prior to Step 5 and GO TO Step 5.

Op Test No.:	301	Scenario #	3	Event #	2	Page	21	of	171
Event Description:	Generator Voltage Regulator Failure								

CNS AP/1/A/5500/037	GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES Case I Abnormal Generator or Grid Voltage	PAGE NO. 5 of 21 Revision 03

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. **Adjust Generator MVARs to operate within Generator Capability Curve limits as follows:** __ • Depress "LOWER" on the VOLTAGE ADJUST to reduce lagging MVARs <u>OR</u> __ • Depress "RAISE" on the VOLTAGE ADJUST to reduce leading MVARs.	**Perform the following:** a. <u>IF</u> voltage regulator in "AUTO", <u>THEN</u> perform the following: __ 1) Place voltage regulator in MANUAL. __ 2) Adjust MVARs to within the GENERATOR CAPABILITY CURVE limits. b. <u>IF</u> unable to maintain MVARs within Generator Capability Curve limits, <u>THEN</u> remove generator from service as follows: 1) <u>IF</u> reactor power greater than or equal to 69%, <u>THEN</u> perform the following: __ a) Trip reactor. __ b) <u>GO TO</u> EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection). 2) <u>IF</u> reactor power less than 69%, <u>THEN</u> perform the following: __ a) Trip turbine. __ b) <u>GO TO</u> AP/1/A/5500/002 (Turbine Generator Trip).
__ 4. **Notify Engineering to evaluate generator abnormal operating conditions.**	

Op Test No.:	301	Scenario #	3	Event #	2	Page	22 of 171
Event Description:	Generator Voltage Regulator Failure						

CNS AP/1/A/5500/037	GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES Case I Abnormal Generator or Grid Voltage	PAGE NO. 6 of 21 Revision 03

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE The TCC "Real Time Contingency Analysis" (RTCA) program determines if the Unit will have adequate switchyard voltage available for ECCS loads following a Unit Trip with Safety Injection actuation.	
__ 5. **Verify TCC reported "Real Time Contingency Analysis" (RTCA) indicates CNS switchyard voltage would NOT be adequate if the unit should trip.**	**Perform the following:** __ a. IF TCC has not reported "RTCA" indications, THEN notify TCC to monitor "RTCA" and report results to Control Room Supervisor. __ b. IF AT ANY TIME TCC reports that "RTCA" indicates CNS switchyard voltage would NOT be adequate if the unit should trip, THEN GO TO Step 6. __ c. Observe Note prior to Step 18 and GO TO Step 18.
__ 6. **Record time TCC "RTCA" indicated CNS switchyard (grid) voltage NOT adequate.** _______________________	
__ 7. **Start 2 hour timer from time TCC "RTCA" indicated CNS switchyard (grid) voltage NOT adequate.**	

Op Test No.:	301	Scenario #	3	Event #	2	Page	23 of 171
Event Description:	Generator Voltage Regulator Failure						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE When TCC "RTCA" indicates switchyard voltage would **NOT** be adequate if the unit trips, the following conditions exist:

- Both trains of offsite (normal) power are inoperable.
- Both ECCS trains are in an unanalyzed condition and inoperable.
- Shared systems (RN, VC, YC, VA) that require an operable normal power source, are inoperable.

8. **Perform Tech Spec assessment as follows:**

   a. Ensure compliance with the following Tech Specs due to both trains of the following systems inoperable:

   __ • 3.8.1 (AC Sources - Operating)

   __ • 3.5.2 (ECCS - Operating)

   __ • 3.7.8 (Nuclear Service Water System (NSWS))

   __ • 3.7.10 (Control Room Area Ventilation System (CRAVS))

   __ • 3.7.11 (Control Room Area Chilled Water System (CRACWS))

   __ • 3.7.12 (Auxiliary Building Filtered Ventilation System ABFVS)).

   __ b. Ensure compliance with Tech Spec 3.0.3 due to both trains of ECCS, RN, VC, YC, VA inoperable.

__ 9. **Notify Regulatory Compliance to pursue licensing options due to loss of normal power source operability to shared systems.**

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Event Description:	Generator Voltage Regulator Failure								

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE The TCC/SOC response to a degraded grid voltage condition may restore voltage to adequate status within one hour.	
10. **Activate the TSC as follows:**	
__ a. Verify TCC expects switchyard (grid) voltage restoration to adequate status in less than one hour.	a. Perform the following: __ 1) Activate the TSC. REFER TO RP/0/B/5000/027 (Augmentation of Shift Utilizing the Emergency Response Organization without Emergency Declaration) __ 2) Observe Note prior to Step 11 and GO TO Step 11.
__ b. Evaluate activating the TSC. REFER TO RP/0/B/5000/027 (Augmentation of Shift Utilizing the Emergency Response Organization without Emergency Declaration)	
NOTE The degraded switchyard (grid) voltage condition places ECCS in an unanalyzed condition reportable per 10CFR50.72(b)(3)(ii).	
11. **Determine required notifications:** __ • REFER TO RP/0/A/5000/001 (Classification Of Emergency) __ • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).	

Op Test No.:	301	Scenario #	3	Event #	2	Page	25 of 171
Event Description:	Generator Voltage Regulator Failure						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

12. **Evaluate the following:**

__ • Stopping in progress surveillance testing.

__ • Stopping in progress maintenance activities.

__ • Returning systems to normal/functional status.

13. **IF AT ANY TIME TCC requests actions to restore grid reliability, THEN perform the following:.**

CAUTION **The actions implemented to restore grid reliability should not exceed any regulatory or equipment operating limits.**

__ a. Notify OSM to evaluate TCC requested actions to restore grid reliability.

__ b. Notify TCC of actions that cannot be performed.

__ c. Perform OSM approved actions to restore grid reliability.

Op Test No.:	301	Scenario #	3	Event #	2	Page	26 of 171
Event Description:	Generator Voltage Regulator Failure						

CNS AP/1/A/5500/037	GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES Case I Abnormal Generator or Grid Voltage	PAGE NO. 10 of 21 Revision 03

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE The SOC/TCC is allowed 2 hours to restore switchyard (grid) voltage to adequate. The 2 hour time limit may be adjusted based on OSM assessment of plant or grid conditions.

14. **Do not continue in this procedure until one of the following conditions exist:**

__ • 2 hours have elapsed since TCC "RTCA" indicated switchyard voltage **NOT** adequate.

OR

__ • Notification from TCC that "RTCA" indicates switchyard voltage would be adequate should the unit trip.

OR

__ • OSM adjust 2 hour time limit based on assessment of plant conditions

Op Test No.: 301 Scenario # 3 Event # 2	Page 27 of 171
Event Description: Generator Voltage Regulator Failure	

CNS AP/1/A/5500/037	GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES Case I Abnormal Generator or Grid Voltage	PAGE NO. 11 of 21 Revision 03

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 15. **Verify TCC reported that "RTCA" indicates switchyard voltage would be adequate should the unit trip.**	**Perform the following:** **NOTE** • The jumpers bypass the 4160 degraded voltage 5 second time delay relay. • If an S/I occurs with the jumpers installed, the 4160V incoming breakers trip open when LOCA Sequencer actuates. The D/Gs will supply power. __ a. Notify SPOC to install jumpers per AM/1/A/5100/008 (4Kv Essential Power (EPC) System Degraded Voltage Logic. **NOTE** When jumpers are installed offsite power and shared systems remain inoperable until "RTCA" indicates switchyard voltage is adequate should the unit trip. __ b. **WHEN** jumpers installed per AM/1/A/5100/008 (4Kv Essential Power (EPC) System Degraded Voltage Logic, **THEN** Unit 1 exits L.C.O. 3.0.3 due to both trains of ECCS inoperable Tech Spec 3.5.2.
__ 16. **Do not continue in this procedure until TCC reports that "RTCA" indicates switchyard voltage would be adequate should the unit trip.**	

Op Test No.:	301	Scenario #	3	Event #	2	Page	28	of	171
Event Description:	Generator Voltage Regulator Failure								

CNS AP/1/A/5500/037	GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES Case I Abnormal Generator or Grid Voltage	PAGE NO. 12 of 21 Revision 03

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

17. **WHEN TCC reports "RTCA" indicates switchyard voltage has been returned to adequate should the unit trip, THEN perform the following:**

__ a. IF jumpers installed, THEN notify SPOC to remove jumpers per, AM/1/A/5100/008 (4Kv Essential Power (EPC) System Degraded Voltage Logic.

b. Evaluate exiting the following Tech Spec LCO actions:

- __ 3.8.1.(AC Sources - Operating)
- __ 3.5.2 (ECCS - Operating)
- __ 3.7.8 (Nuclear Service Water System (NSWS))
- __ 3.7.10 (Control Room Area Ventilation System (CRAVS))
- __ 3.7.11.(Control Room Area Chilled Water System (CRACWS))
- __ 3.7.12 (Auxiliary Building Filtered Ventilation System ABFVS)).
- __ Tech Spec LCO 3.0.3.

__ c. Notify Regulatory Compliance of Tech Spec LCO action status.

Op Test No.:	301	Scenario #	3	Event #	2	Page	29 of 171
Event Description:	Generator Voltage Regulator Failure						

CNS AP/1/A/5500/037	GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES Case I Abnormal Generator or Grid Voltage	PAGE NO. 13 of 21 Revision 03

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE Do not exceed any generator limits when adjusting generator voltage.

18. **Coordinate with the SOC and perform generator voltage adjustments as follows:**

__ • Adjust Unit 1 Generator Bus Voltage per, Unit 1 Revised Data Book Figure 23 (CNS Generator Voltage Operating Schedule).

OR

__ • Adjust Unit 1 Generator Bus Voltage per SOC request.

__ 19. **When SOC/TCC verifies switchyard (grid) voltage adequate and reliable, THEN RETURN TO procedure step in effect.**

END

Note To Evaluator:

This is the end of Event 2. At the Lead Evaluators discretion, the scenario may continue by having the booth operator INSERT Trigger 3 for Event 3 (1A2 KC Pump Trip).

Op Test No.:	301	Scenario #	3	Event #	3	Page	30 of 171
Event Description:	1A2 KC Pump Trips						

Control Room Indications
Indicating lights for 1A2 KC pump - DARK
1AD-11, A/1 "4KV ESS PWR TRAIN A TROUBLE" - LIT
Various KC low flow alarms on the main control boards
KC discharge pressure and flow decreasing

Op Test No.:	301	Scenario #	3	Event #	3	Page	31 of 171
Event Description:	1A2 KC Pump Trips						

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 2 of 35 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

C. Operator Actions

CAUTION **Failure to restore NC pump seal cooling via thermal barrier cooling or NV seal injection within 10 minutes will cause damage to the NC pump seals resulting in NC inventory loss.**

__ 1. Monitor Enclosure 1 (Foldout Page).

Enclosure 1 is included as Attachment 4.

2. Verify the following:

__ • At least one KC pump - ON.

AND

__ • Flow to KC loads presently in service.

Perform the following:

__ a. Start additional KC pump(s) as necessary. Critical Task #4

N/A b. IF no KC pump can be started, THEN perform the following:

__ 1) IF S/I has actuated on either unit, THEN GO TO Step 4.

CAUTION **YD can only supply one Unit's NV pump at a time.**

__ 2) Determine which unit will receive alternate NV pump cooling from YD.

__ 3) IF Unit 2 selected to receive YD cooling to 2A NV pump, THEN GO TO Step 4.

(RNO continued on next page)

Op Test No.:	301	Scenario #	3	Event #	3	Page	32 of 171
Event Description:	1A2 KC Pump Trips						

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 3 of 35 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. (Continued)	**NOTE** • NV pumps may be started without regard to cooling water alignment. • Operating NV Pump will reach high temperature conditions in approximately 15 minutes with no cooling water. __ 4) Dispatch operator to align YD cooling to NV pump 1A. REFER TO Enclosure 2 (Alternate Cooling To NV Pump 1A). __ 5) Maximize NV pump run time. REFER TO Enclosure 5 (Maximize NV Pump Run Time). __ 6) IF AT ANY TIME an S/I occurs on either unit, THEN notify dispatched operator to realign NV Pump 1A cooling to normal. REFER TO Enclosure 2 (Alternate Cooling To NV Pump 1A). __ 7) GO TO Step 4.
__ 3. IF AT ANY TIME all KC pumps are lost, THEN RETURN TO STEP 2.	

Op Test No.:	301	Scenario #	3	Event #	3	Page	33 of 171
Event Description:	1A2 KC Pump Trips						

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 4 of 35 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE Uncooled letdown may result in loss of NV pumps within a matter of minutes.	
4. **Verify the following:** __ • 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" - DARK. **AND** __ • At least one KC pump - ON.	**IF KC flow unavailable to letdown HX, THEN isolate letdown as follows:** a. Ensure the following valves - CLOSED: __ • 1NV-10A (Letdn Orif 1B Otlt Cont Isol) __ • 1NV-11A (Letdn Orif 1C Otlt Cont Isol) __ • 1NV-13A (Letdn Orif 1A Otlt Cont Isol). __ b. Control charging to stabilize Pzr level at program level while maintaining seal injection flow. __ c. Ensure 1NV-153A (Letdn Hx Otlt 3-Way Valve) - ALIGNED TO VCT. __ d. Ensure 1NV-172A (3-Way Divert To VCT-RHT) - ALIGNED TO RHT. __ e. Ensure VCT makeup - IN AUTO __ f. WHEN time and manpower permit, THEN REFER TO AP/1/A/5500/012 (Loss Of Charging Or Letdown). g. IF AT ANY TIME the following conditions exist: __ • VCT level - LESS THAN 23% OR __ • PZR level - GREATER THAN 85% AND INCREASING. __ THEN GO TO Enclosure 6 (Rx Trip Sequence). __ h. GO TO Step 6.

Op Test No.:	301	Scenario #	3	Event #	3	Page	34 of 171
Event Description:	1A2 KC Pump Trips						

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 5 of 35 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 5. **IF AT ANY TIME 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" LIT, THEN perform Step 4 RNO.**	
__ 6. **Verify both KC surge tank levels - 50% - 90% AND STABLE.**	__ **Observe Caution prior to Step 8 and GO TO Step 8.**
__ 7. **Start additional KC pump(s) as necessary to supply any KC loads presently in service.**	__ **IF KC pump(s) damaged by fire, THEN notify IAE to repair cables to pumps needed for recovery. REFER TO IP/1/A/3890/027A (Fire Damage Control Procedure).**

CAUTION **A loss of KC cooling to the NC pumps results in a gradual approach to an overheated condition in approximately 10 minutes which will result in shaft seizure.**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. **Verify KC flow to NC pumps as follows:**	**Perform the following:**
__ • 1AD-20, A/1 "KC SUPPLY HDR FLOW TO NCP BRGS LOW" - DARK	a. Ensure the following valves - OPEN:
__ • 1AD-21, A/1 "KC SUPPLY HDR FLOW TO NCP BRGS LOW" - DARK.	__ • 1KC-425A (NC Pumps Ret Hdr Cont Isol)
	__ • 1KC-338B (NC Pumps Sup Hdr Cont Isol)
	__ • 1KC-424B (NC Pumps Ret Hdr Cont Isol).
	(RNO continued on next page)

Op Test No.:	301	Scenario #	3	Event #	3	Page	35	of	171
Event Description:	1A2 KC Pump Trips								

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 6 of 35 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. (Continued)	

b. IF AT ANY TIME any of the following conditions are met:

__ • Time since loss of KC - GREATER THAN 10 MINUTES

OR

__ • Any NC pump trip criteria from Enclosure 1 (Foldout Page) is met

THEN perform the following:

1) IF letdown is isolated, THEN perform the following:

a) Ensure NV pump suction aligned to FWST as follows:

__ (1) 1NV-252A (NV Pumps Suct From FWST) - OPEN

__ (2) 1NV-253B (NV Pumps Suct From FWST) - OPEN

__ (3) 1NV-188A (VCT Otlt Isol) - CLOSED

__ (4) 1NV-189B (VCT Otlt Isol) - CLOSED.

__ b) WHEN Reactor is tripped, THEN attempt to establish and maintain a slow cooldown as required to maintain PZR level.

__ 2) Ensure steam dumps - IN PRESSURE MODE.

__ 3) Ensure the Reactor - TRIPPED.

(RNO continued on next page)

Op Test No.:	301	Scenario #	3	Event #	3	Page	36 of 171
Event Description:	1A2 KC Pump Trips						

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 7 of 35 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

8. (Continued)

4) **WHEN** reactor power less than 5%, **THEN** perform the following:

__ a) Trip all NC pumps.

__ b) Ensure normal spray valve associated with tripped NC pump(s) - IN MANUAL AND CLOSED.

__ 5) Secure any dilutions in progress.

6) **IF** reactor trip breakers were closed, **THEN** perform one of the following while continuing with this procedure as time and conditions allow:

__ • **IF** above P-11, **THEN GO TO** EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).

OR

__ • **IF** below P-11, **THEN GO TO** AP/1/A/5500/005 (Reactor Trip Or Inadvertent S/I Below P-11).

Op Test No.:	301	Scenario #	3	Event #	3	Page	37 of 171
Event Description:	1A2 KC Pump Trips						

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 8 of 35 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. **Verify KC available as follows:**	
a. Verify the following Train A KC non-essential header isolation valves - OPEN: __ • 1KC-230A (Rx Bldg Non-Ess Hdr Isol) __ • 1KC-3A (Rx Bldg Non-Ess Ret Hdr Isol) __ • 1KC-50A (Aux Bldg Non-Ess Hdr Isol) __ • 1KC-1A (Aux Bldg Non-Ess Ret Hdr Isol).	<u>NOTE</u> The KC non-essential header valves can be reopened when the appropriate train's level switch is reset. This should occur between 40% and 48% KC surge tank level. __ a. <u>WHEN</u> OAC alarm C1D2215 (KC Train A Low-Low Level Surge Tank Isol) is "NOT ACTUATED" <u>AND</u> cause of valve closure known, <u>THEN</u> ensure the affected valve(s) are open.
b. Verify the following Train B KC non-essential header isolation valves - OPEN: __ • 1KC-228B (Rx Bldg Non-Ess Hdr Isol) __ • 1KC-18B (Rx Bldg Non-Ess Ret Hdr Isol) __ • 1KC-53B (Aux Bldg Non-Ess Hdr Isol) __ • 1KC-2B (Aux Bldg Non-Ess Ret Hdr Isol).	<u>NOTE</u> The KC non-essential header valves can be reopened when the appropriate train's level switch is reset. This should occur between 40% and 48% KC surge tank level. __ b. <u>WHEN</u> OAC alarm C1D2214 (KC Train B Low-Low Level Surge Tank Isol) is "NOT ACTUATED" <u>AND</u> cause of valve closure known, <u>THEN</u> ensure the affected valve(s) are open.
__ c. Start additional KC pump(s) as necessary to supply any KC loads presently in service.	__ c. <u>IF</u> KC pump(s) damaged by fire, <u>THEN</u> notify IAE to repair cables to pumps needed for recovery. <u>REFER TO</u> IP/1/A/3890/027A (Fire Damage Control Procedure).

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Event Description:	1A2 KC Pump Trips							

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 9 of 35 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **Verify KC surge tank levels normal as follows:**	
__ a. Verify both KC surge tank levels - 50% - 90% AND STABLE.	a. Perform the following: 1) Dispatch operator to initiate makeup to surge tank(s) by opening the appropriate valve(s): __ • 1KC-107 (1A KC Surge Tank YM M/U) (AB-601, PP-59, Rm 500) OR __ • 1KC-111 (1B KC Surge Tank YM M/U) (AB-601, PP-59, Rm 500). __ 2) Dispatch operators to locate and isolate KC System leakage. __ 3) **WHEN** affected KC surge tank(s) level is greater than or equal to 90%, **THEN** notify dispatched operator to secure makeup. __ 4) **GO TO** Step 11.
__ b. **GO TO** Step 14.	
11. **Verify at least one KC surge tank above lo-lo level as follows:** __ • 1AD-10, A/1 "KC SURGE TANK A LO-LO LEVEL" - DARK OR __ • 1AD-10, A/2 "KC SURGE TANK B LO-LO LEVEL" - DARK.	**Perform the following:** a. Verify the following: __ 1) Both Unit 1 RN Essential Headers - PRESSURIZED. __ 2) **IF** only one RN Essential Header is pressurized, **THEN** use it for surge tank makeup. (RNO continued on next page)

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Event Description: 1A2 KC Pump Trips	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. (Continued)	
	__ 3) IF AT ANY TIME the RN Essential Header being used for makeup becomes depressurized, THEN notify dispatched operator to secure makeup from RN.
	NOTE Preference should be given to the surge tank with the highest stable level and available pumps.
	__ b. Dispatch operator to makeup to available train of KC from YM and RN. REFER TO Enclosure 3 (Surge Tank Makeup).
	__ c. Dispatch operators to locate and isolate KC System leakage.
	__ d. Notify Chemistry of RN makeup to KC System.
	(RNO continued on next page)

Op Test No.: 301	Scenario # 3	Event # 3		Page 40	of 171		
Event Description:	1A2 KC Pump Trips						

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 11 of 35 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. (Continued)	

e. **WHEN** the KC surge tank level is above the lo-lo level setpoint, **THEN**:

__ 1) Ensure the KC pumps on the affected train - ON.

NOTE The KC non-essential header valves can be reopened when the appropriate train's level switch is reset. This should occur between 40% and 48% KC surge tank level.

2) OPEN non-essential header isolation valves for affected train as follows:

- Train A:
  - __ 1KC-230A (Rx Bldg Non-Ess Hdr Isol)
  - __ 1KC-3A (Rx Bldg Non-Ess Ret Hdr Isol)
  - __ 1KC-50A (Aux Bldg Non-Ess Hdr Isol)
  - __ 1KC-1A (Aux Bldg Non-Ess Ret Hdr Isol).

OR

- Train B:
  - __ 1KC-228B (Rx Bldg Non-Ess Hdr Isol)
  - __ 1KC-18B (Rx Bldg Non-Ess Ret Hdr Isol)
  - __ 1KC-53B (Aux Bldg Non-Ess Hdr Isol)
  - __ 1KC-2B (Aux Bldg Non-Ess Ret Hdr Isol).

(RNO continued on next page)

Op Test No.:	301	Scenario #	3	Event #	3	Page	41	of	171
Event Description:	1A2 KC Pump Trips								

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 12 of 35 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. (Continued)	
	__ f. **WHEN** one train's non-essential header isolation valves are opened, **THEN** perform Steps 12 through 13.
	__ g. GO TO Step 14.
__ 12. **Verify 1AD-10, A/1 "KC SURGE TANK A LO-LO LEVEL" - DARK.**	**Perform the following:**
	a. Ensure the following valves - CLOSED:
	__ • 1KC-230A (Rx Bldg Non-Ess Hdr Isol)
	__ • 1KC-3A (Rx Bldg Non-Ess Ret Hdr Isol)
	__ • 1KC-50A (Aux Bldg Non-Ess Hdr Isol)
	__ • 1KC-1A (Aux Bldg Non-Ess Ret Hdr Isol).
	__ b. Ensure both Train B KC pumps - ON.
	(RNO continued on next page)

Op Test No.:	301	Scenario #	3	Event #	3	Page	42	of	171
Event Description:	1A2 KC Pump Trips								

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 13 of 35 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. (Continued)	c. <u>IF</u> KC Surge Tank 1A level continues to decrease <u>OR</u> is empty, <u>THEN</u> perform the following: 1) Ensure the following Train B essential equipment - IN SERVICE AS NEEDED: __ • NV Pump 1B __ • NI Pump 1B __ • ND Pump 1B __ • ND Hx 1B __ • CA Pump 1B __ • NS Pump 1B __ • KF Pump 1B. 2) Ensure the following Train A essential equipment - OFF: __ • NV Pump 1A __ • NI Pump 1A __ • ND Pump 1A __ • CA Pump 1A __ • NS Pump 1A __ • KF Pump 1A. __ 3) Ensure both Train A KC pumps - OFF. __ 4) Locate and isolate leak on Train A essential header.
__ 13. **Verify 1AD-10, A/2 "KC SURGE TANK B LO-LO LEVEL" - DARK.**	**Perform the following:** a. Ensure the following valves - CLOSED: __ • 1KC-228B (Rx Bldg Non-Ess Hdr Isol) __ • 1KC-18B (Rx Bldg Non-Ess Ret Hdr Isol) __ • 1KC-53B (Aux Bldg Non-Ess Hdr Isol) (RNO continued on next page)

Op Test No.:	301	Scenario #	3	Event #	3	Page	43 of 171
Event Description:	1A2 KC Pump Trips						

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 14 of 35 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. (Continued)	__ • 1KC-2B (Aux Bldg Non-Ess Ret Hdr Isol). __ b. Ensure both Train A KC pumps - ON. c. IF KC Surge Tank 1B level continues to decrease OR is empty, THEN perform the following: 1) Ensure the following Train A essential equipment - IN SERVICE AS NEEDED: __ • NV Pump 1A __ • NI Pump 1A __ • ND Pump 1A __ • ND Hx 1A __ • CA Pump 1A __ • NS Pump 1A __ • KF Pump 1A. 2) Ensure the following Train B essential equipment - OFF: __ • NV Pump 1B __ • NI Pump 1B __ • ND Pump 1B __ • CA Pump 1B __ • NS Pump 1B __ • KF Pump 1B. __ 3) Ensure both Train B KC pumps - OFF. __ 4) Locate and isolate leak on Train B essential header.
__ 14. Ensure KC heat exchanger outlet mode switches - PROPERLY ALIGNED.	
__ 15. Determine and correct cause of loss of KC.	

Op Test No.:	301	Scenario #	3	Event #	3	Page	44 of 171
Event Description:	1A2 KC Pump Trips						

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 15 of 35 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

16. **Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual:**

- N/A • SLC 16.9-7 (Boration Systems Flow Path - Shutdown)
- N/A • SLC 16.9-8 (Boration Systems Flow Path - Operating)
- N/A • SLC 16.9-9 (Boration Systems Pumps - Shutdown)
- N/A • SLC 16.9-10 (Boration Systems Charging Pumps - Operating)
- N/A • 3.5.2 (ECCS - Operating)
- N/A • 3.5.3 (ECCS - Shutdown)
- N/A • 3.6.6 (Containment Spray System)
- N/A • 3.7.5 (Auxiliary Feedwater (AFW) System)
- __ • 3.7.7 (Component Cooling Water (CCW) System).

Tech Spec 3.7.7:
- **Condition A applies to restore CCW train to OPERABLE status in 72 hours.**

17. **Determine required notifications:**

- __ • REFER TO RP/0/A/5000/001 (Classification Of Emergency)
- __ • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).

N/A 18. **IF KC Hx leak to RN is suspected, THEN perform the following:**

- __ • Notify Radiation Protection that a potential unmonitored release may have occurred.
- __ • Notify Station Management to evaluate a KC Hx to RN leak.

Op Test No.: 301	Scenario # 3	Event # 3	Page 45 of 171				
Event Description:	1A2 KC Pump Trips						

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 16 of 35 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19. **Verify KC surge tanks level as follows:**	__ **RETURN TO Step 9.**
__ • Greater than 50%	
__ • Stable or increasing.	
20. **WHEN plant conditions permit, THEN perform the following:**	
__ • Return KC pumps to normal operation. REFER TO OP/1/A/6400/005 (Component Cooling Water System).	
N/A __ • Return NV Pump 1A to normal cooling as applicable. REFER TO Enclosure 2 (Alternate Cooling To NV Pump 1A).	
21. **Verify the following:**	**Perform the following:**
__ • 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" - DARK	__ a. IF letdown isolated, THEN refer to AP/1/A/5500/012 (Loss Of Charging Or Letdown).
__ • 1AD-7, H/3 "VCT HI TEMP" - DARK	__ b. Do not continue in this procedure until Step 21 conditions are met.
__ • Normal letdown - IN SERVICE.	

Op Test No.:	301	Scenario #	3	Event #	3	Page	46 of 171
Event Description:	1A2 KC Pump Trips						

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 17 of 35 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

22. **Ensure VCT and letdown path aligned as follows:**

   a. IF desired to align NV pump suction to VCT, then perform the following:

      1) OPEN the following valves:

      __ • 1NV-188A (VCT Otlt Isol)

      __ • 1NV-189B (VCT Otlt Isol).

      2) CLOSE the following valves:

      __ • 1NV-252A (NV Pumps Suct From FWST)

      __ • 1NV-253B (NV Pumps Suct From FWST).

   __ b. WHEN NV suction aligned to VCT, THEN momentarily place 1NV-172A (3-Way Divert To VCT-RHT) to "VCT" position and return to "AUTO".

   __ c. IF desired to restore letdown flow through NV demineralizers, THEN momentarily place 1NV-153A (Letdn Hx Otlt 3-Way Valve) to "DEMIN" position and return to "AUTO".

__ 23. **Determine long term plant status. RETURN TO procedure in affect.**

END

Note To Evaluator:

This is the end of Event 3. At the Lead Evaluators discretion, the scenario may continue by having the booth operator INSERT Trigger 4 for Event 4 (1B S/G Tube Leak).

Op Test No.: 301 Scenario # 3 Event # 4 Page 47 of 171

Event Description: 1B S/G Tube Leak / Failure of BB to Automatically Isolate

Control Room Indications
1RAD-1, B/1 "1EMF-33 CSAE EXHAUST HI RAD" - LIT
1RAD-1, B/5 "1EMF-72 S/G B LEAKAGE HI RAD" - LIT
1RAD-1, C/1 "1EMF-73 S/G C LEAKAGE HI RAD" - LIT
EMF Module for 1EMF-33, 1EMF-72, and 1EMF-73 Trip 2 lights - LIT
OAC point C1P0187 (Estimated Total Pri To Sec Leakrate) - INCREASING
Pressurizer Level indication - DECREASING

Op Test No.:	301	Scenario #	3	Event #	4	Page	48 of 171
Event Description:	1B S/G Tube Leak / Failure of BB to Automatically Isolate						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 3 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. Monitor Enclosure 1 (Case I Steam Generator Tube Leak Foldout Page).	**Enclosure 1 can be found as Attachment 6.**
__ 2. **Verify Pzr level - STABLE OR INCREASING.**	**Perform the following:** __ a. Maintain charging flow less than 180 GPM. __ b. THROTTLE 1NV-294 (NV Pmps A&B Disch Flow Ctrl) to stabilize Pzr level. N/A c. IF Pzr level stable OR increasing, THEN GO TO Step 3. d. IF Pzr level continues to decrease, THEN perform the following: 1) Reduce letdown flow to 45 GPM as follows: a) IF 1NV-10A (Letdn Orif 1B Otlt Cont Isol) open, THEN perform the following: __ (1) Control 1NV-148 (Letdn Press Control) to establish letdown pressure between 375 - 400 PSIG. __ (2) THROTTLE 1NV-849 (Letdn Flow Var Orif Ctrl) for 45 GPM letdown flow. __ (3) WHEN 45 GPM letdown flow established, THEN adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure at 350 PSIG. __ (4) WHEN letdown pressure is stable at 350 PSIG, THEN place 1NV-148 (Letdn Press Control) in auto. (RNO continued on next page)

Op Test No.:	301	Scenario #	3	Event #	4	Page	49 of 171
Event Description:	1B S/G Tube Leak / Failure of BB to Automatically Isolate						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 4 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. (Continued)	

N/A b) IF 1NV-13A (Letdn Orif 1A Otlt Cont Isol) open, THEN perform the following:

__ (1) Control 1NV-148 (Letdn Press Control) to establish letdown pressure between 150 - 200 PSIG.

__ (2) OPEN 1NV-11A (Letdn Orif 1C Otlt Cont Isol).

__ (3) Adjust 1NV-148 (Letdn Press Control) to establish letdown pressure between 375 - 400 PSIG.

__ (4) CLOSE 1NV-13A (Letdn Orif 1A Otlt Cont Isol).

__ (5) Adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure at 350 PSIG.

__ (6) WHEN letdown pressure is stable at 350 PSIG, THEN place 1NV-148 (Letdn Press Control) in auto.

N/A 2) IF Pzr level continues to decrease, THEN ensure the following valves closed:

- __ 1NV-10A (Letdn Orif 1B Otlt Cont Isol)
- __ 1NV-11A (Letdn Orif 1C Otlt Cont Isol)
- __ 1NV-13A (Letdn Orif 1A Otlt Cont Isol).

__ 3) IF Pzr level stable OR increasing, THEN GO TO Step 3.

(RNO continued on next page)

Op Test No.:	301	Scenario #	3	Event #	4	Page	50 of 171
Event Description:	1B S/G Tube Leak / Failure of BB to Automatically Isolate						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 5 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. (Continued)	4) IF Pzr level continues to decrease OR Pzr level cannot be maintained greater than 4%, THEN perform the following: __ a) Trip reactor. __ b) WHEN reactor tripped verified, THEN initiate S/I. __ c) GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).
__ 3. **IF AT ANY TIME Pzr level decreases in an uncontrolled manner or cannot be maintained greater than 4%, THEN perform Step 2.**	

Op Test No.:	301	Scenario #	3	Event #	4	Page	51 of 171
Event Description:	1B S/G Tube Leak / Failure of BB to Automatically Isolate						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 6 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE In subsequent steps the term "affected S/G" is a S/G with primary to secondary leakage.

4. **Identify affected S/G(s) as follows:**

__ • Notify RP to frisk all cation columns.

OR

__ • Any S/G N/R level - INCREASING IN AN UNCONTROLLED MANNER.

OR

Op Test No.:	301	Scenario #	3	Event #	4	Page	52 of 171
Event Description:	1B S/G Tube Leak / Failure of BB to Automatically Isolate						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 7 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
NOTE S/G Leakage EMFs are highly sensitive which may cause EMFs located on adjacent steamline to be increasing or in alarm.	
• Verify any of the following S/G leakage EMF indication(s) - INCREASING OR IN ALARM: __ • 1EMF-71 (S/G A Leakage) __ • 1EMF-72 (S/G B Leakage) __ • 1EMF-73 (S/G C Leakage) __ • 1EMF-74 (S/G D Leakage).	
OR	
• Verify any of the following S/G steamline EMF indication(s) - INCREASING OR IN ALARM: __ • 1EMF-26 (Steamline 1A) __ • 1EMF-27 (Steamline 1B) __ • 1EMF-28 (Steamline 1C) __ • 1EMF-29 (Steamline 1D).	
OR	
__ • Verify CF flow - LOWER TO ANY S/G AS COMPARED TO OTHERS.	
OR	
__ • Notify Secondary Chemistry to determine affected S/G by sampling.	
5. **Verify VCT level able to be maintained by normal makeup as follows:**	
a. One of the following conditions exists:	a. Perform the following:
__ • S/G tube leak is less than 90 gpm.	__ 1) OPEN 1NV-252A (NV Pumps Suct From FWST).
OR	__ 2) OPEN 1NV-253B (NV Pumps Suct From FWST).
__ • Automatic makeup stabilizes or increases VCT level.	__ 3) CLOSE 1NV-188A (VCT Otlt Isol).
OR	(RNO continued on next page)

Op Test No.:	301	Scenario #	3	Event #	4	Page	53 of 171
Event Description:	1B S/G Tube Leak / Failure of BB to Automatically Isolate						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 8 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. (Continued)	
__ • Manual makeup stabilizes or increases VCT level.	__ 4) CLOSE 1NV-189B (VCT Otlt Isol). 5) IF Reactor trip breakers are closed, THEN perform the following: __ a) Continue concurrent use of this procedure for S/G tube leak at Step 6. __ b) Trip reactor. __ c) IF Unit was in Mode 3 below 1955 PSIG, THEN GO TO AP/1/A/5500/005 (Reactor Trip or Inadvertent S/I Below P-11). __ d) GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection). __ 6) IF Reactor trip breakers are open, THEN observe note prior to Step 6 and GO TO Step 6.
b. IF AT ANY TIME the following conditions exist: __ • 1AD-7, I/1 "VCT LO LVL" alarm - LIT AND • Reactor trip breakers are closed. __ THEN perform Step 5.a RNO.	

Op Test No.:	301	Scenario #	3	Event #	4	Page	54 of 171
Event Description:	1B S/G Tube Leak / Failure of BB to Automatically Isolate						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 9 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE
- OAC calculated leak rate may be invalid during mode changes and/or transient conditions unless there is current, coordinated sampling data available.
- Tritium sampling may be the most effective method for determining leak rate for small tube leaks when in Mode 2 or 3.
- OAC Primary to Secondary Leakage points may be accessed by turn on code "GD EROSLEAK"

6. **Determine S/G leak rate by any of the following methods:**
   - Monitor the following computer points:
     - __ EROSLEAK (Primary To Secondary Leakage).
     - __ C1P0187 (Estimated Total Pri To Sec Leakrate)
     - __ C1P0189 (Pri To Sec Leakrate 15 Min Running Avg)

   OR

Note To Evaluator:

Leak rate should be determined to be approximately 55 GPM.

Op Test No.:	301	Scenario #	3	Event #	4	Page	55 of 171
Event Description:	1B S/G Tube Leak / Failure of BB to Automatically Isolate						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 10 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

6. (Continued)

NOTE S/G Leakage EMFs are highly sensitive which may cause EMFs located on the adjacent steamline to be increasing or in alarm.

- S/G leakage EMF indication(s):
  - __ • 1EMF-71 (S/G A Leakage)
  - __ • 1EMF-72 (S/G B Leakage)
  - __ • 1EMF-73 (S/G C Leakage)
  - __ • 1EMF-74 (S/G D Leakage).

OR

__ • Compare charging flow and letdown flow

OR

__ • Monitor OAC NV Graphic

OR

__ • Initiate OAC Program "NSNCLEAK"

OR

__ • Monitor OAC point C1P0976 (Gross NC System Leak Rate, Ten Min Run Avg).

OR

__ • Secondary Chemistry performance of PT/1/B/4600/028 (Determination of Steam Generator Tube Leak For Unit 1).

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Event Description:	1B S/G Tube Leak / Failure of BB to Automatically Isolate

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 11 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **Minimize Secondary contamination as follows:**	
a. Remove CM polishing demineralizers from service as follows:	
__ 1) Ensure "POLSH DEMIN BYP CTRL" - IN MANUAL.	
__ 2) Ensure "POLSH DEMIN BYP CTRL" - OPEN.	
__ 3) Notify Secondary Chemistry CM polishing demineralizers have been bypassed.	
__ b. Align auxiliary systems to minimize secondary side contamination. <u>REFER TO</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 2 (Minimizing Secondary Side Contamination).	
__ c. Stop any transfer of water between both Unit's CSTs.	
8. **Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual:**	
__ • 3.4.13 (RCS Operational Leakage)	Tech Spec 3.4.13: • Condition B applies to be in Mode 3 in 6 hours AND be in Mode 5 in 36 hours. SLC 16.7-9: • Condition B applies to declare the standby makeup pump non-functional and enter Condition A immediately.
N/A • 3.4.14 (RCS Pressure Isolation Valve (PIV) Leakage)	
N/A • 3.5.5 (Seal Injection Flow)	
N/A • 3.7.17 (Secondary Specific Activity)	
__ • SLC 16.7-9 (Standby Shutdown System).	

Technical Specification 3.4.18, Condition B, was added to form ES-D-2 for this event.

Op Test No.:	301	Scenario #	3	Event #	4	Page	57 of 171
Event Description:	1B S/G Tube Leak / Failure of BB to Automatically Isolate						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 12 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 9. **Verify Unit in Mode 1.**	**Perform the following:** a. IF any of the following exist: __ • Leak rate is greater than or equal to 75 gpd in any one S/G __ • Leak rate is increasing and approaching 75 gpd in any one S/G. __ THEN stop any startup activities in progress. __ b. Notify Secondary Chemistry to validate leakage by performing PT/1/B/4600/028 (Determination of Steam Generator Tube Leak For Unit 1). __ c. IF Unit in Mode 2, THEN GO TO Step 10. __ d. GO TO Step 16.

NOTE

- The following leak rates are based on leakage in one S/G.
- In the event of an oscillating leak, leak rate shall be determined based on peak value of the spike.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 10. **Verify leak rate - GREATER THAN OR EQUAL TO 5 GPD.**	**Perform the following:** __ a. Notify Secondary Chemistry to perform PT/1/B/4600/028 (Determination of Steam Generator Tube Leak For Unit 1). __ b. RETURN TO procedure and step in effect.

Op Test No.:	301	Scenario #	3	Event #	4	Page	58	of 171
Event Description:	1B S/G Tube Leak / Failure of BB to Automatically Isolate							

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 13 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 11. Verify leak rate - GREATER THAN OR EQUAL TO 30 GPD.	**Perform the following:** a. Initiate increased monitoring as follows: 1) Notify RP of the following: __ • Current value of leakage. __ • Perform HP/0/B/1009/003 (Radiation Protection Response Following A Primary To Secondary Leak). • Reset setpoints of the following EMFs per HP/0/B/1000/010 (Determination of Radiation Monitor Setpoints): __ • 1EMF-33 (Condenser Air Ejector Exhaust) __ • 1EMF-71 (S/G A Leakage) __ • 1EMF-72 (S/G B Leakage) __ • 1EMF-73 (S/G C Leakage) __ • 1EMF-74 (S/G D Leakage). 2) Notify Secondary Chemistry of the following: __ • Current value of leakage. __ • Perform PT/1/B/4600/028 (Determination of Steam Generator Tube Leak For Unit 1) immediately **AND** increase frequency to daily. (RNO continued on next page)

Op Test No.:	301	Scenario #	3	Event #	4	Page	59 of 171
Event Description:	1B S/G Tube Leak / Failure of BB to Automatically Isolate						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 14 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. (Continued)	

3) IF AT ANY TIME the following conditions are met:

__ • Any main steam line N-16 radiation monitor - INOPERABLE

AND

__ • C1P0187 (Estimated Total Pri To Sec Leakrate) - INVALID.

__ THEN notify Secondary Chemistry determine frequency to perform PT/1/B/4600/028 (Determination of Steam Generator Tube Leak For Unit 1).

4) Monitor the following EMFs:

__ • 1EMF-33 (Condenser Air Ejector Exhaust)
__ • 1EMF-71 (S/G A Leakage)
__ • 1EMF-72 (S/G B Leakage)
__ • 1EMF-73 (S/G C Leakage)
__ • 1EMF-74 (S/G D Leakage).

5) REFER TO the following Tech Specs:

__ • 3.4.13 (RCS Operational Leakage)

__ • 3.7.17 (Secondary Specific Activity).

__ 6) Notify Station Management of trends.

__ b. RETURN TO procedure and step in effect while continuing to monitor leakage for the requirements of this procedure.

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Event Description: 1B S/G Tube Leak / Failure of BB to Automatically Isolate

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 15 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. **Verify at least one of the following:** __ • Leak rate is greater than or equal to 100 gpd. OR __ • Leak rate greater than or equal to 75 gpd has been sustained for at least 1 hour. OR • All of the following: __ • Leak Rate is greater than or equal to 75 gpd __ • C1P0187 (Estimated Total Pri To Sec Leakrate) - INVALID __ • Any main steam line N-16 radiation monitor - INOPERABLE.	**Perform the following:** a. Initiate increased monitoring as follows: 1) Notify RP of the following: __ a) Current value of leakage. __ b) Perform HP/0/B/1009/003 (Radiation Protection Response Following A Primary To Secondary Leak). c) <u>IF</u> 1RAD-1, B/1 "1EMF 33 CSAE EXHAUST HI RAD - LIT, <u>THEN</u> ensure blowdown flow controllers are set to 0 gpm. __ • S/G A BLDWN FLOW CTRL __ • S/G B BLDWN FLOW CTRL __ • S/G C BLDWN FLOW CTRL __ • S/G D BLDWN FLOW CTRL. d) Reset setpoints of the following EMFs per HP/0/B/1000/010 (Determination of Radiation Monitor Setpoints): __ • 1EMF-33 (Condenser Air Ejector Exhaust) __ • 1EMF-71 (S/G A Leakage) __ • 1EMF-72 (S/G B Leakage) __ • 1EMF-73 (S/G C Leakage) __ • 1EMF-74 (S/G D Leakage). 2) Notify Secondary Chemistry of the following: __ • Current value of leakage. __ • Perform PT/1/B/4600/028 (Determination of Steam Generator Tube Leak For Unit 1) immediately <u>AND</u> increase frequency to daily. (RNO continued on next page)

Op Test No.:	301	Scenario #	3	Event #	4	Page	61	of	171

Event Description: 1B S/G Tube Leak / Failure of BB to Automatically Isolate

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 16 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

12. (Continued)

3) IF AT ANY TIME the following conditions are met:

__ • Any main steam line N-16 radiation monitor - INOPERABLE

AND

__ • C1P0187 (Estimated Total Pri To Sec Leakrate) - INVALID.

__ THEN notify Secondary Chemistry determine frequency to perform PT/1/B/4600/028 (Determination of Steam Generator Tube Leak For Unit 1).

NOTE EMFs should be monitored every 15 minutes until leak rates have stabilized.

4) Monitor the following EMFs:

__ • 1EMF-33 (Condenser Air Ejector Exhaust)
__ • 1EMF-71 (S/G A Leakage)
__ • 1EMF-72 (S/G B Leakage)
__ • 1EMF-73 (S/G C Leakage)
__ • 1EMF-74 (S/G D Leakage).

__ 5) Initiate review of applicable procedures to be utilized by Operations, Chemistry and RP in the event leak rate increases.

__ 6) Evaluate secondary contamination potential. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 3 (Turbine Building Sump Isolation).

(RNO continued on next page)

Op Test No.:	301	Scenario #	3	Event #	4	Page	62 of 171
Event Description:	1B S/G Tube Leak / Failure of BB to Automatically Isolate						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 17 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. (Continued)	7) REFER TO the following Tech Specs: __ • 3.4.13 (RCS Operational Leakage) __ • 3.7.17 (Secondary Specific Activity). __ 8) Notify Station Management of trends. __ b. RETURN TO procedure and step in effect while continuing to monitor leakage for the requirements of this procedure.
13. Perform the following:	
NOTE Leakage indications are validated by EMFs trending in the same direction. Precise duplication of leakage values is not required.	
a. Verify at least one of the following EMFs validate leakage indication: __ • 1EMF-71 (S/G A Leakage) __ • 1EMF-72 (S/G B Leakage) __ • 1EMF-73 (S/G C Leakage) __ • 1EMF-74 (S/G D Leakage).	__ a. Notify Secondary Chemistry to perform PT/1/B/4600/028 (Determination of Steam Generator Tube Leak For Unit 1).

Op Test No.:	301	Scenario #	3	Event #	4	Page	63	of	171
Event Description:	1B S/G Tube Leak / Failure of BB to Automatically Isolate								

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 18 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

13. (Continued)

NOTE Unit shutdown should not be postponed while waiting for chemistry calculation results.

b. IF AT ANY TIME Chemistry calculations contradict leakage indications, THEN perform the following:

__ • Unit shutdown may be suspended

__ • RETURN TO Step 8.

NOTE EMFs should be monitored every 15 minutes.

c. Monitor the following EMFs:

__ • 1EMF-33 (Condenser Air Ejector Exhaust)
__ • 1EMF-71 (S/G A Leakage)
__ • 1EMF-72 (S/G B Leakage)
__ • 1EMF-73 (S/G C Leakage)
__ • 1EMF-74 (S/G D Leakage).

d. Notify RP of the following:

__ 1) Current value of leakage.

__ 2) Perform HP/0/B/1009/003 (Radiation Protection Response Following A Primary To Secondary Leak).

__ e. Evaluate secondary contamination potential. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 3 (Turbine Building Sump Isolation).

Op Test No.:	301	Scenario #	3	Event #	4	Page	64 of 171
Event Description:	1B S/G Tube Leak / Failure of BB to Automatically Isolate						

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 19 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

14. **Determine unit shutdown requirements as follows:**

a. IF AT ANY TIME leak rate is greater than or equal to 100 gpd, THEN perform the following:

__ 1) Ensure reactor power less than 50% within 1 hr.

__ 2) Ensure unit in Mode 3 within the following 2 hrs.

__ 3) IF leak rate is greater than or equal to 150 gpd, THEN ensure unit in Mode 5 within 36 hours.

__ 4) Observe Note prior to Step 15 and GO TO Step 15.

b. IF leak rate is greater than or equal to 75 gpd and less than 100 gpd, THEN perform the following:

- IF AT ANY TIME the following conditions are met:

__ • Any main steam line N-16 radiation monitor - INOPERABLE

AND

__ • C1P0187 (Estimated Total Pri To Sec Leakrate) - INVALID.

THEN perform the following:

__ 1) Ensure reactor power less than 50% within 1 hr.

__ 2) Ensure unit in Mode 3 within the following 2 hrs.

__ 3) Observe Note prior to Step 15 and GO TO Step 15.

__ c. IF leak rate is greater than or equal to 75 gpd and less than 100 gpd sustained for one hour, THEN ensure unit in Mode 3 within 24 hrs.

Op Test No.:	301	Scenario #	3	Event #	4	Page	65	of	171

Event Description: 1B S/G Tube Leak / Failure of BB to Automatically Isolate

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 20 of 158 Revision 57

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE EMF indications may decrease during unit shutdown. Unit shutdown should not be suspended based solely on decreasing radiation monitor indications.	
15. **Shutdown Unit as follows:**	
__ a. Notify Engineering of occurrence.	
__ b. Verify reactor power - GREATER THAN 15%.	b. Perform the following: __ 1) Initiate unit shutdown. REFER TO OP/1/A/6100/002 (Controlling Procedure For Unit Shutdown). __ 2) Ensure adequate shutdown margin is maintained. REFER TO ROD Book, Section 5.11. __ 3) GO TO Step 16.
c. Initiate unit shutdown. REFER TO: __ • OP/1/A/6100/003 (Controlling Procedure For Unit Operation) OR __ • AP/1/A/5500/009 (Rapid Downpower).	**Note To Evaluator:** **At this point the crew will transition to AP/1/A/5500/009 (Rapid Downpower) to take the Unit offline. Steps from AP/09 begin on the next page.**
__ d. Ensure adequate shutdown margin is maintained. REFER TO ROD Book, Section 5.11.	
__ 16. **IF AT ANY TIME 1RAD-1, B/1 "1EMF-33 CSAE EXHAUST HI RAD" - LIT, THEN ensure "UNIT 1 CSAE EXH" aligned as required by annunciator response.**	

Op Test No.:	301	Scenario #	3	Event #	5	Page	66 of 171
Event Description:	Rapid Downpower						

CNS AP/1/A/5500/009	RAPID DOWNPOWER	PAGE NO. 2 of 37 Revision 28

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	Enclosure 1 can be found as Attachment 7.
__ 1. Monitor Enclosure 1 (Foldout Page).	
2. Determine required notifications: __ • REFER TO RP/0/A/5000/001 (Classification Of Emergency) __ • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).	
__ 3. IF AT ANY TIME prompt separation from the grid is required, THEN GO TO Step 26.	
N/A 4. IF load reduction is due to grid instability, THEN perform the following:	

NOTE In manual mode, the control valves are capable of full travel within 3 minutes.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ a. Select "MANUAL" and "CONTROL VALVE LOWER" to reduce turbine load as required. __ b. GO TO Step 12.	
__ 5. Verify Turbine Control - IN AUTO.	Perform the following: __ a. IF manual turbine control desired, THEN GO TO Step 9. b. IF auto turbine control desired, THEN perform the following: __ 1) Verify "Auto" - FLASHING. __ 2) Depress "Auto" pushbutton.

Op Test No.:	301	Scenario #	3	Event #	5	Page	67 of 171
Event Description:	Rapid Downpower						

CNS AP/1/A/5500/009	RAPID DOWNPOWER	PAGE NO. 3 of 37 Revision 28

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. **Verify the following load reduction criteria - KNOWN:** __ • Time required to reduce load __ • Target load power level.	**Perform the following:** __ a. <u>WHEN</u> required target power level and available time are known, <u>THEN</u> perform Steps 5 through 10. __ b. <u>GO TO</u> Step 10.
__ 7. **Verify time required to reduce load - GREATER THAN <u>OR</u> EQUAL TO 15 MINUTES.**	__ **<u>GO TO</u> Step 10.**

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Event Description:	Rapid Downpower								

CNS AP/1/A/5500/009	RAPID DOWNPOWER	PAGE NO. 4 of 37 Revision 28

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE The following tables are estimates only and can be used for rapid entry into the turbine control panel.

__ 8. Determine the required power reduction rate (MW/Min) from the table below:

Time to Reduce Load (Min)	Total Power Change Required (%)									
	10	20	30	40	50	60	70	80	90	100
15	8	16	24	32	40	48	56	64	72	80
20	6	12	18	24	30	36	42	48	54	60
30	4	8	12	16	20	24	28	32	36	40
45	2.7	5.3	8	10.7	13.3	16	18.7	21.3	24	26.7
60		4	6	8	10	12	14	16	18	20
75		3.2	4.8	6.4	8	9.6	11.2	12.8	14.4	16
90		2.7	4	5.3	6.7	8	9.3	10.7	12	13.3
120			3	4	5	6	7	8	9	10
150				3.2	4	4.8	5.6	6.4	7.2	8
180					3.3	4	4.7	5.3	6	6.7
210					2.9	3.4	4	4.6	5.1	5.7
240						3	3.5	4	4.5	5
270							3.1	3.6	4	4.4
300								3.2	3.6	4
330									3.3	3.6
360									3	3.3

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Event Description:	Rapid Downpower		

CNS AP/1/A/5500/009	RAPID DOWNPOWER	PAGE NO. 5 of 37 Revision 28

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 9. Determine the target load from the table below:

Reactor Power(%)	Target (MW)
0	40
10	120
20	240
30	360
40	480
48	576
50	600
60	720
69	828
70	840
80	960
90	1080

Op Test No.:	301	Scenario #	3	Event #	5	Page	70 of 171
Event Description:	Rapid Downpower						

CNS AP/1/A/5500/009	RAPID DOWNPOWER	PAGE NO. 6 of 37 Revision 28

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **Initiate turbine load reduction as follows:**	
NOTE • Any load reduction rate of greater than 25 MW/Min must be performed in the manual mode. • Unloading rates greater than 60 MW/Min (5%/minute) will meet C-7A interlock and may result in steam dump actuation.	
__ a. Verify automatic turbine load reduction - DESIRED.	a. Manually reduce turbine load as follows: **NOTE** In manual mode, the control valves are capable of full travel within 3 minutes. __ 1) Select "MANUAL" and "CONTROL VALVE LOWER" to reduce turbine load as required. __ 2) **IF AT ANY TIME** auto turbine control is available **AND** desired, **THEN** perform Steps 5 through 11. __ 3) **GO TO** Step 12.
__ b. Enter the desired "LOAD RATE" on the turbine control panel.	
__ c. Enter the desired "TARGET" on the turbine control panel.	
__ d. Depress the "GO" pushbutton on the turbine control panel.	

Op Test No.:	301	Scenario #	3	Event #	5	Page	71	of	171

Event Description: Rapid Downpower

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
__ e. Verify turbine load - DECREASING AS REQUIRED.	e. Perform the following: **NOTE** In manual mode, the control valves are capable of full travel within 3 minutes. __ 1) Select "MANUAL" and "CONTROL VALVE LOWER" to reduce turbine load as required. __ 2) GO TO Step 12.
__ f. IF AT ANY TIME the turbine controls fail to respond properly, THEN perform Step 10.e.	
__ 11. **IF AT ANY TIME the turbine load reduction rate OR the target load must be changed, THEN RETURN TO Step 5.**	
__ 12. **Adjust power factor as necessary. REFER TO Unit 1 Revised Data Book Figure 43.**	
13. **Attempt to control T-Avg as follows:**	
__ a. Verify T-Ref instrumentation - AVAILABLE.	__ a. IF T-Avg Coastdown is in progress, THEN determine T-Ref from table. REFER TO Enclosure 5 (T-Ref Value Following Runback/Power Reduction).
__ b. Verify control rods - IN AUTO AND STEPPING IN.	__ b. IF T-Avg is greater than 1.5°F higher than T-Ref, THEN manually insert control rods as required to maintain T-Avg within 1°F of T-Ref.

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Event Description:	Rapid Downpower						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. (Continued)	
__ c. Maintain T-Avg greater than or equal to 551°F.	
__ d. Verify Reactor Engineering Power Maneuvering Guidance has been provided by Duty Reactor Engineer.	d. Perform the following: NOTE • The boric acid added to the NC System should be added in several increments. • The boric acid added to the NC System should be added only during the first hour of the downpower event. __ 1) Borate NC System as required. REFER TO R.O.D. book (section 4.8). __ 2) GO TO Step 13.f.
__ e. Borate NC System as required. Refer to Reactor Engineering Power Maneuvering Guidance.	**Note To Evaluator:** **Once the Main Turbine is in 'GO' and the BOP has performed his first required boration, and at the discretion of the Lead Evaluator, the scenario may continue by having the booth operator INSERT Trigger 6 for Event 6 (1B S/G Tube Rupture).**
__ f. Ensure operator monitors Enclosure 2 (Rod Insertion Limit Boration).	

Op Test No.: 301	Scenario # 3	Event # 6, 7, 8	Page 73 of 171
Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure		

Control Room Indications
1RAD-3, E/5 "1EMF26, 27, 28, 29, S/G A, B, C, D STEAM LINE" - LIT
EMF Module for 1EMF-27 Trip 2 light - LIT
Pressurizer Level indication – DECREASING RAPIDLY

<u>Note To Evaluator</u>:

Crew should determine that AP/10 Enclosure 1 guidance should be taken as follows:

a. IF Pzr level cannot be maintained greater than 4%, THEN perform the following:
    - Trip reactor.
    - When reactor trip verified, THEN initiate S/I.
    - GO TO EP/1/A/5000/E-0.

Op Test No.:	301	Scenario #	3	Event #	6, 7, 8	Page	74 of 171
Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 4 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. Monitor Enclosure 1 (Foldout Page).	**Enclosure 1 can be found as Attachment 8.**
2. **Verify Reactor Trip:**	**Perform the following:**
__ • All rod bottom lights - LIT	__ a. Trip reactor.
__ • All reactor trip and bypass breakers - OPEN	b. IF reactor will not trip, THEN concurrently:
__ • I/R power - DECREASING.	__ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ • GO TO EP/1/A/5000/FR-S.1 (Response to Nuclear Power Generation/ATWS).
3. **Verify Turbine Trip:**	**Perform the following:**
__ • All turbine stop valves - CLOSED	__ a. Trip turbine. b. IF turbine will not trip, THEN: __ 1) Depress "MANUAL" pushbutton on turbine control panel. __ 2) Rapidly CLOSE control valves by simultaneously depressing "CONTROL VALVE LOWER" and "FAST RATE" pushbuttons. 3) IF control valves will not close, THEN CLOSE: __ • All MSIVs __ • All MSIV bypass valves.

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 5 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 4. **Verify 1ETA and 1ETB - ENERGIZED.**	**Perform the following:** __ a. IF 1ETA AND 1ETB de-energized, THEN GO TO EP/1/A/5000/ECA-0.0 (Loss of All AC Power). __ b. WHEN time allows, THEN attempt to restore power to de-energized switchgear while continuing with this procedure. REFER TO AP/1/A/5500/007 (Loss of Normal Power).
5. **Verify S/I actuated:**	
__ a. "SAFETY INJECTION ACTUATED" status light (1SI-13) - LIT.	a. Perform the following: 1) Verify conditions requiring S/I: __ • Pzr pressure - LESS THAN 1845 PSIG OR __ • Containment pressure - GREATER THAN 1.2 PSIG. __ 2) IF S/I required, THEN initiate S/I. 3) IF S/I not required, THEN concurrently: __ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ • GO TO EP/1/A/5000/ES-0.1 (Reactor Trip Response).
__ b. Both E/S load sequencer actuated status lights (1SI-14) - LIT.	__ b. Initiate S/I.

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 6 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 6. **Announce "Unit 1 Safety Injection".**	
7. **Determine required notifications:**	
__ • <u>REFER TO</u> RP/0/A/5000/001 (Classification Of Emergency)	
__ • <u>REFER TO</u> RP/0/B/5000/013 (NRC Notification Requirements).	
__ 8. **Verify all Feedwater Isolation status lights (1SI-5) - LIT.**	**Perform the following:** __ a. Initiate Feedwater Isolation. __ b. <u>IF</u> proper status light indication not obtained, <u>THEN</u> CLOSE valves.
9. **Verify Phase A Containment Isolation status as follows:**	
__ a. Phase A "RESET" lights - DARK.	__ a. Initiate Phase A Isolation.
__ b. Monitor Light Panel Group 5 St lights on energized train(s) - LIT.	__ b. Align valves as necessary to ensure each penetration isolated by at least one isolation valve.
10. **Verify proper Phase B actuation as follows:**	
__ a. Verify Containment pressure - HAS REMAINED LESS THAN 3 PSIG.	a. Perform the following: 1) Verify Phase B Isolation actuated as follows: __ a) Phase B Isolation "RESET" lights - DARK. (RNO continued on next page)

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

10. (Continued)

__ b) **IF** Phase B Isolation "RESET" lights lit, **THEN** initiate Phase B Isolation.

c) Verify following monitor light panel lights - LIT:

__ • Group 1 Sp lights

__ • Group 5 Sp lights

__ • Group 5 St light L/11.

__ d) **IF** monitor light panel not in correct alignment, **THEN** ensure correct alignment.

__ 2) Stop all NC pumps.

__ 3) Maintain seal injection flow.

__ 4) Energize H_2 igniters.

5) Dispatch operator to perform the following:

__ a) Secure all ice condenser air handling units. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 11 (Securing All Ice Condenser Units).

__ b) Place containment H_2 analyzers in service. **REFER TO** OP/1/A/6450/010 (Containment Hydrogen Control Systems).

__ 6) **WHEN** 9 minutes elapsed, **THEN** verify proper VX system operation. **REFER TO** Enclosure 5 (VX System Operation).

__ 7) **GO TO** Step 11.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
__ b. **IF AT ANY TIME** containment pressure exceeds 3 PSIG while in this procedure, **THEN** perform Step 10.a.	
11. **Verify proper CA pump status as follows:**	
__ a. Motor driven CA pumps - ON.	a. Perform the following for affected train(s): __ 1) Reset ECCS. __ 2) Reset D/G load sequencer(s). __ 3) Start affected pump(s). __ 4) **IF AT ANY TIME** B/O occurs, **THEN** restart S/I equipment previously on.
__ b. 3 S/G N/R levels - GREATER THAN 11%.	b. Perform the following: __ 1) Place CA PMP #1 control switch to ON. __ 2) Ensure CA Pump #1 - RUNNING.
12. **Verify all of the following S/I pumps - ON:** __ • NV pumps __ • ND pumps __ • NI pumps.	**Perform the following for affected train(s):** __ a. Reset ECCS. __ b. Reset D/G load sequencer(s). __ c. Start affected pump(s). __ d. **IF AT ANY TIME** B/O occurs, **THEN** restart S/I equipment previously on.

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CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 9 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 13. **Verify all KC pumps - ON.**	**Perform the following for affected train(s):** __ a. Reset ECCS. __ b. Reset D/G load sequencer(s). __ c. Start affected pump(s). __ d. <u>IF</u> <u>AT</u> <u>ANY</u> <u>TIME</u> B/O occurs, <u>THEN</u> restart S/I equipment previously on. __ e. <u>IF</u> KC flow cannot be established to NC pumps, <u>THEN</u> stop all NC pumps.
__ 14. **Verify all Unit 1 and Unit 2 RN pumps - ON.**	**Perform the following:** __ a. <u>IF</u> any Unit 2 RN pump off, <u>THEN</u> start affected pump(s). b. <u>IF</u> any Unit 1 RN pump off, <u>THEN</u> perform the following for affected train(s): __ 1) Reset ECCS. __ 2) Reset D/G load sequencer(s). __ 3) Start affected pump(s). __ 4) <u>IF</u> <u>AT</u> <u>ANY</u> <u>TIME</u> B/O occurs, <u>THEN</u> restart S/I equipment previously on.
15. **Verify proper ventilation systems operation as follows:** __ • <u>REFER</u> <u>TO</u> Enclosure 2 (Ventilation System Verification). __ • Notify Unit 2 operator to perform Enclosure 3 (Opposite Unit Ventilation Verification).	**Enclosure 2 can be found as Attachment 9.**

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Event Description: 1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure							

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 16. Verify all S/G pressures - GREATER THAN 775 PSIG.	**Perform the following:** a. Verify Main Steam Isolation as follows: __ • All MSIVs - CLOSED __ • All MSIV bypass valves - CLOSED __ • All S/G PORVs - CLOSED. b. <u>IF</u> any valve open, <u>THEN</u> perform the following: __ 1) Initiate Main Steam Isolation. __ 2) <u>IF</u> any valve still open, <u>THEN</u> CLOSE valve.
17. **Verify proper S/I flow as follows:**	
__ a. "NV S/I FLOW" - INDICATING FLOW.	__ a. Start NV pump(s) and align valves.
__ b. NC pressure - LESS THAN 1620 PSIG.	b. Perform the following: __ 1) Ensure ND pump miniflow valve on operating ND pump(s) - OPEN. N/A 2) <u>IF</u> ND pump miniflow valve(s) cannot be opened, <u>THEN</u> perform the following for affected train(s): __ a) Reset ECCS. __ b) Reset D/G load sequencer. __ c) Stop ND pump. __ d) <u>IF AT ANY TIME</u> B/O occurs, <u>THEN</u> restart S/I equipment previously on. __ e) <u>IF AT ANY TIME</u> NC pressure decreases to less than 285 PSIG in an uncontrolled manner, <u>THEN</u> restart the ND pump. (RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17. (Continued)	
	__ 3) GO TO Step 18.
__ c. NI pumps - INDICATING FLOW.	__ c. Start NI pump(s) and align valves.
__ d. NC pressure - LESS THAN 285 PSIG.	d. Perform the following: __ 1) Ensure ND pump miniflow valve on operating ND pump(s) - OPEN. 2) **IF** ND pump miniflow valve(s) cannot be opened, **THEN** perform the following for affected train(s): __ a) Reset ECCS. __ b) Reset D/G load sequencer. __ c) Stop ND pump. __ d) IF AT ANY TIME B/O occurs, **THEN** restart S/I equipment previously on. __ e) IF AT ANY TIME NC pressure decreases to less than 285 PSIG in an uncontrolled manner, **THEN** restart the ND pump. __ 3) GO TO Step 18.
__ e. ND pumps - INDICATING FLOW TO C-LEGS.	__ e. Start ND pump(s) and align valves.

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 12 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 18. **WHEN time and manpower permit (within two hours of event), THEN monitor Spent Fuel Pool level and temperature. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 1 (Unit 1 Spent Fuel Pool Monitoring).**	**G-1 Enclosure 1 can be found as Attachment 11.**
19. **Control S/G levels as follows:**	
__ a. Verify total CA flow - GREATER THAN 450 GPM.	a. Perform the following: 1) IF N/R level in all S/Gs less than 11% (29% ACC), THEN perform the following: __ • Start CA pumps __ • Ensure correct valve alignment. 2) IF N/R level in all S/Gs less than 11% (29% ACC) AND feed flow greater than 450 GPM cannot be established, THEN concurrently: __ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ • GO TO EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink).
__ b. WHEN each S/G N/R level greater than 11% (29% ACC), THEN control feed flow to maintain that S/G N/R level between 11% (29% ACC) and 50%.	
__ 20. **Verify all CA isolation valves - OPEN.**	__ **OPEN valve(s).**

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 21. **Verify S/I equipment status based on monitor light panel - IN PROPER ALIGNMENT.**	__ **Align equipment.**

NOTE Enclosure 4 (NC Temperature Control) shall remain in effect until subsequent procedures provide alternative NC temperature control guidance.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 22. **Control NC temperature. REFER TO Enclosure 4 (NC Temperature Control).**	**Enclosure 4 can be found as Attachment 10.**
23. **Verify Pzr PORV and Pzr Spray Valve status as follows:**	
__ a. All Pzr PORVs - CLOSED.	a. IF Pzr pressure less than 2315 PSIG, THEN perform the following: __ 1) CLOSE Pzr PORV(s). __ 2) IF any Pzr PORV cannot be closed, THEN CLOSE its isolation valve. 3) IF 1NC-32B OR 1NC-34A cannot be closed OR isolated, THEN perform the following: a) Align N_2 to PORVs by opening the following valves: __ • 1NI-438A (Emer N2 From CLA A To 1NC-34A) __ • 1NI-439B (Emer N2 From CLA B To 1NC-32B). __ b) CLOSE affected Pzr PORV. (RNO continued on next page)

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Event Description: 1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

23. (Continued)

4) IF any Pzr PORV cannot be closed OR isolated, THEN perform the following:

__ a) Energize H_2 igniters.

b) Dispatch operator to perform the following:

__ (1) Secure all ice condenser air handling units. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 11 (Securing All Ice Condenser Units).

__ (2) Place containment H2 analyzers in service. REFER TO OP/1/A/6450/010 (Containment Hydrogen Control Systems).

c) IF both the following conditions exist,

__ • Containment pressure - HAS REMAINED LESS THAN 3 PSIG

__ • Containment pressure - BETWEEN 1 PSIG AND 3 PSIG

__ THEN start one VX fan and secure normal containment ventilation. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 18 (VX and Containment Ventilation Control).

(RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. (Continued)	
	d) Concurrently: __ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ • GO TO EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant).
__ b. Normal Pzr spray valves - CLOSED.	b. IF Pzr pressure less than 2150 PSIG, THEN perform the following: __ 1) CLOSE spray valve(s). 2) IF spray valve(s) cannot be closed, THEN perform the following: __ a) Stop NC pumps 1A and 1B. __ b) IF both 1C AND 1D NC pumps on, THEN stop one additional pump.
__ c. At least one Pzr PORV isolation valve - OPEN.	__ c. IF power available, THEN OPEN one Pzr PORV isolation valve unless it was closed to isolate an open Pzr PORV.
__ 24. **Verify NC subcooling based on core exit T/Cs - GREATER THAN 0°F.**	**IF any NV OR NI pump on, THEN perform the following:** __ a. Ensure all NC pumps - OFF. __ b. Maintain seal injection flow.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25. **Verify main steamlines intact:** __ • All S/G pressures - STABLE OR INCREASING __ • ALL S/Gs - PRESSURIZED.	**IF pressure in any S/G decreasing in an uncontrolled manner OR any S/G depressurized, THEN perform the following:** __ a. Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ b. GO TO EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).
26. **Verify S/G tubes intact as follows:** • Verify the following EMF trip 1 lights - DARK: __ • 1EMF-33 (Condenser Air Ejector Exhaust) __ • 1EMF-26 (Steamline 1A) __ • 1EMF-27 (Steamline 1B) __ • 1EMF-28 (Steamline 1C) __ • 1EMF-29 (Steamline 1D). __ • All S/G levels - STABLE OR INCREASING IN A CONTROLLED MANNER.	**IF any EMF trip 1 light lit OR any S/G level increasing in an uncontrolled manner, THEN concurrently:** __ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ • GO TO EP/1/A/5000/E-3 (Steam Generator Tube Rupture). **Note To Evaluator:** **At this point, the crew will transition to EP/1/A/5000/E-3. Steps from E-3 begin on the next page.**

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure							

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 2 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

C. Operator Actions

__ 1. Monitor Enclosure 1 (Foldout Page).

Enclosure 1 can be found as Attachment 12.

2. **Identify ruptured S/G(s) as follows:**

- __ S/G level - INCREASING IN AN UNCONTROLLED MANNER.

OR

- __ Chemistry or RP has determined ruptured S/G

OR

- Any of the following EMF trip 1 lights - LIT:
  - __ 1EMF-26 (Steamline 1A)
  - __ 1EMF-27 (Steamline 1B)
  - __ 1EMF-28 (Steamline 1C)
  - __ 1EMF-29 (Steamline 1D).

Perform the following:

__ a. Continue to monitor S/G N/R levels and steamline EMFs.

b. Notify RP to perform the following:

- __ Frisk all Unit 1 S/G cation columns for activity
- __ Notify Control Room of results.

c. IF S/G Sampling required to identify ruptured S/G(s), THEN perform the following:

1) Ensure the following signals - RESET:

__ a) Phase A Containment Isolations.

__ b) CA System valve control.

__ c) KC NC NI NM St signals.

__ 2) Align all S/Gs for Chemistry sampling.

3) Notify Chemistry to perform the following:

- __ Sample all S/Gs for activity
- __ Notify Control Room of results.

__ d. WHEN ruptured S/G(s) is identified, THEN immediately RETURN TO Step 3.

__ e. GO TO Step 11.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 3. **Verify at least one intact S/G - AVAILABLE FOR NC SYSTEM COOLDOWN.**	__ **Maintain at least one S/G available for NC System cooldown in subsequent steps.**
4. **Isolate flow from ruptured S/G(s) as follows:**	
__ a. Verify all ruptured S/G(s) PORV - CLOSED.	a. <u>WHEN</u> ruptured S/G(s) pressure less than 1090 PSIG, <u>THEN</u> perform the following: __ 1) Ensure ruptured S/G(s) PORV - CLOSED. __ 2) <u>IF</u> ruptured S/G(s) PORV will not close, <u>THEN</u> CLOSE ruptured S/G(s) PORV isolation valve. __ 3) <u>IF</u> ruptured S/G(s) PORV isolation valve will not close, <u>THEN</u> dispatch operator to close ruptured S/G(s) PORV isolation valve.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
__ b. Verify S/G(s) 1B and 1C - INTACT.	b. Perform the following:

N/A 1) IF both motor driven CA pumps available, THEN CLOSE "CAPT TRIP T/V CTRL".

N/A 2) IF CA Pump #1 is only source of feedwater, THEN maintain steam flow to CAPT from at least one S/G.

3) IF S/G 1B ruptured, THEN perform the following:

__ a) Dispatch two operators to unlock and close 1SA-1 (1B S/G Main Steam to CAPT Maintenance Isol) (DH-624, FF-53, Rm 572) (Breakaway lock).

N/A b) IF 1SA-1 cannot be closed, THEN dispatch two operators to unlock and close 1SA-3 (1B S/G Main Steam to CAPT Stop Check) (AB-551, DD-53, Rm 217) (Breakaway lock).

N/A 4) IF S/G 1C ruptured, THEN perform the following:

__ a) Dispatch two operators to unlock and close 1SA-4 (1C S/G Main Steam to CAPT Maintenance Isol) (DH-624, FF-53, Rm 572) (Breakaway lock installed).

__ b) IF 1SA-4 cannot be closed, THEN dispatch two operators to unlock and close 1SA-6 (1C S/G Main Steam to CAPT Stop Check) (AB-551, DD-53, Rm 217) (Breakaway lock) (Ladder needed).

(RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
	__ 5) **WHEN** ruptured S/G steam supply to CA Pump #1 isolated, **THEN** OPEN "CAPT TRIP T/V CTRL".
c. Isolate blowdown and steam drain on all ruptured S/G(s) as follows:	
• S/G 1A:	
__ 1) CLOSE 1SM-77A (S/G 1A Otlt Hdr Bldwn C/V).	__ 1) Dispatch operator to close 1SM-77A (S/G 1A Otlt Hdr Bldwn C/V) (DH-583, FF-GG, 43-44, Rm 591).
2) Verify the following blowdown isolation valves - CLOSED:	
__ a) 1BB-56A (S/G 1A Bldwn Cont Isol Insd).	__ a) CLOSE valve.

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Event Description: 1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
__ b) 1BB-148B (S/G 1A Bldwn Cont Isol Byp).	b) Perform the following: __ (1) CLOSE valve. (2) **IF** valve will not close **AND** 1BB-56A open, **THEN** perform the following: __ 1. Ensure "S/G A BLDWN FLOW CTRL" - CLOSED. 2. Dispatch operators to ensure the following valves - CLOSED: __ • 1BB-148B (S/G 1A Bldwn Cont Isol Byp) (DH-580, EE-FF, 44-45, Rm 591) __ • 1BB-81 (1A S/G Blowdown Penetration Valve Test Isol) (DH-583, EE-FF, 44, Rm 591).

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Event Description: 1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
__ c) 1BB-57B (S/G 1A Bldwn Cont Isol Otsd).	c) Perform the following: __ (1) CLOSE valve. (2) **IF** valve will not close **AND** 1BB-56A open, **THEN** perform the following: __ 1. Ensure "S/G A BLDWN FLOW CTRL" - CLOSED. 2. Dispatch operators to ensure the following valves - CLOSED: __ • 1BB-57B (S/G 1A Bldwn Cont Isol Otsd) (DH-580, EE-FF, 44-45, Rm 591) __ • 1BB-81 (1A S/G Blowdown Penetration Valve Test Isol) (DH-583, EE-FF, 44, Rm 591).

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
• S/G 1B:	
__ 1) CLOSE 1SM-76B (S/G 1B Otlt Hdr Bldwn C/V).	__ 1) Dispatch operator to close 1SM-76B (S/G 1B Otlt Hdr Bldwn C/V) (DH-583, FF-53, Rm 572).
2) Verify the following blowdown isolation valves - CLOSED:	
__ a) 1BB-19A (S/G 1B Bldwn Cont Isol Insd).	__ a) CLOSE valve.
__ b) 1BB-150B (S/G 1B Bldwn Cont Isol Byp).	b) Perform the following: __ (1) CLOSE valve. (2) IF valve will not close AND 1BB-19A open, THEN perform the following: __ 1. Ensure "S/G B BLDWN FLOW CTRL" - CLOSED. 2. Dispatch operators to ensure the following valves - CLOSED: __ • 1BB-150B (S/G 1B Bldwn Cont Isol Byp) (DH-580, FF, 52-53, Rm 572) __ • 1BB-83 (1B S/G Blowdown Penetration Valve Test Isol) (DH-580, FF-53, Rm 572).

Op Test No.:	301	Scenario #	3	Event #	6, 7, 8	Page	94 of 171

Event Description: 1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
__ c) 1BB-21B (S/G 1B Bldwn Cont Isol Otsd).	c) Perform the following: __ (1) CLOSE valve. (2) **IF** valve will not close **AND** 1BB-19A open, **THEN** perform the following: __ 1. Ensure "S/G B BLDWN FLOW CTRL" - CLOSED. 2. Dispatch operators to ensure the following valves - CLOSED: __ • 1BB-21B (S/G 1B Bldwn Cont Isol Otsd) (DH-580, FF, 52-53, Rm 572) __ • 1BB-83 (1B S/G Blowdown Penetration Valve Test Isol) (DH-580, FF-53, Rm 572).

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
• S/G 1C:	
__ 1) CLOSE 1SM-75A (S/G 1C Otlt Hdr Bldwn C/V).	__ 1) Dispatch operator to close 1SM-75A (S/G 1C Otlt Hdr Bldwn C/V) (DH-580, GG-52/53, Rm 572).
2) Verify the following blowdown isolation valves - CLOSED:	
__ a) 1BB-60A (S/G 1C Bldwn Cont Isol Insd).	__ a) CLOSE valve.
__ b) 1BB-149B (S/G 1C Bldwn Cont Isol Byp).	b) Perform the following: __ (1) CLOSE valve. (2) **IF** valve will not close **AND** 1BB-60A open, **THEN** perform the following: __ 1. Ensure "S/G C BLDWN FLOW CTRL" - CLOSED. 2. Dispatch operators to ensure the following valves - CLOSED: __ • 1BB-149B (S/G 1C Bldwn Cont Isol Byp) (DH-578, FF-GG, 52, Rm 572) __ • 1BB-82 (1C S/G Blowdown Penetration Valve Test Isol) (DH-583, FF-53, Rm 572).

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
__ c) 1BB-61B (S/G 1C Bldwn Cont Isol Otsd).	c) Perform the following: __ (1) CLOSE valve. (2) **IF** valve will not close **AND** 1BB-60A open, **THEN** perform the following: __ 1. Ensure "S/G C BLDWN FLOW CTRL" - CLOSED. 2. Dispatch operators to ensure the following valves - CLOSED: __ • 1BB-61B (S/G 1C Bldwn Cont Isol Otsd) (DH-578, FF-GG, 52, Rm 572) __ • 1BB-82 (1C S/G Blowdown Penetration Valve Test Isol) (DH-583, FF-53, Rm 572).

Op Test No.:	301	Scenario #	3	Event #	6, 7, 8	Page	97 of 171
Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 12 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
• S/G 1D:	
__ 1) CLOSE 1SM-74B (S/G 1D Otlt Hdr Bldwn C/V).	__ 1) Dispatch operator to close 1SM-74B (S/G 1D Otlt Hdr Bldwn C/V) (DH-583, FF-GG, 44-45, Rm 591).
2) Verify the following blowdown isolation valves - CLOSED:	
__ a) 1BB-8A (S/G 1D Bldwn Cont Isol Insd).	__ a) CLOSE valve.
__ b) 1BB-147B (S/G 1D Bldwn Cont Isol Byp).	b) Perform the following:
	__ (1) CLOSE valve.
	(RNO continued on next page)

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 13 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	(2) **IF** valve will not close **AND** 1BB-8A open, **THEN** perform the following: __ 1. Ensure "S/G D BLDWN FLOW CTRL" - CLOSED. 2. Dispatch operators to ensure the following valves - CLOSED: __ • 1BB-147B (S/G 1D Bldwn Cont Isol Byp) (DH-582, EE-FF, 44, Rm 591) __ • 1BB-80 (1D S/G Blowdown Penetration Valve Test Isol) (DH-583,EE-FF, 44, Rm 591).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
__ c) 1BB-10B (S/G 1D Bldwn Cont Isol Otsd).	c) Perform the following: __ (1) CLOSE valve. (2) <u>IF</u> valve will not close <u>AND</u> 1BB-8A open, <u>THEN</u> perform the following: __ 1. Ensure "S/G D BLDWN FLOW CTRL" - CLOSED. 2. Dispatch operators to ensure the following valves - CLOSED: __ • 1BB-10B (S/G 1D Bldwn Cont Isol Otsd) (DH-582, EE-FF, 44, Rm 591) __ • 1BB-80 (1D S/G Blowdown Penetration Valve Test Isol) (DH-583,EE-FF, 44, Rm 591).

Op Test No.:	301	Scenario #	3	Event #	6, 7, 8	Page	100 of 171
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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. **CLOSE the following valves on all ruptured S/G(s):** __ • MSIV __ • MSIV bypass valve. Critical Task #1	**Perform the following:** a. CLOSE the following valves on remaining S/Gs: __ • MSIV __ • MSIV bypass valve. __ b. Place "STM DUMP CTRL" in manual. __ c. Adjust "STM DUMP CTRL" output to 0%. __ d. Place "STEAM DUMP SELECT" switch in pressure mode. __ e. IF any intact S/G MSIV and associated bypass valve closed, THEN GO TO Step g. in this RNO. __ f. GO TO EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired). __ g. Place steam dump interlock bypass switches in "OFF RESET". h. Transfer turbine steam seal supply to AS as follows: __ 1) OPEN 1TL-8 (Aux Stm To Stm Seal Reg). __ 2) CLOSE 1TL-2 (Main Stm To Stm Seal Reg). (RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. (Continued)	
	i. Ensure the following turbine S/V before seat drain valves - CLOSED: __ • 1SM-41 (Stop Vlv #1 Before Seat Drn) __ • 1SM-44 (Stop Vlv #2 Before Seat Drn) __ • 1SM-43 (Stop Vlv #3 Before Seat Drn) __ • 1SM-42 (Stop Vlv #4 Before Seat Drn).
	__ j. CLOSE 1AS-1 (SM To AS Inlet).
	k. Ensure the following valves - CLOSED: __ • 1HM-1 (MSRH 1A&1B SSRH Stm Source) __ • 1HM-2 (MSRH 1C&1D SSRH Stm Source).
	__ l. Dispatch operator to isolate steam flow from all ruptured S/G(s). <u>REFER TO</u> Enclosure 2 (Locally Isolating Steam Flow From Ruptured S/G(s)).
	__ m. <u>WHEN</u> cooldown is initiated in subsequent steps, <u>THEN</u> use intact S/G(s) PORV for steam dump.

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 17 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. **Control ruptured S/G(s) N/R level as follows:**	
__ a. Verify ruptured S/G(s) N/R level - GREATER THAN 11% (29% ACC).	a. Perform the following: __ 1) IF any ruptured S/G is also faulted, THEN do not establish feed flow to ruptured S/G unless needed for NC System cooldown. 2) IF any ruptured S/G(s) is not faulted OR is required for cooldown, THEN perform the following: __ a) Establish and maintain feed flow to affected S/G(s). __ b) WHEN affected S/G(s) N/R level greater than 11% (29% ACC), THEN perform Steps 6.b and 6.c. __ 3) GO TO Step 7.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	
b. Isolate feed flow to all ruptured S/G(s) as follows:	
• S/G 1A:	
__ 1) CLOSE 1CA-62A (CA Pmp A Disch To S/G 1A Isol).	1) Perform the following: __ a) CLOSE 1CA-60 (CA Pump 1A Flow To S/G 1A). __ b) Dispatch operator with 14" valve wrench to close 1CA-62A (CA Pmp A Disch To S/G 1A Isol) (DH-587, DD-EE, 44-45, Rm 591).
__ 2) CLOSE 1CA-66B (CA Pmp 1 Disch To S/G 1A Isol).	2) Perform the following: __ a) CLOSE 1CA-64 (CA Pump #1 Flow To S/G 1A). __ b) Dispatch operator with 14" valve wrench to close 1CA-66B (CA Pmp 1 Disch To S/G 1A Isol) (DH-584, DD-EE, 44-45, Rm 591).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	
• S/G 1B:	
__ 1) CLOSE 1CA-58A (CA Pmp A Disch To S/G 1B Isol). **Critical Task #1**	1) Perform the following: __ a) CLOSE 1CA-56 (CA Pump 1A Flow To S/G 1B). __ b) Dispatch operator with 14" valve wrench to close 1CA-58A (CA Pmp A Disch To S/G 1B Isol) (DH-586, DD-EE, 52-53, Rm 572).
__ 2) CLOSE 1CA-54B (CA Pmp 1 Disch To S/G 1B Isol). **Critical Task #1**	2) Perform the following: __ a) CLOSE 1CA-52 (CA Pump #1 Flow To S/G 1B). __ b) Dispatch operator with 14" valve wrench to close 1CA-54B (CA Pmp 1 Disch To S/G 1B Isol) (DH-584, DD-EE, 52-53, Rm 572).

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CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 20 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	
• S/G 1C:	
__ 1) CLOSE 1CA-46B (CA Pmp B Disch To S/G 1C Isol).	1) Perform the following: __ a) CLOSE 1CA-44 (CA Pump 1B Flow To S/G 1C). __ b) Dispatch operator with 14" valve wrench to close 1CA-46B (CA Pmp B Disch To S/G 1C Isol) (DH-586, DD, 53-54, Rm 572).
__ 2) CLOSE 1CA-50A (CA Pmp 1 Disch To S/G 1C Isol).	2) Perform the following: __ a) CLOSE 1CA-48 (CA Pump #1 Flow To S/G 1C). __ b) Dispatch operator with 14" valve wrench to close 1CA-50A (CA Pmp 1 Disch To S/G 1C Isol) (DH-584, EE-53, Rm 572).

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CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 21 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	
• S/G 1D:	
__ 1) CLOSE 1CA-42B (CA Pmp B Disch To S/G 1D Isol).	1) Perform the following: __ a) CLOSE 1CA-40 (CA Pump 1B Flow To S/G 1D). __ b) Dispatch operator with 14" valve wrench to close 1CA-42B (CA Pmp B Disch To S/G 1D Isol) (DH-586, DD-EE, 43-44, Rm 591).
__ 2) CLOSE 1CA-38A (CA Pmp 1 Disch To S/G 1D Isol).	2) Perform the following: __ a) CLOSE 1CA-36 (CA Pump #1 Flow To S/G 1D). __ b) Dispatch operator with 14" valve wrench to close 1CA-38A (CA Pmp 1 Disch To S/G 1D Isol) (DH-584, DD-EE, 43-44, Rm 591).
__ c. IF AT ANY TIME ruptured S/G(s) N/R level is less than 11% (29% ACC), THEN perform Step 6.	
__ 7. **Verify all ruptured S/G(s) pressure - GREATER THAN 320 PSIG.**	__ GO TO **EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).**

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 8. **Verify any NC pump - ON.**	<u>CAUTION</u> **NC T-Cold indication in ruptured loop may cause an invalid Integrity Status Tree condition.** __ **Disregard NC T-Cold indication in ruptured loop, until directed by this EP or until this EP exited.**
__ 9. **Verify Pzr pressure - GREATER THAN 1955 PSIG.**	**<u>IF</u> "P-11 PZR S/I BLOCK PERMISSIVE" status light (1SI-18) lit, <u>THEN</u> perform the following:** __ a. Depress ECCS steam pressure "BLOCK" pushbuttons. __ b. Verify main steam isolation blocked status lights (1SI-13) - LIT. c. Maintain NC pressure less than 1955 PSIG using one of the following: __ • Pzr spray OR __ • Pzr PORV.

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CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 23 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

- NC pump trip criteria based on NC subcooling does not apply after starting a controlled cooldown.
- After low steamline pressure main steam isolation signal is blocked, maintaining steam pressure negative rate less than 2 PSIG per second will prevent a Main Steam Isolation.
- OAC graphic SMRATES to monitor S/G pressure rates can be accessed via a hot button in the center of the SM graphic.

10. **Initiate NC System cooldown as follows:**

__ a. Determine required core exit temperature based on lowest ruptured S/G pressure from table below:

LOWEST RUPTURED S/G PRESSURE (PSIG)	REQUIRED CORE EXIT T/Cs (°F)
EQUAL TO OR GREATER THAN 1200	532 (512 ACC)
1100 - 1199	520 (501 ACC)
1000 - 1099	507 (489 ACC)
900 - 999	494 (476 ACC)
800 - 899	479 (461 ACC)
700 - 799	462 (445 ACC)
600 - 699	442 (426 ACC)
500 - 599	420 (405 ACC)
400 - 499	392 (379 ACC)
320 - 399	364 (352 ACC)

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CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 24 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
b. Ensure ruptured S/G(s) isolated as follows:	
1) Verify the following valves on all ruptured S/G(s) - CLOSED:	1) Ensure the following valves on at least one intact S/G - CLOSED:
__ • MSIV	__ • MSIV
__ • MSIV bypass valves.	__ • MSIV bypass valve.
__ 2) Verify S/G PORV on ruptured S/G(s) - CLOSED OR ISOLATED.	2) <u>IF</u> ruptured S/G(s) pressure is less than 1090 PSIG, <u>THEN</u> perform the following:
	__ a) Ensure S/G PORV on ruptured S/G(s) - CLOSED <u>OR</u> ISOLATED.
	b) <u>IF</u> S/G PORV on ruptured S/G(s) not closed or isolated, <u>THEN</u> perform the following:
	__ (1) Ensure operator dispatched to close ruptured S/G(s) PORV isolation valve.
	(2) Do not continue until affected S/G PORV(s):
	__ • Isolated
	OR
	__ • Determined to be unisolable.

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Event Description: 1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 25 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
3) IF S/G 1B OR 1C ruptured, THEN verify one of the following CAPT steam supply valves - CLOSED:	3) Perform the following:
__ • "CAPT TRIP T/V CTRL"	__ a) Ensure operator dispatched to isolate CAPT steam supply from ruptured S/G.
OR	b) Do not continue until affected CAPT steam supply:
__ • Manual isolation valve on affected S/G.	__ • Isolated OR __ • Determined to be unisolable.
c. Verify condenser is available as follows:	__ c. GO TO Step 10.f RNO.
__ • "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT	
__ • MSIV on intact S/G(s) - OPEN.	
__ d. Verify steam dumps - IN PRESSURE MODE.	d. Place steam dumps in pressure mode as follows:
	__ 1) Place "STM DUMP CTRL" slim station in manual. Critical Task #2
	__ 2) Adjust "STM DUMP CTRL" slim station output to match "% STM DUMP DEMAND" (1SMP5211).
	__ 3) WHEN output on "STM DUMP CTRL" slim station equal to "% STM DUMP DEMAND" (1SMP5211), THEN place steam dumps in pressure mode. Critical Task #2

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CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 26 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
__ e. **WHEN** "P-12 LO-LO TAVG" status light (1SI-18) lit, **THEN** place steam dump interlock bypass switches in "BYP INTLK."	
__ f. Dump steam to condenser from intact S/G(s) at maximum rate while attempting to avoid a Main Steam Isolation. **Critical Task #2**	f. Perform the following: 1) **IF** any intact S/G(s) PORV isolation valve closed **AND** associated PORV operable, **THEN** perform the following: __ a) OPEN S/G PORV isolation valve. __ b) **IF** isolation valve will not open, **THEN** dispatch operator to open isolation valve. __ 2) Dump steam from all intact S/G(s) at maximum rate with S/G PORV(s). __ 3) **IF** any intact S/G PORV cannot be operated from Control Room, **THEN** dispatch operator(s) to dump steam at maximum rate from intact S/G(s) PORV. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 10 (Local Operation of S/G PORVs). 4) **IF** operator(s) dispatched to S/G PORV(s), **THEN** perform the following: __ a) Obtain sound powered phone from storage box on rear wall of Control Room. __ b) Connect sound powered phone to jack on 1MC-11. __ c) Monitor sound powered phone for communication from Doghouse(s). (RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
	5) IF any intact S/G PORV unavailable, THEN evaluate the following to dump steam:
	__ • OPEN MSIVs and dump steam to condenser. REFER TO Enclosure 6 (Condenser Dump Operation).
	__ • Start CA Pump #1.
	6) IF no intact S/G is available for NC System cooldown, THEN contact station management to determine which of the following to perform:
	__ • Use faulted S/G
	OR
	__ • GO TO EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).
	__ 7) GO TO Step 10.g.

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 28 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
__ g. Verify main steam isolation blocked status lights (1SI-13) - LIT.	g. Perform the following: 1) Depressurize NC System to less than 1955 PSIG using one of the following: __ • Pzr spray OR __ • Pzr PORV. 2) **WHEN** "P-11 PZR S/I BLOCK PERMISSIVE" status light (1SI-18) lit, **THEN** perform the following: __ a) Depress ECCS steam pressure "BLOCK" pushbuttons. __ b) Verify main steam isolation blocked status lights (1SI-13) - LIT. __ 3) Maintain NC pressure less than 1955 PSIG.
__ h. **WHEN** core exit T/Cs less than required temperature, **THEN** stabilize core exit T/Cs less than required temperature. Critical Task #2	

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure							

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 29 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. **Control intact S/G levels as follows:**	
__ a. Verify N/R level in all intact S/Gs - GREATER THAN 11% (29% ACC).	a. Perform the following: __ 1) Maintain total feed flow greater than 450 GPM to intact S/Gs until any intact S/G N/R level greater than 11% (29% ACC). 2) IF total feed flow greater than 450 GPM cannot be established, THEN contact station management for guidance to establish feed flow from one of the following alternate sources: __ • CF __ • CM __ • Alternate low pressure water source.
__ b. THROTTLE feed flow to maintain all intact S/G N/R levels between 16% (29% ACC) and 50%.	b. IF N/R level in any intact S/G continues to increase in an uncontrolled manner, THEN perform the following: __ 1) Stop NC system cooldown. __ 2) RETURN TO Step 1.

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 30 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. **Verify Pzr PORV and isolation valve status as follows:**	
__ a. Power to all Pzr PORV isolation valves - AVAILABLE.	__ a. Evaluate cause of power loss and initiate actions to restore power to affected isolation valve(s).
__ b. All Pzr PORVs - CLOSED.	b. IF Pzr pressure is less than 2315 PSIG, THEN perform the following: __ 1) CLOSE Pzr PORV(s). __ 2) IF any Pzr PORV cannot be closed, THEN CLOSE its isolation valve. 3) IF 1NC-32B OR 1NC-34A cannot be closed OR isolated, THEN perform the following: a) Align N_2 to PORVs by opening the following valves: __ • 1NI-438A (Emer N2 From CLA A To 1NC-34A) __ • 1NI-439B (Emer N2 From CLA B To 1NC-32B). __ b) CLOSE affected Pzr PORV. __ 4) IF any Pzr PORV cannot be closed OR isolated, THEN GO TO EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).
__ c. At least one Pzr PORV isolation valve - OPEN.	__ c. OPEN one Pzr PORV isolation valve unless it was closed to isolate an open Pzr PORV.

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure							

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 31 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. (Continued)	
__ d. **IF AT ANY TIME** a Pzr PORV opens due to high pressure, **WHEN** Pzr pressure decreases to less than 2315 PSIG, ensure valve closes or is isolated.	__ d. **IF** Pzr PORV cannot be closed **OR** isolated, **THEN GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).
13. **Reset the following:**	
__ a. ECCS.	__ a. Reset ECCS. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 4 (ECCS Master Reset).
__ b. D/G load sequencers.	b. Dispatch operator to open affected sequencer(s) control power breaker: __ • 1EDE-F01F (Diesel Generator Load Sequencer Panel 1DGLSA) (AB-577, BB-46, Rm 496) __ • 1EDF-F01F (Diesel Generator Load Sequencer Panel 1DGLSB) (AB-560, BB-46, Rm 372).
__ c. Phase A	
__ d. Phase B.	
__ e. **IF AT ANY TIME** B/O occurs, **THEN** restart S/I equipment previously on.	

Op Test No.:	301	Scenario #	3	Event #	6, 7, 8	Page	117 of 171
Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 32 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. **Establish VI to Containment as follows:**	**Perform the following:**
__ • Ensure 1VI-77B (VI Cont Isol) - OPEN.	a. Align N_2 to Pzr PORVs by opening the following valves:
__ • Verify VI pressure - GREATER THAN 85 PSIG.	__ • 1NI-438A (Emer N2 From CLA A To 1NC-34A)
	__ • 1NI-439B (Emer N2 From CLA B To 1NC-32B).
	b. IF VI pressure is less than 85 PSIG, THEN perform the following:
	__ 1) Dispatch operator to ensure proper VI compressor operation.
	__ 2) Restore VI while continuing with this procedure. REFER TO AP/0/A/5500/022 (Loss of Instrument Air).
15. **Determine if ND pumps should be stopped:**	
__ a. Any ND pump - ON.	__ a. GO TO Step 15.e.
__ b. Any running ND pump suction - ALIGNED TO FWST.	__ b. GO TO Step 16.
__ c. NC pressure - GREATER THAN 285 PSIG.	__ c. GO TO Step 16.
__ d. Stop all ND pump(s) with suction aligned to FWST.	
__ e. IF AT ANY TIME NC pressure decreases to less than 285 PSIG in an uncontrolled manner, THEN restart ND pumps.	

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 33 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 16. **Verify ruptured S/G(s) - IDENTIFIED.**	**Perform the following:** __ a. Do not continue in this procedure until ruptured S/G(s) identified. __ b. RETURN TO Step 3.
17. **Verify if NC System cooldown should be stopped:**	
__ a. Verify core exit T/Cs - LESS THAN REQUIRED TEMPERATURE.	__ a. Do not continue in this procedure until core exit T/Cs are less than required temperature.
__ b. Stop NC System cooldown. Critical Task #2	
__ c. Stabilize core exit T/Cs - LESS THAN REQUIRED TEMPERATURE. Critical Task #2	

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 34 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18. **Verify ruptured S/G(s) pressure is under operator control as follows:**	
__ a. All ruptured S/G(s) pressure - STABLE OR INCREASING.	a. Perform the following: __ 1) Ensure ruptured S/G(s) isolated. REFER TO Steps 3 through 6. __ 2) IF ruptured S/G(s) pressure is less than intact S/G(s) used for cooldown, THEN GO TO EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired). 3) IF AT ANY TIME D/P between ruptured S/G(s) and intact S/G(s) used for cooldown is less than 250 PSIG, THEN perform the following: __ • Maintain total NC System cooldown less than 100°F in an hour __ • Dump steam from intact S/Gs to maintain intact S/G pressures 250 PSIG below ruptured S/G(s) pressure. __ 4) IF intact S/G(s) used for cooldown cannot be maintained at least 250 PSIG below pressure of ruptured S/G(s), THEN GO TO EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired). __ 5) GO TO Step 19.
__ b. IF AT ANY TIME ruptured S/G(s) pressure is decreasing while in this procedure, THEN perform Step 18.	

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CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 35 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 19. **Verify NC subcooling based on core exit T/Cs - GREATER THAN 20°F.**	__ **IF NC subcooling cannot be promptly restored to greater than 20°F, THEN GO TO EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).**
20. **Depressurize NC System using PZR Spray as follows:**	
__ a. Verify normal Pzr spray flow - AVAILABLE.	__ a. GO TO Step 21.
__ b. Initiate NC depressurization using maximum available spray. Critical Task #3	
c. IF AT ANY TIME during this step one of the following conditions exists, THEN GO TO Step 21:	
__ • Spray valves not effective in reducing NC pressure	
OR	
__ • Ruptured S/G(s) NR level approaching 83% (75% ACC).	

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 36 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20. (Continued)	
d. Do not continue until at least one of the following conditions satisfied: • Both of the following: __ • NC pressure - LESS THAN RUPTURED S/G(s) PRESSURE __ • Pzr level - GREATER THAN 11% (30% ACC) OR • Both of the following: __ • NC pressure - WITHIN 300 PSIG OF RUPTURED S/G(s) PRESSURE __ • Pzr level - GREATER THAN 41% (50% ACC) OR __ • Pzr level - GREATER THAN 68% (50% ACC) OR __ • NC subcooling based on core exit T/Cs - LESS THAN 0°F.	
__ e. CLOSE normal Pzr spray valves.	e. <u>IF</u> spray valve(s) will not close, <u>THEN</u> perform the following: __ 1) Stop 1A and 1B NC pumps. __ 2) <u>IF</u> both 1C <u>AND</u> 1D NC pumps on, <u>THEN</u> stop one additional pump.

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CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 37 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20. (Continued)	
__ f. Verify 1NV-37A (NV Supply To Pzr Aux Spray) - CLOSED	f. Perform the following: 1) Ensure one of the following valves - OPEN: __ • 1NV-39A (NV Supply To Loop D Isol). OR __ • 1NV-32B (NV Supply To Loop A Isol). __ 2) CLOSE 1NV-37A. __ 3) Maintain charging flow less than 180 GPM. 4) IF 1NV-37A will not close, THEN ensure one of the following valves - CLOSED: __ • 1NV-312A (Chrg Line Cont Isol) OR __ • 1NV-314B (Chrg Line Cont Isol).
__ g. Observe Caution prior to Step 23 and GO TO Step 23.	
21. Depressurize NC System using Pzr PORV as follows:	
__ a. Verify at least one Pzr PORV - AVAILABLE.	a. Establish NV aux spray as follows: __ 1) Ensure at least one NI pump - ON. __ 2) Ensure at least one NV pump - ON. (RNO continued on next page)

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure						

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 38 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

21. (Continued)

3) Ensure the following NV pump miniflow valves - OPEN:
   - __ • 1NV-203A (NV Pumps A&B Recirc Isol)
   - __ • 1NV-202B (NV Pmps A&B Recirc Isol).

4) CLOSE the following valves:
   - __ • 1NI-9A (NV Pmp C/L Inj Isol)
   - __ • 1NI-10B (NV Pmp C/L Inj Isol).

__ 5) THROTTLE 1NV-294 (NV Pmps A&B Disch Flow Ctrl) for 32 GPM charging line flow.

__ 6) CLOSE 1NV-309 (Seal Water Injection Flow).

7) OPEN the following valves:
   - __ • 1NV-312A (Chrg Line Cont Isol)
   - __ • 1NV-314B (Chrg Line Cont Isol).

__ 8) Place 1NV-309 in auto.

__ 9) Maintain charging flow less than 180 GPM.

10) Ensure the following valves - CLOSED:
   - __ • 1NC-27 (Pzr Spray Ctrl Frm Loop A)
   - __ • 1NC-29 (Pzr Spray Ctrl Frm Loop B).

__ 11) THROTTLE 1NV-37A (NV Supply To Pzr Aux Spray) and charging flow as required to maximize spray flow.

(RNO continued on next page)

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 39 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21. (Continued)	
	12) Ensure the following valves - CLOSED: __ • 1NV-39A (NV Supply To Loop D Isol) __ • 1NV-32B (NV Supply To Loop A Isol). __ 13) **RETURN TO** Step 20.d.
__ b. OPEN one Pzr PORV.	b. Perform the following: 1) Align N_2 to Pzr PORVs by opening the following valves: __ • 1NI-438A (Emer N2 From CLA A To 1NC-34A) __ • 1NI-439B (Emer N2 From CLA B To 1NC-32B). 2) OPEN one of the following Pzr PORVs: __ • 1NC-34A (PZR PORV) OR __ • 1NC-32B (PZR PORV)

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CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 40 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21. (Continued)	
c. Do not continue until at least one of the following conditions satisfied: __ • NC subcooling based on core exit T/Cs - LESS THAN 0°F OR __ • Pzr level - GREATER THAN 68% (50% ACC) OR • Both of the following: __ • NC pressure - LESS THAN RUPTURED S/G(s) PRESSURE __ • Pzr level - GREATER THAN 11% (30% ACC).	
__ d. CLOSE Pzr PORV.	__ d. CLOSE Pzr PORV isolation valve.
__ e. CLOSE Pzr spray valves.	e. <u>IF</u> spray valve(s) will not close, <u>THEN</u> perform the following: __ 1) Stop NC pumps 1A and 1B. __ 2) <u>IF</u> both 1C <u>AND</u> 1D NC pumps on, <u>THEN</u> stop one additional pump.

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CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 41 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 22. **Verify NC pressure - INCREASING.**	**Perform the following for Pzr PORV used during depressurization:**

__ a. CLOSE Pzr PORV isolation valve.

b. IF 1NC-32B OR 1NC-34A cannot be closed or isolated, THEN perform the following:

1) Align N_2 to PORVs by opening the following valves:

__ • 1NI-438A (Emer N2 From CLA A To 1NC-34A)

__ • 1NI-439B (Emer N2 From CLA B To 1NC-32B).

__ 2) CLOSE affected Pzr PORV.

c. IF pressure continues to decrease, THEN perform the following:

1) Monitor the following conditions for indication of leakage from Pzr PORV:

__ • PRT pressure

__ • Pzr Relief Valve Temp.

__ 2) GO TO EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

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Event Description:	1B S/G Tube Rupture / CF Isolation Failure / 'B' Train Phase A Failure								

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 42 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
CAUTION **S/I must be terminated when termination criteria are satisfied to prevent overfilling ruptured S/G(s).**	
23. **Verify S/I termination criteria as follows:**	
__ a. NC subcooling based on core exit T/Cs - GREATER THAN 0°F.	__ a. GO TO EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).
b. Verify secondary heat sink as follows: __ • N/R level in at least one intact S/G - GREATER THAN 11% (29% ACC) OR __ • Total feed flow available to S/G(s) - GREATER THAN 450 GPM.	__ b. GO TO EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).
__ c. NC pressure - STABLE OR INCREASING.	__ c. GO TO EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).
__ d. Pzr level - GREATER THAN 11% (30% ACC).	__ d. RETURN TO Step 7.

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CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 43 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24. **Stop S/I pumps as follows:**	
__ a. Stop NI pumps.	a. Isolate S/I flow from NI pump(s) as follows: __ • IF NI Pump 1A failed to trip, THEN CLOSE 1NI-118A (NI Pump 1A C-Leg Inj Isol). __ • IF NI Pump 1B failed to trip, THEN CLOSE 1NI-150B (NI Pump 1B C-Leg Inj Isol).
__ b. Ensure only one NV pump - ON.	

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CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 44 of 97 Revision 43

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25. **Isolate NV S/I flowpath as follows:**	
a. Verify the following valves - OPEN: __ • 1NV-252A (NV Pumps Suct From FWST) __ • 1NV-253B (NV Pumps Suct From FWST).	a. IF NV pump suction aligned to discharge of ND pumps in Cold Leg Recirc, THEN perform the following: __ 1) Align charging with NV miniflow isolated. GO TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 13 (Aligning Charging With NV Miniflow Valves Closed). __ 2) GO TO Step 28.
b. Ensure the following valves - OPEN: __ • 1NV-203A (NV Pumps A&B Recirc Isol) __ • 1NV-202B (NV Pmps A&B Recirc Isol).	b. Perform the following: 1) Dispatch operator to open affected valve(s): __ • 1NV-203A (NV Pumps A&B Recirc Isol) (AB-554, HH-JJ, 54-55, Rm 231) (Ladder needed) __ • 1NV-202B (NV Pmps A&B Recirc Isol) (AB-554, HH-JJ, 54-55, Rm 231) (Ladder needed). __ 2) GO TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 13 (Aligning Charging With NV Miniflow Valves Closed). __ 3) WHEN 1NV-203A AND 1NV-202B are opened, THEN charging flow may be reduced below 80 GPM. __ 4) GO TO Step 28.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

25. (Continued)

c. CLOSE the following valves:

__ • 1NI-9A (NV Pmp C/L Inj Isol)
__ • 1NI-10B (NV Pmp C/L Inj Isol).

Note To Evaluator:

At this point, the crew has terminated S/I. All critical tasks for this scenario are complete. At the discretion of the Lead Evaluator, the scenario may be terminated by having the booth operator place the simulator in FREEZE.

c. IF NV S/I flow exists, THEN perform the following:

1) Dispatch operator to close affected valve(s). REFER TO the following enclosure(s) for affected valve(s):

__ • EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 5 (Locally Close 1NI-9A)

__ • EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 7 (Locally Close 1NI-10B).

2) IF NC pump seal cooling is established from KC flow to thermal barrier, THEN perform the following:

__ a) Ensure all NC pumps - OFF.

__ b) Stop NV Pumps.

__ c) WHEN 1NI-9A AND 1NI-10B are closed, THEN restore NV pump to service. REFER TO Enclosure 4 (NV Pump Restart).

d) Ensure the following valves - OPEN:

__ • 1NI-115A (NI Pump 1A Miniflow Isol)

__ • 1NI-144A (NI Pump 1B Miniflow Isol)

__ • 1NI-147B (NI Miniflow Hdr To FWST Isol).

(RNO continued on next page)

Attachment List

Scenario 3

ATTACHMENT 1 -	Crew Critical Task Summary
ATTACHMENT 2 -	Shift Turnover Information
ATTACHMENT 3 -	AP/1/A/5500/028 Enclosure 1 (Foldout Page)
ATTACHMENT 4 -	AP/1/A/5500/021 Enclosure 1 (Foldout Page)
ATTACHMENT 5 -	AP/1/A/5500/037 Enclosure 1 (Unit 1 Generator Capability Curves)
ATTACHMENT 6 -	AP/1/A/5500/010 Enclosure 1 (Case I S/G Tube Leak Foldout Page)
ATTACHMENT 7 -	AP/1/A/5500/009 Enclosure 1 (Foldout Page)
ATTACHMENT 8 -	EP/1/A/5000/E-0 Enclosure 1 (Foldout Page)
ATTACHMENT 9 -	EP/1/A/5000/E-0 Enclosure 2 (Control Room Ventilation Verification)
ATTACHMENT 10 -	EP/1/A/5000/E-0 Enclosure 4 (NC Temperature Control)
ATTACHMENT 11 -	EP/1/A/5000/G-1 Enclosure 1 (Spent Fuel Pool Monitoring)
ATTACHMENT 12 -	EP/1/A/5000/E-3 Enclosure 1 (Foldout Page)
ATTACHMENT 13 -	OP/1/A/6150/009 Enclosure 4.2 (Boration)

ATTACHMENT 1

CREW CRITICAL TASK SUMMARY			
SAT	**UNSAT**	**CT #**	**CRITICAL TASK**
		1	Isolate feedwater into and steam flow from the ruptured S/G before a transition to ECA-3.1 occurs.
		2	Establish/maintain an RCS temperature so that the transition from E-3 does not occur because the RCS temperature is in either of the following conditions: • Too high to maintain the minimum required subcooling • Below the RCS temperature that causes an extreme (Red Path) or a severe (Orange Path) challenge to the Subcriticality and/or Integrity status tree.
		3	Depressurize RCS to meet S/I termination criteria before water release occurs from the ruptured S/G PORV or safety (prior to S/G N/R level reaching 100% and an associated S/G PORV or Safety Valve open).
		4	Start a KC pump prior to any NCP motor bearing temperature exceeding 195°F.

Comments:

ATTACHMENT 2

SHIFT TURNOVER INFORMATION			
Unit 1 Status			
Power Level	**Power History**	**NCS Boron**	**Xenon**
50 **%**	EOL	256 PPM	per OAC
Controlling Procedure			
• OP/1/A/6100/003 (Controlling Procedure for Unit Operation), Enclosure 4.1 (Power Increase). The steps up through 3.50 are complete.			
Other Information Needed to Assume the Shift			
• Unit 1 is at 50% power at the EOL. Unit 2 is at 100% power. 1A CA Pump is removed from service for PMs. 1A CA Pump has been inoperable for 3 hours and is expected to be returned to service in 6 hours. Direction for the crew is to maintain present plant conditions.			
AOs Available			
Seven AOs are available as listed on the status board			
METEOROLOGICAL CONDITIONS			
• Upper wind direction = 315 degrees, speed = 3 mph • Lower wind direction = 315 degrees, speed = 4.5 mph • Forecast calls for clear skies over the next 24 hours.			

ATTACHMENT 3

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK Enclosure 1 - Page 1 of 2 **Foldout Page**	PAGE NO. 24 of 41 Revision 8

1. **Reactor trip criteria:**

   IF any of the following conditions exist:

   __ • Steam leak endangering personnel or jeopardizing plant equipment

   __ • S/G levels - DECREASING IN AN UNCONTROLLED MANNER

   __ • Tavg 5°F less than T-Ref AND decreasing in an uncontrolled manner

   __ • Reactor power - INCREASING IN AN UNCONTROLLED MANNER

   __ • Secondary condensate inventory - DECREASING IN AN UNCONTROLLED MANNER.

   THEN perform the following:

   __ a. Trip Unit 1 reactor.

   b. CLOSE the following valves:

      __ • All MSIVs

      __ • All MSIV bypass valves.

   __ c. GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).

ATTACHMENT 3

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK Enclosure 1 - Page 2 of 2 **Foldout Page**	PAGE NO. 25 of 41 Revision 8

2. **Uncontrolled cooldown:**

   IF Tavg less than 554°F AND decreasing, THEN perform one of the following:

   - IF reactor power less than 1%, THEN perform the following:

     a. CLOSE the following valves:

     __ • All MSIVs

     __ • All MSIV bypass valves.

     b. IF cooldown continues, THEN perform the following:

     __ 1) Trip Unit 1 reactor.

     __ 2) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).

   - IF reactor power less than 69%, THEN perform the following:

   __ a. Trip Unit 1 turbine.

     b. IF cooldown continues, THEN perform the following:

     __ 1) Trip Unit 1 reactor.

     2) CLOSE the following valves:

     __ • All MSIVs

     __ • All MSIV bypass valves.

     __ 3) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).

   __ c. REFER TO AP/1/A/5500/002 (Turbine Generator Trip).

__ 3. **IF steam leak size increases, THEN RETURN TO C. (Operator Actions), Step 2.**

ATTACHMENT 4

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING Enclosure 1 - Page 1 of 2 **Foldout Page**	PAGE NO. 18 of 35 Revision 42

1. **SSF Manning Criteria:**

CAUTION **Failure to restore NC pump seal cooling via thermal barrier cooling or NV seal injection within ten minutes will cause damage to the NC pump seals resulting in NC System inventory loss.**

IF AT ANY TIME KC AND NV seal cooling for any NC pump is lost, THEN perform the following:

__ a. Dispatch operator to SSF to establish NC pump seal injection. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 19 (Establishing NC Makeup/Seal Injection From The SSF).

b. IF 1EMXS is de-energized, THEN perform the following:

__ 1) Dispatch operator to 1ETA switchgear room to align alternate power supply to 1EMXS. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 20 (Align Alternate Power Supply To 1EMXS).

__ 2) Notify operator at SSF (Ext. 5251 or 5212) an operator has been dispatched to align alternate power supply to 1EMXS.

2. **NC Pump Trip Criteria:**

- IF any of the following NC pump trip criteria is met:

__ • KC flow unavailable to NC pumps - GREATER THAN 10 MINUTES

OR

__ • #1 Seal outlet temperature - GREATER THAN 235°F

OR

__ • Lower bearing temperature - GREATER THAN 225°F

OR

__ • Motor bearing temperature - GREATER THAN 195°F

__ THEN GO TO Enclosure 6 (Rx Trip Sequence).

ATTACHMENT 4

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING Enclosure 1 - Page 2 of 2 **Foldout Page**	PAGE NO. 19 of 35 Revision 42

NOTE The following step prevents damage to the 1B2 KC pump as a result of deadheading. (PIP #00-5862)

3. **IF AT ANY TIME the following conditions are met:**

__ • Train B KC non-essential header isolation valves - CLOSED

AND

__ • 1KC-81B (KC To ND Hx 1B Sup Isol) - CLOSED.

__ **THEN** ensure less than 2 Train B KC pumps - IN SERVICE.

NOTE Monitoring of the following steps must continue while KC malfunction exists even if a transition is made to the emergency procedures.

__ 4. **IF AT ANY TIME both trains of KC are lost, THEN RETURN TO Section C. (Operator Actions), Step 2.**

5. **IF operators are dispatched to align alternate cooling to NV pump 1A, THEN perform the following:**

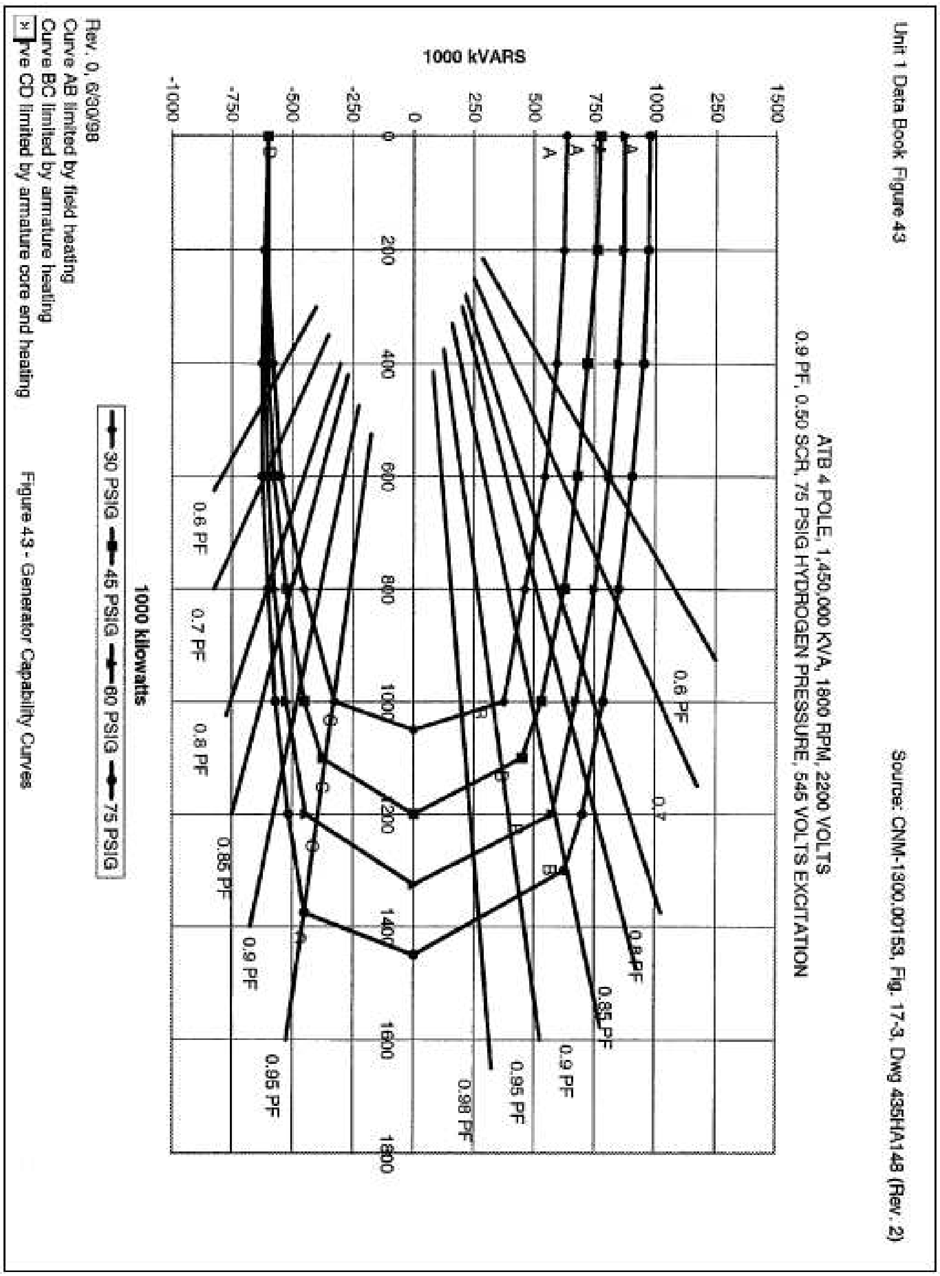
__ a. **WHEN** alternate cooling is aligned, **THEN** perform Enclosure 5 (Maximize NV Pump Run Time), Step 7.

6. **IF AT ANY TIME KC cooling to operating KF pump(s) is lost, THEN perform the following:**

__ • **IF** annunciator 1AD-13, D/6 "KF PUMP A MTR CLR HI TEMP" lit, **THEN** secure 1A KF pump and **REFER TO** AP/1/A/5500/041 (Loss Of Spent Fuel Cooling Or Level).

__ • **IF** annunciator 1AD-13, D/7 "KF PUMP B MTR CLR HI TEMP" lit, **THEN** secure 1B KF pump and **REFER TO** AP/1/A/5500/041 (Loss Of Spent Fuel Cooling Or Level).

ATTACHMENT 5



ATTACHMENT 6

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Enclosure 1 - Page 1 of 1 **Case I Steam Generator Tube Leak Foldout Page**	PAGE NO. 75 of 158 Revision 57

Case I (Steam Generator Tube Leak) Safety Injection Initiation Criteria:

a. IF Pzr level cannot be maintained greater than 4% OR Pzr pressure is decreasing in an uncontrolled manner, THEN perform the following:

1) Trip reactor.

2) WHEN reactor trip verified, THEN initiate S/I.

3) GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).

ATTACHMENT 7

CNS AP/1/A/5500/009	RAPID DOWNPOWER Enclosure 1 - Page 1 of 2 **Foldout Page**	PAGE NO. 29 of 37 Revision 28

1. **Turbine Trip Criteria:**
   - IF T-Avg is less than T-Ref AND decreasing in an uncontrolled manner, THEN:
     a. IF reactor power is greater than or equal to 69%, THEN manually trip reactor.
     b. Ensure turbine - TRIPPED.
     c. IF reactor is tripped, THEN GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).
     d. GO TO AP/1/A/5500/02 (Turbine Generator Trip).
   - IF any turbine trip parameter is reached OR an automatic turbine trip occurs, THEN:
     a. IF reactor power is greater than or equal to 69%, THEN manually trip reactor.
     b. Ensure turbine - TRIPPED.
     c. IF reactor is tripped, THEN GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).
     d. GO TO AP/1/A/5500/02 (Turbine Generator Trip).

2. **Reactor Trip Criteria:**

   IF any of the following conditions exist:
   - NC T-Avg cannot be maintained greater than 551°F.

   OR
   - Both of the following:
     - NC T-Avg is greater than 587°F
     - NC T-Avg is stable or increasing.

   OR
   - Any reactor trip setpoint is exceeded.

   THEN manually trip reactor and GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).

3. **Manual Rod Control Operation Criterion:**
   - IF "C-5 LO TURB IMPULSE PRESS ROD BLOCK" status light (1SI-18) is lit, THEN ensure rod control is in manual.

ATTACHMENT 7

CNS AP/1/A/5500/009	RAPID DOWNPOWER Enclosure 1 - Page 2 of 2 **Foldout Page**	PAGE NO. 30 of 37 Revision 28

4. **IF AT ANY TIME prompt separation from the grid is required AND it is desired to carry in-house loads, THEN GO TO Section C. (Operator Actions), Step 26.**

ATTACHMENT 8

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 1 of 2 **Foldout Page**	PAGE NO. 32 of 47 Revision 42

1. **NC Pump Trip Criteria:**
   - IF the following conditions satisfied, THEN trip all NC pumps while maintaining seal injection flow:
     - Any NV or NI pump - ON
     - NC subcooling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F
     - Reactor power - LESS THAN 5%.
2. **CA Suction Source Switchover Criterion:**
   - IF 1AD-8, B/1 "UST LO LEVEL" lit, THEN REFER TO AP/1/A/5500/006 (Loss of S/G Feedwater).
3. **Position Criteria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol):**
   - IF NC pressure less than 1500 PSIG AND NV S/I flowpath aligned, THEN CLOSE 1NV-202B and 1NV-203A.
   - IF NC pressure greater than 2000 PSIG, THEN OPEN 1NV-202B and 1NV-203A.
4. **Ruptured S/G CA Isolation Criteria:**
   - IF both the following conditions met, THEN stop CA flow to affected S/G:
     - Level increasing in an uncontrolled manner or radiation level in that S/G abnormal
     - N/R level - GREATER THAN 11% (29% ACC).

ATTACHMENT 8

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 2 of 2 **Foldout Page**	PAGE NO. 33 of 47 Revision 42

5. **Faulted S/G CA isolation Criteria:**
   - IF all the following conditions met, THEN stop CA flow to affected S/G:
     - S/G pressure decreasing in an uncontrolled manner or completely depressurized
     - Only one S/G diagnosed as faulted
     - Secondary heat sink criteria met:
       - Total CA flow - GREATER THAN 450 GPM

       OR
       - ANY S/G(s) N/R level - GREATER THAN 11%(29% ACC).

6. **NS Pump Trip Criterion:**
   - IF NS pump in recirc and S/I occurs, THEN perform one of the following:
     - IF train affected ECCS and D/G load sequencer - RESET, THEN stop NS pump.

     OR
     - WHEN sequencer loading complete, THEN perform the following for affected train:
       a. Notify Control Room Supervisor.
       b. Reset ECCS.
       c. Reset D/G load sequencer.
       d. Secure NS pump.
       e. IF AT ANY TIME B/O occurs, THEN restart S/I equipment previously on.

ATTACHMENT 9

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 1 of 7 **Ventilation System Verification**	PAGE NO. 34 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. **Verify proper VC/YC operation as follows:**	
a. Verify one train of the following equipment in operation: __ • YC chiller __ • CR AHU-1 __ • CRA AHU-1 __ • CRA PFT-1.	a. Perform the following: __ 1) Shift operating VC/YC trains. <u>REFER TO</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 17 (Shifting Operating VC/YC Trains). 2) <u>IF</u> no train can be properly aligned, <u>THEN</u> dispatch operator and IAE/Maintenance to restore at least one train of VC/YC. <u>REFER TO</u> the following: __ • OP/0/A/6450/011 (Control Room Area Ventilation/Chilled Water System) __ • EM/0/A/5200/001 (Troubleshooting Cause For Improper Operation of VC/YC System).

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 2 of 7 **Ventilation System Verification**	PAGE NO. 35 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. (Continued)	
b. Verify the following alarms - DARK: __ • 1AD-18, A/8 "UNIT 1 INTAKE HI CHLORINE 1A" __ • 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE 1B" __ • 1AD-18, D/8 "UNIT 2 INTAKE HI CHLORINE 2A" __ • 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE 2B".	b. <u>IF</u> chlorine odor detected in the Control Room, <u>**THEN**</u> perform the following based on the status of given alarms: 1) <u>IF</u> detectors on both unit intakes in alarm, <u>**THEN**</u> perform the following: a) Ensure the following VC intake dampers - CLOSED: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet) __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). __ b) <u>GO TO</u> Step 1.d. 2) <u>IF</u> Unit 1 intake HI chlorine detector(s) in alarm, <u>**THEN**</u> perform the following: a) Ensure the following VC dampers - CLOSED: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet). b) Ensure the following dampers - OPEN: __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). __ c) <u>GO TO</u> Step 1.d. (RNO continued on next page)

ATTACHMENT 9

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 3 of 7 **Ventilation System Verification**	PAGE NO. 36 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. (Continued)	3) IF Unit 2 intake Hi chlorine detector(s) in alarm, **THEN** perform the following: a) Ensure the following VC dampers - CLOSED: __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). b) Ensure the following dampers - OPEN: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet). __ c) GO TO Step 1.d.
c. Ensure the following VC dampers - OPEN: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet) __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). d. Repeat Step 1 of this enclosure until notified by station management as follows: __ • At least once every 8 hours OR __ • Any time VC/YC related annunciators on 1AD-18 actuate.	

ATTACHMENT 9

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 4 of 7 **Ventilation System Verification**	PAGE NO. 37 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. **Ensure proper VA System operation as follows:** • Ensure the following fans - OFF: __ • ABUXF 1A __ • ABUXF 1B. • Ensure VA System filter in service as follows: __ • 1ABF-D-12 & 19 (VA Filter A Bypass Dampers) - CLOSED __ • 1ABF-D-5 & 20 (VA Filter B Bypass Dampers) - CLOSED. • Ensure the following fans - ON: __ • ABFXF-1A __ • ABFXF 1B.	

ATTACHMENT 9

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. **Verify proper VE System operation as follows:**	
__ a. VE fans - ON.	__ a. Start fan(s).
__ b. Annulus pressure - BETWEEN -1.4 IN. WC AND -1.8 IN. WC.	b. Perform the following: 1) <u>IF</u> annulus pressure more positive than -1.4 in. WC, <u>THEN</u> perform the following: a) Verify flow indicated on the following indications: __ • 1VEP5180 (VE 1A Flow To Stack) __ • 1VEP5200 (VE 1B Flow To Stack). b) <u>IF</u> flow not indicated, <u>THEN</u> dispatch operator to verify status of the following dampers based on their local indication or their operating piston rods being extended 4" to 6": __ • 1AVS-D-2 (VE A Trn Recirc Damp) (AB-603, JJ-51, Rm 500) - CLOSED __ • 1AVS-D-7 (VE B Trn Recirc Damp) (AB-603, HH-52, Rm 500) - CLOSED __ • 1AVS-D-3 (VE A Trn Exh Damp) (AB-603, JJ-52, Rm 500) - OPEN __ • 1AVS-D-8 (VE B Trn Exh Damp) (AB-603, HH-52, Rm 500) - OPEN. (RNO continued on next page)

ATTACHMENT 9

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 6 of 7 **Ventilation System Verification**	PAGE NO. 39 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. (Continued)	
	__ c) Consult plant engineering staff and notify IAE/Maintenance to troubleshoot and repair. REFER TO EM/1/A/5200/002 (Troubleshooting Cause For VE System Hi/Lo Pressure).
	__ d) GO TO Step 3.c.
	2) IF annulus pressure more negative than -1.8 in. WC, THEN perform the following:
	__ a) Determine which VE train indicates highest discharge flow to stack.
	__ b) Within 2 hours, ensure VE train that indicates highest discharge flow to stack secured.
	__ c) Consult plant engineering staff and notify IAE/Maintenance to troubleshoot and repair. REFER TO EM/1/A/5200/002 (Troubleshooting Cause For VE System Hi/Lo Pressure).
__ c. Repeat Step 3.b every 30 minutes until notified by station management.	

ATTACHMENT 9

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 7 of 7 **Ventilation System Verification**	PAGE NO. 40 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 4. **Record time ventilation systems verified on following table:**

TIME	SYSTEM (VC, VE)	INITIALS

ATTACHMENT 10

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 1 of 5 NC Temperature Control	PAGE NO. 42 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. **Verify any NC pump - ON.**	**Perform the following:** a. Use NC T-Colds to determine NC temperature as required in subsequent steps. b. GO TO Step 4.
2. **Use NC T-Avg to determine NC temperature as required in subsequent steps.**	
3. **IF AT ANY TIME all NC pumps tripped, THEN use NC T-Colds to determine NC temperature as required in subsequent steps.**	
4. **Verify one of the following:** • NC temperature - STABLE AT LESS THAN OR EQUAL TO 557°F OR • NC temperature - TRENDING TO 557°F.	**GO TO Step 8.**
5. **Continue to monitor NC temperature.**	
6. **Notify Control Room Supervisor of NC temperature control status.**	

ATTACHMENT 10

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 2 of 5 **NC Temperature Control**	PAGE NO. 43 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

7. **Do not continue in this enclosure until one of the following occurs:**

   - NC temperature - GREATER THAN 557°F AND INCREASING IN AN UNCONTROLLED MANNER

   OR

   - NC temperature - GREATER THAN 557°F AND STABLE

   OR

   - NC temperature - LESS THAN 557°F AND DECREASING IN AN UNCONTROLLED MANNER.

ATTACHMENT 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. **Verify NC temperature - LESS THAN 557°F AND DECREASING.**	**Perform the following:** a. IF NC temperature greater than 557°F AND increasing, THEN stabilize NC temperature at 557°F as follows: 1) IF steam dumps available, THEN use steam dumps. 2) IF steam dumps not available, THEN use S/G PORVs. b. IF the following conditions exist: • NC temperature greater than 557°F and stable • Time and manpower available, THEN stabilize NC temperature at 557°F as follows: 1) IF steam dumps available, THEN use steam dumps. 2) IF steam dumps not available, THEN use S/G PORVs. c. GO TO Step 10.
9. **Attempt to stop the NC cooldown as follows:**	
a. Ensure all steam dumps - CLOSED.	
b. Ensure all S/G PORVs - CLOSED.	b. IF any S/G PORV cannot be closed, THEN CLOSE its isolation valve.
c. Ensure S/G blowdown isolated.	

ATTACHMENT 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
d. CLOSE the following valves: • 1SM-77A (S/G 1A Otlt Hdr Bldwn C/V) • 1SM-76B (S/G 1B Otlt Hdr Bldwn C/V) • 1SM-75A (S/G 1C Otlt Hdr Bldwn C/V) • 1SM-74B (S/G 1D Otlt Hdr Bldwn C/V).	
e. Verify MSR Second Stage steam supply valves - CLOSED • 1HM-1 (MSRH 1A&1B SSRH Stm Source) • 1HM-2 (MSRH 1C&1D SSRH Stm Source).	e. Perform the following: 1) CLOSE MSR Second Stage steam supply valve(s). 2) <u>IF</u> steam flowpath cannot be isolated from Control Room, <u>THEN</u> CLOSE the following valves: • All MSIVs • All MSIV bypass valves.
f. Depress and hold "S/V BEFORE SEAT DRN" "CLOSE" pushbutton (1MC-3) to close the following valves: • 1SM-41 (Stop Vlv #1 Before Seat Drn) • 1SM-44 (Stop Vlv #2 Before Seat Drn) • 1SM-43 (Stop Vlv #3 Before Seat Drn) • 1SM-42 (Stop Vlv #4 Before Seat Drn).	

ATTACHMENT 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
g. Verify NC cooldown - STOPPED.	g. <u>IF</u> cooldown continues, <u>THEN</u> THROTTLE feed flow as follows: 1) <u>IF</u> S/G N/R level less than 11% (29% ACC) in all S/G's, <u>THEN</u> THROTTLE feed flow to achieve the following: • Minimize cooldown • Maintain total feed flow greater than 450 GPM. 2) <u>WHEN</u> N/R level greater than 11% (29% ACC) in any S/G, <u>THEN</u> THROTTLE feed flow further to achieve the following: • Minimize cooldown • Maintain at least one S/G N/R level greater than 11% (29% ACC). 3) <u>IF</u> cooldown continues, <u>THEN</u> CLOSE the following valves: • All MSIVs • All MSIV bypass valves.
10. **Continue to perform actions of this enclosure as required to ensure one of the following:** • NC temperature - STABLE AT LESS THAN OR EQUAL TO 557°F. OR • NC temperature - TRENDING TO 557°F.	
11. **Notify Control Room Supervisor of NC temperature control status.**	

ATTACHMENT 11

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 1 - Page 1 of 8 **Unit 1 Spent Fuel Pool Monitoring**	PAGE NO. 3 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. **Review the following considerations for Spent Fuel Pool monitoring:**	
__ • Control Room temperature indication 1KFP5130 is a non-safety instrument loop. Guidance is provided for local temperature verification if access to Spent Fuel Pool available.	
__ • Normal level indication 1KFP5120 is a non-safety instrument loop powered from 1RPA. Guidance is provided for local temperature verification if access to Spent Fuel Pool available.	
__ • If a loss of all AC Power is anticipated to last greater than 6 hrs, portable Spent Fuel Pool level and temperature instrumentation can be installed if access to Spent Fuel Pool available.	
__ • Seismic event may cause loss of Spent Fuel Pool inventory due to "splashing" of water.	
2. **Monitor Unit 1 KF pump motor cooling as follows:**	
a. Verify the following:	__ a. Ensure affected Unit 1 KF pump(s) - OFF.
__ • KF PUMP A MTR CLR HI TEMP (1AD-13 D/6) - DARK. __ • KF PUMP B MTR CLR HI TEMP (1AD-13 D/7) - DARK.	
__ b. **<u>IF AT ANY TIME</u>** KF PUMP MTR CLR HI TEMP annunciator(s) lit, **<u>THEN</u>** perform Step 2.a.	
__ 3. **<u>IF AT ANY TIME</u> Spent Fuel Pool level <u>AND</u> temperature indications unavailable in Control Room, <u>THEN</u> dispatch operator to monitor Unit 1 Spent Fuel Pool. <u>GO TO</u> Enclosure 24 (Local Spent Fuel Pool Monitoring).**	

ATTACHMENT 11

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE Steps 4 and 5 may be performed concurrently.	
4. **Monitor Unit 1 Spent Fuel Pool level as follows:**	
__ a. Verify Spent Fuel Pool level indication in Control Room - AVAILABLE.	__ a. **GO TO** Step 4.e.
__ b. Verify Spent Fuel Pool level greater than - 39 ft.	b. Notify Control Room Supervisor of the following: __ 1) Unit 1 Spent Fuel Pool level. __ 2) **REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).
__ c. Record Unit 1 Spent Fuel Pool level in the following table:	

Time	Unit 1 SFP Level	Time	Unit 1 SFP Level	Time	Unit 1 SFP Level

__ d. **GO TO** Step 5 .

ATTACHMENT 11

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 1 - Page 3 of 8 **Unit 1 Spent Fuel Pool Monitoring**	PAGE NO. 5 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
e. Determine Spent Fuel Pool level as follows:	
__ 1) Dispatch operator and RP to determine if Unit 1 Spent Fuel Pool area accessible.	
2) **WHEN** Unit 1 Spent Fuel Pool area accessibility determined, **THEN** perform the following:	
__ a) Verify Unit 1 Spent Fuel Pool area - ACCESSIBLE.	a) Notify Station Management to perform the following: __ (1) Evaluate alternate method to monitor Unit 1 Spent Fuel Pool level. __ (2) **IF AT ANY TIME** Unit 1 level estimated less than - 39 ft, **THEN REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level). __ (3) **GO TO** Step 5.
b) Notify dispatched operator to perform the following: (1) Determine Spent Fuel Pool level using the following reference points: __ • Top of skimmer trough is 40 Ft __ • 1 Ft below lip of skimmer trough is 39 Ft __ • Centerline of KF pump suction strainer is 37.5 Ft. __ (2) Report level determination to Control Room.	

ATTACHMENT 11

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 1 - Page 4 of 8 **Unit 1 Spent Fuel Pool Monitoring**	PAGE NO. 6 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
c) **WHEN** operator reports level, **THEN** perform the following:	
__ (1) Verify level greater than -39 ft.	(1) Notify Control Room Supervisor of the following: __ 1. Unit 1 Spent Fuel Pool level. __ 2. **REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).
__ (2) Record Unit 1 Spent Fuel Pool level in the following table:	

Time	Unit 1 SFP Level	Time	Unit 1 SFP Level	Time	Unit 1 SFP Level

ATTACHMENT 11

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 1 - Page 5 of 8 **Unit 1 Spent Fuel Pool Monitoring**	PAGE NO. 7 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. **Monitor Unit 1 Spent Fuel Pool temperature as follows:**	
__ a. Verify Spent Fuel Pool temperature indication in Control Room - AVAILABLE.	__ a. **GO TO** Step 5.e.
__ b. Verify Spent Fuel Pool temperature less than - 125°F.	b. Notify Control Room Supervisor of the following: __ 1) Unit 1 Spent Fuel Pool temperature. __ 2) **REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).
__ c. Record Unit 1 Spent Fuel Pool temperature in the following table:	

Time	Unit 1 SFP Temp	Time	Unit 1 SFP Temp	Time	Unit 1 SFP Temp

__ d. **GO TO** Step 6.

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 1 - Page 6 of 8 **Unit 1 Spent Fuel Pool Monitoring**	PAGE NO. 8 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. (Continued)	
e. Determine Spent Fuel Pool temperature as follows:	
__ 1) Verify access to Unit 1 Spent Fuel Pool area previously determined.	1) Perform the following: __ a) Dispatch operator and RP to determine if Unit 1 Spent Fuel Pool area accessible. __ b) **WHEN** Unit 1 Spent Fuel Pool area accessibility determined, **THEN** perform Steps 5.e.2 through 5.e.4. __ c) **GO TO** Step 6.
__ 2) Verify Unit 1 Spent Fuel Pool area - ACCESSIBLE.	2) Notify station management to perform the following: __ a) Evaluate alternate method to monitor Unit 1 Spent Fuel Pool temperature. __ b) **IF AT ANY TIME** Unit 1 temperature estimated greater than - 125°F, **THEN REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level). __ c) **GO TO** Step 6.
3) Notify dispatched operator to determine Unit 1 Spent Fuel Pool temperature as follows: __ a) Obtain infrared thermometer from OSC "Emergency Supply Cabinet". __ b) Scan Spent Fuel Pool surface for highest reading. __ c) Report temperature determination to Control Room.	

ATTACHMENT 11

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. (Continued)	
4) **WHEN** operator reports temperature, **THEN** perform the following:	
__ a) Verify Spent Fuel Pool temperature - LESS THAN 125°F.	a) Notify Control Room Supervisor of the following: __ (1) Unit 1 Spent Fuel Pool temperature. __ (2) **REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).
__ b) Record Unit 1 Spent Fuel Pool temperature in the following table:	

Time	Unit 1 SFP Temp	Time	Unit 1 SFP Temp	Time	Unit 1 SFP Temp

__ 6. **Notify Control Room Supervisor of Unit 1 Spent Fuel Pool level and temperature.**

ATTACHMENT 11

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 1 - Page 8 of 8 **Unit 1 Spent Fuel Pool Monitoring**	PAGE NO. 10 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 7. **Verify AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level) - IMPLEMENTED.**	**IF AT ANY TIME Unit 1 Spent Fuel Pool cooling NOT established prior to reaching either of the following conditions, THEN notify Control Room Supervisor, REFER TO AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level):** __ • Unit 1 Spent Fuel Pool greater than - 125°F. __ • Unit 1 Spent Fuel Pool level less than - 39 ft.
__ 8. **Repeat this enclosure every 2 hours until notified by station management.**	

ATTACHMENT 12

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE Enclosure 1 - Page 1 of 2 **Foldout Page**	PAGE NO. 71 of 97 Revision 43

1. **NC Pump Trip Criteria:**

   - IF the following conditions satisfied, THEN trip all NC pumps while maintaining seal injection flow:

   __ • Any NV or NI pump - ON

   __ • NC subcooling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F.

2. **Position Criteria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol):**

   __ • IF NC pressure less than 1500 PSIG AND NV S/I flowpath aligned, THEN CLOSE 1NV-202B and 1NV-203A.

   __ • IF NC pressure greater than 2000 PSIG, THEN OPEN 1NV-202B and 1NV-203A.

3. **S/I Reinitiation Criteria:**

   - IF NC subcooling based on core exit T/Cs less than 0°F OR Pzr level cannot be maintained greater than 11% (30% ACC), THEN perform the following:

     a. Perform the following as necessary to maintain subcooling greater than 0°F and Pzr level greater than 11% (30% ACC) as follows:

     __ • Start one or more S/I pumps

     __ • Align NV S/I flow path. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 14 (NV Alignment To S/I Mode).

   __ b. IF S/I reinitiation occurs after Section C. (Operator Actions), Step 24, THEN GO TO EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

4. **Secondary Integrity Criteria:**

   __ • IF any unisolated S/G pressure decreasing in an uncontrolled manner OR has completely depressurized, THEN GO TO EP/1/A/5000/E-2 (Faulted Steam Generator Isolation) unless needed for NC System cooldown.

5. **Cold Leg Recirc Switchover Criterion:**

   __ • IF FWST level decreases to 20% (1AD-9, D/8 "FWST 2/4 LO LEVEL"), THEN GO TO EP/1/A/5000/ES-1.3 (Transfer To Cold Leg Recirculation).

ATTACHMENT 12

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE Enclosure 1 - Page 2 of 2 **Foldout Page**	PAGE NO. 72 of 97 Revision 43

6. **CA Suction Source Switchover Criterion:**

__ • IF 1AD-8, B/1 "UST LO LEVEL" lit, THEN REFER TO AP/1/A/5500/006 (Loss of S/G Feedwater).

7. **Multiple Tube Rupture Criteria:**

• IF level in any intact S/G increases in an uncontrolled manner OR any intact S/G indicates abnormal radiation, THEN perform the following:

__ a. Stop any operator controlled cooldown and depressurization in progress.

__ b. RETURN TO EP/1/A/5000/E-3 (Steam Generator Tube Rupture), Step 1.

ATTACHMENT 13

1. Limits and Precautions

1.1 This procedure is Reactivity Management related because it controls activities that can affect core reactivity by changing boron concentration. (R.M.)

1.2 The following Limits and Precautions are Reactivity Management related: (R.M.)

1.2.1 If the boron concentration is being increased in the NC System, at least one NC pump or one ND pump shall be in operation, recirculating the NC System.

1.2.2 If the unit has operated continuously for several months, significant Boron 10 depletion may have occurred. The effective boron concentration of the NC System may be lower than indicated by Chemistry samples.

1.3 Maintaining VCT pressure as low as practical during large makeups will minimize gas absorption. VCT pressure can be reduced by diverting letdown or by VCT purge.

2. Initial Conditions

BB 2.1 **IF** in Mode 1, 2 or 3, ensure R2 reactivity management controls established AD-OP-ALL-0203 (Reactivity Management). (R.M.)

BB 2.2 Verify the NV System is in operation per OP/1/A/6200/001 (Chemical and Volume Control System).

BB 2.3 Verify sufficient RHT volume is available to receive the reactor coolant displaced during the planned boration operation.

3. Procedure

NOTE:	This enclosure will affect reactivity of the core and is therefore designated important to Reactivity Management per the guidelines of AD-OP-ALL-0203 (Reactivity Management). (R.M.)

BB 3.1 Ensure valves are aligned per Enclosure 4.8 (Valve Checklist).

3.2 Ensure the following valve control switches in "AUTO":

_____ • 1NV-238A (B/A To Blender Ctrl Vlv)

_____ • 1NV-186A (B/A Blender Otlt To VCT Otlt)

_____ 3.3 Ensure 1NV-238A (B/A Xfer Pmp To Blender Ctrl) controller in auto.

_____ 3.4 Ensure at least one boric acid transfer pump is in "AUTO" or "ON".

☐ 3.5 Record the desired volume of boric acid to be added. _________ gallons

_____ 3.6 Adjust the boric acid counter to the desired volume of boric acid to be added. (R.M.)

_____ 3.7 **IF** the blender is set up for automatic makeup per Enclosure 4.1 (Automatic Makeup), record the setpoint of the controller for 1NV-238A (B/A Xfer Pmp To Blender Ctrl). _______gpm

_____ 3.8 Place the "NC MAKEUP MODE SELECT" switch in "BORATE".

NOTE:	Boric Acid flow rates > 32 gpm may result in a boric acid flow deviation annunciator.

_____ 3.9 **IF** required, adjust the controller for 1NV-238A (B/A Xfer Pmp To Blender Ctrl) to the desired flow.

_____ 3.10 **IF** NC System boron concentration will be changed by ≥ 50 ppm, initiate PZR spray to equalize the boron concentration throughout the system by operating backup heaters per OP/0/A/6200/055 (Miscellaneous Component Operation).

_____ 3.11 **IF AT ANY TIME** it is desired to divert letdown to the RHT manually operate 1NV-172A (3-Way Divert To VCT-RHT) as follows:

_____ 3.11.1 Place the control switch for 1NV-172A (3-Way Divert To VCT-RHT) to the "RHT" position.

_____ 3.11.2 Ensure VCT level is monitored continuously while diverting to the RHT.

NOTE:	Procedure may continue while performing the following step.

3.11.3 **WHEN** desired VCT level is reached return 1NV-172A (3-Way Divert To VCT-RHT) to auto as follows:

_____ 3.11.3.1 Place the control switch for 1NV-172A (3-Way Divert To VCT-RHT) in the "VCT" position.

_____ 3.11.3.2 Place the control switch for 1NV-172A (3-Way Divert To VCT-RHT) in the "AUTO" position.

_____ 3.12 **IF AT ANY TIME** during the makeup it becomes necessary to change the makeup flow rate, adjust the setpoint for 1NV-238A (B/A Xfer Pmp To Blender Ctrl) as necessary to achieve the desired flow.

ATTACHMENT 13

_____ 3.13 **IF AT ANY TIME** while boration is in progress it becomes necessary **OR** it is desired to stop the boration, perform the following:

_____ 3.13.1 Place the "NC MAKEUP CONTROL" switch to the "STOP" position.

3.13.2 Ensure the following valves close: (R.M.)

- _____ 1NV-238A (B/A To Blender Ctrl Vlv)
- _____ 1NV-186A (B/A Blender Otlt To VCT Otlt)

☐ 3.13.3 Record boric acid volume added as indicated on the Boric Acid counter.
____________ gallons

3.13.4 **WHEN** conditions allow resuming the boration, perform the following:

☐ 3.13.4.1 Determine remaining volume to be added by subtracting the amount previously added (Step 3.13.3) from the desired volume to be added (Step 3.5).

__________ - __________ = ___________ gallons
(Step 3.5) (Step 3.13.3)

_____ 3.13.4.2 Adjust boric acid counter to the volume of boric acid determined in Step 3.13.4.1. (R.M.)

_____ 3.13.4.3 Place the "NC MAKEUP CONTROL" switch in the "START" position. (R.M.)

_____ 3.13.4.4 Verify the following:

☐ 1NV-238A (B/A To Blender Ctrl Vlv) modulates to establish desired flow
☐ 1NV-186A (B/A Blender Otlt To VCT Otlt) opens

_____ 3.13.4.5 **IF** in "AUTO", verify the boric acid pump starts.

_____ 3.14 **WHILE** makeup is in progress, monitor the following for expected results:

☐ Control rod motion
☐ NC System Tavg
☐ Reactor Power

ATTACHMENT 13

NOTE:	If a small makeup is being performed, placekeeping for Steps 3.15 through 3.18 may be performed after Step 3.19 is performed.

_____ 3.15 Place the "NC MAKEUP CONTROL" switch to the "START" position. (R.M.)

_____ 3.16 Verify the following:

- ☐ 1NV-238A (B/A To Blender Ctrl Vlv) modulates to establish desired flow
- ☐ 1NV-186A (B/A Blender Otlt To VCT Otlt) opens

_____ 3.17 **IF** in "AUTO", verify the boric acid transfer pump starts.

☐ 3.18 Verify proper flow by observing the Boric Acid Counter. {PIP 96-0137}

NOTE:	The boric acid counter may count up 1 - 5 gallons after termination.

3.19 **WHEN** the desired volume of boric acid is reached on the boric acid counter, ensure the following valves close: (R.M.)

- _____ 1NV-238A (B/A To Blender Ctrl Vlv)
- _____ 1NV-186A (B/A Blender Otlt To VCT Otlt)

ATTACHMENT 13

NOTE:	If additional borations will be performed over the course of the shift, flushing the makeup line is **NOT** recommended.

N/A 3.20 **IF** desired, flush the makeup line as follows:

☐ 3.20.1 Record the setpoint on 1NV-242A (RMWST To B/A Blender Ctrl): ___________gpm

_____ 3.20.2 Place controller for 1NV-242A (RMWST To B/A Blender Ctrl) in manual.

_____ 3.20.3 Increase demand on controller for 1NV-242A (RMWST To B/A Blender Ctrl) to full open.

3.20.4 Open the following valves:

_____ • 1NV-242A (RMWST To B/A Blender Ctrl)

_____ • 1NV-186A (B/A Blender Otlt To VCT Otlt)

3.20.5 Align reactor makeup water pump(s) as follows:

_____ 3.20.5.1 **IF** Unit 1 RMWST is **NOT** aligned to supply Unit 2 per OP/2/A/6200/012 (Reactor Makeup Water), ensure at least one reactor makeup water pump is in "ON".

_____ 3.20.5.2 **IF** Unit 1 RMWST is aligned to supply Unit 2 per OP/2/A/6200/012 (Reactor Makeup Water) **AND** a Unit 1 RMW Pump is **NOT** running to support Unit 2 activities, ensure at least one reactor makeup water pump is in "ON".

_____ 3.20.5.3 **IF** Unit 1 RMWST is aligned to supply Unit 2 per OP/2/A/6200/012 (Reactor Makeup Water) **AND** a Unit 1 RMW Pump is running to support Unit 2 activities, ensure the second Unit 1 reactor makeup water pump is in "ON".

3.20.6 **WHEN** ~ 20 gallons of makeup water have been flushed through the makeup line, close the following valves:

_____ 3.20.6.1 1NV-242A (RMWST To B/A Blender Ctrl)

_____ 3.20.6.2 1NV-186A (B/A Blender Otlt To VCT Otlt)

3.20.7 Place the following valve control switches in "AUTO":

_____ • 1NV-242A (RMWST To B/A Blender Ctrl)

_____ • 1NV-186A (B/A Blender Otlt To VCT Otlt)

ATTACHMENT 13

_____ 3.20.8 Ensure controller for 1NV-242A (RMWST To B/A Blender Ctrl) is set to the value recorded in Step 3.20.1. (R.M.)

_____ 3.20.9 Place controller for 1NV-242A (RMWST To B/A Blender Ctrl) in auto.

_____ 3.20.10 **IF NOT** required for current plant operation, place the reactor makeup water pump started in Step 3.20.5 in "AUTO".

_____ 3.21 **IF** automatic makeup is desired, perform one of the following:

_____ 3.21.1 **IF** it is desired to change the blender outlet boron concentration, refer to Enclosure 4.1 (Automatic Makeup).

OR

_____ 3.21.2 **IF** makeup at the previous concentration is acceptable **AND** the system was previously aligned per Enclosure 4.1 (Automatic Makeup), perform the following:

_____ 3.21.2.1 Ensure the controller for 1NV-238A (B/A Xfer Pmp To Blender Ctrl) is set to the value recorded in Step 3.7. (R.M.)

_____ 3.21.2.2 Place the "NC MAKEUP MODE SELECT" switch in "AUTO".

_____ 3.21.2.3 Place the "NC MAKEUP CONTROL" switch to the "START" position. (R.M.)

_____ 3.22 **IF** initiated in Step 3.10, terminate PZR spray by securing backup heaters per OP/0/A/6200/055 (Miscellaneous Component Operation).

3.23 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

2017 INITIAL LICENSE NRC EXAM
SCENARIO # 4

Facility:	Catawba NRC Exam 2017	Scenario No.: 4	Op Test No.: 2017301
Examiners:		Operators:	SRO
			RO
			BOP

Initial Conditions: Unit 1 is at $7x10^{-2}$ % power at the BOL. Unit 2 is at 100% power.

Turnover: Unit 1 is at $7x10^{-2}$ % power at the BOL. Unit 2 is at 100% power. 1A Condensate Booster Pump is tagged out for emergent motor replacement. Direction for the crew is to swap operating RN pumps by starting the 1B RN pump and securing the 1A RN pump per OP/0/A/6400/006 C (Nuclear Service Water System) Enclosure 4.7 (Starting/Securing Additional RN Pumps). Initial conditions have been verified. Chemistry has been notified of the RN pump lineup being changed and has informed operations that RN Chemical Addition system has been aligned to support the RN pump swap. The Unit 1 Cation Bed Demineralizer is not in service. Unit 2 Mixed bed demineralizers have been bypassed per step 3.2.2. Crew is to begin at step 3.2.1 of Enclosure 4.7. Following the RN pump swap, the crew is to withdraw control rods to increase reactor power to ~14 % in preparation for placing the Main Turbine online.

Event No.	Malf. No.	Event Type*	Event Description
1		N – BOP N – SRO	Swap RN pumps
2		R – RO	Increase reactor power
3	ENB008B	C – RO C – SRO TS - SRO	N36 Loss of Fission Chamber (Affects N32)
4A	RL015	C – BOP C – SRO	‘C’ RL Pump Trip
4B	SG004	TS-SRO	1A S/G N/R Level Channel 2 Fails High
5	WL017D	C – BOP C – SRO	1A NCDT Pump trip
6	NCP003C	C – RO C - SRO	1C NC Pump High/High Vibration
7	EP003E EQB005A EQB006A	M – ALL	Loss of All AC Power
8	EQB005A EQB006A	C – RO	D/G Load Sequencers Fail To Actuate
9	RN003A RN003B RN003C RN003D	C – BOP C - SRO	RN Pump fails to start on power restoration

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Scenario 4 – Summary

Initial Condition
Unit 1 is at $7x10^{-2}$ % power at the BOL. Unit 2 is at 100% power.

Turnover:
Unit 1 is at $7x10^{-2}$ % power at the BOL. Unit 2 is at 100% power. 1A Condensate Booster Pump is tagged out for emergent motor replacement. Direction for the crew is to swap operating RN pumps by starting the 1B RN pump and securing the 1A RN pump per OP/0/A/6400/006 C (Nuclear Service Water System) Enclosure 4.7 (Starting/Securing Additional RN Pumps). Initial conditions have been verified. Chemistry has been notified of the RN pump lineup being changed and has informed operations that RN Chemical Addition system has been aligned to support the RN pump swap. The Unit 1 Cation Bed Demineralizer is not in service. Unit 2 Mixed bed demineralizers have been bypassed per step 3.2.2. Crew is to begin at step 3.2.1 of Enclosure 4.7. Following the RN pump swap, the crew is to withdraw control rods to increase reactor power to ~14 % in preparation for placing the Main Turbine online.

Event 1
BOP will perform OP/0/A/6400/006 C Enclosure 4.7 to swap operating RN pumps.

Event 2
The RO will withdraw control rods to establish a positive startup rate to increase reactor power.

Event 3
A loss of fission chamber will occur affecting both Intermediate Range channel N36 and Source Range channel N32. Crew will enter AP/1/A/5500/016 (Malfunction of Nuclear Instrumentation). SRO will address Tech Specs.

Verifiable Action – The RO will insert control rods to stabilize reactor power. The BOP will remove N32 and N36 from service.

Event 4A
'C' Low Pressure Service Water (RL) pump will trip. Crew will enter AP/0/A/5500/038 (Loss of Conventional Low Pressure Service Water).

Verifiable Action – BOP will start 'A' or 'B' RL pump.

Event 4B
Five (5) minutes following the 'C' RL pump trip, 1A S/G N/R Level Channel 2 will fail High. SRO will address Tech Specs.

Event 5
1A NCDT pump will trip. Crew will use the Annunciator Response for 1AD-13 B/2 annunciator (NCDT Recirc Lo Flow) to start 1B NCDT pump.

Verifiable Action – BOP starts 1B NCDT pump.

Event 6
1C NC pump will have a high vibration develop. The crew will use the Annunciator Response for 1AD-6 B/5 annunciator (NCP Hi-Hi Vibration) to determine that a reactor trip is required, and once reactor power is < 5%, that 1C NC pump should be secured.

Verifiable Action – RO will trip Unit 1 reactor.

Event 7
Once the reactor is tripped, a Loss of All AC power will occur on Unit 1.

Verifiable Action – RO will manually control S/G levels and the BOP will initiate S/I on both trains to start the D/Gs.

Event 8
Both trains D/G Load sequencers will fail to actuate. This will cause CAPT #1 to not receive a signal to start.

Verifiable Action – RO will manually start CAPT #1 to maintain S/G levels.

Event 9
Once S/I is initiated on both trains, the RN pumps will fail to start automatically.

Verifiable Action – BOP will reset ECCS and D/G load sequencers on both trains and start RN pumps as required.

***Critical Task 1* – Initiate Safety Injection (S/I) on both trains to start the Unit 1 Diesel Generators by the completion of EP/1/A/5000/ECA-0.0 Step 8.**

***Critical Task 2* – Manually start Nuclear Service Water (RN) pumps such that the EDG does not fail because of damage caused by engine overheating. (Reference Simulator Work Request # DSG-044 for the simulator programming for this critical task)**

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5–8)	6
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	4
4. Major transients (1–2)	1
5. EOPs entered/requiring substantive actions (1–2)	1
6. EOP contingencies requiring substantive actions (0–2)	1
7. Critical tasks (2–3)	2

EXERCISE GUIDE WORKSHEET

1. INITIAL CONDITIONS:

   1.1 Reset to IC # 159 and load schedule file for Scenario 4.

START TIME:__________

✓	✓	Trigger	Instructor Action	Final	Delay	Ramp	Delete In	Event
		3	MAL-ENB008B (I/R N36 LOSS OF FISSION CHAMBER (AFFECTS N32))	ACTIVE				3
		4	LOA-RL015 (RACKOUT RL PUMP C)	RACK-OUT				4
		4	XMT-SG004 (LCF_5510 S/G 1A N/R LVL CH2 TO DCS/MCB/OAC (CFAA5510))	100	5:00			4
		5	OVR-WL017D (NCDT PMP 1A OFF PB)	ON				5
		5	OVR-WL017A (NCDT PMP 1A OFF LT)	OFF				5
		6	MAL-NCP003C (NCP C VIBRATION)	25		:15		6
		7	MAL-EP003E (ZONE 1A and 1B LOCKOUT)	ACTIVE				7
		7	MAL-EQB006A (TRN B BLACKOUT SEQUENCER BLOCK)	ACTIVE				7
		7	MAL-EQB005A (TRN A BLACKOUT SEQUENCER BLOCK)	ACTIVE				7
		7	OVR-DG014D (D/G 1A PB (11/212) OFF PB)	ON				7
		7	OVR-DG016D (D/G 1B PB (11/407) OFF PB)	ON				7
		7	MAL-RN003A (RN PMP 1A FAILURE TO STRT)	AUTO				9
		7	MAL-RN003B (RN PMP 1B FAILURE TO STRT)	AUTO				9
		7	MAL-RN003C (RN PMP 2A FAILURE TO STRT)	AUTO				9
		7	MAL-RN003D (RN PMP 2B FAILURE TO STRT)	AUTO				9
		11	OVR-DG014D (D/G 1A PB (11/212) OFF PB)	OFF				

<table>
<tr><td></td><td></td><td>12</td><td>OVR-DG016D (D/G 1B PB (11/407) OFF PB)</td><td>OFF</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>ANN-AD11-B03 (TRANSFORMER A TROUBLE)</td><td>ON</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>ANN-AD11-E03 (TRANSFORMER B TROUBLE)</td><td>ON</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>LOA-CM039 (RACKOUT CBP 1A)</td><td>RACK-OUT</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>14</td><td>LOA-VI011 (EMERGENCY DIESEL VI & ISOL VLV)</td><td>ON</td><td>10:00</td><td></td><td></td><td></td></tr>
<tr><td colspan="9"></td></tr>
<tr><td></td><td></td><td colspan="7">Ensure EVENT 7 = jpplp4(1) | jpplp4(2) (Reactor Trip Either Train)</td></tr>
<tr><td></td><td></td><td colspan="7">Ensure EVENT 11 = jpplsia</td></tr>
<tr><td></td><td></td><td colspan="7">Ensure EVENT 12 = jpplsib</td></tr>
<tr><td></td><td></td><td colspan="7">Ensure Red Collar is placed on 1A Condensate Booster Pump</td></tr>
</table>

2. SIMULATOR BRIEFING

   2.1 Control Room Assignments:

Position	Name
CRS	
RO	
BOP	

   2.2 Give a copy of Attachment 2 (Shift Turnover Information) to the CRS.

3. EXERCISE PRESENTATION

   3.1 Familiarization Period

      A. Allow examinees time to familiarize themselves with the Control Board alignments.

   3.2 **Scenario EVENT 1**, Swap Operating RN pumps

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Primary Chemistry notifying of intention to bypass Unit 1 demineralizers while changing RN Pump configuration, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Radiation Protection notifying of intention to bypass Unit 1 demineralizers while changing RN Pump configuration, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as the AO at the RN pump house for post start check of 1B RN pump, **REPORT** "1B RN Pump looks good for continued operation."

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Primary Chemistry notifying that Unit 1 demineralizers have been restored to service, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Radiation Protection notifying that Unit 1 demineralizers have been restored to service, **REPEAT** the information.

   3.3 **Scenario EVENT 2**, Withdrawing Control Rods To Increase Reactor Power

   3.4 **Scenario EVENT 3**, N36 Loss of Fission Chamber (Affects N32)

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 3** to cause a loss of fission chamber to N36 and N32.

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for loss of fission chamber, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Reactor Engineering informing of loss of fission chamber, **REPEAT** the information.

3.5 **Scenario EVENTs 4A & 4B**, 'C' RL Pump Trip / 1A S/G N/R Level Channel 2 Fails High

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 4** to cause a trip of the 'C' RL Pump.

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for 'C' RL Pump, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for 1A S/G N/R Level Channel 2, **REPEAT** the information.

3.6 **Scenario EVENT 5**, 1A NCDT Pump Trip

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 5** to cause a trip of the 1A NCDT Pump.

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for 1A NCDT Pump, **REPEAT** the information.

3.7 **Scenario EVENT 6**, 1C NC Pump High/High Vibration

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 6** to cause a High/High Vibration on 1C NC Pump.

3.8 **Scenario EVENTS 7, 8, & 9**, Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I

✓	BOOTH INSTRUCTOR ACTION
	If contacted as an AO dispatched to perform G-1 Enclosures 19 and 20, **REPEAT** the information and pull up and run schedule file **Schedule/Operations/ECA-0.0 EMXS - SSF DG – SSF pump.sch**
	After 5 minutes, contact the control room and **REPORT** "G-1 Enclosures 19 & 20 are complete. The standby makeup pump is in service."

✓	BOOTH INSTRUCTOR ACTION
	If contacted as an AO and dispatched to place the backup diesel VI compressor in service, **REPEAT** the information and **INSERT SIMULATOR** **Trigger 14** to start the backup diesel VI compressor and tie it to the VI header.
	After 10 minutes, contact the control room and **REPORT** "Backup Diesel VI Compressor #1 has been started and is tied to the VI header."

Op Test No.:	301	Scenario #	4	Event #	1	Page	10 of 118
Event Description:	Swap Operating RN (Nuclear Service Water) pumps						

Enclosure 4.7
Starting/Securing Additional RN Pumps

OP/0/A/6400/006 C
Page 1 of 7

1. Limits and Precautions

1.1 This procedure is Reactivity Management related because it controls activities that can affect core reactivity by changing boron concentration. (R.M.)

1.2 Starting or stopping RN Pumps can affect KC system temperature which in turn can affect letdown temperature resulting in changes in letdown boron concentration if the demineralizers are in service. (R.M.)

1.3 After manual operation, maintenance or packing adjustment of any safety related valve, it shall be cycled electrically to insure reliable automatic operation.

1.4 RN Pump minimum flow is 8600 gpm for continuous operation. Flow rates between 8600 gpm and 4000 gpm are allowable for up to 2 hours in a 10 hour period. It is preferred to maintain RN flow ≥10,000 gpm.

1.5 The following sequence is recommended to relieve a RN Pump low flow condition:

1.5.1 Secure excess RN Pump(s).

1.5.2 Initiate manual RN Strainer backwash on non-affected RN Pump(s).

1.5.3 Establish flow through the RN Crossover Flush Header.

1.5.4 Establish flow through NS Heat Exchanger(s).

1.6 Maximum RN flow for one pump is 25,800 gpm. During pump manipulations max flow rate may be exceeded and low pressure conditions occur when reducing operating pumps while the RN system stabilizes. Stabilization is expected to occur within 10 minutes of the manipulation.

1.7 When securing one of two operating RN Pumps, RN high flow alarm may be momentarily received if total RN flow is greater than 32,000 gpm. A total flow greater than 37,000 gpm may result in momentarily exceeding of the 25,800 gpm maximum allowable flow.

1.8 Before contact with raw water or exposure to a raw water mist or spray, refer to AD-HS-ALL-0101 (Nuclear Health and Safety Handbook) for guidance and requirements on personal protective equipment, respiratory protection, personal hygiene and the posting of areas.

1.9 Starting an RN Pump while its associated D/G is paralleled to the grid may result in an overcurrent trip of the D/G breaker. {PIP 99-1648}

1.10 Additions from RN Chemical Addition to the RN System must be secured at least 30 minutes before any section of RN piping that is to be drained to the WZ sump in the Auxiliary Building is isolated.

1.11 If RN is aligned to Lake Wylie and lake level is ≤ 562.0 ft, the possibility exists that running both RN pumps in either pit will result in an automatic swap to the SNSWP.

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Event Description:	Swap Operating RN (Nuclear Service Water) pumps						

Enclosure 4.7
Starting/Securing Additional RN Pumps

OP/0/A/6400/006 C
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2. Initial Conditions

BB 2.1 Verify the RN System is in operation per Enclosure 4.1 (RN System Startup).

BB 2.2 Ensure appropriate Reactivity Management controls established per AD-OP-ALL-0203 (Reactivity Management). (R.M.)

3. Procedure

NOTE:
- If RN pumps are being swapped between trains, the RN Chemical Addition system may need to be secured or swapped as necessary.
- For operation with 2 RN Pumps in service, it is preferable to run 2 pumps in the same pit barring any other equipment issues or limitations. This provides more accurate chemical addition to the pit, helping to ensure chlorine concentrations remain below material compatability limitations for the RN System.

3.1 Perform the following:

NOTE: The time allowed for the next two steps may take up to an hour as there may be a minimum of 30 minutes of RN flow required after RN chemical addition has been secured, if required.

BB 3.1.1 Notify Chemistry that RN pump lineup is being changed. Chemistry will determine the need to change the operation of the RN Chemical Addition system.
Person notified Tony Story

NOTE: If plant conditions warrant immediate action, Step 3.1.2 may be completed later. A CR shall be written to describe actions taken.

BB 3.1.2 Chemistry has notified OPS that the RN Chemical Addition system is aligned to support pump manipulations and time requirements met.
Person contacted Tony Story

Op Test No.:	301	Scenario #	4	Event #	1	Page	12	of	118
Event Description:	Swap Operating RN (Nuclear Service Water) pumps								

Enclosure 4.7
Starting/Securing Additional RN Pumps

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3.2 Align Letdown demineralizers as follows:

NOTE:	Steps 3.2.1 and 3.2.2 may be performed in any order or concurrently.

_____ 3.2.1 **IF** normal letdown is in service on Unit 1 per OP/1/A/6200/001 (Chemical and Volume Control System), perform the following:

BB 3.2.1.1 Verify the Cation Bed Demineralizer is **NOT** in service per OP/1/A/6200/001 (Chemical and Volume Control System).

_____ 3.2.1.2 Record position of 1NV-153A (Letdn Hx Otlt 3-Way Vlv).
Recorded valve position _______________

_____ 3.2.1.3 **IF** letdown flow is through the demineralizers, notify Primary Chemistry that the demineralizers will be bypassed while changing RN Pump configuration.
Person notified _______________

_____ 3.2.1.4 **IF** letdown flow is through the demineralizers, notify Radiation Protection that the demineralizers will be bypassed while changing RN Pump configuration.
Person notified _______________

_____ 3.2.1.5 Place 1NV-153A (Letdn Hx Otlt 3-Way Vlv) in the "VCT" position.

BB 3.2.2 **IF** normal letdown is in service on Unit 2 per OP/2/A/6200/001 (Chemical and Volume Control System), perform the following:

BB 3.2.2.1 Verify the Cation Bed Demineralizer is **NOT** in service per OP/2/A/6200/001 (Chemical and Volume Control System).

BB 3.2.2.2 Record position of 2NV-153A (Letdn Hx Otlt 3-Way Vlv).
Recorded valve position Auto / Demin

BB 3.2.2.3 **IF** letdown flow is through the demineralizers, notify Primary Chemistry that the demineralizers will be bypassed while changing RN Pump configuration.
Person notified Greg Lancaster

BB 3.2.2.4 **IF** letdown flow is through the demineralizers, notify Radiation Protection that the demineralizers will be bypassed while changing RN Pump configuration.
Person notified Gary Beale

BB 3.2.2.5 Place 2NV-153A (Letdn Hx Otlt 3-Way Vlv) in the "VCT" position.

Op Test No.:	301	Scenario #	4	Event #	1	Page	13	of	118
Event Description:	Swap Operating RN (Nuclear Service Water) pumps								

Enclosure 4.7
Starting/Securing Additional RN Pumps

OP/0/A/6400/006 C
Page 4 of 7

_____ 3.3 **IF** starting RN pumps, perform the following:

_____ 3.3.1 Evaluate in-service and available flow paths to ensure that no component flow rate limits are exceeded and RN Pump miniflow requirements will be met.

3.3.2 Start the desired RN pump:

- _____ RN Pump 1A
- _____ RN Pump 1B
- _____ RN Pump 2A
- _____ RN Pump 2B

_____ 3.3.3 Verify the appropriate pump discharge valve opens:

- ☐ 1RN-28A (RN Pump 1A Disch Isol)
- ☐ 1RN-38B (RN Pump 1B Disch Isol)
- ☐ 2RN-28A (RN Pump 2A Disch Isol)
- ☐ 2RN-38B (RN Pump 2B Disch Isol)

_____ 3.3.4 Verify the appropriate pump motor cooler inlet isolation opens:

- ☐ 1RN-11A (RN Pmp 1A Mtr Clr Inlet Isol) (indication on Monitor Light Panel 1MD-4 F/5, or on OAC graphic RNPUMPS, or OAC Point C1Q1397 (1RN11A RN Pump 1A Mtr Cooler Inlet Isol))
- ☐ 1RN-20B (RN Pmp 1B Mtr Clr Inlet Isol) (indication on Monitor Light Panel 1MD-4 F/8, or on OAC graphic RNPUMPS, or OAC Point C1Q1395 (1RN20B RN Pump 1B Mtr Cooler Sup Isol))
- ☐ 2RN-11A (RN Pmp 2A Mtr Clr Isol) (indication on Monitor Light Panel 2MD-4 F/5, or on OAC graphic RNPUMPS, or OAC Point C2Q1397 (2RN11A RN Pump 2A Mtr Cooler Inlet Isol))
- ☐ 2RN-20B (RN Pmp 2B Mtr Clr Isol) (indication on Monitor Light Panel 2MD-4 F/8, or on OAC graphic RNPUMPS, or OAC Point C2Q1395 (2RN20B RN Pump 2B Mtr Cooler Sup Isol))

N/A 3.3.5 **IF** RN Pump 2A was started, perform the following: {PIP 94-1591}

_____ 3.3.5.1 Open equalizing valve for 2RNPG7440 (2A RN Pump Motor Cooler Outlet Flow) (RNB 605).

_____ 3.3.5.2 **AFTER** 5 minutes, close equalizing valve for 2RNPG7440 (2A RN Pump Motor Cooler Outlet Flow) (RNB 605).

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Event Description:	Swap Operating RN (Nuclear Service Water) pumps								

Enclosure 4.7
Starting/Securing Additional RN Pumps

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N/A 3.3.6 **IF** RN Pump 2B was started, perform the following: {PIP 94-1591}

_____ 3.3.6.1 Open equalizing valve for 2RNPG7410 (2B RN Pump Motor Cooler Outlet Flow) (RNB 605).

_____ 3.3.6.2 **AFTER** 5 minutes, close equalizing valve for 2RNPG7410 (2B RN Pump Motor Cooler Outlet Flow) (RNB 605).

NOTE: When RN Essential Header temperature is ≥ 80°F, two RN Pumps are normally in service to ensure continuous flow through KC Hxs selected to "MINIFLOW".

_____ 3.4 **IF** securing RN pumps, perform the following:

NOTE: To secure all RN pumps, refer to Enclosure 4.2 (Shutdown of the RN System).

3.4.1 Shutdown the desired RN pump:

- _____ RN Pump 1A
- _____ RN Pump 1B
- _____ RN Pump 2A
- _____ RN Pump 2B

_____ 3.4.2 Verify the appropriate pump discharge valve closes:

- ☐ 1RN-28A (RN Pump 1A Disch Isol)
- ☐ 1RN-38B (RN Pump 1B Disch Isol)
- ☐ 2RN-28A (RN Pump 2A Disch Isol)
- ☐ 2RN-38B (RN Pump 2B Disch Isol)

_____ 3.4.3 Verify the appropriate pump motor cooler inlet isolation closes:

- ☐ 1RN-11A (RN Pmp 1A Mtr Clr Inlet Isol) (indication on OAC graphic RNPUMPS, or OAC Point C1Q1397 (1RN11A RN Pump 1A Mtr Cooler Inlet Isol))
- ☐ 1RN-20B (RN Pmp 1B Mtr Clr Inlet Isol) (indication on OAC graphic RNPUMPS, or OAC Point C1Q1395 (1RN20B RN Pump 1B Mtr Cooler Sup Isol))
- ☐ 2RN-11A (RN Pmp 2A Mtr Clr Isol) (indication on OAC graphic RNPUMPS, or OAC Point C2Q1397 (2RN11A RN Pump 2A Mtr Cooler Inlet Isol))
- ☐ 2RN-20B (RN Pmp 2B Mtr Clr Isol) (indication on OAC graphic RNPUMPS, or OAC Point C2Q1395 (2RN20B RN Pump 2B Mtr Cooler Sup Isol))

Op Test No.:	301	Scenario #	4	Event #	1	Page	15 of 118
Event Description:	Swap Operating RN (Nuclear Service Water) pumps						

Enclosure 4.7
Starting/Securing Additional RN Pumps

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3.5 Align Letdown demineralizers as follows:

NOTE:	Steps 3.5.1 and 3.5.2 may be performed in any order or concurrently.

_____ 3.5.1 **IF** normal letdown is in service on Unit 1 per OP/1/A/6200/001 (Chemical and Volume Control System), **WHEN** KC temperature has stabilized perform the following:

_____ 3.5.1.1 **IF** 1NV-153A (Letdn Hx Otlt 3-Way Vlv) position was recorded as "DEMIN" in Step 3.2.1.2 **AND** no other reason exists for it to remain in the "VCT" position, return it to "AUTO" as follows:

_____ A. Place 1NV-153A in the "DEMIN" position. (R.M.)

☐ B. Verify 1NV-153A returns to "AUTO".

_____ 3.5.1.2 **IF** letdown flow is through the demineralizers, notify Primary Chemistry that the demineralizers have been restored to service.
Person notified ______________________

_____ 3.5.1.3 **IF** letdown flow is through the demineralizers, notify Radiation Protection that the demineralizers have been restored to service.
Person notified ______________________

_____ 3.5.2 **IF** normal letdown is in service on Unit 2 per OP/2/A/6200/001 (Chemical and Volume Control System), **WHEN** KC temperature has stabilized perform the following:

_____ 3.5.2.1 **IF** 2NV-153A (Letdn Hx Otlt 3-Way Vlv) position was recorded as "DEMIN" in Step 3.2.2.2 **AND** no other reason exists for it to remain in the "VCT" position, return it to "AUTO" as follows:

_____ A. Place 2NV-153A in the "DEMIN" position. (R.M.)

☐ B. Verify 2NV-153A returns to "AUTO".

_____ 3.5.2.2 **IF** letdown flow is through the demineralizers, notify Primary Chemistry that the demineralizers have been restored to service.
Person notified ______________________

_____ 3.5.2.3 **IF** letdown flow is through the demineralizers, notify Radiation Protection that the demineralizers have been restored to service.
Person notified ______________________

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Event Description:	Swap Operating RN (Nuclear Service Water) pumps						

Enclosure 4.7
Starting/Securing Additional RN Pumps

OP/0/A/6400/006 C
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_____ 3.6 Document the running RN Pump(s) below:

☐ RN Pump 1A
☐ RN Pump 1B
☐ RN Pump 2A
☐ RN Pump 2B

3.7 File this enclosure in the Control Copy folder of this procedure.

Note To Evaluator:

This concludes Event 1. Event 2 has the control room crew withdrawing control rods to establish a positive startup rate to increase reactor power to approximately 14 % in preparation for placing the Main Turbine online. The steps for withdrawing control rods are included starting on the next page.

n

Op Test No.:	301	Scenario #	4	Event #	2	Page	17	of	118
Event Description:	Withdraw Control Rods To Increase Reactor Power to ~14%								

Enclosure 4.4
Rod Withdrawal

OP/1/A/6150/008
Page 1 of 7

1. Limits and Precautions

1.1 This procedure is Reactivity Management related because it controls activities that can affect core reactivity by changing control rod position. (R.M.)

1.2 The following Limits and Precautions are Reactivity Management related: (R.M.)

1.2.1 Criticality shall be anticipated anytime control rods are being withdrawn.

1.2.2 When rods are being moved, observe "RODS IN/RODS OUT" light for proper direction.

1.2.3 When rods are being moved, observe the demand position and actual (digital) position to verify proper operation of the Rod Control System.

1.2.4 Adjusting T-Avg ± 1°F of T-Ref before transferring rod control to "AUTO" will prevent undesired rod movement.

1.2.5 Severe reactor power tilts (in excess of Tech Spec limits) may result from a dropped rod and its recovery. The Reactor Group Engineer may restrict reactor power to ≤ 50% RTP per T. S. 3.2.4.

1.2.6 Do **NOT** attempt to achieve criticality during dropped rod retrieval.

1.2.7 Monitor startup rate continuously during any rod motion to ensure < 0.5 DPM stable startup rate.

1.3 Automatic rod control shall **NOT** be used when less than 15% (184 MW_e) turbine power.

1.4 Individual control bank positions on "CRD BANK SELECT" switch shall not be used to position rods manually. (The automatic overlap feature is disabled.)

1.5 Two or more control rod drive ventilation fans shall be in operation when either reactor coolant temperature is ≥ 350°F or control rod drive mechanisms are energized.

1.6 After releasing Rod Motion lever, waiting 2 seconds before attempting to move rods again will allow all signals to clear the firing cards.

1.7 Prior to operation of CRDMs, NC System must be filled and vented with NC System pressure > 300 psig.

1.8 If the Rod Control System is capable of rod withdrawal with the Unit in Mode 3, then at least three RCS loops shall be in operation. Refer to TS 3.4.5.

1.9 A rod motion demand below zero steps may result in the movable grippers **NOT** properly engaging the drive shaft.

1.10 Automatic Rod withdrawal is blocked when Control Rod Bank D is ≥ 200 steps withdrawn.

1.11 Failure to pause at each bank position with the "CRD BANK SELECT" switch may result in dropping rods.

Op Test No.:	301	Scenario #	4	Event #	2	Page	18 of 118
Event Description:	Withdraw Control Rods To Increase Reactor Power to ~14%						

Enclosure 4.4
Rod Withdrawal

OP/1/A/6150/008
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2. Initial Conditions

<u>BB</u> 2.1 Verify Unit Startup is in progress per OP/1/A/6100/001 (Controlling Procedure for Unit Startup) or Unit Fast Recovery in progress per OP/1/A/6100/005 (Unit Fast Recovery).

NOTE:	The following LED lights can indicate a fault or power supply swap that must be addressed prior to rod withdrawal. CNS-2013-03999

<u>BB</u> 2.2 <u>**IF**</u> this is the initial rod withdrawal, complete Enclosure 4.17 (Circuit Cards LED Status Lights Verification) to verify the following:

- Fault status lights are extinguished.
- Firing Circuit Card power supply LEDs (4 per card) for cards A1, A2, D1, D2 and G1 are lit.

3. Procedure

NOTE:	• This enclosure will affect reactivity of the core and is therefore designated important to Reactivity Management per the guidelines of AD-OP-ALL-0203 (Reactivity Management). (R.M.) • The SDM boron concentration at 400°F is always greater than the critical boron concentration at 212°F.

<u>N/A</u> 3.1 <u>**IF**</u> < P-11 <u>**AND**</u> cycle burnup (C1P1457) > 350 EFPD, prior to withdrawing shutdown banks, verify K-eff will remain < 0.99 with shutdown banks withdrawn for one of the following: {PIP 04-6307}

☐ <u>**IF**</u> NC temperature ≥ 400°F, verify SDM per OP/0/A/6100/006 (Reactivity Balance Calculation) using 400°F.

☐ <u>**IF**</u> NC temperature < 400°F, verify SDM per OP/0/A/6100/006 (Reactivity Balance Calculation) using current NC temperature.

<u>BB</u> 3.2 <u>**IF**</u> > P-11 <u>**OR**</u> cycle burnup (C1P1457) ≤ 350 EFPD, prior to withdrawing shutdown banks, verify K-eff will remain < 0.99 with shutdown banks withdrawn. Refer to OP/0/A/6100/006 (Reactivity Balance Calculation).

Op Test No.:	301	Scenario #	4	Event #	2	Page	19 of 118
Event Description:	Withdraw Control Rods To Increase Reactor Power to ~14%						

Enclosure 4.4 OP/1/A/6150/008

Rod Withdrawal Page 3 of 7

NOTE: If in Mode 4 or shutdown banks are being withdrawn for trippable rod worth, withdraw only shutdown banks A and B. {PIP 97-0693}

3.3 Withdraw shutdown banks in accordance with OP/1/A/6100/001 (Controlling Procedure for Unit Startup) or OP/1/A/6100/005 (Unit Fast Recovery) as follows:

BB 3.3.1 Dispatch operator to Rod Control Power Cabinets to verify selected banks "GRP SELECT" lights illuminate per Enclosure 4.13 (Rod Control Power Cabinet GRP Select Lights).

BB 3.3.2 **IF NOT** fully withdrawn, withdraw Shutdown Bank A as follows:

CAUTION: Failure to pause at each bank position with the "CRD BANK SELECT" switch may result in dropping rods.

BB 3.3.2.1 Place "CRD BANK SELECT" in the "SBA" position on 1MC1.

BB 3.3.2.2 Verify that "GRP SELECT" light "C" illuminates on Rod Control Cabinets 1AC and 2AC per Enclosure 4.13 (Rod Control Power Cabinet GRP Select Lights).

BB 3.3.2.3 **WHILE** moving rods in the following step, verify proper rod movement by the following indications:

- Proper "RODS IN/RODS OUT" direction light
- Proper step demand counter movement
- DRPI indication
- Reactor power changes
- T-Avg changes.

BB 3.3.2.4 Using the "IN-OUT" switch, withdraw shutdown bank rods to position specified by COLR (T.S. 3.1.5). (R.M.)

BB 3.3.2.5 Observe "S/D BANK A GROUP 1" and "S/D BANK A GROUP 2" counters indicate withdrawal steps within one step of each other.

BB 3.3.2.6 Verify that the shutdown bank mechanisms are moving on the DRPI display.

Op Test No.:	301	Scenario #	4	Event #	2	Page	20 of 118
Event Description:	Withdraw Control Rods To Increase Reactor Power to ~14%						

Enclosure 4.4 OP/1/A/6150/008
Rod Withdrawal Page 4 of 7

BB 3.3.3 **IF NOT** fully withdrawn, withdraw Shutdown Bank B as follows:

BB 3.3.3.1 Place "CRD BANK SELECT" in the "SBB" position on 1MC1.

BB 3.3.3.2 Verify that the selected banks "GRP SELECT" light "C" illuminates on Rod Control Cabinets 1BD and 2BD per Enclosure 4.13 (Rod Control Power Cabinet GRP Select Lights).

BB 3.3.3.3 **WHILE** moving rods in the following step, verify proper rod movement by the following indications:

- Proper "RODS IN/RODS OUT" direction light
- Proper step demand counter movement
- DRPI indication
- Reactor power changes
- T-Avg changes.

BB 3.3.3.4 Using the "IN-OUT" switch, withdraw shutdown bank rods to position specified by COLR (T.S. 3.1.5). (R.M.)

BB 3.3.3.5 Observe "S/D BANK B GROUP 1" and "S/D BANK B GROUP 2" counters indicate withdrawal steps within one step of each other.

BB 3.3.3.6 Verify that the shutdown bank mechanisms are moving on the DRPI display.

N/A 3.3.4 **IF** shutdown banks A and B have been withdrawn for trippable rod worth only, then proceed to Step 3.12.

BB 3.3.5 Withdraw Shutdown Bank C as follows:

BB 3.3.5.1 Place "CRD BANK SELECT" in the "SBC" position on 1MC1.

BB 3.3.5.2 Verify that the selected banks "GRP SELECT" light "A" illuminates on Rod Control Cabinet SCDE per Enclosure 4.13 (Rod Control Power Cabinet GRP Select Lights).

BB 3.3.5.3 **WHILE** moving rods in the following step, verify proper rod movement by the following indications:

- Proper "RODS IN/RODS OUT" direction light
- Proper step demand counter movement
- DRPI indication
- Reactor power changes
- T-Avg changes.

BB 3.3.5.4 Using the "IN-OUT" switch, withdraw shutdown bank rods to position specified by COLR (T.S. 3.1.5). (R.M.)

BB 3.3.5.5 Verify that the shutdown bank mechanisms are moving on the DRPI display.

Op Test No.:	301	Scenario #	4	Event #	2	Page	21 of 118
Event Description:	Withdraw Control Rods To Increase Reactor Power to ~14%						

Enclosure 4.4
Rod Withdrawal

OP/1/A/6150/008
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BB 3.3.6 Withdraw Shutdown Bank D as follows:

BB 3.3.6.1 Place "CRD BANK SELECT" in the "SBD" position on 1MC1.

BB 3.3.6.2 Verify that the selected banks "GRP SELECT" light "B" illuminates on Rod Control Cabinet SCDE per Enclosure 4.13 (Rod Control Power Cabinet GRP Select Lights).

BB 3.3.6.3 **WHILE** moving rods in the following step, verify proper rod movement by the following indications:

- Proper "RODS IN/RODS OUT" direction light
- Proper step demand counter movement
- DRPI indication
- Reactor power changes
- T-Avg changes.

BB 3.3.6.4 Using the "IN-OUT" switch, withdraw shutdown bank rods to position specified by COLR (T.S. 3.1.5). (R.M.)

BB 3.3.6.5 Verify that the shutdown bank mechanisms are moving on the DRPI display.

BB 3.3.7 Withdraw Shutdown Bank E as follows:

BB 3.3.7.1 Place "CRD BANK SELECT" in the "SBE" position on 1MC1.

BB 3.3.7.2 Verify that the selected banks "GRP SELECT" light "C" illuminates on Rod Control Cabinet SCDE per Enclosure 4.13 (Rod Control Power Cabinet GRP Select Lights).

BB 3.3.7.3 **WHILE** moving rods in the following step, verify proper rod movement by the following indications:

- Proper "RODS IN/RODS OUT" direction light
- Proper step demand counter movement
- DRPI indication
- Reactor power changes
- T-Avg changes.

BB 3.3.7.4 Using the "IN-OUT" switch, withdraw shutdown bank rods to position specified by COLR (T.S. 3.1.5). (R.M.)

BB 3.3.7.5 Verify that the shutdown bank mechanisms are moving on the DRPI display.

Op Test No.:	301	Scenario #	4	Event #	2	Page	22	of	118
Event Description:	Withdraw Control Rods To Increase Reactor Power to ~14%								

Enclosure 4.4
Rod Withdrawal

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NOTE:	If the A206 circuit card "ALM" light is lit , there is the possibility that the wrong bank may move.

BB 3.4 Verify the "ALM" LED on circuit card A206 in the left side of 1ERCC0006 (Rod Control Logic Cabinet) is **NOT** illuminated.

CAUTION:	Failure to pause at each bank position with the "CRD BANK SELECT" switch may result in dropping rods.

BB 3.5 Place the "CRD BANK SELECT " switch in the "MAN" position.

____ 3.6 **WHILE** moving rods in the following Step, verify proper rod movement by the following indications:

- Proper "RODS IN/RODS OUT" direction light
- Proper step demand counter movement
- DRPI indication
- Reactor power changes
- T-Avg changes.

____ 3.7 **IF AT ANY TIME** during Unit Startup a rod has dropped on an approach to criticality, or a dropped rod results in a return to subcriticality from a critical condition, perform one of the following: (R.M.)

____ 3.7.1 **IF** the malfunction is in the Control banks, reinsert ONLY the Control banks.

____ 3.7.2 **IF** the malfunction is in the Shutdown banks, reinsert Control and Shutdown banks

____ 3.8 **IF AT ANY TIME** a stable startup rate of > 1.0 DPM is achieved during rod motion, manually trip the reactor. (R.M.)

____ 3.9 Withdraw control banks to achieve criticality as directed by OP/1/A/6100/001 (Controlling Procedure for Unit Startup) or OP/1/A/6100/005 (Unit Fast Recovery). (R.M.)

NOTE:	Per SOER 07-01 (Reactivity Management) it is recommended that Plant Operators monitor multiple indications such as Thermal Power Best Estimate, Nuclear Instrumentation, Steam Pressure. ΔT's, CF Flowrate, and Turbine Load when making at power reactivity changes. (R.M.)

____ 3.10 For power operation, ensure control rods maintain their proper insertion limits by use of curves on Unit One Reactor Operating Data Book.

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Event Description:	Withdraw Control Rods To Increase Reactor Power to ~14%						

Enclosure 4.4 OP/1/A/6150/008

Rod Withdrawal Page 7 of 7

3.11 **WHEN** greater than 15% Impulse pressure (1SI-18.9-01 "C5 LO TURB IMPULSE PRESS ROD BLOCK" status light cleared), perform the following:

_____ 3.11.1 Adjust T-Avg within ± 1°F of T-Ref (rod motion demand signal meters shall be used for comparison). (R.M.)

_____ 3.11.2 Place "CRD BANK SELECT" switch in "AUTO". (R.M.)

_____ 3.12 Verify the following:

- ☐ OAC and control board demand indication for all shutdown and control rod banks agree within ± 1 step. (Control Rod Position Information, RODS)
- ☐ OAC and control board DRPI indication for each shutdown and control rod agrees within ± 1 step. (Control Rod Position Information, RODS)
- ☐ Rod position indication system and demand position indication system shall agree on rod position within ± 12 steps.

3.13 File this enclosure in the Control Copy folder of this procedure.

Note To Evaluator:

Once the crew has withdrawn control rods and established a positive startup rate to increase reactor power, Event 2 is complete. At the discretion of the Lead Evaluator, the scenario may continue by having the booth operator INSERT Trigger 3 for Event 3 (N36 Loss of Fission Chamber (Also Affects N32)).

Op Test No.:	301	Scenario #	4	Event #	3	Page	24	of	118
Event Description:	N36 Loss of Fission Chamber (Also Affects N32)								

Control Room Indications
Flux level on N36 and N32 decrease

Op Test No.:	301	Scenario #	4	Event #	3	Page	25 of 118
Event Description:	N36 Loss of Fission Chamber (Also Affects N32)						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
1. **Verify at least one of the following S/R Channels - OPERABLE:** __ • N-31 OR __ • N-32.	**Perform the following:** a. IF in Mode 2 below P-6, THEN perform the following: __ 1) Manually trip reactor. __ 2) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection). b. IF in Mode, 3, 4, or 5 AND the following conditions exist: __ • Reactor Trip Breakers - CLOSED __ • Rod control system capable of rod withdrawal. THEN perform the following: __ 1) Manually trip reactor. __ 2) IF any control rods were withdrawn AND Pzr Pressure greater than 1955 PSIG, THEN GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection). __ 3) IF any control rods were withdrawn AND Pzr Pressure less than 1955 PSIG, THEN REFER TO AP/1/A/5500/005 (Reactor Trip or Inadvertent S/I Below P-11). __ c. GO TO Step 5.
__ 2. **Verify unit - IN MODE 2 BELOW P-6.**	__ **GO TO Step 5.**

Note To Evaluator:

The failure of a fission chamber will affect both Intermediate Range detector N36 and Source Range detector N32. This will require performing both Case I and Case III of AP/16. The crew can start with either Case and it will direct them to the other Case once the instrument is removed from service.

Op Test No.:	301	Scenario #	4	Event #	3	Page	26 of 118
Event Description:	N36 Loss of Fission Chamber (Also Affects N32)						

CNS AP/1/A/5500/016	MALFUNCTION OF NUCLEAR INSTRUMENTATION SYSTEM Case I Source Range Malfunctions	PAGE NO. 3 of 15 Revision 27

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE Limited boron concentration changes associated with NC inventory control or limited plant temperature changes are allowed.	
__ 3. **Stop operations involving positive reactivity additions.**	
__ 4. **GO TO Step 7.**	
__ 5. **Verify unit - IN MODE 6.**	__ **GO TO Step 7.**
NOTE BDMS (Gamma Metrics) automatic actuations and alarm not required for operability during refueling operations.	
6. **Verify at least two of the following neutron flux monitors - OPERABLE:** __ • N-31 __ • N-32 __ • A Train BDMS __ • B Train BDMS.	**Perform the following:** a. Notify fuel handling operators to perform the following: __ 1) Place components being handled in a safe position. __ 2) Suspend Core Alterations. __ b. Suspend operations that would cause introduction of coolant into the NC system with boron concentration less than limit specified in the COLR. __ c. IF no neutron flux monitors operable, THEN immediately initiate actions to restore one neutron flux monitor to operable status.

Op Test No.:	301	Scenario #	4	Event #	3	Page	27 of 118
Event Description:	N36 Loss of Fission Chamber (Also Affects N32)						

CNS AP/1/A/5500/016	MALFUNCTION OF NUCLEAR INSTRUMENTATION SYSTEM Case I Source Range Malfunctions	PAGE NO. 4 of 15 Revision 27

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **Identify the affected S/R channel(s):** __ • N31 OR __ • N32.	
8. **Verify the following alarms - DARK:** __ • 1AD-2, D/3 "S/R HI FLUX LEVEL AT SHUTDOWN" __ • 1AD-2, D/4 "S/R HI FLUX LEVEL AT SHUTDOWN".	**Perform the following:** __ a. Depress "OFF" for the containment evacuation alarm. __ b. Notify plant personnel to disregard the containment evacuation alarm.
<u>NOTE</u> 1AD-2, C/4 "N/I SYS S/R & I/R TRIP BYPASS" will actuate in the following step.	
__ 9. **At the affected S/R drawer, place the "LEVEL TRIP" switch for the affected channel in "BYPASS".**	
__ 10. **Verify the affected S/R channel trip bypass status light (1SI-19) - LIT.**	__ **Notify OSM that due to loss of control power S/R "LEVEL TRIP" cannot be bypassed. Reactor power reduction below P-6 S/R BLOCK PERMISSIVE will result in Reactor Trip due to "N/I HI FLUX SR RX TRIP".**
__ 11. **Verify 1AD-2, C/4 "N/I SYS S/R & I/R TRIP BYPASS" - LIT.**	

Op Test No.:	301	Scenario #	4	Event #	3	Page	28 of 118
Event Description:	N36 Loss of Fission Chamber (Also Affects N32)						

CNS AP/1/A/5500/016	MALFUNCTION OF NUCLEAR INSTRUMENTATION SYSTEM Case I Source Range Malfunctions	PAGE NO. 5 of 15 Revision 27

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE Annunciator 1AD-2 D/2 "S/R HI SHUTDOWN FLUX ALM BLOCKED" is disabled above P-10 (10% reactor power).

12. **Block the high flux at shutdown function as follows:**

__ a. At the affected S/R drawer, ensure the "HIGH FLUX AT SHUTDOWN" switch for the affected channel in "BLOCK".

__ b. Verify 1AD-2, D/2 "S/R HI SHUTDOWN FLUX ALM BLOCKED" - LIT.

13. **Align components to operable S/R channel as follows:**

N/A • IF Audio Count Rate required to be in service, THEN align Audio Count Rate Channel "CHANNEL SELECTOR" switch to operable S/R channel.

__ • Ensure NIS RECORDER aligned to operable S/R channel.

CAUTION **Loss of S/R control power below P-6 will result in a reactor trip.**

__ 14. **Determine and correct cause of S/R malfunction.**

15. **Ensure compliance with appropriate Tech Specs:**

__ • 3.3.1 (Reactor Trip System (RTS) Instrumentation)

N/A • 3.9.2 (Nuclear Instrumentation)

N/A • 3.3.9 (Boron Dilution Mitigation System(BDMS)).

Tech Spec 3.3.1:
- **(Function 4) Condition F applies to reduce THERMAL POWER to < P-6 OR increase THERMAL POWER to > P-10 in 24 hours.**
- **(Function 5) Tracking entry for Source Range Instrument N32.**

Op Test No.:	301	Scenario #	4	Event #	3	Page	29 of 118
Event Description:	N36 Loss of Fission Chamber (Also Affects N32)						

CNS AP/1/A/5500/016	MALFUNCTION OF NUCLEAR INSTRUMENTATION SYSTEM Case I Source Range Malfunctions	PAGE NO. 6 of 15 Revision 27

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

16. **Determine required notifications:**

__ • REFER TO RP/0/A/5000/001 (Classification Of Emergency)

__ • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).

__ 17. **Notify Reactor Group Engineer of occurrence.**

__ 18. **WHEN the affected S/R channel is repaired, THEN ensure IAE returns the channel to service.**

NOTE IR Channel instrument power failure may cause a SR and IR channel to malfunction.

__ 19. **IF IR channel malfunction exists and not previously addressed by this procedure, THEN GO TO Case III (Intermediate Range Malfunction).**

__ 20. **Determine long term plant status. RETURN TO procedure in effect.**

END

Op Test No.:	301	Scenario #	4	Event #	3	Page	30 of 118
Event Description:	N36 Loss of Fission Chamber (Also Affects N32)						

CNS AP/1/A/5500/016	MALFUNCTION OF NUCLEAR INSTRUMENTATION SYSTEM Case III Intermediate Range Malfunction	PAGE NO. 8 of 15 Revision 27

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. Verify reactor power - GREATER THAN 10%.	__ Stop any power increase.
__ 2. Verify 1AD-2, C/3 "I/R HI FLUX LEVEL ROD STOP" - DARK.	__ Adjust turbine load to maintain T-Avg at T-Ref.
3. Identify affected I/R channel: __ • N-35 OR __ • N-36.	
NOTE 1AD-2, C/4 "N/I SYS S/R & I/R TRIP BYPASS" will actuate in the following step.	
__ 4. At the affected I/R drawer, place the "LEVEL TRIP" switch for affected channel in "BYPASS".	
__ 5. Verify the affected I/R channel trip bypass status light (1SI-19) - LIT.	__ Notify OSM that due to loss of control power I/R "HIGH LEVEL TRIP" cannot be bypassed. Reactor power reduction below P-10 I/R BLOCK PERMISSIVE will result in Reactor Trip due to "N/I HI FLUX IR RX TRIP".
__ 6. Verify 1AD-2, C/4 "N/I SYS S/R & I/R TRIP BYPASS" - LIT.	
__ 7. Ensure operable I/R channel selected to record on NIS RECORDER.	

Op Test No.:	301	Scenario #	4	Event #	3	Page	31 of 118
Event Description:	N36 Loss of Fission Chamber (Also Affects N32)						

CNS AP/1/A/5500/016	MALFUNCTION OF NUCLEAR INSTRUMENTATION SYSTEM Case III Intermediate Range Malfunction	PAGE NO. 9 of 15 Revision 27

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

<u>CAUTION</u>
- Loss of I/R control power below P-10 will result in reactor trip.
- Loss of I/R instrument power below P-10 will result in reactor trip unless affected channel "LEVEL TRIP" switch in "BYPASS".

__ 8. Determine and correct cause of I/R malfunction.

__ 9. Ensure compliance with Tech Spec 3.3.1 (Reactor Trip System (RTS) Instrumentation).

Tech Spec 3.3.1:
- (Function 4) Condition F applies to reduce THERMAL POWER to < P-6 OR increase THERMAL POWER to > P-10 in 24 hours.
- (Function 5) Tracking entry for Source Range Instrument N32.

10. Determine required notifications:
- __ <u>REFER TO</u> RP/0/A/5000/001 (Classification Of Emergency)
- __ <u>REFER TO</u> RP/0/B/5000/013 (NRC Notification Requirements).

__ 11. Notify Reactor Group Engineer of occurrence.

<u>CAUTION</u> Closing either I/R control power breaker or instrument power breaker with any P/R channel inoperable or in tripped condition may result in a reactor trip on P/R rate trip due to voltage spikes.

__ 12. <u>WHEN</u> the affected I/R channel is repaired, <u>THEN</u> ensure IAE returns the channel to service.

Op Test No.:	301	Scenario #	4	Event #	3	Page	32	of 118
Event Description:	N36 Loss of Fission Chamber (Also Affects N32)							

CNS AP/1/A/5500/016	MALFUNCTION OF NUCLEAR INSTRUMENTATION SYSTEM Case III Intermediate Range Malfunction	PAGE NO. 10 of 15 Revision 27

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE IR Channel instrument power failure may cause a SR and IR channel to malfunction.

__ 13. **IF SR channel malfunction exists and not previously addressed by this procedure, THEN GO TO Case I (Source Range Malfunctions).**

__ 14. **Determine long term plant status. RETURN TO procedure in effect.**

END

Note To Evaluator:

This is the end of Event 3. At the Lead Evaluators discretion, the scenario may continue by having the booth operator INSERT Trigger 4 for Event 4 ('C' RL Pump Trip / 1A S/G N/R Level Channel 2 Fails High).

Op Test No.:	301	Scenario #	4	Event #	4A	Page	33 of 118
Event Description:	'C' RL Pump Trip						

Control Room Indications
OAC alarm for RL Header Pressure Low
RL Header Pressure decreasing
Indicating lights for 'C' RL pump - DARK

Op Test No.:	301	Scenario #	4	Event #	4A	Page	34	of 118
Event Description:	'C' RL Pump Trip							

CNS AP/0/A/5500/038	LOSS OF LOW PRESSURE SERVICE WATER	PAGE NO. 2 of 19 Revision 2

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. **Ensure Unit 1 and Unit 2 OATC monitors Enclosure 1 (Foldout Page).**	**Enclosure 1 can be found as Attachment 3.**
__ 2. **Verify at least one RL pump in service.**	**Perform the following:** __ a. Start at least one RL pump. N/A b. IF no RL pump can be placed in service, THEN perform the following: __ 1) Dispatch operator to start Backup VI Compressor. REFER to EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 23 (Backup VI Compressor(s)). __ 2) Dispatch operator to align RF to VI compressors. REFER TO Enclosure 4 (RF To VI Compressor Alignment) __ 3) Align Unit 1 YV to RN cooling. REFER TO Enclosure 5 (Unit 1 YV to RN Cooling). __ 4) Align Unit 2 YV to RN cooling. REFER TO Enclosure 6 (Unit 2 YV to RN Cooling). 5) Concurrently perform the following as required: __ • Ensure Unit 1 Reactor - TRIPPED. GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) AND __ • Ensure Unit 2 Reactor - TRIPPED. GO TO EP/2/A/5000/E-0 (Reactor Trip or Safety Injection).
Note To Evaluator: **Five (5) minutes after the trip of 'C' RL pump, 1A S/G N/R Level Channel 2 will fail high causing annunciator 1AD-4 D/1 (S/G A HI-HI LEVEL ALERT). This annunciator response can be found following the steps for AP/38 in this guide.**	

Op Test No.:	301	Scenario #	4	Event #	4A	Page	35 of 118
Event Description:	'C' RL Pump Trip						

CNS AP/0/A/5500/038	LOSS OF LOW PRESSURE SERVICE WATER	PAGE NO. 3 of 19 Revision 2

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE 0RLP5030 is the indication used in this procedure for monitoring and controlling RL header pressure. The OAC indication C2A0017 will read lower due to the location of the pressure tap.	
__ 3. **IF AT ANY TIME 0RLP5030 is out of service, THEN Unit 2 OAC point C2A0017 may be used as RL pressure indication, contingent on OWPG/ENG providing a correlation factor.**	
__ 4. **Verify RL pressure greater than 60 PSIG AND stable or increasing.**	**Perform the following:** __ a. Start additional RL pump(s) as required. __ b. IF RL leak suspected, THEN dispatch operator to locate leak. __ c. Monitor RL pressure. __ d. IF RL pressure remains less than 60 PSIG, THEN GO TO Step 7.
__ 5. **IF AT ANY TIME RL pressure less than 60 PSIG, THEN RETURN TO Step 2.**	
__ 6. **GO TO Step 17.**	
__ 7. **Ensure any Liquid Waste release in progress is secured as required.**	
8. **Ensure Chemistry notified to perform the following:** __ • Secure Unit 1 cooling tower blowdown. __ • Secure Unit 2 cooling tower blowdown.	

Op Test No.:	301	Scenario #	4	Event #	4A	Page	36	of	118
Event Description:	'C' RL Pump Trip								

CNS AP/0/A/5500/038	LOSS OF LOW PRESSURE SERVICE WATER	PAGE NO. 4 of 19 Revision 2

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 9. **Verify RL pressure less than 54 PSIG <u>AND</u> stable or decreasing.**	**Perform the following:** __ a. Monitor RL cooled equipment for continued operation. <u>REFER</u> <u>TO</u> Enclosure 1 (Foldout Page). __ b. <u>IF</u> <u>AT</u> <u>ANY</u> <u>TIME</u> RL cooled equipment temperature approaching trip limit, <u>THEN</u> <u>GO</u> <u>TO</u> Step 10. __ c. <u>IF</u> <u>AT</u> <u>ANY</u> <u>TIME</u> RL pressure less than 54 psig <u>AND</u> stable or decreasing, <u>THEN</u> <u>RETURN</u> <u>TO</u> Step 9. __ d. <u>GO</u> <u>TO</u> Step 16.
10. **Ensure VI compressors aligned as follows:** __ a. Ensure operator dispatched to start Backup VI Compressor. <u>REFER</u> <u>TO</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 23 (Backup VI Compressor(s)). __ b. Ensure operator dispatched to align RF to VI compressors. <u>REFER</u> <u>TO</u> Enclosure 4 (RF To VI Compressor Alignment).	
__ 11. **Verify RL pump(s) in service.**	**<u>IF</u> no RL pump can be placed in service, <u>THEN</u> perform the following:** __ • Shutdown Unit 1 equipment. <u>REFER</u> <u>TO</u> Enclosure 2 (Unit 1 Equipment Shutdown) __ • Shutdown Unit 2 equipment. <u>REFER</u> <u>TO</u> Enclosure 3 (Unit 2 Equipment Shutdown).

Op Test No.:	301	Scenario #	4	Event #	4A	Page	37 of 118
Event Description:	'C' RL Pump Trip						

CNS AP/0/A/5500/038	LOSS OF LOW PRESSURE SERVICE WATER	PAGE NO. 5 of 19 Revision 2

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 12. **Verify both Units on line.**	**Perform the following to maintain Cooling Tower level AND RL pressure greater than 60 PSIG:** __ a. IF Unit 1 on line, THEN reduce load as required. REFER TO AP/1/A/5500/009 (Rapid Downpower). __ b. IF Unit 2 on line, THEN reduce load as required. REFER TO AP/2/A/5500/009 (Rapid Downpower). __ c. GO TO Step 14.
13. **Reduce Unit load as follows:** __ a. Notify a second SRO to report to the Control Room. b. Initiate load reduction on both Units to 50% reactor power in 15 minutes. REFER TO the following: __ • AP/1/A/5500/009 (Rapid Downpower) __ • AP/2/A/5500/009 (Rapid Downpower).	
__ 14. **Verify 1AD-13, F/6 "YV HI TEMP" - DARK.**	**Perform the following:** __ a. IF Unit 1 YV chiller(s) tripped AND RL can support YV chiller operation, THEN dispatch operator to restore YV. REFER TO OP/1/A/6450/020 (Containment Chilled Water System). __ b. IF RL cannot support Unit 1 YV chiller operation OR any NC pump stator temperature exceeds 275°F, THEN ensure Unit 1 YV aligned to RN cooling. REFER TO Enclosure 5 (Unit 1 YV to RN Cooling).

Op Test No.:	301	Scenario #	4	Event #	4A	Page	38 of 118
Event Description:	'C' RL Pump Trip						

CNS AP/0/A/5500/038	LOSS OF LOW PRESSURE SERVICE WATER	PAGE NO. 6 of 19 Revision 2

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 15. **Verify 2AD-13, F/6 "YV HI TEMP" - DARK**	**Perform the following:** __ a. IF Unit 2 YV chiller(s) tripped **AND** RL can support YV chiller operation, **THEN** dispatch operator to restore YV. REFER TO OP/2/A/6450/020 (Containment Chilled Water System). __ b. IF RL cannot support Unit 2 YV chiller operation OR any NC pump stator temperature exceeds 275°F, **THEN** ensure Unit 2 YV aligned to RN cooling. REFER TO Enclosure 6 (Unit 2 YV to RN Cooling).

Op Test No.:	301	Scenario #	4	Event #	4A	Page	39 of 118
Event Description:	'C' RL Pump Trip						

CNS AP/0/A/5500/038	LOSS OF LOW PRESSURE SERVICE WATER	PAGE NO. 7 of 19 Revision 2

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

16. **IF additional RL cooling capacity needed, THEN reduce RL heat load by performing the following as required:**

__ • Evaluate securing Unit 1 S/G Blowdown. REFER TO OP/1/A/6250/008 (Steam Generator Blowdown).

__ • Evaluate securing Unit 2 S/G Blowdown. REFER TO OP/2/A/6250/008 (Steam Generator Blowdown).

__ • Evaluate NF shutdown on both Units. REFER TO Enclosure 7 (NF System Shutdown).

__ • Evaluate VS compressor(s) shutdown. REFER TO OP/0/A/6450/013 (Station Air System).

__ • Evaluate VB compressor(s) shutdown. REFER TO OP/0/A/6450/006 (Breathing Air System).

__ • Evaluate shutdown Service Building Ventilation units cooled by RL. REFER TO OP/0/B/6450/021 Service Building Chill Water and Ventilation System.

__ • Evaluate shutdown Unit 1 Turbine Building Ventilation units cooled by KR. REFER TO OP/1/B/6450/016 (Turbine Building Ventilation Systems).

__ • Evaluate shutdown Unit 2 Turbine Building Ventilation units cooled by KR. REFER TO OP/2/B/6450/016 (Turbine Building Ventilation System).

17. **Ensure compliance with appropriate Tech Specs:**

N/A • 3.4.5 (RCS Loops - MODE 3)

N/A • 3.6.5 (Containment Air Temperature)

N/A • 3.6.12 (Ice Bed)

Op Test No.:	301	Scenario #	4	Event #	4A	Page	40	of 118
Event Description:	'C' RL Pump Trip							

CNS AP/0/A/5500/038	LOSS OF LOW PRESSURE SERVICE WATER	PAGE NO. 8 of 19 Revision 2

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

18. **Determine required notifications:**

__ • REFER TO RP/0/A/5000/001 (Classification Of Emergency)

__ • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).

__ 19. **Determine and correct cause of loss of Low Pressure Service Water (RL).**

20. **WHEN plant conditions permit, THEN perform the following:**

UNIT 1

__ a. Perform required steps in OP/1/A/6100/003 (Controlling Procedure For Unit Operation).

__ b. Perform required steps in OP/1/A/6100/002 (Controlling Procedure For Unit Shutdown).

UNIT 2

__ a. Perform required steps in OP/2/A/6100/003 (Controlling Procedure For Unit Operation).

__ b. Perform required steps in OP/2/A/6100/002 (Controlling Procedure For Unit Shutdown).

21. **WHEN RL system low pressure condition cleared and RL pressure stable, THEN perform the following:**

__ • Evaluate 1RL-199 return to desired position. REFER TO OP/0/B/6400/003 (Low Pressure Service Water System)

__ • Evaluate KR system return to normal. REFER TO OP/0/B/6400/004 (Recirculated Cooling Water System)

Op Test No.:	301	Scenario #	4	Event #	4A	Page	41 of 118
Event Description:	'C' RL Pump Trip						

CNS AP/0/A/5500/038	LOSS OF LOW PRESSURE SERVICE WATER	PAGE NO. 9 of 19 Revision 2

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

21. (Continued)

__ • Evaluate VI system return to normal. REFER TO AP/0/A/5500/022 (Loss Of Instrument Air)

__ • Evaluate Unit 1 YV system return to normal. REFER TO OP/1/A/6450/020 (Containment Chilled Water System)

__ • Evaluate Unit 2 YV system return to normal. REFER TO OP/2/A/6450/020 (Containment Chilled Water System)

__ • Evaluate NF system return. REFER TO OP/0/A/6200/008 (Ice Condenser Refrigeration System).

__ • Evaluate establishing Unit 1 S/G Blowdown. REFER TO OP/1/A/6250/008 (Steam Generator Blowdown).

__ • Evaluate establishing Unit 2 S/G Blowdown. REFER TO OP/2/A/6250/008 (Steam Generator Blowdown).

__ • Evaluate restoring VB system. REFER TO OP/0/A/6450/006 (Breathing Air System).

__ • Evaluate restoring VS system. REFER TO OP/0/A/6450/013 (Station Air System).

__ • Evaluate Service Building Ventilation return. REFER TO OP/0/B/6450/021 Service Building Chill Water and Ventilation System.

__ • Evaluate Unit 1 Turbine Building Ventilation return. REFER TO OP/1/B/6450/016 (Turbine Building Ventilation Systems).

__ • Evaluate Unit 2 Turbine Building Ventilation return. REFER TO OP/2/B/6450/016 (Turbine Building Ventilation System).

Op Test No.:	301	Scenario #	4	Event #	4A	Page	42	of	118
Event Description:	'C' RL Pump Trip								

CNS AP/0/A/5500/038	LOSS OF LOW PRESSURE SERVICE WATER	PAGE NO. 10 of 19 Revision 2

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 22. **Determine long term plant status. <u>RETURN TO</u> procedure in effect.**	

<u>END</u>

Op Test No.:	301	Scenario #	4	Event #	4B	Page	43	of	118
Event Description:	1A S/G N/R Level Channel 2 Fails High								

OP/1/B/6100/010E
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Panel 1AD-4

D/1

S/G A HI-HI LEVEL ALERT

SETPOINT: 1/4 narrow range level channels > 83.9%

ORIGIN:
1. 1CFLT5501 Channel 1
2. 1CFLT5510 Channel 2
3. 1CFLT5500 Channel 3
4. 1CFLT5490 Channel 4

PROBABLE CAUSE:
1. Malfunction of S/G level control
2. Instrument malfunction

AUTOMATIC ACTIONS: None

> **NOTE:** 2/4 hi-hi level will cause:
>
> - Turbine trip
> - Feedwater pumps trip
> - Feedwater isolation

IMMEDIATE ACTIONS:
1. Compare all level indication to verify alarm.
2. **IF** automatic level control is **NOT** correcting, take manual control and reduce level.

SUPPLEMENTARY ACTIONS:
1. **WHEN** malfunction is corrected **OR** bypassed, return to automatic control. Refer to AP/1/A/5500/006 (Loss of S/G Feedwater).
2. Refer to Tech Specs for operable channel requirements (TS 3.3.1, 3.3.2, 3.3.3 and 3.3.4).

Tech Spec 3.3.1 (Function 13):
- Condition E applies to place the channel in trip in 72 hours OR be in Mode 3 in 78 hours.

Tech Spec 3.3.2:
- (Function 5.a(2)): Condition J applies to place channel in trip in 72 hours OR be in Mode 3 in 78 hours.
- (Function 5.b(2) and 6.b): Condition D applies to place the channel in trip in 72 hours OR be in Mode 3 in 78 hours AND be in Mode 4 in 84 hours.

Tracking entries will also be made for Tech Specs 3.3.3 and 3.3.4 for the inoperable channel.

Note To Evaluator:

Once Tech Specs have been addressed and at the discretion of the Lead Evaluator, the scenario may continue to the next event by having the booth operator INSERT Trigger 5 for Event 5 (1A NCDT Pump Trip).

Op Test No.:	301	Scenario #	4	Event #	5	Page	44 of 118
Event Description:	1A NCDT Pump Trip						

Control Room Indications
1AD-13, B/2 "NCDT RECIRC LO FLOW" - LIT

<u>Note To Evaluator</u>:

The response for this Event is located in the alarm response for 1AD-13, B/2 "NCDT RECIRC LO FLOW" which is included on the following page.

Op Test No.:	301	Scenario #	4	Event #	5	Page	45	of	118
Event Description:	1A NCDT Pump Trip								

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Panel 1AD-13

B/2

NCDT RECIRC LO FLOW

SETPOINT: 30 gpm

ORIGIN: 1WLFT5730 (RCDT Recirculation Flow)

PROBABLE CAUSE:
1. NCDT pumps tripped
2. Loss of suction to NCDT pumps (low NCDT level)
3. Malfunction of 1WL-802 (NCDT Lvl Ctrl)
4. NCDT isolated for cooldown of PRT contents

AUTOMATIC ACTIONS: None

IMMEDIATE ACTIONS: Verify low recirc. flow on 1WLP5730 NCDT Recirc. Flow on 1MC9.

SUPPLEMENTARY ACTIONS:
1. Verify NCDT level on 1WLP5630 on 1MC11.
2. **IF** due to pump malfunction, start alternate NCDT pump.
3. N/A **IF** no NCDT pumps are available, refer to OP/1/A/6500/014 (Operations Controlled Liquid Waste System).
4. Verify proper operation of 1WL-802 (NCDT Lvl Ctrl).

REFERENCES:
1. CN-1565-2.0
2. Westinghouse Setpoint Document CNM-1201.00-39

Note To Evaluator:

The concludes Event 5. At the discretion of the Lead Evaluator, the scenario may continue by having the booth operator INSERT Trigger 6 for Event 6 (1C NC Pump High/High Vibration).

Op Test No.:	301	Scenario #	4	Event #	6	Page	46 of 118
Event Description:	1C NC Pump High/High Vibration						

Control Room Indications
1AD-6, A/5 "NCP HI VIBRATION" - LIT
1AD-6, B/5 "NCP HI-HI VIBRATION" - LIT
1C NC Pump Shaft Vibration indicating 25 mils on NC Pump Vibration Monitor

<u>Note To Evaluator</u>:

The response for this Event is found in the alarm response for 1AD-6, B/5 (NCP HI-HI VIBRATION) which is included on the following page.

Op Test No.:	301	Scenario #	4	Event #	6	Page	47 of 118
Event Description:	1C NC Pump High/High Vibration						

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PANEL: 1AD-6

B/5

NCP HI-HI VIBRATION

SETPOINT:
1. 5 mils (frame)
2. 20 mils (shaft)

ORIGIN:
1. 1 of 2 vibration pickups on 1 of 4 NC pump frames
2. 1 of 2 vibration pickups on 1 of 4 NC pump/motor shafts
3. 1RFM-2 on 1RFMP1

PROBABLE CAUSE:
1. Motor or pump imbalance
2. Changes in NC System temperature and/or pressure
3. Changes in containment temperature

AUTOMATIC ACTIONS: None

IMMEDIATE ACTIONS: None

SUPPLEMENTARY ACTIONS:
1. Verify which pump has Hi-Hi vibration, from 1EMMN5390 (NC Pump Vibration Monitor Panel System Panel (back of 1MC6).
2. Read all 4 vibration channels for the alarming pump and compare readings to determine if a real vibration problem exists.
3. IF a valid frame or shaft vibration indication exists, then perform the following:
   - 3.1 IF in Modes 1 OR 2:
     - 3.1.1 Trip reactor.
     - 3.1.2 WHEN reactor power less than 5%, THEN trip the affected NC pump.
     - N/A 3.1.3 IF A OR B NCP is tripped, ensure that the spray valve associated with the pump is closed.
     - 3.1.4 Go to EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).
   - N/A 3.2 IF NOT in Modes 1 OR 2:
     - 3.2.1 IF alarm is due to frame vibration exceeding 5 mils OR shaft vibration exceeding 30 mils perform the following:
       - 3.2.1.1 Trip the affected NC Pump.
       - 3.2.1.2 Go to AP/1/A/5500/004 (Loss of Reactor Coolant Pump).

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Op Test No.:	301	Scenario #	4	Event #	6	Page	48	of	118
Event Description:	1C NC Pump High/High Vibration								

OP/1/B/6100/010 G
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PANEL: 1AD-6

B/5

NCP HI-HI VIBRATION (Cont'd)

SUPPLEMENTARY ACTIONS: (con't)

3.2.2 **IF** shaft vibrations are > 20 mils but < 30 mils **AND** continued NC Pump operations are required to support data acquisition or short term operational needs perform the following:

- Contact Engineering to determine if continued operation is allowed.
- Contact OSM for approval for continued operation.

3.2.3 **IF** continued operation is not allowed **OR** the condition has exceeded 24 hours (PIP C-03-02132) perform the following:

3.2.1.3 Trip the affected NC Pump.

3.2.1.4 Go to AP/1/A/5500/004 (Loss of Reactor Coolant Pump).

REFERENCES:

1. CNM-1201.01-157 (NC Pump Tech Manual)
2. TS 3.4.4, 3.4.5, 3.4.6
3. CNEE-0153-01.02
4. PIP #1-C95-0437
5. PPRB OPS-8470
6. PIP #C-03-2132

Note To Evaluator:

Once the reactor is tripped, a loss of all AC power on Unit 1 will occur. The procedures for Events 7, 8, and 9 (Loss of all AC / CAPT #1 fails to auto start / RN pumps fail to start on S/I) begin on the next page.

Op Test No.:	301	Scenario #	4	Event #	7, 8, 9	Page	49 of 118
Event Description:	Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I						

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 4 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. Monitor Enclosure 1 (Foldout Page).	**Enclosure 1 can be found as Attachment 4.**
2. Verify Reactor Trip:	**Perform the following:**
__ • All rod bottom lights - LIT	__ a. Trip reactor.
__ • All reactor trip and bypass breakers - OPEN	b. IF reactor will not trip, THEN concurrently:
__ • I/R power - DECREASING.	__ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).
	__ • GO TO EP/1/A/5000/FR-S.1 (Response to Nuclear Power Generation/ATWS).
3. Verify Turbine Trip:	**Perform the following:**
__ • All turbine stop valves - CLOSED	__ a. Trip turbine.
	b. IF turbine will not trip, THEN:
	__ 1) Depress "MANUAL" pushbutton on turbine control panel.
	__ 2) Rapidly CLOSE control valves by simultaneously depressing "CONTROL VALVE LOWER" and "FAST RATE" pushbuttons.
	3) IF control valves will not close, THEN CLOSE:
	__ • All MSIVs
	__ • All MSIV bypass valves.

Op Test No.:	301	Scenario #	4	Event #	7, 8, 9	Page	50 of 118

Event Description: Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 5 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 4. **Verify 1ETA and 1ETB - ENERGIZED.**	**Perform the following:**
	__ a. IF 1ETA AND 1ETB de-energized, THEN GO TO EP/1/A/5000/ECA-0.0 (Loss of All AC Power).
Note To Evaluator: At this point the crew will transition to ECA-0.0. Once the crew manually initiates S/I in ECA-0.0, the D/Gs will start and begin loading the essential busses. The crew will transition back to E-0 at Step 4.	__ b. WHEN time allows, THEN attempt to restore power to de-energized switchgear while continuing with this procedure. REFER TO AP/1/A/5500/007 (Loss of Normal Power).
5. **Verify S/I actuated:**	
__ a. "SAFETY INJECTION ACTUATED" status light (1SI-13) - LIT.	a. Perform the following: 1) Verify conditions requiring S/I: __ • Pzr pressure - LESS THAN 1845 PSIG OR __ • Containment pressure - GREATER THAN 1.2 PSIG. __ 2) IF S/I required, THEN initiate S/I. 3) IF S/I not required, THEN concurrently: __ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ • GO TO EP/1/A/5000/ES-0.1 (Reactor Trip Response).
__ b. Both E/S load sequencer actuated status lights (1SI-14) - LIT.	__ b. Initiate S/I.

Op Test No.:	301	Scenario #	4	Event #	7, 8, 9	Page	51 of 118
Event Description:	Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I						

CNS EP/1/A/5000/ECA-0.0	LOSS OF ALL AC POWER	PAGE NO. 2 of 238 Revision 50

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. **CSF Status trees should be monitored for information only. Do not exit this procedure to implement any of the CSF procedures.**	
__ 2. **Monitor Enclosure 1 (Foldout Page).**	**Enclosure 1 can be found as Attachment 8.**
3. **Verify Reactor Trip:** __ • All rod bottom lights - LIT __ • Reactor trip and bypass breakers - OPEN __ • I/R power - DECREASING.	__ **Trip reactor.**
4. **Verify Turbine Trip:** __ • All turbine stop valves - CLOSED.	**Perform the following:** __ a. Trip turbine. b. **IF** turbine will not trip, **THEN** perform the following: __ 1) Depress "MANUAL" pushbutton on turbine control panel. __ 2) Rapidly CLOSE control valves by simultaneously depressing "CONTROL VALVE LOWER" and "FAST RATE" pushbuttons. 3) **IF** control valves will not close, **THEN** CLOSE: __ • All MSIVs __ • All MSIV bypass valves.

Op Test No.:	301	Scenario #	4	Event #	7, 8, 9	Page	52 of 118
Event Description:	Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I						

CNS EP/1/A/5000/ECA-0.0	LOSS OF ALL AC POWER	PAGE NO. 3 of 238 Revision 50

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. **Establish NC pump seal injection from the SSF:** __ • Dispatch operator to SSF to establish NC pump seal injection. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 19 (Establishing NC Makeup/Seal Injection From The SSF). __ • Dispatch operator to 1ETA switchgear room to align alternate power supply to 1EMXS. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 20 (Align Alternate Power Supply To 1EMXS).	

Op Test No.:	301	Scenario #	4	Event #	7, 8, 9	Page	53	of 118
Event Description:	Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I							

CNS EP/1/A/5000/ECA-0.0	LOSS OF ALL AC POWER	PAGE NO. **4 of 238** **Revision 50**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. **Verify NC system - ISOLATED:**	
a. All the following letdown isolation valves - CLOSED:	__ a. CLOSE valve(s).
__ • 1NV-10A (Letdn Orif 1B Otlt Cont Isol)	
__ • 1NV-11A (Letdn Orif 1C Otlt Cont Isol)	
__ • 1NV-13A (Letdn Orif 1A Otlt Cont Isol)	
__ • 1NV-1A (NC Letdn To Regen Hx Isol)	
__ • 1NV-2A (NC Letdn To Regen Hx Isol)	
__ • 1NV-135 (ND Flow To Letdn Hx).	
__ b. All Pzr PORVs - CLOSED.	__ b. **IF** Pzr pressure less than 2315 PSIG, **THEN** CLOSE Pzr PORVs.
c. All the following excess letdown isolation valves - CLOSED:	__ c. CLOSE valve(s).
__ • 1NV-122B (Loop C To Exs Letdn Hx Isol)	
__ • 1NV-123B (Loop C To Exs Letdn Hx Isol)	
__ • 1NV-124B (Excess Letdn Press Ctrl).	

Op Test No.:	301	Scenario #	4	Event #	7, 8, 9	Page	54	of 118
Event Description:	Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I							

CNS EP/1/A/5000/ECA-0.0	LOSS OF ALL AC POWER	PAGE NO. 5 of 238 Revision 50

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 7. **Verify total CA flow - GREATER THAN 450 GPM.**	**Perform the following:**
	__ a. Ensure CA Pump #1 - RUNNING.
	N/A b. **IF** flow less than 450 GPM due to operator action to control CA flow, **THEN GO TO** Step 8.
	__ c. Ensure all CA Pump #1 flow control valves - AT 100% DEMAND POSITION.
	N/A d. **IF** flow less than 450 GPM, **THEN** dispatch operator to verify proper CA Pump #1 valve alignment. **REFER TO** Enclosure 2 (Local Valve Alignment for CA Pump #1).
8. **Attempt to restore power to 1ETA or 1ETB as follows:**	
__ a. Start both D/Gs from Control Room.	a. Perform the following: Critical Task #1
	__ 1) Initiate both trains S/I.
	N/A 2) **IF** no D/G can be started, **THEN GO TO** Step 9.

Op Test No.: 301	Scenario # 4	Event # 7, 8, 9	Page 55	of 118			

Event Description: Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I

CNS EP/1/A/5000/ECA-0.0	LOSS OF ALL AC POWER	PAGE NO. 6 of 238 Revision 50

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. (Continued)	
__ b. Verify both D/G load sequencers - AUTOMATICALLY LOADING BUS.	b. Perform the following for affected train(s):

There is a critical task associated with manually starting required RN pumps prior to D/G damage occurring and subsequent D/G trip. The failure of these pumps to start once the D/G load sequencing has begun, is a failed automatic action, and the crew may decide to reset the D/G load sequencers and manually start these pumps under OMP 1-7 guidance. If the crew continues on without taking this action, steps in E-0 will start them.

- 1ETA:

1) **IF** 1ETA de-energized, **THEN** perform the following:

a) Ensure the following breakers - OPEN:

__ • "ETA NORM FDR FRM ATC"

__ • "ETA ALT FDR FRM SATA".

b) **IF** 1ETA still de-energized, **THEN** perform the following:

__ (1) **IF** D/G 1A running, **THEN** depress and hold D/G "OFF" pushbutton.

__ (2) Dispatch operator to open 1EDE-F01F (Diesel Generator Load Sequencer Panel 1DGLSA) (AB-577, BB-46, Rm 496).

__ (3) **WHEN** 1EDE-F01F open, **THEN** ensure D/G "OFF" pushbutton released.

__ 2) **IF** 1ETA energized, **THEN** ensure at least one A Train RN pump on.

(RNO continued on next page)

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Event Description:	Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I						

CNS EP/1/A/5000/ECA-0.0	LOSS OF ALL AC POWER	PAGE NO. **7 of 238** **Revision 50**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. (Continued)	• 1ETB: 1) **IF** 1ETB de-energized, **THEN** perform the following: a) Ensure the following breakers - OPEN: __ • "ETB NORM FDR FRM ATD" __ • "ETB ALT FDR FRM SATB". b) **IF** 1ETB still de-energized, **THEN** perform the following: __ (1) **IF** D/G 1B running, **THEN** depress and hold D/G "OFF" pushbutton. __ (2) Dispatch operator to open 1EDF-F01F (Diesel Generator Load Sequencer Panel 1DGLSB) (AB-560, BB-46, Rm 372). __ (3) **WHEN** 1EDF-F01F open, **THEN** ensure D/G "OFF" pushbutton released. __ 2) **IF** 1ETB energized, **THEN** ensure at least one B Train RN pump on.
__ c. Verify 1ETA or 1ETB - ENERGIZED.	__ c. **GO TO** Step 9.
__ d. Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).	

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Event Description:	Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I								

CNS EP/1/A/5000/ECA-0.0	LOSS OF ALL AC POWER	PAGE NO. 8 of 238 Revision 50

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. (Continued)	**Note To Evaluator:** At this point the crew will transition back to E-0 beginning at Step 4.
__ e. **RETURN TO** procedure and step in effect.	
9. **Verify CA supply adequate as follows:**	
__ a. VI pressure - GREATER THAN 85 PSIG.	a. **REFER TO** OP/0/A/6450/005 (Instrument Air System) to perform the following: __ • Dispatch operator to start backup VI compressor. __ • **IF** 2LXH (600V Blackout Load Center) energized, **THEN** dispatch operator to place VI compressor F in service __ • **IF** 2SLXC (600V Load Center) energized, **THEN** dispatch operator to place VS compressor B in service. **REFER TO** OP/0/A/6450/013 (Station Air System).
__ b. Verify loss of power to both essential busses anticipated to continue for greater than 4 hours.	b. Perform the following: __ 1) **IF AT ANY TIME** loss of power to both essential busses anticipated to continue for greater than 4 hours, **THEN** perform Steps 9.c through 9.g. __ 2) **GO TO** Step 9.i.
c. Verify at least one of the following normal CA suction sources - INTACT: __ • Upper Surge Tank __ • Hotwell.	c. Perform the following: __ 1) Concurrently implement FG/1/A/CFLX/FSG-02 (Alternate TD CA Pump Suction Source) while continuing in this procedure. __ 2) **GO TO** Step 10.

Op Test No.:	301	Scenario #	4	Event #	7, 8, 9	Page	58 of 118
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CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 5 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 4. **Verify 1ETA and 1ETB - ENERGIZED.**	**Perform the following:** __ a. IF 1ETA AND 1ETB de-energized, THEN GO TO EP/1/A/5000/ECA-0.0 (Loss of All AC Power). __ b. WHEN time allows, THEN attempt to restore power to de-energized switchgear while continuing with this procedure. REFER TO AP/1/A/5500/007 (Loss of Normal Power).
Note To Evaluator: **At this point the crew will transition to ECA-0.0. Once the crew manually initiates S/I in ECA-0.0, the D/Gs will start and begin loading the essential busses. The crew will transition back to E-0 at Step 4.**	
5. **Verify S/I actuated:**	
__ a. "SAFETY INJECTION ACTUATED" status light (1SI-13) - LIT.	a. Perform the following: 1) Verify conditions requiring S/I: __ • Pzr pressure - LESS THAN 1845 PSIG OR __ • Containment pressure - GREATER THAN 1.2 PSIG. __ 2) IF S/I required, THEN initiate S/I. 3) IF S/I not required, THEN concurrently: __ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ • GO TO EP/1/A/5000/ES-0.1 (Reactor Trip Response).
__ b. Both E/S load sequencer actuated status lights (1SI-14) - LIT.	__ b. Initiate S/I.

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Event Description:	Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I						

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 6 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 6. **Announce "Unit 1 Safety Injection".**	
7. **Determine required notifications:**	
__ • REFER TO RP/0/A/5000/001 (Classification Of Emergency)	
__ • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).	
__ 8. **Verify all Feedwater Isolation status lights (1SI-5) - LIT.**	**Perform the following:** __ a. Initiate Feedwater Isolation. __ b. IF proper status light indication not obtained, THEN CLOSE valves.
9. **Verify Phase A Containment Isolation status as follows:**	
__ a. Phase A "RESET" lights - DARK.	__ a. Initiate Phase A Isolation.
__ b. Monitor Light Panel Group 5 St lights on energized train(s) - LIT.	__ b. Align valves as necessary to ensure each penetration isolated by at least one isolation valve.
10. **Verify proper Phase B actuation as follows:**	
__ a. Verify Containment pressure - HAS REMAINED LESS THAN 3 PSIG.	a. Perform the following: 1) Verify Phase B Isolation actuated as follows: __ a) Phase B Isolation "RESET" lights - DARK. (RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	

__ b) **IF** Phase B Isolation "RESET" lights lit, **THEN** initiate Phase B Isolation.

c) Verify following monitor light panel lights - LIT:

- __ Group 1 Sp lights
- __ Group 5 Sp lights
- __ Group 5 St light L/11.

__ d) **IF** monitor light panel not in correct alignment, **THEN** ensure correct alignment.

__ 2) Stop all NC pumps.

__ 3) Maintain seal injection flow.

__ 4) Energize H_2 igniters.

5) Dispatch operator to perform the following:

__ a) Secure all ice condenser air handling units. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 11 (Securing All Ice Condenser Units).

__ b) Place containment H_2 analyzers in service. **REFER TO** OP/1/A/6450/010 (Containment Hydrogen Control Systems).

__ 6) **WHEN** 9 minutes elapsed, **THEN** verify proper VX system operation. **REFER TO** Enclosure 5 (VX System Operation).

__ 7) **GO TO** Step 11.

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CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 8 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
__ b. <u>IF AT ANY TIME</u> containment pressure exceeds 3 PSIG while in this procedure, <u>THEN</u> perform Step 10.a.	
11. **Verify proper CA pump status as follows:**	
__ a. Motor driven CA pumps - ON.	a. Perform the following for affected train(s): __ 1) Reset ECCS. __ 2) Reset D/G load sequencer(s). __ 3) Start affected pump(s). __ 4) <u>IF AT ANY TIME</u> B/O occurs, <u>THEN</u> restart S/I equipment previously on.
__ b. 3 S/G N/R levels - GREATER THAN 11%.	b. Perform the following: __ 1) Place CA PMP #1 control switch to ON. __ 2) Ensure CA Pump #1 - RUNNING.
12. **Verify all of the following S/I pumps - ON:** __ • NV pumps __ • ND pumps __ • NI pumps.	**Perform the following for affected train(s):** __ a. Reset ECCS. __ b. Reset D/G load sequencer(s). __ c. Start affected pump(s). __ d. <u>IF AT ANY TIME</u> B/O occurs, <u>THEN</u> restart S/I equipment previously on.

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Event Description:	Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 9 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 13. **Verify all KC pumps - ON.**	**Perform the following for affected train(s):** __ a. Reset ECCS. __ b. Reset D/G load sequencer(s). __ c. Start affected pump(s). __ d. IF AT ANY TIME B/O occurs, THEN restart S/I equipment previously on. __ e. IF KC flow cannot be established to NC pumps, THEN stop all NC pumps.
__ 14. **Verify all Unit 1 and Unit 2 RN pumps - ON.** **These steps are only critical if the RN pumps were not previously started in ECA-0.0.**	**Perform the following:** __ a. IF any Unit 2 RN pump off, THEN start affected pump(s). Critical Task #2 b. IF any Unit 1 RN pump off, THEN perform the following for affected train(s): __ 1) Reset ECCS. __ 2) Reset D/G load sequencer(s). __ 3) Start affected pump(s). Critical Task #2 __ 4) IF AT ANY TIME B/O occurs, THEN restart S/I equipment previously on.
15. **Verify proper ventilation systems operation as follows:** __ • REFER TO Enclosure 2 (Ventilation System Verification). __ • Notify Unit 2 operator to perform Enclosure 3 (Opposite Unit Ventilation Verification).	**Enclosure 2 can be found as Attachment 5.**

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Event Description:	Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I						

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 10 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 16. **Verify all S/G pressures - GREATER THAN 775 PSIG.**	**Perform the following:** a. Verify Main Steam Isolation as follows: __ • All MSIVs - CLOSED __ • All MSIV bypass valves - CLOSED __ • All S/G PORVs - CLOSED. b. <u>IF</u> any valve open, <u>THEN</u> perform the following: __ 1) Initiate Main Steam Isolation. __ 2) <u>IF</u> any valve still open, <u>THEN</u> CLOSE valve.
17. **Verify proper S/I flow as follows:**	
__ a. "NV S/I FLOW" - INDICATING FLOW.	__ a. Start NV pump(s) and align valves.
__ b. NC pressure - LESS THAN 1620 PSIG.	b. Perform the following: __ 1) Ensure ND pump miniflow valve on operating ND pump(s) - OPEN. N/A 2) <u>IF</u> ND pump miniflow valve(s) cannot be opened, <u>THEN</u> perform the following for affected train(s): __ a) Reset ECCS. __ b) Reset D/G load sequencer. __ c) Stop ND pump. __ d) <u>IF AT ANY TIME</u> B/O occurs, <u>THEN</u> restart S/I equipment previously on. __ e) <u>IF AT ANY TIME</u> NC pressure decreases to less than 285 PSIG in an uncontrolled manner, <u>THEN</u> restart the ND pump. (RNO continued on next page)

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Event Description:	Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I							

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 11 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17. (Continued)	
	__ 3) GO TO Step 18.
__ c. NI pumps - INDICATING FLOW.	__ c. Start NI pump(s) and align valves.
__ d. NC pressure - LESS THAN 285 PSIG.	d. Perform the following: __ 1) Ensure ND pump miniflow valve on operating ND pump(s) - OPEN. 2) IF ND pump miniflow valve(s) cannot be opened, THEN perform the following for affected train(s): __ a) Reset ECCS. __ b) Reset D/G load sequencer. __ c) Stop ND pump. __ d) IF AT ANY TIME B/O occurs, THEN restart S/I equipment previously on. __ e) IF AT ANY TIME NC pressure decreases to less than 285 PSIG in an uncontrolled manner, THEN restart the ND pump. __ 3) GO TO Step 18.
__ e. ND pumps - INDICATING FLOW TO C-LEGS.	__ e. Start ND pump(s) and align valves.

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CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 12 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 18. **<u>WHEN</u> time and manpower permit (within two hours of event), <u>THEN</u> monitor Spent Fuel Pool level and temperature. <u>REFER TO</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 1 (Unit 1 Spent Fuel Pool Monitoring).**	**G-1 Enclosure 1 can be found as Attachment 6.**
19. **Control S/G levels as follows:**	
__ a. Verify total CA flow - GREATER THAN 450 GPM.	a. Perform the following: 1) <u>IF</u> N/R level in all S/Gs less than 11% (29% ACC), <u>THEN</u> perform the following: __ • Start CA pumps __ • Ensure correct valve alignment. 2) <u>IF</u> N/R level in all S/Gs less than 11% (29% ACC) <u>AND</u> feed flow greater than 450 GPM cannot be established, <u>THEN</u> concurrently: __ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ • <u>GO TO</u> EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink).
__ b. <u>WHEN</u> each S/G N/R level greater than 11% (29% ACC), <u>THEN</u> control feed flow to maintain that S/G N/R level between 11% (29% ACC) and 50%.	
__ 20. **Verify all CA isolation valves - OPEN.**	__ **OPEN valve(s).**

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 21. **Verify S/I equipment status based on monitor light panel - IN PROPER ALIGNMENT.**	__ **Align equipment.**

<u>NOTE</u> Enclosure 4 (NC Temperature Control) shall remain in effect until subsequent procedures provide alternative NC temperature control guidance.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 22. **Control NC temperature. <u>REFER TO</u> Enclosure 4 (NC Temperature Control).**	**Enclosure 4 can be found as Attachment 7.**
23. **Verify Pzr PORV and Pzr Spray Valve status as follows:**	
__ a. All Pzr PORVs - CLOSED.	a. <u>IF</u> Pzr pressure less than 2315 PSIG, <u>THEN</u> perform the following: __ 1) CLOSE Pzr PORV(s). __ 2) <u>IF</u> any Pzr PORV cannot be closed, <u>THEN</u> CLOSE its isolation valve. 3) <u>IF</u> 1NC-32B <u>OR</u> 1NC-34A cannot be closed <u>OR</u> isolated, <u>THEN</u> perform the following: a) Align N_2 to PORVs by opening the following valves: __ • 1NI-438A (Emer N2 From CLA A To 1NC-34A) __ • 1NI-439B (Emer N2 From CLA B To 1NC-32B). __ b) CLOSE affected Pzr PORV. (RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. (Continued)	

4) IF any Pzr PORV cannot be closed OR isolated, THEN perform the following:

__ a) Energize H_2 igniters.

b) Dispatch operator to perform the following:

__ (1) Secure all ice condenser air handling units. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 11 (Securing All Ice Condenser Units).

__ (2) Place containment H2 analyzers in service. REFER TO OP/1/A/6450/010 (Containment Hydrogen Control Systems).

c) IF both the following conditions exist,

__ • Containment pressure - HAS REMAINED LESS THAN 3 PSIG

__ • Containment pressure - BETWEEN 1 PSIG AND 3 PSIG

__ THEN start one VX fan and secure normal containment ventilation. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 18 (VX and Containment Ventilation Control).

(RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. (Continued)	
	d) Concurrently: __ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ • GO TO EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant).
__ b. Normal Pzr spray valves - CLOSED.	b. IF Pzr pressure less than 2150 PSIG, THEN perform the following: __ 1) CLOSE spray valve(s). 2) IF spray valve(s) cannot be closed, THEN perform the following: __ a) Stop NC pumps 1A and 1B. __ b) IF both 1C **AND** 1D NC pumps on, THEN stop one additional pump.
__ c. At least one Pzr PORV isolation valve - OPEN.	__ c. IF power available, THEN OPEN one Pzr PORV isolation valve unless it was closed to isolate an open Pzr PORV.
__ 24. **Verify NC subcooling based on core exit T/Cs - GREATER THAN 0°F.**	**IF any NV OR NI pump on, THEN perform the following:** __ a. Ensure all NC pumps - OFF. __ b. Maintain seal injection flow.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25. **Verify main steamlines intact:**	**IF pressure in any S/G decreasing in an uncontrolled manner OR any S/G depressurized, THEN perform the following:**
__ • All S/G pressures - STABLE OR INCREASING	
__ • ALL S/Gs - PRESSURIZED.	__ a. Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).
	__ b. GO TO EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).
26. **Verify S/G tubes intact as follows:**	**IF any EMF trip 1 light lit OR any S/G level increasing in an uncontrolled manner, THEN concurrently:**
• Verify the following EMF trip 1 lights - DARK:	
__ • 1EMF-33 (Condenser Air Ejector Exhaust)	__ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).
__ • 1EMF-26 (Steamline 1A)	__ • GO TO EP/1/A/5000/E-3 (Steam Generator Tube Rupture).
__ • 1EMF-27 (Steamline 1B)	
__ • 1EMF-28 (Steamline 1C)	
__ • 1EMF-29 (Steamline 1D).	
__ • All S/G levels - STABLE OR INCREASING IN A CONTROLLED MANNER.	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27. **Verify NC System intact as follows:**	**Perform the following:**
__ • Containment pressure - LESS THAN 1 PSIG.	__ a. Energize H_2 igniters.
N/A • IF normal off-site power available, THEN verify containment pressure less than 0.3 PSIG.	b. Dispatch operator to perform the following:
• Containment high range EMFs - LESS THAN 3 R/HR:	__ 1) Secure all ice condenser air handling units. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 11 (Securing All Ice Condenser Units).
__ • 1EMF-53A (Containment Trn A) __ • 1EMF-53B (Containment Trn B).	__ 2) Place containment H2 analyzers in service. REFER TO OP/1/A/6450/010 (Containment Hydrogen Control Systems).
• Containment EMF trip 1 lights - DARK:	c. IF both the following conditions exist,
__ • 1EMF-38 (Containment Particulate) __ • 1EMF-39 (L) (Containment Gas (Lo Range)).	__ • Containment pressure - HAS REMAINED LESS THAN 3 PSIG
__ • Containment sump level - STABLE.	__ • Containment pressure - BETWEEN 1 PSIG AND 3 PSIG
	__ THEN start one VX fan and secure normal containment ventilation. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 18 (VX and Containment Ventilation Control).
	d. Concurrently:
	__ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).
	__ • GO TO EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28. **Verify S/I termination criteria:**	
__ a. NC subcooling based on core exit T/Cs - GREATER THAN 0°F.	__ a. GO TO Step 39.
b. Verify secondary heat sink as follows: __ • N/R level in any S/G - GREATER THAN 11% OR __ • Total feed flow to S/Gs - GREATER THAN 450 GPM.	__ b. GO TO Step 39.
__ c. NC pressure - STABLE OR INCREASING.	__ c. GO TO Step 39.
__ d. Pzr level - GREATER THAN 11%.	d. Perform the following: __ 1) IF NC pressure increasing AND normal Pzr spray available, THEN attempt to stabilize NC pressure using normal Pzr spray. __ 2) RETURN TO Step 28.a.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29. **Reset the following:**	
__ a. ECCS.	__ a. Reset ECCS. <u>REFER TO</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 4 (ECCS Master Reset).
__ b. D/G load sequencers.	b. Dispatch operator to open affected sequencer(s) control power breaker: __ • 1EDE-F01F (Diesel Generator Load Sequencer Panel 1DGLSA) (AB-577, BB-46, Rm 496) __ • 1EDF-F01F (Diesel Generator Load Sequencer Panel 1DGLSB) (AB-560, BB-46, Rm 372).
__ c. <u>IF AT ANY TIME</u> B/O occurs, <u>THEN</u> restart S/I equipment previously on.	
__ 30. **Ensure only one NV pump - ON.**	
__ 31. **Verify NC pressure - STABLE OR INCREASING.**	**Perform the following:** __ a. Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ b. <u>GO TO</u> EP/1/A/5000/ES-1.2 (POST LOCA Cooldown and Depressurization).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 32. **Verify VI pressure - GREATER THAN 50 PSIG.**	**In subsequent steps, Control Room control is lost for the following valves and local operation will be required:** __ • 1NV-294 (NV Pmps A&B Disch Flow Ctrl) __ • 1NV-309 (Seal Water Injection Flow).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33. **Isolate NV S/I flowpath as follows:**	
a. Verify the following valves - OPEN: __ • 1NV-203A (NV Pumps A&B Recirc Isol) __ • 1NV-202B (NV Pmps A&B Recirc Isol).	a. Perform the following: __ 1) OPEN affected valve(s). __ 2) <u>IF</u> 1NV-203A <u>AND</u> 1NV-202B open, <u>THEN</u> <u>GO TO</u> Step 33.b. 3) Dispatch operator to open affected valve(s): __ • 1NV-203A (NV Pumps A&B Recirc Isol) (AB-554, HH-JJ, 54-55, Rm 231) (Ladder needed) __ • 1NV-202B (NV Pmps A&B Recirc Isol) (AB-554, HH-JJ, 54-55, Rm 231) (Ladder needed). __ 4) Align charging with NV miniflow isolated. <u>GO TO</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 13 (Aligning Charging With NV Miniflow Valves Closed). __ 5) <u>WHEN</u> 1NV-203A <u>AND</u> 1NV-202B open, <u>THEN</u> charging flow may be reduced below 80 GPM. __ 6) <u>GO TO</u> Step 35.
b. CLOSE the following valves: __ • 1NI-9A (NV Pmp C/L Inj Isol) __ • 1NI-10B (NV Pmp C/L Inj Isol).	b. Dispatch operator to close affected valve(s). <u>REFER TO</u> the following enclosure(s) for affected valve(s): __ • EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 5 (Locally Close 1NI-9A) __ • EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 7 (Locally Close 1NI-10B).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34. **Establish charging as follows:**	
__ a. THROTTLE 1NV-294 (NV Pmps A&B Disch Flow Ctrl) for 32 GPM charging line flow.	a. Perform the following: __ 1) Place controller for 1NV-294 in the 100% demand position. __ 2) Dispatch operator with radio to throttle 1NV-295 (NV Pmps A & B Disch Ctrl Isol) (AB-551, JJ-55, Rm 231) for 32 GPM charging line flow. __ 3) THROTTLE 1NV-295 to control charging flow as required in subsequent steps.
__ b. CLOSE 1NV-309 (Seal Water Injection Flow).	b. Dispatch operator with radio to perform the following: __ 1) CLOSE 1NV-308 (Seal Wtr Inj Flow Ctrl Isol) (AB-554, JJ-54, Rm 233) (Ladder needed). __ 2) Do not continue until 1NV-308 - CLOSED. __ 3) THROTTLE 1NV-311 (Seal Wtr Inj Flow Ctrl Byp) (AB-555, JJ-54, Rm 233) to maintain 32 GPM seal water flow in subsequent steps.
c. Ensure one of the following valves - OPEN: __ • 1NV-32B (NV Supply To Loop A Isol) OR __ • 1NV-39A (NV Supply To Loop D Isol).	
__ d. Ensure 1NV-37A (NV Supply To Pzr Aux Spray) - CLOSED.	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34. (Continued)	
e. OPEN the following valves: __ • 1NV-312A (Chrg Line Cont Isol) __ • 1NV-314B (Chrg Line Cont Isol)	e. Dispatch operator to open affected valve(s). REFER TO the following enclosure(s) for affected valve(s): __ • EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 6 (Locally Open 1NV-312A) __ • EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 8 (Locally Open 1NV-314B).
__ f. Verify 1NV-309 - ABLE TO BE OPERATED FROM THE CONTROL ROOM.	__ f. GO TO Step 34.h.
__ g. Place 1NV-309 in auto.	
h. Perform the following: __ • Maintain charging flow less than 180 GPM. __ • Maintain 32 GPM seal water flow.	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35. **Control charging as follows:**	
__ a. Control charging flow to maintain Pzr level stable.	
__ b. Verify Pzr level - STABLE OR INCREASING.	b. IF Pzr level continues to decrease with maximum charging, THEN perform the following: 1) OPEN the following valves: __ • 1NI-9A (NV Pmp C/L Inj Isol) __ • 1NI-10B (NV Pmp C/L Inj Isol) 2) CLOSE the following valves: __ • 1NV-312A (Chrg Line Cont Isol) __ • 1NV-314B (Chrg Line Cont Isol). __ 3) Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ 4) GO TO EP/1/A/5000/ES-1.2 (POST LOCA Cooldown and Depressurization).
36. **Ensure the following containment isolation signals - RESET:** __ • Phase A __ • Phase B.	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
37. **Establish VI to containment as follows:**	**Perform the following:**
__ • Ensure 1VI-77B (VI Cont Isol) - OPEN.	a. Align N_2 to Pzr PORVs by opening the following valves:
__ • Verify VI pressure - GREATER THAN 85 PSIG.	__ • 1NI-438A (Emer N2 From CLA A To 1NC-34A)
	__ • 1NI-439B (Emer N2 From CLA B To 1NC-32B).
	b. IF VI pressure less than 85 PSIG, THEN perform the following:
	__ 1) Dispatch operator to ensure proper VI compressor operation.
	__ 2) Restore VI while continuing with this procedure. REFER TO AP/0/A/5500/022 (Loss of Instrument Air).
38. **Transition to EP/1/A/5000/ES-1.1 (Safety Injection Termination) as follows:**	
__ a. Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).	
__ b. Monitor EP/1/A/5000/ES-1.1 (Safety Injection Termination), Enclosure 1 (Foldout Page).	**ES-1.1 Enclosure 1 can be found as Attachment 9.**
__ c. GO TO EP/1/A/5000/ES-1.1 (Safety Injection Termination), Step 10.	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **Determine if NI pumps should be stopped:**	
a. Verify the following:	a. Perform the following:
__ • NC pressure - STABLE OR INCREASING	__ 1) IF Pzr level decreasing, THEN increase charging flow to stabilize Pzr level while maintaining less than 180 GPM.
__ • NC pressure - GREATER THAN 1620 PSIG.	__ 2) IF T-Avg less than 350°F prior to event AND NC pressure stable or increasing, THEN GO TO Step 10.b.
	__ 3) GO TO Step 10.d
__ b. Stop NI pumps.	
__ c. GO TO Step 11.	
__ d. Verify Pzr spray valves - CLOSED.	d. Perform the following:
	__ 1) CLOSE Pzr spray valves.
	__ 2) IF NC pressure stable or increasing, THEN RETURN TO Step 10.a.
e. Verify main steamlines intact as follows:	e. IF any S/G faulted, THEN do not continue until one of the following met:
__ • ALL S/G pressures - STABLE OR INCREASING	__ • Faulted S/G depressurization stops
__ • ALL S/Gs - PRESSURIZED.	OR
	__ • NC pressure starts increasing.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
NOTE If Pzr heaters are off, NC pressure may decrease slowly due to Pzr spray bypass flow. This may be considered "stable" pressure.	
__ f. Verify NC pressure - STABLE OR INCREASING.	__ f. GO TO EP/1/A/5000/ES-1.2 (Post LOCA Cooldown And Depressurization).
__ g. Verify NC pressure - GREATER THAN 1620 PSIG.	g. Perform the following: 1) Do not continue until one of the following met: __ • NC pressure - GREATER THAN 1620 PSIG OR __ • NC pressure - STABILIZES LESS THAN 1620 PSIG OR __ • NC pressure - DECREASING. __ 2) IF NC pressure increases to greater than 1620 PSIG, THEN GO TO Step 10.h. __ 3) IF NC pressure remains less than 1620 PSIG, THEN GO TO EP/1/A/5000/ES-1.2 (Post LOCA Cooldown And Depressurization).
__ h. Stop NI pumps.	
__ 11. **Ensure all ND pump(s) with suction aligned to FWST - STOPPED.**	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. **Verify S/I flow not required:**	
__ a. NC subcooling based on core exit T/Cs - GREATER THAN 0°F.	a. Perform the following: 1) Increase S/I flow to restore subcooling as follows: __ • Start one or more S/I pumps. __ • IF necessary, THEN realign NV S/I flow path. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 14 (NV Alignment To S/I Mode). __ 2) GO TO EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant).
__ b. Pzr level - GREATER THAN 11% (30% ACC).	b. Perform the following: __ 1) Control charging flow to restore Pzr level. 2) IF Pzr level cannot be maintained with normal charging, THEN perform the following: __ a) Start one or more S/I pumps. __ b) IF necessary, THEN realign NV S/I flow path. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 14 (NV Alignment To S/I Mode). __ c) GO TO EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. **Transfer condenser steam dump to pressure control mode as follows:** a. Verify condenser - AVAILABLE: __ • "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT __ • MSIVs on intact S/G(s) - OPEN.	<u>**CAUTION**</u> **If Pzr is solid, lowering intact S/G pressures and NC T-Hots too rapidly can cause a loss of subcooling.** <u>NOTE</u> Quickly stabilizing NC temperature will help prevent Pzr overfill. a. Perform the following: __ 1) Dump steam using intact S/G PORV(s) in subsequent steps to stabilize NC T-Hots. N/A 2) <u>IF</u> Pzr is solid, <u>THEN</u> perform the following in subsequent steps while operating S/G PORVs: a) <u>IF</u> NC pressure starts decreasing, <u>THEN</u> perform the following: __ (1) <u>IF</u> Pzr level greater than 17%, <u>THEN</u> operate Pzr heaters as required to stabilize pressure. __ (2) Increase charging flow as required to maintain NC subcooling based on core exit T/Cs greater than 0°F. __ b) Closely monitor T-Hots until Pzr bubble established. (RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. (Continued)	
	3) Perform the following to place steam dumps to pressure mode:
	__ a) Reset C-7A and C-7B by momentarily placing "STEAM DUMP SELECT" switch to "RESET".
	__ b) Place "STM DUMP CTRL" in manual.
	__ c) Adjust "STM DUMP CTRL" to 0% demand.
	__ d) Place steam dumps in pressure mode.
	__ 4) **GO TO** Step 14.
__ b. Ensure "STM DUMP CTRL" - SET AT 1090 PSIG STEAM HEADER PRESSURE.	
c. Place steam dumps in pressure mode as follows:	
__ 1) Verify steam dumps in T-AVE mode.	__ 1) **GO TO** Step 13.d.
__ 2) Place "STM DUMP CTRL" slim station in manual.	
__ 3) Adjust "STM DUMP CTRL" slim station output to match "% STM DUMP DEMAND" (1SMP5211).	
__ 4) **WHEN** output on "STM DUMP CTRL" slim station equal to "% STM DUMP DEMAND" (1SMP5211), **THEN** place steam dumps in - PRESSURE MODE.	
__ 5) Place "STM DUMP CTRL" in auto.	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. (Continued)	
__ d. WHEN steam dump valves closed, THEN Reset C-7A and C-7B by momentarily placing "STEAM DUMP SELECT" switch to "RESET".	
__ e. Verify "P-12 LO-LO TAVG" status light (1SI-18) - DARK.	__ e. Place steam dump interlock bypass switches in "BYP INTLK".
__ 14. **Verify all NC T-Hots - STABLE.**	__ **THROTTLE steam flow and total feed flow as required to maintain NC System temperatures stable.**
15. **Determine if letdown can be established:**	
__ a. Verify VI pressure - GREATER THAN 35 PSIG.	a. Perform the following: __ 1) WHEN VI pressure greater than 35 psig, THEN perform Step 15. __ 2) Observe Caution and Note prior to Step 15.i and GO TO Step 15.i.
__ b. Verify Pzr level - GREATER THAN 25% (44% ACC).	b. Perform the following: __ 1) WHEN Pzr level increases to greater than 25% (44% ACC), THEN perform Step 15. __ 2) GO TO Step 16.

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Event Description:	Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I								

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15. (Continued)	
__ c. Verify ND pumps - OFF.	c. Perform the following: __ 1) Ensure sufficient KC pumps in service to support increase in KC flow prior to opening Aux Bldg Non-Ess header isolation valves in Step 15.e RNO. __ 2) <u>GO TO</u> Step 15.e.
d. Ensure the following valves - CLOSED: __ • 1KC-56A (KC To ND Hx 1A Sup Isol) __ • 1KC-81B (KC To ND Hx 1B Sup Isol).	
e. Verify KC aligned to Aux Bldg Non-essential header as follows:	
1) Verify the following valves for the operating KC train(s) - OPEN: • <u>Train A</u>: __ • 1KC-1A (Aux Bldg Non-Ess Ret Hdr Isol) __ • 1KC-50A (Aux Bldg Non-Ess Hdr Isol) OR • <u>Train B</u>: __ • 1KC-2B (Aux Bldg Non-Ess Ret Hdr Isol) __ • 1KC-53B (Aux Bldg Non-Ess Hdr Isol)	__ 1) OPEN valve(s).
__ 2) Ensure adequate KC pumps in service	

Op Test No.:	301	Scenario #	4	Event #	7, 8, 9	Page	86	of 118
Event Description:	Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I							

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15. (Continued)	
f. Verify containment high range EMFs - LESS THAN 25 R/HR: __ • 1EMF-53A (Containment Trn A) __ • 1EMF-53B (Containment Trn B).	f. Perform the following: __ 1) Establish excess letdown. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 12 (Establishing Excess Letdown). __ 2) Notify station management to evaluate performing Step 15.g with high NC System activity. __ 3) GO TO Step 16.
__ g. Establish normal letdown. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 21 (Establishing Normal Letdown). **Note To Evaluator:** **It is not required for the crew to establish normal letdown as part of this scenario.**	g. Perform the following: __ 1) Establish excess letdown. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 12 (Establishing Excess Letdown). __ 2) IF no letdown path available, THEN observe Note prior to Step 15.i and GO TO Step 15.i.
__ h. GO TO Step 16.	

Op Test No.: 301	Scenario # 4	Event # 7, 8, 9	Page 87 of 118				

Event Description: Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

15. (Continued)

CAUTION **PRT rupture disk relieves at 100 PSIG.**

NOTE Cycling of head vents in the following step should be minimized due to water hammer concerns in vent line.

i. IF AT ANY TIME Pzr level approaches 96% (93% ACC), THEN perform the following:

1) Control Pzr level by OPENING and CLOSING the following head vent valves as required to stabilize Pzr level and limit operation of Pzr PORVs and safeties:

__ a) 1NC-250A (Rx Head Vent Block).

__ b) 1NC-251B (Rx Head Vent).

RESPONSE NOT OBTAINED:

1) IF vent path cannot be aligned, THEN perform the following:

a) Ensure the following valves - CLOSED:

__ • 1NC-250A (Rx Head Vent Block)

__ • 1NC-251B (Rx Head Vent).

b) Dispatch operator to remove white tags and close the following breakers:

__ • 1EMXL-F10C (Reactor Vessel Head Vent Motor (1NC252B)) (AB-560, BB-47, Rm 372)

__ • 1EMXS-F03E (Reactor Vessel Head Vent Motor (1NC253A)) (AB-577, BB-49, Rm 496).

c) Operate the following valves as required:

__ • 1NC-252B (Rx Head Vent Block)

__ • 1NC-253A (Rx Head Vent).

Op Test No.:	301	Scenario #	4	Event #	7, 8, 9	Page	88	of	118
Event Description:	Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I								

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15. (Continued)	
2) <u>WHEN</u> vent path no longer needed to control Pzr level, <u>THEN</u> ensure all of the following vent valves - CLOSED: __ • 1NC-250A (Rx Head Vent Block) __ • 1NC-251B (Rx Head Vent) __ • 1NC-252B (Rx Head Vent Block) __ • 1NC-253A (Rx Head Vent).	
16. **Ensure proper operation of VCT Makeup Control System as follows:**	
__ a. Determine required shutdown boron concentration. <u>REFER</u> <u>TO</u> ROD Book, Section 5.11.	
b. <u>WHEN</u> required shutdown boron concentration determined, <u>THEN</u> perform the following:	
__ 1) Verify Unit 1 RMWST aligned for VCT makeup.	1) Perform the following: __ a) Adjust VCT makeup controls for boron concentration greater than or equal to required shutdown boron concentration. <u>REFER</u> <u>TO</u> OP/1/A/6150/009 (Boron Concentration Control). __ b) <u>GO</u> <u>TO</u> Step 17.
__ 2) Adjust VCT makeup controls for boron concentration greater than or equal to required shutdown boron concentration.	
__ 3) Ensure "NC MAKEUP MODE SELECT" - IN AUTO.	
__ 4) Place "NC MAKEUP CONTROL" switch momentarily to "START" position.	

Op Test No.:	301	Scenario #	4	Event #	7, 8, 9	Page	89	of	118

Event Description: Loss of All AC / CAPT #1 Fails to Start on B/O / RN Pumps Fail to Start on S/I

CNS EP/1/A/5000/ES-1.1	SAFETY INJECTION TERMINATION	PAGE NO. 21 of 57 Revision 33

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17. **Align NV pump suction to VCT as follows:**	
a. Verify at least one of the following NV pump suction valves - OPEN: __ • 1NV-252A (NV Pumps Suct From FWST) OR __ • 1NV-253B (NV Pumps Suct From FWST).	a. IF NV pump aligned to discharge of ND pumps in cold leg recirc, THEN perform the following: __ 1) Notify station management for guidance to restore NV pump suction to VCT. __ 2) GO TO Step 18.
b. OPEN the following valves: __ • 1NV-188A (VCT Otlt Isol) __ • 1NV-189B (VCT Otlt Isol). c. CLOSE the following valves: __ • 1NV-252A (NV Pumps Suct From FWST) __ • 1NV-253B (NV Pumps Suct From FWST).	**Note To Evaluator:** **At this point, all critical tasks are complete and S/I has been terminated. At the Lead Evaluators discretion, the scenario may be terminated by having the booth operator place the simulator in FREEZE.**
__ 18. **Maintain Pzr pressure stable using Pzr heaters and normal Pzr spray.**	**IF normal Pzr spray not available, THEN perform the following:** __ a. IF letdown in service, THEN use NV aux spray. REFER TO Enclosure 4 (NV Aux Spray). __ b. IF letdown not in service OR NV aux spray not available, THEN use one Pzr PORV.

Attachment List

Scenario 4

ATTACHMENT 1 -	Crew Critical Task Summary
ATTACHMENT 2 -	Shift Turnover Information
ATTACHMENT 3 -	AP/0/A/5500/038 Enclosure 1 (Foldout Page)
ATTACHMENT 4 -	EP/1/A/5000/E-0 Enclosure 1 (Foldout Page)
ATTACHMENT 5 -	EP/1/A/5000/E-0 Enclosure 2 (Control Room Ventilation Verification)
ATTACHMENT 6 -	EP/1/A/5000/G-1 Enclosure 1 (Spent Fuel Pool Monitoring)
ATTACHMENT 7 -	EP/1/A/5000/E-0 Enclosure 4 (NC Temperature Control)
ATTACHMENT 8 -	EP/1/A/5000/ECA-0.0 Enclosure 1 (Foldout Page)
ATTACHMENT 9 -	EP/1/A/5000/ES-1.1 Enclosure 1 (Foldout Page)

ATTACHMENT 1

CREW CRITICAL TASK SUMMARY			
SAT	**UNSAT**	**CT #**	**CRITICAL TASK**
		1	Initiate Safety Injection (S/I) on both trains to start the Unit 1 Diesel Generators by the completion of EP/1/A/5000/ECA-0.0 Step 8.
		2	Manually start Nuclear Service Water (RN) pumps such that the EDG does not fail because of damage caused by engine overheating.

Comments:

ATTACHMENT 2

SHIFT TURNOVER INFORMATION

Unit 1 Status

Power Level	Power History	NCS Boron	Xenon
$7x10^{-2}$ %	BOL	1969 PPM	per OAC

Controlling Procedure

- OP/1/A/6100/001 (Controlling Procedure for Unit Startup), Enclosure 4.1 (Unit Startup). The steps up to 3.180 are complete.

Other Information Needed to Assume the Shift

- Unit 1 is at $7x10^{-2}$ % power at the BOL. Unit 2 is at 100% power. 1A Condensate Booster Pump is tagged out for emergent motor replacement. Direction for the crew is to swap operating RN pumps by starting the 1B RN pump and securing the 1A RN pump per OP/0/A/6400/006 C (Nuclear Service Water System) Enclosure 4.7 (Starting/Securing Additional RN Pumps). Initial conditions have been verified. Chemistry has been notified of the RN pump lineup being changed and has informed operations that RN Chemical Addition system has been aligned to support the RN pump swap. The Unit 1 Cation Bed Demineralizer is not in service. Unit 2 Mixed bed demineralizers have been bypassed per step 3.2.2. Crew is to begin at step 3.2.1 of Enclosure 4.7. Following the RN pump swap, the crew is to withdraw control rods to increase reactor power to ~14 % in preparation for placing the Main Turbine online.

AOs Available

Seven AOs are available as listed on the status board

METEOROLOGICAL CONDITIONS

- Upper wind direction = 315 degrees, speed = 3 mph
- Lower wind direction = 315 degrees, speed = 4.5 mph
- Forecast calls for clear skies over the next 24 hours.

ATTACHMENT 3

CNS AP/0/A/5500/038	LOSS OF LOW PRESSURE SERVICE WATER Enclosure 1 - Page 1 of 1 **Foldout Page**	PAGE NO. 11 of 19 Revision 2

1. **IF AT ANY TIME RL pressure less than 60 PSIG (RLHDR Press 0RLP5030), THEN notify Chemistry to perform the following:**

   __ • Secure Unit 1 cooling tower blowdown
   __ • Secure Unit 2 cooling tower blowdown.

2. **IF AT ANY TIME Main Turbine Lube Oil Cooler Outlet Temperature reaches 190°F, THEN perform the following:**

   __ • IF Reactor power is greater than or equal to 69%, THEN trip affected Reactor.
   __ • Ensure affected Turbine - TRIPPED.

3. **IF AT ANY TIME Turbine Generator bearing metal temperatures exceed any of the following limits:**

   __ • Journal Bearing Metal temperature (TGBRG) - 250°F.
   __ • Thrust Bearing Metal temperature (TGBRG) - I90°F.

   THEN perform the following:

   __ • Ensure affected unit Reactor - TRIPPED.
   __ • Ensure affected unit Turbine - TRIPPED.
   __ • Break affected unit Condenser vacuum to reduce Turbine speed.

4. **Monitor the following temperatures for both Units and follow OAC Alarm Response actions.**

   __ • Turb Lube Oil Cooler Outlet Temp - (TGBRG)

   __ • Turbine Generator bearing temperatures - (TGBRG)

   __ • Main Generator Gas temperatures - (MAINGEN)

   __ • Generator Stator Cooling temperatures - (KG)

   __ • CFPTs Oil and Bearing temperatures - (CFBRG1A(2A) (CFBRG1B(2B)

   __ • CBP Motor and Pump Bearing temperatures - (CMCBP)

   __ • Hotwell Pump Motor Bearing temperatures - (CMHWP)

   __ • Heater Drain TNK Pump Bearing temperatures - (HWHP)

   __ • Exciter Air Cooler Cold Air temperature - (MAINGEN)

   __ • Recirculated Cooling Water - temperature - (KR)

   __ • Containment Chilled Water system temperature - (YV)

ATTACHMENT 4

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 1 of 2 **Foldout Page**	PAGE NO. 32 of 47 Revision 42

1. **NC Pump Trip Criteria:**
   - IF the following conditions satisfied, **THEN** trip all NC pumps while maintaining seal injection flow:
     - Any NV or NI pump - ON
     - NC subcooling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F
     - Reactor power - LESS THAN 5%.

2. **CA Suction Source Switchover Criterion:**
   - IF 1AD-8, B/1 "UST LO LEVEL" lit, **THEN REFER TO** AP/1/A/5500/006 (Loss of S/G Feedwater).

3. **Position Criteria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol):**
   - IF NC pressure less than 1500 PSIG **AND** NV S/I flowpath aligned, **THEN** CLOSE 1NV-202B and 1NV-203A.
   - IF NC pressure greater than 2000 PSIG, **THEN** OPEN 1NV-202B and 1NV-203A.

4. **Ruptured S/G CA Isolation Criteria:**
   - IF both the following conditions met, **THEN** stop CA flow to affected S/G:
     - Level increasing in an uncontrolled manner or radiation level in that S/G abnormal
     - N/R level - GREATER THAN 11% (29% ACC).

ATTACHMENT 4

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 2 of 2 **Foldout Page**	PAGE NO. 33 of 47 Revision 42

5. **Faulted S/G CA isolation Criteria:**

- IF all the following conditions met, THEN stop CA flow to affected S/G:
  - S/G pressure decreasing in an uncontrolled manner or completely depressurized
  - Only one S/G diagnosed as faulted
  - Secondary heat sink criteria met:
    - Total CA flow - GREATER THAN 450 GPM

    OR

    - ANY S/G(s) N/R level - GREATER THAN 11%(29% ACC).

6. **NS Pump Trip Criterion:**

- IF NS pump in recirc and S/I occurs, THEN perform one of the following:
  - IF train affected ECCS and D/G load sequencer - RESET, THEN stop NS pump.

  OR

  - WHEN sequencer loading complete, THEN perform the following for affected train:
    a. Notify Control Room Supervisor.
    b. Reset ECCS.
    c. Reset D/G load sequencer.
    d. Secure NS pump.
    e. IF AT ANY TIME B/O occurs, THEN restart S/I equipment previously on.

ATTACHMENT 5

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 1 of 7 **Ventilation System Verification**	PAGE NO. 34 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. **Verify proper VC/YC operation as follows:**	
a. Verify one train of the following equipment in operation: __ • YC chiller __ • CR AHU-1 __ • CRA AHU-1 __ • CRA PFT-1.	a. Perform the following: __ 1) Shift operating VC/YC trains. <u>REFER TO</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 17 (Shifting Operating VC/YC Trains). 2) <u>IF</u> no train can be properly aligned, <u>THEN</u> dispatch operator and IAE/Maintenance to restore at least one train of VC/YC. <u>REFER TO</u> the following: __ • OP/0/A/6450/011 (Control Room Area Ventilation/Chilled Water System) __ • EM/0/A/5200/001 (Troubleshooting Cause For Improper Operation of VC/YC System).

ATTACHMENT 5

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 2 of 7 **Ventilation System Verification**	PAGE NO. 35 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. (Continued) b. Verify the following alarms - DARK: __ • 1AD-18, A/8 "UNIT 1 INTAKE HI CHLORINE 1A" __ • 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE 1B" __ • 1AD-18, D/8 "UNIT 2 INTAKE HI CHLORINE 2A" __ • 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE 2B".	b. <u>IF</u> chlorine odor detected in the Control Room, <u>**THEN**</u> perform the following based on the status of given alarms: 1) <u>IF</u> detectors on both unit intakes in alarm, <u>**THEN**</u> perform the following: a) Ensure the following VC intake dampers - CLOSED: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet) __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). __ b) <u>GO TO</u> Step 1.d. 2) <u>IF</u> Unit 1 intake HI chlorine detector(s) in alarm, <u>**THEN**</u> perform the following: a) Ensure the following VC dampers - CLOSED: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet). b) Ensure the following dampers - OPEN: __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). __ c) <u>GO TO</u> Step 1.d. (RNO continued on next page)

ATTACHMENT 5

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 3 of 7 **Ventilation System Verification**	PAGE NO. 36 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. (Continued)	
	3) IF Unit 2 intake Hi chlorine detector(s) in alarm, THEN perform the following: a) Ensure the following VC dampers - CLOSED: __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet). b) Ensure the following dampers - OPEN: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet). __ c) GO TO Step 1.d.
c. Ensure the following VC dampers - OPEN: __ • 1VC-5B (CRA Filt Inlet) __ • 1VC-6A (CRA Filt Inlet) __ • 2VC-5B (CRA Filt Inlet) __ • 2VC-6A (CRA Filt Inlet).	
d. Repeat Step 1 of this enclosure until notified by station management as follows: __ • At least once every 8 hours OR __ • Any time VC/YC related annunciators on 1AD-18 actuate.	

ATTACHMENT 5

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 4 of 7 **Ventilation System Verification**	PAGE NO. 37 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2. **Ensure proper VA System operation as follows:**

   - Ensure the following fans - OFF:

     __ • ABUXF 1A
     __ • ABUXF 1B.

   - Ensure VA System filter in service as follows:

     __ • 1ABF-D-12 & 19 (VA Filter A Bypass Dampers) - CLOSED

     __ • 1ABF-D-5 & 20 (VA Filter B Bypass Dampers) - CLOSED.

   - Ensure the following fans - ON:

     __ • ABFXF-1A
     __ • ABFXF 1B.

ATTACHMENT 5

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 5 of 7 **Ventilation System Verification**	PAGE NO. 38 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. **Verify proper VE System operation as follows:**	
__ a. VE fans - ON.	__ a. Start fan(s).
__ b. Annulus pressure - BETWEEN -1.4 IN. WC AND -1.8 IN. WC.	b. Perform the following: 1) <u>IF</u> annulus pressure more positive than -1.4 in. WC, <u>THEN</u> perform the following: a) Verify flow indicated on the following indications: __ • 1VEP5180 (VE 1A Flow To Stack) __ • 1VEP5200 (VE 1B Flow To Stack). b) <u>IF</u> flow not indicated, <u>THEN</u> dispatch operator to verify status of the following dampers based on their local indication or their operating piston rods being extended 4" to 6": __ • 1AVS-D-2 (VE A Trn Recirc Damp) (AB-603, JJ-51, Rm 500) - CLOSED __ • 1AVS-D-7 (VE B Trn Recirc Damp) (AB-603, HH-52, Rm 500) - CLOSED __ • 1AVS-D-3 (VE A Trn Exh Damp) (AB-603, JJ-52, Rm 500) - OPEN __ • 1AVS-D-8 (VE B Trn Exh Damp) (AB-603, HH-52, Rm 500) - OPEN. (RNO continued on next page)

ATTACHMENT 5

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 6 of 7 **Ventilation System Verification**	PAGE NO. 39 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. (Continued)	
	__ c) Consult plant engineering staff and notify IAE/Maintenance to troubleshoot and repair. <u>REFER TO</u> EM/1/A/5200/002 (Troubleshooting Cause For VE System Hi/Lo Pressure).
	__ d) <u>GO</u> <u>TO</u> Step 3.c.
	2) <u>IF</u> annulus pressure more negative than -1.8 in. WC, <u>THEN</u> perform the following:
	__ a) Determine which VE train indicates highest discharge flow to stack.
	__ b) Within 2 hours, ensure VE train that indicates highest discharge flow to stack secured.
	__ c) Consult plant engineering staff and notify IAE/Maintenance to troubleshoot and repair. <u>REFER TO</u> EM/1/A/5200/002 (Troubleshooting Cause For VE System Hi/Lo Pressure).
__ c. Repeat Step 3.b every 30 minutes until notified by station management.	

ATTACHMENT 5

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 4. **Record time ventilation systems verified on following table:**

TIME	SYSTEM (VC, VE)	INITIALS

ATTACHMENT 6

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. **Review the following considerations for Spent Fuel Pool monitoring:**	
__ • Control Room temperature indication 1KFP5130 is a non-safety instrument loop. Guidance is provided for local temperature verification if access to Spent Fuel Pool available.	
__ • Normal level indication 1KFP5120 is a non-safety instrument loop powered from 1RPA. Guidance is provided for local temperature verification if access to Spent Fuel Pool available.	
__ • If a loss of all AC Power is anticipated to last greater than 6 hrs, portable Spent Fuel Pool level and temperature instrumentation can be installed if access to Spent Fuel Pool available.	
__ • Seismic event may cause loss of Spent Fuel Pool inventory due to "splashing" of water.	
2. **Monitor Unit 1 KF pump motor cooling as follows:**	
a. Verify the following: __ • KF PUMP A MTR CLR HI TEMP (1AD-13 D/6) - DARK. __ • KF PUMP B MTR CLR HI TEMP (1AD-13 D/7) - DARK.	__ a. Ensure affected Unit 1 KF pump(s) - OFF.
__ b. **<u>IF AT ANY TIME</u>** KF PUMP MTR CLR HI TEMP annunciator(s) lit, **<u>THEN</u>** perform Step 2.a.	
__ 3. **<u>IF AT ANY TIME</u> Spent Fuel Pool level <u>AND</u> temperature indications unavailable in Control Room, <u>THEN</u> dispatch operator to monitor Unit 1 Spent Fuel Pool. <u>GO TO</u> Enclosure 24 (Local Spent Fuel Pool Monitoring).**	

ATTACHMENT 6

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE Steps 4 and 5 may be performed concurrently.

4. **Monitor Unit 1 Spent Fuel Pool level as follows:**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ a. Verify Spent Fuel Pool level indication in Control Room - AVAILABLE.	__ a. **GO TO** Step 4.e.
__ b. Verify Spent Fuel Pool level greater than - 39 ft.	b. Notify Control Room Supervisor of the following: __ 1) Unit 1 Spent Fuel Pool level. __ 2) **REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).
__ c. Record Unit 1 Spent Fuel Pool level in the following table:	

Time	Unit 1 SFP Level	Time	Unit 1 SFP Level	Time	Unit 1 SFP Level

__ d. **GO TO** Step 5 .

ATTACHMENT 6

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 1 - Page 3 of 8 **Unit 1 Spent Fuel Pool Monitoring**	PAGE NO. 5 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
e. Determine Spent Fuel Pool level as follows:	
__ 1) Dispatch operator and RP to determine if Unit 1 Spent Fuel Pool area accessible.	
2) **<u>WHEN</u>** Unit 1 Spent Fuel Pool area accessibility determined, **<u>THEN</u>** perform the following:	
__ a) Verify Unit 1 Spent Fuel Pool area - ACCESSIBLE.	a) Notify Station Management to perform the following: __ (1) Evaluate alternate method to monitor Unit 1 Spent Fuel Pool level. __ (2) **<u>IF AT ANY TIME</u>** Unit 1 level estimated less than - 39 ft, **<u>THEN REFER TO</u>** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level). __ (3) **<u>GO TO</u>** Step 5.
b) Notify dispatched operator to perform the following:	
(1) Determine Spent Fuel Pool level using the following reference points:	
__ • Top of skimmer trough is 40 Ft	
__ • 1 Ft below lip of skimmer trough is 39 Ft	
__ • Centerline of KF pump suction strainer is 37.5 Ft.	
__ (2) Report level determination to Control Room.	

ATTACHMENT 6

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 1 - Page 4 of 8 **Unit 1 Spent Fuel Pool Monitoring**	PAGE NO. 6 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
c) **WHEN** operator reports level, **THEN** perform the following:	
__ (1) Verify level greater than -39 ft.	(1) Notify Control Room Supervisor of the following: __ 1. Unit 1 Spent Fuel Pool level. __ 2. **REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).
__ (2) Record Unit 1 Spent Fuel Pool level in the following table:	

Time	Unit 1 SFP Level	Time	Unit 1 SFP Level	Time	Unit 1 SFP Level

ATTACHMENT 6

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. **Monitor Unit 1 Spent Fuel Pool temperature as follows:**	
__ a. Verify Spent Fuel Pool temperature indication in Control Room - AVAILABLE.	__ a. **GO TO** Step 5.e.
__ b. Verify Spent Fuel Pool temperature less than - 125°F.	b. Notify Control Room Supervisor of the following: __ 1) Unit 1 Spent Fuel Pool temperature. __ 2) **REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).
__ c. Record Unit 1 Spent Fuel Pool temperature in the following table:	

Time	Unit 1 SFP Temp	Time	Unit 1 SFP Temp	Time	Unit 1 SFP Temp

__ d. **GO TO** Step 6.

ATTACHMENT 6

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. (Continued)	
e. Determine Spent Fuel Pool temperature as follows:	
__ 1) Verify access to Unit 1 Spent Fuel Pool area previously determined.	1) Perform the following: __ a) Dispatch operator and RP to determine if Unit 1 Spent Fuel Pool area accessible. __ b) **WHEN** Unit 1 Spent Fuel Pool area accessibility determined, **THEN** perform Steps 5.e.2 through 5.e.4. __ c) **GO TO** Step 6.
__ 2) Verify Unit 1 Spent Fuel Pool area - ACCESSIBLE.	2) Notify station management to perform the following: __ a) Evaluate alternate method to monitor Unit 1 Spent Fuel Pool temperature. __ b) **IF AT ANY TIME** Unit 1 temperature estimated greater than - 125°F, **THEN REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level). __ c) **GO TO** Step 6.
3) Notify dispatched operator to determine Unit 1 Spent Fuel Pool temperature as follows: __ a) Obtain infrared thermometer from OSC "Emergency Supply Cabinet". __ b) Scan Spent Fuel Pool surface for highest reading. __ c) Report temperature determination to Control Room.	

ATTACHMENT 6

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 1 - Page 7 of 8 **Unit 1 Spent Fuel Pool Monitoring**	PAGE NO. 9 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

5. (Continued)

4) **<u>WHEN</u>** operator reports temperature, **<u>THEN</u>** perform the following:

__ a) Verify Spent Fuel Pool temperature - LESS THAN 125°F.

RESPONSE NOT OBTAINED:

a) Notify Control Room Supervisor of the following:

__ (1) Unit 1 Spent Fuel Pool temperature.

__ (2) **<u>REFER TO</u>** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).

__ b) Record Unit 1 Spent Fuel Pool temperature in the following table:

Time	Unit 1 SFP Temp	Time	Unit 1 SFP Temp	Time	Unit 1 SFP Temp

__ 6. **Notify Control Room Supervisor of Unit 1 Spent Fuel Pool level and temperature.**

ATTACHMENT 6

CNS EP/1/A/5000/G-1	GENERIC ENCLOSURES Enclosure 1 - Page 8 of 8 **Unit 1 Spent Fuel Pool Monitoring**	PAGE NO. 10 of 103 Revision 10

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 7. **Verify AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level) - IMPLEMENTED.**	**<u>IF AT ANY TIME</u> Unit 1 Spent Fuel Pool cooling <u>NOT</u> established prior to reaching either of the following conditions, <u>THEN</u> notify Control Room Supervisor, <u>REFER TO</u> AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level):** __ • Unit 1 Spent Fuel Pool greater than - 125°F. __ • Unit 1 Spent Fuel Pool level less than - 39 ft.
__ 8. **Repeat this enclosure every 2 hours until notified by station management.**	

ATTACHMENT 7

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 1 of 5 NC Temperature Control	PAGE NO. 42 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. **Verify any NC pump - ON.**	**Perform the following:** a. Use NC T-Colds to determine NC temperature as required in subsequent steps. b. GO TO Step 4.
2. **Use NC T-Avg to determine NC temperature as required in subsequent steps.**	
3. **IF AT ANY TIME all NC pumps tripped, THEN use NC T-Colds to determine NC temperature as required in subsequent steps.**	
4. **Verify one of the following:** • NC temperature - STABLE AT LESS THAN OR EQUAL TO 557°F OR • NC temperature - TRENDING TO 557°F.	GO TO **Step 8.**
5. **Continue to monitor NC temperature.**	
6. **Notify Control Room Supervisor of NC temperature control status.**	

ATTACHMENT 7

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 2 of 5 **NC Temperature Control**	PAGE NO. 43 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **Do not continue in this enclosure until one of the following occurs:** • NC temperature - GREATER THAN 557°F AND INCREASING IN AN UNCONTROLLED MANNER OR • NC temperature - GREATER THAN 557°F AND STABLE OR • NC temperature - LESS THAN 557°F AND DECREASING IN AN UNCONTROLLED MANNER.	

ATTACHMENT 7

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 3 of 5 **NC Temperature Control**	PAGE NO. 44 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. **Verify NC temperature - LESS THAN 557°F AND DECREASING.**	**Perform the following:** a. IF NC temperature greater than 557°F AND increasing, THEN stabilize NC temperature at 557°F as follows: 1) IF steam dumps available, THEN use steam dumps. 2) IF steam dumps not available, THEN use S/G PORVs. b. IF the following conditions exist: • NC temperature greater than 557°F and stable • Time and manpower available, THEN stabilize NC temperature at 557°F as follows: 1) IF steam dumps available, THEN use steam dumps. 2) IF steam dumps not available, THEN use S/G PORVs. c. GO TO Step 10.
9. **Attempt to stop the NC cooldown as follows:**	
a. Ensure all steam dumps - CLOSED.	
b. Ensure all S/G PORVs - CLOSED.	b. IF any S/G PORV cannot be closed, THEN CLOSE its isolation valve.
c. Ensure S/G blowdown isolated.	

ATTACHMENT 7

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 4 of 5 **NC Temperature Control**	PAGE NO. 45 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
d. CLOSE the following valves: • 1SM-77A (S/G 1A Otlt Hdr Bldwn C/V) • 1SM-76B (S/G 1B Otlt Hdr Bldwn C/V) • 1SM-75A (S/G 1C Otlt Hdr Bldwn C/V) • 1SM-74B (S/G 1D Otlt Hdr Bldwn C/V).	
e. Verify MSR Second Stage steam supply valves - CLOSED • 1HM-1 (MSRH 1A&1B SSRH Stm Source) • 1HM-2 (MSRH 1C&1D SSRH Stm Source).	e. Perform the following: 1) CLOSE MSR Second Stage steam supply valve(s). 2) <u>IF</u> steam flowpath cannot be isolated from Control Room, <u>THEN</u> CLOSE the following valves: • All MSIVs • All MSIV bypass valves.
f. Depress and hold "S/V BEFORE SEAT DRN" "CLOSE" pushbutton (1MC-3) to close the following valves: • 1SM-41 (Stop Vlv #1 Before Seat Drn) • 1SM-44 (Stop Vlv #2 Before Seat Drn) • 1SM-43 (Stop Vlv #3 Before Seat Drn) • 1SM-42 (Stop Vlv #4 Before Seat Drn).	

ATTACHMENT 7

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 5 of 5 **NC Temperature Control**	PAGE NO. 46 of 47 Revision 42

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
g. Verify NC cooldown - STOPPED.	g. <u>IF</u> cooldown continues, <u>THEN</u> THROTTLE feed flow as follows: 1) <u>IF</u> S/G N/R level less than 11% (29% ACC) in all S/G's, <u>THEN</u> THROTTLE feed flow to achieve the following: • Minimize cooldown • Maintain total feed flow greater than 450 GPM. 2) <u>WHEN</u> N/R level greater than 11% (29% ACC) in any S/G, <u>THEN</u> THROTTLE feed flow further to achieve the following: • Minimize cooldown • Maintain at least one S/G N/R level greater than 11% (29% ACC). 3) <u>IF</u> cooldown continues, <u>THEN</u> CLOSE the following valves: • All MSIVs • All MSIV bypass valves.
10. **Continue to perform actions of this enclosure as required to ensure one of the following:** • NC temperature - STABLE AT LESS THAN OR EQUAL TO 557°F. OR • NC temperature - TRENDING TO 557°F.	
11. **Notify Control Room Supervisor of NC temperature control status.**	

ATTACHMENT 8

CAUTION **Loss of CA Pump #1 suction requires prompt action.**

NOTE SSF, VI and normal CA suction sources are susceptible to adverse wind and seismic interaction.

1. **Ensure CA suction source availability as follows:**

   a. Monitor the following:

      1) **IF AT ANY TIME** any of the following conditions exist, **THEN GO TO** Step 1.a.2:

         - 1AD-5, E/1 "CA PUMPS TRAIN A LOSS OF NORMAL SUCTION" - LIT
         - 1AD-5, E/2 "CA PUMPS TRAIN B LOSS OF NORMAL SUCTION" - LIT
         - Unanticipated decrease in CA flow
         - Unanticipated UST level decrease.

      2) Verify loss of CA Pump #1 suction source as follows:

         - Both of the following RN suction valves - CLOSED:
           - 1RN-250A (RN Hdr A To CA Pmp Suct Isol)
           - 1RN-310B (RN Hdr B To CA Pmp Suct Isol).

           AND

         - Either of the following RC suction valves - CLOSED:
           - 1CA-174 (RC To CA Suction Isol)
           - 1CA-175 (RC To CA Suction Isol).

      3) Do not continue in this step unless loss of CA Pump #1 suction source has occurred.

   NOTE 1SA-2 and 1SA-5 fail open on loss of power or loss of VI.

   b. **IF** Loss of CA suction source has occurred, **THEN** secure CA Pump #1 as follows:

      1) Reset "CA SYS VLV CTRL TRN A".

      2) Depress "CLS/TRIP" on "CAPT TRIP T/V CTRL".

      3) **IF** loss of power anticipated to last greater than 4 hours, **THEN** concurrently implement FG/1/A/CFLX/FSG-02 (Alternate TD CA Pump Suction Source) while continuing in this procedure.

      4) **IF** loss of power anticipated to be less than 4 hours, **THEN** concurrently implement Enclosure 37 (Alternate CA Suction Strategy) while continuing in this procedure.

ATTACHMENT 8

CNS EP/1/A/5000/ECA-0.0	LOSS OF ALL AC POWER **Enclosure 1 - Page 2 of 2** **Foldout Page**	PAGE NO. **60 of 238** **Revision 50**

2. **Alternate Low Pressure Feedwater Criteria (applies after Step 25 in body of the procedure):**

   - **IF** CA Pump #1 flow lost **AND** not immediately recoverable, **THEN** perform Enclosure 44 (Feeding S/Gs with Low Pressure Source).

3. **Loss of Vital Instrumentation or Control Power:**

   - **IF** either of the following conditions occur, **THEN** perform FG/1/A/CFLX/FSG-07 (Loss of Vital Instrumentation or Control Power):
     - All essential DC bus voltages - LESS THAN 110V

       OR
     - All channels of any one of the following critical indications - LOST:
       - High priority: (FSG-7 is high priority to ensure plant control for the following):
         - S/G N/R level (all channels lost for any S/G)
         - S/G pressure (all channels lost for any S/G).
       - Low priority: (FSG-7 can be performed as time allows for the following):
         - ICCM (includes NC pressure, Core Exit T/C temperature, RVLIS)
         - Pzr Level
         - W/R Neutron Flux
         - Containment pressure
         - CA flow to S/Gs.

4. **Low Decay Heat Temperature Control:**

   - **IF** S/G pressure cannot be maintained at or above target pressure in either condition below,
     - S/G pressure 240 PSIG with Cold Leg Accumulators in service

       OR
     - S/G pressure 160 PSIG with Cold Leg Accumulators isolated or vented,

     THEN perform FG/1/A/CFLX/FSG-09 (Low Decay Heat Temperature Control).

ATTACHMENT 9

CNS EP/1/A/5000/ES-1.1	SAFETY INJECTION TERMINATION Enclosure 1 - Page 1 of 1 **Foldout Page**	PAGE NO. 38 of 57 Revision 33

1. **S/I Reinitiation Criteria:**

   - IF NC subcooling based on core exit T/Cs less than 0°F OR Pzr level cannot be maintained greater than 11% (30% ACC), THEN perform the following:

     a. Start one or more S/I pumps.

     b. Realign NV S/I flow path. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 14 (NV Alignment To S/I Mode).

     c. IF Step 11 has been completed, THEN GO TO EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant).

2. **Secondary Integrity Criteria:**

   - IF any unisolated S/G pressure decreasing in an uncontrolled manner OR has completely depressurized, THEN GO TO EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).

3. **Cold Leg Recirc Switchover Criterion:**

   - IF FWST level decreases to 20% (1AD-9, D/8 "FWST 2/4 LO LEVEL"), THEN GO TO EP/1/A/5000/ES-1.3 (Transfer To Cold Leg Recirculation).

4. **CA Suction Source Switchover Criterion:**

   - IF 1AD-8, B/1 "UST LO LEVEL" lit, THEN REFER TO AP/1/A/5500/006 (Loss of S/G Feedwater).

JPM A

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EVALUATION SHEET

Task: Emergency Borate the Reactor Coolant System

Alternate Path: Yes

Facility JPM #: NV-017

Safety Function: 1 **Title:** Reactivity Control

K/A 004 A2.14 Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Emergency Boration

Rating(s): 3.8 / 3.9 **CFR:** 41.5 / 43/5 / 45/3 / 45/5

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator __X__ In-**P**lant ________ **P**erform __X__ **S**imulate ________

References: EP/1/A/5000/FR-S.1 (Nuclear Power Generation/ATW) rev. 022

Task Standard: One NV pump running with its suction aligned to the FWST and isolated from the VCT.

Validation Time: 5 minutes **Time Critical:** Yes _____ No __X__

===

Applicant: Time Start: __________

NAME____________________________ Docket #_______________ Time Finish: __________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ____________________________ ____________________________/________

NAME SIGNATURE DATE

===

COMMENTS

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SIMULATOR OPERATOR INSTRUCTIONS:

1. ENSURE NRC Examination Security has been established.
2. Reset to IC #150
3. Enter the password.
4. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
5. Ensure simulator setup per table below.
6. Place simulator in RUN and acknowledge any alarms.
7. ENSURE "Extra Operator" is present in the simulator.
8. Place simulator in FREEZE until Examiner cue is given.

✓	Instructor Action	Final	Delay	Ramp	Delete In	Event
	MAL-IPX003A (REACTOR TRIP BKR A FAILURE)	ACTIVE				
	MAL-IPX003B (REACTOR TRIP BKR B FAILURE)	ACTIVE				
	VLV-NV043F (NV236B BORIC ACID TO CHG PMP VLV FAIL TO POSITION)	0				
	MAL-MT007 (LOSS OF TURBINE LUBE OIL PRESSURE)	ACTIVE				
	Instructor will act as the OATC and be manually inserting control rods when the simulator is placed in RUN.					

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READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **A valid reactor trip signal has been received.**
- **The reactor will NOT trip automatically or manually.**
- **A Red Path for Subcriticality is in effect.**
- **The OATC is inserting rods manually.**

INITIATING CUES:

The Control Room Supervisor instructs you to initiate emergency boration, per EP/1/A/5000/FR-S.1, (Nuclear Power Generation/ATWS), step 4.

EXAMINER NOTE: After reading cue, provide the applicant with a copy of EP/1/A/5000/FR-S.1.

STEP/STANDARD	SAT/UNSAT

START TIME: _______

STEP 1: 4. **Initiate emergency boration of NC System as follows:** a. Ensure at least one NV pump - ON. STANDARD: Applicant verifies red "ON" light lit for "NV PMP 1A" or "1B" (1MC-10). COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 2 4. b. OPEN 1NV-236B (Boric Acid To NV Pumps Suct). STANDARD: Applicant depresses the red "OPEN" pushbutton for 1NV-236B and verifies the red "OPEN" light remains dark and the green "CLSD" light remains lit on 1MC-10. 1NV-236B remains closed. **Examiner Note: This begins the alternate path of this JPM.** COMMENTS:	___ **SAT** ___**UNSAT**
STEP 3 4. c. Ensure both boric acid transfer pump switches - IN THE "ON" POSITION. STANDARD: Applicant rotates the switches for "B/A XFER PMP 1A" and "B/A XFER PMP 1B" to the "ON" position. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 4 4. d. Verify emergency boration flow - GREATER THAN OR EQUAL TO 30 GPM. STANDARD: Applicant verifies “EMER BORATE FLOW” (1NVP5440) indicates 0 gpm (1MC-5) and transitions to the RNO. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 5 4. d. RNO d. Align NV pump suction to FWST as follows: 1) OPEN the following valves: • 1NV-252A (NV Pumps Suct From FWST) • 1NV-253B (NV Pumps Suct From FWST). STANDARD: Applicant depresses the red “OPEN” pushbuttons for 1NV-252A and 1NV-253B and verifies the red “OPEN” light is lit and green “CLSD” light is dark for both valves. **Examiner Note: This step is critical to align borated water to the suction of the charging pumps. Only ONE of the valves opened meets the Critical Step criteria.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 6 4. d. RNO d. 2) CLOSE the following valves: • 1NV-188A (VCT Otlt Isol) • 1NV-189B (VCT Otlt Isol). STANDARD: Applicant depresses the green "CLOSE" pushbutton for 1NV-188A and 1NV-189B and verifies the green "CLSD" light lit and red "OPEN" light dark for both valves. **Examiner Note: This step is critical to prevent borated water from going to the VCT instead of the suction of the charging pumps as long as one of the valves is closed. Closing only ONE of the valves meets the intent of the Critical Step criteria.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 7 4. e. Verify the following charging line isolation valves - OPEN: • 1NV-312A (Chrg Line Cont Isol) follows: • 1NV-314B (Chrg Line Cont Isol). STANDARD: Applicant verifies the red "OPEN" lights lit and green "CLSD" lights dark on 1NV-312A and 1NV-314B. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 8 4. f. Verify Pzr pressure - LESS THAN 2335 PSIG. STANDARD: Applicant verifies PZR pressure instruments (1NCP5161, 1NCP5150, 1NCP5170 and 1NCP5171) indicate less than 2335 psig (1MC-10). COMMENTS: **END OF TASK**	___ **SAT** ___ **UNSAT**

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **A valid reactor trip signal has been received.**
- **The reactor will NOT trip automatically or manually.**
- **A Red Path for Subcriticality is in effect.**
- **The OATC is inserting rods manually.**

INITIATING CUES:

The Control Room Supervisor instructs you to initiate emergency boration, per EP/1/A/5000/FR-S.1, (Nuclear Power Generation/ATWS), step 4.

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EVALUATION SHEET

Task: Perform E-0 Actions To Ensure A Complete Containment Isolation

Alternate Path: Yes

Facility JPM #: N/A

Safety Function: 2 **Title:** Engineering Safety Features Actuation System

K/A 013 A4.01 Ability to manually operate and/or monitor in the control room: ESFAS-initiated equipment which fails to actuate.

Rating(s): 4.5 / 4.8 **CFR:** 41.7 / 45.5 to 45.8

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator __X__ In-**P**lant ________ **P**erform __X__ **S**imulate ________

References: EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) Rev 42

Task Standard: At least one train of Phase A containment isolation initiated and either 1WL-825A or 1WL-827B manually closed.

Validation Time: 5 minutes **Time Critical:** Yes ______ No __X__

==

Applicant: Time Start: __________
NAME____________________________ Docket #_______________ Time Finish: __________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ______________________________ ______________________________/________
NAME SIGNATURE DATE

==

COMMENTS

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SIMULATOR OPERATOR INSTRUCTIONS:

1. ENSURE NRC Examination Security has been established.
2. Reset to IC #151
3. Enter the password.
4. Select “Yes” on the INITIAL CONDITION RESET pop-up window.
5. Ensure simulator setup per table below.
6. Place simulator in RUN.

✓	Instructor Action	Final	Delay	Ramp	Delete In	Event
	MAL-NC013D (NC COLD LEG D LEAK)	27.5	:10			1
	MAL-ISE003A (AUTO PHASE A ISOL SIGNAL TRN A)	BLOCK				
	MAL-ISE003B (AUTO PHASE B ISOL SIGNAL TRN B)	BLOCK				
	VLV-WL009A (WL825A CONT SUMP PMP DISCH ISOL IN FAIL AUTO ACTIONS)	ACTIVE				
	VLV-WL010A (WL827B CONT SUMP PMP DISCH ISOL OUT FAIL AUTO ACTIONS)	ACTIVE				
	When applicant is ready, INSERT EVENT 1.					

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READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **You are the OATC**
- **The BOP has stepped out of the control room**
- **The CRS is performing an IPTE brief on Unit 2**

INITIATING CUES:

- **Monitor your control boards**

EXAMINER NOTE: **After reading cue, and applicant has walked down the control boards, have the simulator operator INSERT EVENT 1. This will cause a safety injection on Unit 1. All E-0 immediate action steps will be met without any operator action. Once the applicant has announced that the Immediate Actions are complete, hand them a copy of E-0 beginning at step 6.**

EXAMINER CUE: "The CRS has validated that the immediate actions are complete and directs you to continue performance of E-0, beginning at Step 6."

STEP/STANDARD	SAT/UNSAT

START TIME: _______

STEP 1: 6. **Announce "Unit 1 Safety Injection".** STANDARD: Applicant uses the plant paging system to make the announcement. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 2 7. **Determine required notifications:** • **REFER TO** RP/0/A/5000/001 (Classification of Emergency) • **REFER TO** RP/0/B/5000/013 (NRC Notification Requirements) STANDARD: Applicant acknowledges the step and continues with E-0. COMMENTS:	___ **SAT** ___**UNSAT**
STEP 3 8. **Verify all Feedwater Isolation status lights (1SI-5) – LIT.** STANDARD: Applicant verifies all Feedwater Isolation status lights lit on 1SI-5. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 4 9. **Verify Phase A Containment Isolation status as follows:** a. Phase A "RESET" lights – DARK. STANDARD: Applicant determines that the Phase A RESET lights are lit and transitions to the RNO. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 5 9.a.RNO. Initiate Phase A Isolation. STANDARD: Applicant depresses both of the red INITIATE pushbuttons for Train A and Train B and verifies the yellow RESET lights extinguish. **Examiner Note: It is critical for the applicant to at least initiate one train of Phase A to ensure that at least one valve in every penetration other than from the containment sump is isolated. The containment sump penetration will have to be manually isolated in the RNO for the following step.** **Examiner Note: This begins the alternate path for this JPM.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 6 9.b. Monitor Light Panel Group 5 St lights on energized train(s) – LIT. STANDARD: Applicant determines that Group 5 St lights C/3 and C/10 are dark and transitions to the RNO. **Examiner Note: It may take up to 60 seconds for all other valves to indicate isolated.** COMMENTS:	**___ SAT** **___ UNSAT**
STEP 7 9.b.RNO. Align valves as necessary to ensure each penetration isolated by at least one isolation valve. STANDARD: Applicant depresses the green CLOSE pushbuttons for 1WL-825A and 1WL-827B and verifies the green CLSD light lit and red OPEN light dark for each valve. **Examiner Note: It is critical for the applicant to close 1 of these valves to ensure the containment sump penetration is isolated.** **Examiner Cue: Once valves have been closed, "This JPM is complete."** COMMENTS: **END OF TASK**	**CRITICAL STEP** **___ SAT** **___ UNSAT**

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **You are the OATC**
- **The BOP has stepped out of the control room**
- **The CRS is performing an IPTE brief on Unit 2**

INITIATING CUES:

- **Monitor your control boards**

JPM C

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EVALUATION SHEET

Task: Establish NC system Bleed and Feed per EP/1/A/5000/FR-H.1

Alternate Path: Yes

Facility JPM #: NC-046

Safety Function: 4P **Title:** Reactor Coolant System

K/A WE05EA1.1 Ability to operate and/or monitor the following as they apply to the (Loss of Secondary Heat Sink): Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Rating(s): 4.1 / 4.0 **CFR:** 41.7 / 45.5 / 45.6

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator __X__ In-**P**lant ________ **P**erform __X__ **S**imulate ________

References: EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink) rev. 42

Task Standard: Aligns S/I feed path using NI and NV pumps and opens 1NC-32B and 1NC-34A PZR PORVs to establish NC system bleed path

Validation Time: 10 minutes **Time Critical:** Yes _____ No __X__

===

Applicant: Time Start: __________
NAME____________________________ Docket #_______________ Time Finish: __________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ____________________________ ____________________________/________
NAME SIGNATURE DATE

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COMMENTS

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SIMULATOR OPERATOR INSTRUCTIONS:

1. ENSURE NRC Examination Security has been established.
2. Reset to IC #152.
3. Enter the password.
4. Select “Yes” on the INITIAL CONDITION RESET pop-up window.
5. Ensure simulator setup per table below.
6. Place simulator in RUN and acknowledge any alarms.
7. ENSURE “Extra Operator” is present in the simulator.
8. Place simulator in FREEZE until Examiner cue is given.

✓	Instructor Action	Final	Delay	Ramp	Delete In	Event
	MAL-CA003A CAPT SA2 FAILS TO START	Active				
	MAL-CA003B CAPT SA5 FAILS TO START	Active				
	MAL-CA004A FAILURE OF CA PUMP A TO START	Both				
	MAL-CA004B FAILURE OF CA PUMP B TO START	Both				
	MAL-NI001B NI PUMP B FAILURE	Auto				
	OVR-ISE043 SAFETY INJECTION INITIATE PB TRN B	Off				
	MAL-ISE002B (AUTO SI TRN B FAILS TO ACTUATE)	Active				
	VLV-NI001F (NI9A B.I.T. DISCHARGE ISOL VLV FAIL TO POSITION)	0				

Catawba Nuclear Station
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READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **A reactor trip has occurred on Unit 1 due to a loss of both Main Feedwater pumps.**
- **The CA system will not function.**
- **Attempts to restart the Main CF pumps have been unsuccessful.**
- **EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink) has been entered due to a "RED PATH" for the Heat Sink critical safety function while performing EP/1/A/5000/ES-0.1 (Reactor Trip Response).**
- **Bleed and Feed initiation criteria have been met.**

INITIATING CUES:

- **The CRS instructs you to initiate NC system bleed and feed beginning at step 19 of EP/1/A/5000/FR-H.1. Inform the CRS when the bleed and feed path has been initiated and verified.**

EXAMINER NOTE: After reading cue, provide the applicant with a copy of EP/1/A/5000/FR-H.1.

STEP/STANDARD	SAT/UNSAT

START TIME: _______

STEP 1: 19. Perform Steps 20 through 24 quickly to establish NC heat removal by NC bleed and feed. STANDARD: Applicant acknowledges this step. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP 2 20. Ensure all NC pumps - OFF. STANDARD: Applicant ensures the NC pumps are off. COMMENTS:	___ **SAT** ___**UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 3 21. Initiate S/I. STANDARD: Applicant depresses the red train 'A' and 'B' "SAFETY INJECTION INITIATE" pushbuttons and verifies the red "SAFETY INJECTION ACTUATED" status light is lit on 1SI-13 or "ECCS TRN A" yellow reset light is dark on 1MC-11. **Examiner Note: This step is critical to start the NI pump and align the valves required for initiating an NC system feed path.** **Examiner Note: This begins the alternate path for this JPM.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 4 22. Verify NC System feed path as follows: a. Verify the following pumps - ON: • At least one NV pump • At least one NI pump. STANDARD: Applicant determines that at least one NV pump and one NI pump are running. **Examiner Note: Applicant may start 1B NI pump and 1B NV pump at this time due to it being a failed auto action. If not, the procedure will direct starting these pumps in the upcoming steps.** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 5 22 b. Verify "NV S/I FLOW" – INDICATING FLOW. STANDARD: Applicant determines that 1NVP6080 (NV S/I FLOW) on 1MC-3 indicates 0 GPM and transitions to the RNO. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 6 22 b. RNO Perform the following: 1) Ensure the following pumps - ON: • NV Pumps • NI Pumps. STANDARD: Applicant ensures that all NV pumps and NI pumps are running by depressing the red ON pushbuttons for any non-running pump, and verifying the red ON lights are lit and green OFF lights are dark for all pumps. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 7 22 b. RNO 2) **IF** at least one NV pump in service, **THEN** perform the following: a) Ensure the following valves - OPEN: • 1NV-252A (NV Pumps Suct From FWST) • 1NV-253B (NV Pumps Suct From FWST). STANDARD: Applicant verifies the red OPEN lights lit and green CLSD lights dark on 1NV-252A and 1NV-253B. COMMENTS:	___ SAT ___ UNSAT
STEP 8 22 b. RNO 2) b) Ensure the following valves - CLOSED: • 1NV-188A (VCT Otlt Isol) • 1NV-189B (VCT Otlt Isol). STANDARD: Applicant determines that the green CLSD light is lit and red OPEN light is dark on 1NV-188A. Applicant determines that the green CLSD light is dark for 1NV-189B, and depresses the green CLOSE pushbutton and verifies the green CLSD light is lit and the red OPEN light is dark COMMENTS:	___ SAT ___ UNSAT

STEP/STANDARD	SAT/UNSAT
STEP 9 22 b. RNO 2) c) Ensure the following valves - OPEN: • 1NI-9A (NV Pmp C/L Inj Isol) • 1NI-10B (NV Pmp C/L Inj Isol). STANDARD: Applicant determines the red OPEN light is dark and green CLSD light is lit on 1NI-9A and 1NI-10B. Applicant depresses the red OPEN pushbutton for 1NI-9A but the valve will not open. Applicant depresses the red OPEN pushbutton for 1NI-10B and verifies the red OPEN light is lit and the green CLSD light is dark. **Examiner Note: This step is critical to align an NC (Reactor Coolant) system Feed path.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 10 22 b. RNO 3) **IF** NI Pump 1A is in service, **THEN** ensure the following valves - OPEN: • 1NI-103A (NI Pump 1A Suct) • 1NI-118A (NI Pump 1A C-Leg Inj Isol) • 1NI-162A (NI To C-Legs Inj Hdr Isol) • 1NI-100B (NI Pmps Suct From FWST). STANDARD: Applicant determines that the red OPEN lights are lit and green CLSD lights are dark on valves 1NI-103A, 1NI-118A, 1NI-162A, and 1NI-100B. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 11 22 b. RNO 4) **IF** NI Pump 1B is in service, **THEN** ensure the following valves - OPEN: • 1NI-135B (NI Pump 1B Suct) • 1NI-150B (NI Pump 1B C-Leg Inj Isol) • 1NI-162A (NI To C-Legs Inj Hdr Isol) • 1NI-100B (NI Pmps Suct From FWST). STANDARD: Applicant verifies that the red OPEN light is lit and green CLSD light is dark on valves 1NI-135B, 1NI-150B, 1NI-162A, and 1NI-100B. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 12 22 b. RNO 5) **IF** no feed path can be aligned, **THEN** perform the following: STANDARD: Applicant determines that a feed path does exist and this step is N/A. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 13 23. Establish NC System bleed path as follows: a. Ensure all Pzr PORV isolation valves - OPEN. STANDARD: Applicant determines the RED lights are lit and GREEN lights are dark on valves 1NC-31B, 1NC-35B, and 1NC-33A. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 14 23 b. Select "OPEN" on the following PZR PORVs: • 1NC-34A (PZR PORV) • 1NC-32B (PZR PORV). STANDARD: Applicant rotates switches for 1NC-34A and 1NC-32B, clockwise to the OPEN position and verifies RED lights are lit and GREEN lights are dark on both valves. **Examiner Note: This step is critical because it establishes an NC (Reactor Coolant) system Bleed path.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 15 23 c. Align N_2 to Pzr PORVs by opening the following valves: • 1NI-438A (Emer N2 From CLA A To 1NC-34A) • 1NI-439B (Emer N2 From CLA B To 1NC-32B). STANDARD: Applicant depresses the red OPEN pushbutton and verifies red OPEN light lit and green CLSD light dark on valves 1NI-438A and 1NI-439B. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 16 23 d. Verify power to all Pzr PORV isolation valves - AVAILABLE. STANDARD: Applicant verifies indicating lights lit on 1NC-31B, 1NC-35B, and 1NC-33A. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 17 24. Verify the following valves - OPEN: • 1NC-31B (PZR PORV Isol) • 1NC-32B (PZR PORV) • 1NC-33A (PZR PORV Isol) • 1NC-34A (PZR PORV). STANDARD: Applicant verifies lights on 1NC-31B, 1NC-32B, 1NC-33A and 1NC-34A indicate OPEN. COMMENTS: **END OF TASK**	___ SAT ___ UNSAT

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **A reactor trip has occurred on Unit 1 due to a loss of both Main Feedwater pumps.**
- **The CA system will not function.**
- **Attempts to restart the Main CF pumps have been unsuccessful.**
- **EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink) has been entered due to a “RED PATH” for the Heat Sink critical safety function while performing EP/1/A/5000/ES-0.1 (Reactor Trip Response).**
- **Bleed and Feed initiation criteria have been met.**

INITIATING CUES:

- **The CRS instructs you to initiate NC system bleed and feed beginning at step 19 of EP/1/A/5000/FR-H.1. Inform the CRS when the bleed and feed path has been initiated and verified.**

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EVALUATION SHEET

Task: Realign CA Suction Source

Alternate Path: Yes

Facility JPM #: CA-085

Safety Function: 4S **Title:** Auxiliary / Emergency Feedwater System

K/A 054 AA1.01 Ability to operate and/or monitor the following as they apply to the Loss of Main Feedwater (MFW): AFW controls, including the use of alternate AFW sources.

Rating(s): 4.5 / 4.4 **CFR:** 41.7 / 45.5 / 45.6

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator __X__ In-**P**lant ________ **P**erform __X__ **S**imulate ________

References: AP/1/A/5500/006 (Loss of S/G Feedwater) Rev 42

Task Standard: CA suction supply aligned to the RN system while maintaining total CA flow < 600 gpm per AP/1/A/5500/006 Case II.

Validation Time: 10 minutes **Time Critical:** Yes ____ No __X__

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Applicant: Time Start: __________
NAME____________________________ Docket #_______________ Time Finish: __________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ____________________________ ____________________________/________
NAME SIGNATURE DATE

==

COMMENTS

Catawba Nuclear Station
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SIMULATOR OPERATOR INSTRUCTIONS:

1. ENSURE NRC Examination Security has been established.
2. Reset to IC #153.
3. Enter the password.
4. Select “Yes” on the INITIAL CONDITION RESET pop-up window.
5. Ensure simulator setup per table below.
6. Place simulator in RUN and acknowledge any alarms.
7. ENSURE “Extra Operator” is present in the simulator.
8. Place simulator in FREEZE until Examiner cue is given.

✓	Instructor Action	Final	Delay	Ramp	Delete In	Event
	XMT-CM004 (LCS_5840 UST LVL RECORDER BLUE)	8.5				
	VLV-CM012F (CM370 COND C VACUUM BRKR FAIL TO POSTION)	0				
	VLV-CM011F (CM369 COND B VACUUM BRKR FAIL TO POSTION)	0				
	VLV-CM010F (CM368 COND A VACUUM BRKR FAIL TO POSTION)	0				
	OVR-FWP012C (CFPT 1A TRIP_RESET TRIP PB)	ON				
	OVR-FWP015C (CFPT 1B TRIP_RESET TRIP PB)	ON				
	VLV-CA002F (CA4 CA PMP SUCT FROM UST HDR ISOL FAIL TO POSITION)	1				
	Ensure CA System Valve Control is reset.					

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INITIAL CONDITIONS:

- **A reactor trip has occurred.**
- **The crew has performed applicable actions of EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) and transitioned to EP/1/A/5000/ES-0.1 (Reactor Trip Response).**
- **While performing actions of ES-0.1, 1AD-8, B/1 (UST LO LEVEL) alarmed.**
- **Using guidance contained in Enclosure 1 (Foldout Page), the crew has implemented AP/1/A/5500/006 (Loss of S/G Feedwater), Case II (Loss of Normal CA Supply).**

INITIATING CUES:

The Control Room Supervisor instructs you to perform the actions of AP/06 Case II, beginning at Step 7.

EXAMINER NOTE: After reading cue, provide the applicant with a copy of AP/1/A/5500/006 Case II with steps 1-6 completed.

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STEP/STANDARD	SAT/UNSAT

START TIME: _______

STEP 1: 7. **IF AT ANY TIME UST level is less than 10% (5,000 gal), THEN perform the following:** a. Close 1CA-4 (CA Pmps Suct From UST). STANDARD: Applicant determines that UST level is <10% on chart recorder and depresses the green "CLOSE" pushbutton on 1CA-4 and verifies the red "OPEN" light remains lit (1CA-4 will not close). COMMENTS:	___ **SAT** ___ **UNSAT**

STEP 2 7. b. **IF** 1CA-4 will not close, **THEN** dispatch operator to unlock and close 1CS-19 (CA Pumps Supply From Upper Surge Tank) (TB1-627, 1D-30) (Key #633). STANDARD: Applicant contacts an AO and dispatches them to unlock and close 1CS-19. **Booth Operator Cue: "Operator has been dispatched to unlock and close 1CS-19."** **Examiner Note: It is only critical for the applicant to dispatch an operator to manually close 1CS-19 by the end of the scenario to isolate the suction from the UST. This valve will not be closed during the performance of this JPM.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___**UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 3 8. Maintain total CA flow less than 600 GPM in subsequent steps. STANDARD: Applicant uses CA flow control valves to throttle total CA flow to less than 600 GPM. **Examiner Note: This step is critical to preserve the remaining inventory of available makeup water while aligning an alternate source.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 4 9. Monitor Enclosure 1 (Foldout Page). STANDARD: Applicant acknowledges step and continues. **Examiner Cue: "Another operator will monitor Enclosure 1."** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
<u>STEP 5</u> 10. Break condenser vacuum as follows: a. Open "COND A-B-C VAC BKR VLVS" <u>STANDARD</u>: Applicant depresses the red "OPEN" pushbutton for "COND A-B-C VAC BKR VLVS" and notes that the red "OPEN" light remains dark (vacuum breaker valves will not open). Applicant transitions to the RNO. **Examiner Note: This begins the alternate path for this JPM.** <u>COMMENTS:</u>	___ **SAT** ___ **UNSAT**
<u>STEP 6</u> 10.a.RNO. Dispatch two (2) operators to break vacuum. <u>**REFER TO**</u> Enclosure 3 (Local Actions To Break Condenser Vacuum). <u>STANDARD</u>: Applicant dispatches two AOs to break condenser vacuum per Enclosure 3. **Booth Operator Cue: "Operators have been dispatched to break condenser vacuum per Enclosure 3."** <u>COMMENTS:</u>	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 7 10.b.1) Verify condenser vacuum indication – AVAILABLE. STANDARD: Applicant verifies that condenser vacuum indication is available on both 1MC-1 and 1MC-13 control boards. COMMENTS:	___ **SAT** ___ **UNSAT**
NOTE It may take up to 10 minutes for condenser vacuum to reach 0 inches HgVac. STEP 8 10.b.2) Verify one of the following: • "CONDENSER VACUUM" (1MC-13) – 0"IN HGV" OR • Dispatched operator reports no air flow into condenser. STANDARD: Applicant verifies condenser vacuum is not broken and operators were unsuccessful in breaking vacuum. Applicant transitions to the RNO. **Booth Operator Cue:** **"Dispatched operators report that they are unable to manually open Condenser Vacuum Breaker valves."** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 9 10.b.2)RNO. Shift CA pump suction to RN as follows: a) **IF** Train A RN essential header is available, **THEN** open the following valves: • 1RN-250A (RN Hdr A To CA Pmp Suct Isol) • 1CA-116A (CA Pump #1 Suct Frm RN Isol) • 1CA-15A (CA Pump 1A Suct Frm RN Isol). STANDARD: Applicant determines Train A RN essential header is available and rotates the switches for 1RN-250A, 1CA-116A, and 1CA-15A to the “OPEN” position and verifies the red “OPEN” indicating light is lit. **Examiner Note: This step is critical to ensure a makeup source of water is available to supply S/Gs for reactor decay heat removal.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT

STEP 10 10.b.2)RNO.b) **IF** Train B RN essential header is available, **THEN** open the following valves: • 1RN-310B (RN Hdr B To CA Pmp Suct Isol) • 1CA-85B (CA Pump #1 Suct Frm RN Hdr B) • 1CA-18B (CA Pump 1B Suct Frm RN Isol). STANDARD: Applicant determines Train B RN essential header is available and rotates the switches for 1RN-310B, 1CA-85B, and 1CA-18B to the “OPEN” position and verifies the red “OPEN” indicating light is lit. **Examiner Note: This step is critical to ensure a makeup source of water is available to supply S/Gs for reactor decay heat removal.** COMMENTS:	**CRITICAL STEP** **___ SAT** **___ UNSAT**

STEP 11 10.b.2)RNO.c) Ensure 1CA-6 (CA Pmps Suct From CACST) – CLOSED. STANDARD: Applicant determines that 1CA-6 is closed (normal position of this valve is closed with power removed). COMMENTS:	**___ SAT** **___ UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 12 10.b.2)RNO.d) **IF** 1CA-6 will not close, **THEN** dispatch operator to unlock and close 1CS-69 (U1 CACST To U1 & U2 CA Supplies) (SB-625, T-25) (Key #633). STANDARD: Applicant determines that this step does not apply. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 13 10.b.2)RNO.e) Ensure 1CA-4 (CA Pmps Suct From UST) – CLOSED. STANDARD: Applicant depresses the green “CLOSE” pushbutton and verifies that the red “OPEN” light remains illuminated (1CA-4 will not close and an AO was previously dispatched to unlock and close 1CS-19). COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 14 10.b.2)RNO.f) **IF** 1CA-4 will not close, **THEN** dispatch operator to unlock and close 1CS-19 (CA Pumps Supply From Upper Surge Tank) (TB1-627, 1D-30) (Key #633). STANDARD: Applicant determines that an operator has been previously dispatched to perform this action. **Examiner Note: It is only critical for the applicant to dispatch an operator to manually close 1CS-19 by the end of the scenario to isolate the suction from the UST. This valve will not be closed during the performance of this JPM.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 15 10.b.2)RNO.g) Maintain S/G N/R levels between 11% - 50%. STANDARD: Applicant acknowledges the step and attempts to adjust CA flow as required. **Examiner Cue: "Another operator will maintain S/G levels."** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 16 10.b.2)RNO.h) **GO TO** Step 17. STANDARD: Applicant acknowledges the step **Examiner Cue: "This JPM is complete."** COMMENTS: **END OF TASK**	___ **SAT** ___ **UNSAT**

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

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INITIAL CONDITIONS:

- **A reactor trip has occurred.**
- **The crew has performed applicable actions of EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) and transitioned to EP/1/A/5000/ES-0.1 (Reactor Trip Response).**
- **While performing actions of ES-0.1, 1AD-8, B/1 (UST LO LEVEL) alarmed.**
- **Using guidance contained in Enclosure 1 (Foldout Page), the crew has implemented AP/1/A/5500/006 (Loss of S/G Feedwater), Case II (Loss of Normal CA Supply).**

INITIATING CUES:

The Control Room Supervisor instructs you to perform the actions of AP/06 Case II, beginning at Step 7.

JPM E

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EVALUATION SHEET

Task: Operate Containment Cooling System Fans

Alternate Path: No

Facility JPM #: VV-001

Safety Function: 5 **Title:** Containment Cooling System

K/A 022 A4.01 Ability to manually operate and/or monitor in the control room: CCS fans.

Rating(s): 3.6 / 3.6 **CFR:** 41.7 / 45.5 to 45.8

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator X In-**P**lant ________ **P**erform X **S**imulate ________

References: AP/1/A/5500/028 (Secondary Steam Leak)

Task Standard: Place all Containment Cooling Fans in operation in "Max" cooling mode in accordance with AP/1/A/5500/028 (Secondary Steam Leak) Step 9.

Validation Time: 5 minutes **Time Critical:** Yes _____ No X

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Applicant: Time Start: __________

NAME____________________________ Docket #_______________ Time Finish: __________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ______________________________ ______________________________/________

NAME SIGNATURE DATE

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COMMENTS

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SIMULATOR OPERATOR INSTRUCTIONS:

1. ENSURE NRC Examination Security has been established.
2. Reset to IC # 154.
3. Enter the password.
4. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
5. Ensure simulator setup per table below.
6. Place simulator in RUN and acknowledge any alarms.
7. ENSURE "Extra Operator" is present in the simulator.
8. Place simulator in FREEZE until Examiner cue is given.

✓	Instructor Action	Final	Delay	Ramp	Delete In	Event
	MAL-SM007B (STM LINE BRK INSIDE CONTAINMENT LOOP B)	20000				
	Ensure LCVU's 1A, 1B, and 1D are in service.					
	Ensure UCVU 1B is in service.					

DO NOT PLACE SIMULATOR IN "RUN" UNTIL APPLICANT IS READY TO BEGIN.

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INITIAL CONDITIONS:

- **AP/1/A/5500/028 (Secondary Steam Leak) has been entered due to indications of a steam leak.**

INITIATING CUES:

- **The CRS has directed you to perform AP/1/A/5500/028, step 9.**
- **No personnel are in Containment.**

EXAMINER NOTE: After reading the cue, provide the applicant with a copy of AP/1/A/5500/028, step 9.

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START TIME: _______

STEP/STANDARD	SAT/UNSAT
STEP 1: 9. Attempt to identify and isolate the leak as follows: a. Verify the following conditions NORMAL: • Containment temperature • Containment pressure • Containment humidity • Containment floor & equipment sump level. STANDARD: Applicant determines conditions are not normal and transitions to RNO. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP 2: 9.aRNOa. Perform the following: 1) Evacuate containment. STANDARD: Applicant initiates the Containment Evacuation Alarm and may request the WCC to review the Containment Entry Logbook. **Examiner Cue: "If asked, WCC reports no personnel are listed in Containment Entry Logbook."** COMMENTS:	___ **SAT** ___**UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 3: 9.aRNOa. 2) Perform the following: a) Start all lower containment ventilation units in low speed. STANDARD: Applicant rotates switch VV LCVU 1C from “OFF” to “LOW” **Examiner Note: This step is critical to ensure all Lower Containment Ventilation Units are providing cooling and available to be used in Max cooling mode in order to minimize Containment pressure.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 4: 9.aRNOa.2) b) Start all upper containment ventilation units. STANDARD: Applicant rotates the following switches from “OFF” to “NORM”: VV UCVU 1A VV UCVU 1C VV UCVU 1D **Examiner Note: This step is critical to ensure all Upper Containment Ventilation Units are providing cooling and available to be used in Max cooling mode in order to minimize Containment pressure.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 5: 9.aRNOa.2) c) Place all upper and lower containment ventilation units in "MAX" cooling. STANDARD: Applicant verifies the following switches are in the "MAX" position. VV LCVU 1A MAX VV LCVU 1B MAX VV LCVU 1C MAX VV LCVU 1D MAX Applicant rotates the following switches from "NORM" to "MAX": VV UCVU 1A VV UCVU 1B VV UCVU 1C VV UCVU 1D **Examiner Note: This step is critical to ensure all Containment Ventilation Units are providing maximum cooling in order to minimize Containment pressure.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP 6: 9.aRNOa.3) **IF AT ANY TIME** containment pressure reaches 1.2 PSIG, **THEN** perform the following: STANDARD: Applicant acknowledges the continuous action statement and continues to step 4. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 7: 9.aRNOa.4) **GO TO** Step 10. STANDARD: **Examiner Cue: "Another operator will complete this procedure. JPM Complete"** COMMENTS: **END OF TASK**	___ **SAT** ___ **UNSAT**

EXAMINER NOTE: The applicant may choose to also place Lower Containment Ventilation Units in Hi Speed per the ARP associated with 1AD-19 B/12 (LOWER CONT PRESS 0.5 PSIG INITIATE HI SPEED). This is not included in the standard of this JPM.

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **AP/1/A/5500/028 (Secondary Steam Leak) has been entered due to indications of a steam leak.**

INITIATING CUES:

- **The CRS has directed you to perform AP/1/A/5500/028, step 9.**
- **No personnel are in Containment.**

JPM F

Catawba Nuclear Station
JPM F
2017 NRC Exam

EVALUATION SHEET

EVALUATION SHEET

Task: Reset Radiation Monitor Trip Setpoints

Alternate Path: No

Facility JPM #: WE-EMF-001

Safety Function: 7 **Title:** Process Radiation Monitoring System

K/A 073 A4.02 Ability to manually operate and/or monitor in the control room: Radiation monitoring system control panel

Rating(s): 3.7 / 3.7 **CFR:** 41.7 / 45.5 to 45.8

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator __X__ In-**P**lant ________ **P**erform __X__ **S**imulate ________

References: OP/0/A/6500/080 (EMF RP86A Output Modules) rev. 17, Enclosure 4.2 (EMF RP86A Trip Setpoint Adjustment)

Task Standard: EMF50L TRIP 1 setpoint set to 6.3 E3 CPM and the TRIP 2 setpoint set to 9.0 E3 CPM per OP/0/A/6500/080 (EMF RP86A Output Modules) Enclosure 4.2 (EMF RP86A Trip Setpoint Adjustment).

Validation Time: 10 minutes **Time Critical:** Yes _____ No __X__

===

Applicant: Time Start: __________

NAME____________________________ Docket #_______________ Time Finish: __________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ______________________________ ______________________________/________

NAME SIGNATURE DATE

===

COMMENTS

Catawba Nuclear Station
JPM F
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SIMULATOR OPERATOR INSTRUCTIONS:

1. ENSURE NRC Examination Security has been established.
2. Reset to IC # 155.
3. Enter the password.
4. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
5. Ensure simulator setup per table below.
6. Place simulator in RUN and acknowledge any alarms.
7. ENSURE "Extra Operator" is present in the simulator.
8. Ensure copy of EMF-50 setpoint log page has been replaced.
9. Place simulator in FREEZE until Examiner cue is given.

✓	Instructor Action	Final	Delay	Ramp	Delete In	Event

Catawba Nuclear Station
JPM F
2017 NRC Exam

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **Unit 1 is at 100% power.**

INITIATING CUES:

Following a discussion with Glenn from RP concerning a premature gaseous release termination, the Control Room Supervisor directs you to set EMF 50L setpoints using OP/0/A/6500/080 (EMF RP86A Output Modules) Enclosure 4.2 (EMF RP86A and RM1000 Trip Setpoint Adjustment) to the following values:

- **Trip 1 = 6300 CPM**
- **Trip 2 = 9000 CPM**

OAC Program EMFLIB is currently not available.

EXAMINER NOTE: **After reading the cue, provide the applicant with a copy of OP/0/A/6500/080 (EMF RP86A Output Modules) Enclosure 4.2 (EMF RP86A and RM1000 Trip Setpoint Adjustment).**

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STEP/STANDARD	SAT/UNSAT

START TIME: _______

NOTE: 1. If desired, EMF setpoints adjustments may be performed from the "EMF SETPOINT" screen of OAC EMF Library (EMFLIB) Application. EMFLIB is user friendly, no procedure instructions are provided for this application.
2. The Trip Lamps can only be cleared if the activity level has decreased below the Trip Setpoint.
3. The setpoints given on release permits are already rounded to 3 significant digits and are entered into the EMF as is. Setpoints for non-release conditions are rounded up or down to 3 significant digits using standard mathematical rules for rounding.

STEP 1 3.1 **IF** necessary, press the clear key [CLR] to reset trip lamps

STANDARD:

Applicant verifies trip lamps dark or depresses the [CLR] key to clear alarms.

COMMENTS:

___ SAT

___ UNSAT

STEP 2 3.2 Press the function key [FUN] to bring up the "SELECT FUNCTION" screen.

CRITICAL STEP

STANDARD:

Applicant depresses the [FUN] key to bring up the "SELECT FUNCTION" screen.

This step is critical, due to being the only way to get to the select function screen, which is required to input new Trip 1 and Trip 2 values.

COMMENTS:

___ SAT

___ UNSAT

STEP/STANDARD	SAT/UNSAT
STEP 3 3.3 Adjust Trip 1 Setpoint as follows: 3.3.1 Press [1] for Trip 1 setting display screen. STANDARD: Applicant depresses the [1] to bring up the Trip 1 setting display screen. **This step is critical to bring up the screen that the new Trip 1 setting will be input into.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 4 3.3.2 Key in the desired Trip 1 setpoint. STANDARD: Applicant keys in 6300 CPM using the numeric keypad. **This step is critical to input the new Trip 1 setpoint required to meet the task standard. This new setpoint is checked in the next step. The critical requirement is for the new trip setpoint of 6300 CPM to be entered by the end of this JPM.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 5 3.3.3 Ensure the following: 3.3.3.1 Setpoint is correctly displayed in the "ENTER" block on the setpoint display screen. 3.3.3.2 Setpoint is greater than the current EMF reading. STANDARD: Applicant ensures 6300 CPM is displayed in the ENTER block and that the setpoint is greater than the current reading on the EMF. COMMENTS:	___ **SAT** ___ **UNSAT**
NOTE: Once the enter key [ENT] is pressed, the change in Trip 1 alarm setpoint is active.	
STEP 6 3.3.4 Press the enter key [ENT]. This value is now displayed under "TRIP 1" and the "ENTER" block is cleared. STANDARD: Applicant presses the [ENT] key and verifies the correct value under the "Trip 1" on the display. **This step is critical to input the new Trip 1 setpoint. Again the critical requirement is to have the Trip 1 setpoint set to 6300 CPM by the end of the JPM.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 7 3.3.5 Press the clear key [CLR] to return to the "SELECT FUNCTION" screen. STANDARD: Applicant presses the [CLR] key to return to the "SELECT FUNCTION" screen. COMMENTS:	___ SAT ___ UNSAT
STEP 8 3.4 Adjust Trip 2 Setpoint as follows: 3.4.1 Press [2] for Trip 2 setting display screen. STANDARD: Applicant presses [2] to bring up the Trip 2 setting display screen. **This step is critical to get to the required screen to input the new Trip 2 setpoint.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 9 3.4.2 Key in the desired Trip 2 setpoint. STANDARD: Applicant enters 9000 CPM using the numeric keypad. **This step is critical to input the new Trip 2 setpoint required to meet the task standard. This new setpoint is checked in the next step. The critical requirement is for the new trip setpoint of 9000 CPM to be entered by the end of this JPM.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP/STANDARD	SAT/UNSAT
STEP 10 3.4.3 Ensure the following: 3.4.3.1 Setpoint is correctly displayed in the "ENTER" block on the setpoint display screen. 3.4.3.2 Setpoint is greater than the current EMF reading. STANDARD: Applicant ensures 9000 CPM is displayed in the ENTER block and that the entered setpoint is greater than the current reading on the EMF. COMMENTS:	___ SAT ___ UNSAT
NOTE: Once the enter key [ENT] is pressed, the change in Trip 2 alarm setpoint is active.	
STEP 11 3.4.4 Press the enter key [ENT]. This value is now displayed under "TRIP 2" and the "ENTER" block is cleared. STANDARD: Applicant presses the [ENT] key and verifies the correct value under the "Trip 2" on the display. **This step is critical to input the new Trip 2 setpoint. Again the critical requirement is to have the Trip 2 setpoint set to 9000 CPM by the end of the JPM.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP/STANDARD	SAT/UNSAT
STEP 12 3.5 Press the clear key [CLR] twice to return to the normal display screen. STANDARD: Applicant presses the [CLR] key twice to return to the normal display screen. **EXAMINER CUE:** **"Another operator will complete the procedure. This JPM is complete."** COMMENTS: **END OF TASK**	___ **SAT** ___ **UNSAT**

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **Unit 1 is at 100% power.**

INITIATING CUES:

Following a discussion with Glenn from RP concerning a premature gaseous release termination, the Control Room Supervisor directs you to set EMF 50L setpoints using OP/0/A/6500/080 (EMF RP86A Output Modules) Enclosure 4.2 (EMF RP86A and RM1000 Trip Setpoint Adjustment) to the following values:

- **Trip 1 = 6300 CPM**
- **Trip 2 = 9000 CPM**

OAC Program EMFLIB is currently not available.

JPM G

Catawba Nuclear Station
JPM G
2017 NRC Exam

EVALUATION SHEET

Task: Isolate Cold Leg Accumulators Following a Shutdown LOCA

Alternate Path: Yes

Facility JPM #: N/A

Safety Function: 3 **Title:** Emergency Core Cooling System (ECCS)

K/A 006 A1.13 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ECCS controls including: Accumulator pressure (level, boron concentration)

Rating(s): 3.5 / 3.7 **CFR:** 41.5 / 45.5

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator __X__ In-**P**lant ________ **P**erform __X__ **S**imulate ________

References: AP/1/A/5500/027 (Shutdown LOCA), Enclosure 14 (Isolating Cold Leg Accumulators)

Task Standard: AP/1/A/5500/027 (Shutdown LOCA) Enclosure 14 (Isolating Cold Leg Accumulators) is performed and 1A & 1D Cold Leg Accumulators are isolated and 1NI-83 fully opened to vent 1B & 1C Cold Leg Accumulators to containment.

Validation Time: 15 minutes **Time Critical:** Yes _____ No __X__

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Applicant: Time Start: __________
NAME____________________________ Docket #________________ Time Finish: __________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ____________________________ ____________________________/________
NAME SIGNATURE DATE

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COMMENTS

Catawba Nuclear Station
JPM G
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SIMULATOR OPERATOR INSTRUCTIONS:

1. ENSURE NRC Examination Security has been established.
2. Reset to IC # 156.
3. Enter the password.
4. Select “Yes” on the INITIAL CONDITION RESET pop-up window.
5. Ensure simulator setup per table below.
6. Place simulator in RUN and acknowledge any alarms.
7. ENSURE “Extra Operator” is present in the simulator.
8. Place simulator in FREEZE until Examiner cue is given.

✓	Instructor Action	Final	Delay	Ramp	Delete In	Event
	ANN-AD11-B03 (TRANSFORMER A TROUBLE)	ON				
	ANN-AD11-E03 (TRANSFORMER B TROUBLE)	ON				
	MAL-NC013B (NC COLD LEG B LEAK)	0.5				
	VLV-NI008F (NI65B ACCUM ISOL VLV FAIL TO POSITION)	1				
	VLV-NI011F (NI76A ACCUM ISOL VLV FAIL TO POSITION)	1				

Catawba Nuclear Station
JPM G
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READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **Unit 1 is in Mode 4.**
- **Unit 1 shutdown was in progress for a refueling outage, when pressurizer pressure and level began to decrease uncontrollably.**
- **The CRS has entered AP/1/A/5500/027 (Shutdown LOCA) to address the reactor coolant system leak.**
- **Power to all CLA discharge isolation valves has been restored per EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 9 (Power Alignment for CLA Valves).**

INITIATING CUES:

- **The CRS has directed you to isolate the Unit 1 Cold Leg Accumulators by performing AP/1/A/5500/027 (Shutdown LOCA) Enclosure 14 (Isolating Cold Leg Accumulators).**

EXAMINER NOTE: **After reading the cue, provide the applicant with a copy of AP/1/A/5500/027 Enclosure 14.**

START TIME: _______

STEP/STANDARD	SAT/UNSAT
STEP 1: 1. **Dispatch operator to restore power to all CLA discharge isolation valves. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 9 (Power Alignment for CLA Valves).** STANDARD: Per initiating cue, the applicant should realize that this step is complete. Also valve indication for each of the CLA discharge isolation valves is available, due to power already being aligned by the AO. COMMENTS:	**___ SAT** **___ UNSAT**

STEP 2: 2. **Ensure S/I - RESET** a. ECCS. b. D/G load sequencers. c. **IF AT ANY TIME** a B/O occurs, **THEN** restart S/I equipment previously on. STANDARD: Applicant verifies that the yellow ECCS and D/G load sequencer RESET lights are lit. Applicant acknowledges the If at any time statement. COMMENTS:	**___ SAT** **___UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 3: 3. **WHEN power is aligned, THEN perform the following:** a. CLOSE the following valves: • **1NI-54A (C-Leg Accum A Disch Isol)** • 1NI-65B (C-Leg Accum B Disch Isol) • 1NI-76A (C-Leg Accum C Disch Isol) • **1NI-88B (C-Leg Accum D Disch Isol)** STANDARD: Applicant depresses the green CLOSE pushbutton for the valves listed, and verifies the green CLSD light lit and red OPEN light dark for valves 1NI-54A & 1NI-88B. Applicant also verifies the red OPEN light lit and green CLSD light dark for valves 1NI-65B & 1NI-76A and transitions to the RNO. **The critical part of this step is to close isolation valves 1NI-54A & 1NI-88B. The other 2 Cold Leg Accumulators will be vented to containment in subsequent steps in the RNO.** **EXAMINER NOTE: This begins the alternate path of this JPM.** **EXAMINER NOTE: The applicant should determine from the initiating cue that power has been aligned. If necessary, inform "Power has been aligned".** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP/STANDARD	SAT/UNSAT
STEP 4: 3.RNOa. Perform the following: 1) Ensure containment isolation signals – RESET: • Phase A • Phase B STANDARD: Applicant verifies that the yellow RESET lights are lit for both trains Phase A and Phase B isolations. COMMENTS:	___ SAT ___ UNSAT
STEP 5: 3.RNOa. 2) Ensure 1VI-77B (VI Cont Isol) - OPEN STANDARD: Applicant determines that the red OPEN light lit and green CLSD light dark for 1VI-77B. COMMENTS:	___ SAT ___ UNSAT

STEP/STANDARD	SAT/UNSAT
STEP 6: 3.RNOa. 3) **IF** VI pressure is less than 85 PSIG, **THEN** dispatch operator to ensure proper VI compressor operation. STANDARD: Applicant determines that VI pressure is ~ 90 PSIG. This step is N/A. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 7: 3.RNOa.4) Vent any CLA which cannot be isolated as follows: a) OPEN 1NI-47A (C-Leg Accum N2 Sup Cont Isol) STANDARD: Applicant depresses the red OPEN pushbutton for 1NI-47A and verifies the red OPEN light lit and green CLSD light dark. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 8: 3.RNOa.4) b) Place breaker 1CB-1 (behind 1MC-6)(Key #11) to - ON STANDARD: Applicant lifts breaker 1CB-1 fully up to the ON position. **This step is critical to place power on Cold Leg Accumulator Nitrogen supply isolation valves for 1B and 1C CLAs which will be opened in the next step to allow venting the accumulators to containment.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 9: 3.RNOa.4) c) OPEN valve for CLA(s) to be vented: • 1NI-50 (C-Leg Accum A N2 Supply Isol) • **1NI-61 (C-Leg Accum B N2 Supply Isol)** • **1NI-72 (C-Leg Accum C N2 Supply Isol)** • 1NI-84 (C-Leg Accum D N2 Supply Isol) STANDARD: Applicant depresses the red OPEN pushbutton and verifies the red OPEN light lit and green CLSD light dark for 1NI-61 and 1NI-72. **This step is critical due to not being able to isolate these CLAs. If these CLAs are not vented to reduce the N2 overpressure, it could cause a hard bubble to form in the reactor coolant system as reactor coolant pressure continues to decrease.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP/STANDARD	SAT/UNSAT
STEP 10: 3.RNOa.4) d) CLOSE 1NI-47A. STANDARD: Applicant depresses the green CLOSE pushbutton and verifies the green CLSD light lit and red OPEN light dark for 1NI-47A. **This step is critical to allow venting the 1B and 1C CLAs.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 11: 3.RNOa.4) e) OPEN 1NI-83 (C-Leg Accums N2 Vent Ctrl) to depressurize affected CLA(s). STANDARD: Applicant rotates potentiometer for 1NI-83 clockwise to full open to begin venting the 1B and 1C CLAs. **This step is critical to vent the 1B and 1C CLAs.** **NOTE TO EVALUATOR: The time to fully vent the 1B & 1C CLAs would be approximately 30 minutes. The critical steps for this JPM have been met at this point and the JPM may be terminated at your discretion.** **EVALUATOR CUE: "Another operator will continue to vent the 1B and 1C Cold Leg Accumulators. This JPM is complete."** COMMENTS: **END OF TASK**	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **Unit 1 is in Mode 4.**
- **Unit 1 shutdown was in progress for a refueling outage, when pressurizer pressure and level began to decrease uncontrollably.**
- **The CRS has entered AP/1/A/5500/027 (Shutdown LOCA) to address the reactor coolant system leak.**
- **Power to all CLA discharge isolation valves has been restored per EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 9 (Power Alignment for CLA Valves).**

INITIATING CUES:

- **The CRS has directed you to isolate the Unit 1 Cold Leg Accumulators by performing AP/1/A/5500/027 (Shutdown LOCA) Enclosure 14 (Isolating Cold Leg Accumulators).**

Catawba Nuclear Station
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EVALUATION SHEET

Task: Restore Normal Power to 1ETA From The Control Room

Alternate Path: No

Facility JPM #: DG3-003

Safety Function: 6 **Title:** Emergency Diesel Generator (ED/G) System

K/A 064 A4.07 Ability to manually operate and/or monitor in the control room: Transfer ED/G (with load) to grid.

Rating(s): 3.4 / 3.4 **CFR:** 41.7 / 45.5 to 45.8

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator __X__ In-**P**lant ________ **P**erform __X__ **S**imulate ________

References: OP/1/A/6350/002 Rev 179

Task Standard: 1ETA power being supplied from offsite through 1ATC and 1A D/G secured from the control room without a reverse power trip in accordance with OP/1/A/6350/002 (Diesel Generator Operation) Enclosure 4.17 (Shutdown of D/G 1A After An Automatic Start).

Validation Time: 12.5 minutes **Time Critical:** Yes _____ No __X__

==

Applicant: Time Start: __________

NAME____________________________ Docket #________________ Time Finish: __________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ____________________________ ____________________________/________

NAME SIGNATURE DATE

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COMMENTS

Catawba Nuclear Station
JPM H
2017 NRC Exam

SIMULATOR OPERATOR INSTRUCTIONS:

1. **ENSURE NRC Examination Security has been established.**
2. **Reset to IC #157.**
3. **Enter the password.**
4. **Select “Yes” on the INITIAL CONDITION RESET pop-up window.**
5. **Ensure simulator setup per table below.**
6. **Place simulator in RUN and acknowledge any alarms.**
7. **ENSURE “Extra Operator” is present in the simulator.**
8. **Place simulator in FREEZE until Examiner cue is given.**

✓	Instructor Action	Final	Delay	Ramp	Delete In	Event

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JPM H
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READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **Unit 1 is recovering from a blackout per AP/1/A/5500/007 Case I (Loss of Normal Power to an Essential Train).**
- **1ATC is energized and available to supply 1ETA.**
- **D/G 1A Mode Select Switch is in the "CTRL-RM" position.**
- **D/G 1A Load Sequencer has been reset.**

INITIATING CUES:

- **The Control Room Supervisor instructs you to parallel D/G 1A to 1ETA's normal power source (1ATC) and shutdown D/G 1A per OP/1/A/6350/002 (Diesel Generator Operation) Enclosure 4.17 (Shutdown of D/G 1A After an Automatic Start) Step 3.2.**
- **Initial Conditions are complete.**
- **Concurrent Verification has been waived.**

EXAMINER NOTE: **After reading cue, provide the applicant with a copy of OP/1/A/6350/002 Enclosure 4.17 with the initial conditions completed.**

STEP/STANDARD	SAT/UNSAT

START TIME: _______

STEP 1: 3.2 **IF** shutting down the diesel from the Control Room, perform the following: 3.2.1 **IF** both the normal (ETA Norm Fdr Frm ATC) **AND** alternate (ETA Alt Fdr Frm SATA) incoming feeder breakers are open, perform the following: **CAUTION:** It is essential for the Operator to read and understand the following steps before attempting to re-synchronize the D/G and bus to the normal or alternate power source. Quick response to any changes in load and power factor when the breaker closes is required to reduce the likelihood of a reverse power D/G Breaker trip. 3.2.1.1 Adjust voltage using "D/G 1A Volt Adjust" to allow "D/G 1A Volts" to be one half to two divisions (50 to 200 volts) higher than "Line Volts". STANDARD: Applicant uses the D/G voltage control pushbuttons to set D/G 1A VOLTS 50 to 200 volts higher than LINE VOLTS on 1MC-8. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 2: 3.2.1.2 Place the "D/G 1A Sync" Switch in the "ON" position. STANDARD: Applicant rotates the D/G 1A Sync switch clockwise to the ON position. **Examiner Note: This step is critical to ensure that D/G 1A is in sync with the grid prior to closing the 1ETA normal incoming breaker.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 3 3.2.1.3 Adjust D/G speed using "D/G 1A Gov Ctrl" such that the Synchroscope is moving slowly in the "FAST" direction, (approximately 1 revolution per 30 seconds). STANDARD: Applicant uses the D/G 1A Gov Ctrl pushbuttons to ensure that the Synchroscope is rotating slowly in the FAST direction. **Examiner Note: This step is critical to prevent a reverse power trip once the Normal Feeder breaker to 1ETA is closed.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 4 **CAUTION:** The following three steps shall be performed prior to signing off either step to reduce the likelihood of a reverse power D/G Breaker trip. 3.2.1.4 As the indicator reaches 1.5 min. before the vertical (synchronized) position, close one of the following breakers: ○ ETA Norm Fdr Frm ATC OR ○ ETA Alt Fdr Frm SATA STANDARD: Once the Synchroscope indicator reaches the 1.5 min. before the vertical position, the applicant will depress the red CLOSE pushbutton and verify the red CLSD light lit and green OPEN light dark on the "ETA Norm Fdr Frm ATC" breaker. The applicant will then immediately perform the next step to prevent a reverse power D/G Breaker trip. **Examiner Note: This step is critical to parallel 1A D/G to the normal offsite circuit to meet the task standard.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 5 3.2.1.5 Stabilize the D/G with a positive load and a lagging power factor. STANDARD: Applicant depresses the D/G 1A Gov Ctrl RAISE pushbutton to ensure that D/G 1A picks up a positive load. **Examiner Note: This step is critical to ensure the 1A D/G is stabilized with a positive load to prevent a reverse power D/G Breaker trip.** **Examiner Note: As long as the applicant ensured that D/G 1A volts were 50 to 200 volts higher than line volts, power factor will be lagging, and depending on how much higher D/G 1A volts were than line volts, may be severely lagging.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP/STANDARD	SAT/UNSAT
STEP 6 3.2.1.6 **IF** the power factor meter indicates severely leading, (pegs high) **AND** power output decreases to 0 KW (pegs low), **THEN** IMMEDIATELY trip D/G 1A Bkr To ETA. STANDARD: Applicant determines that this step is not applicable and continues. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 7 3.2.1.7 Place the "D/G 1A Sync" Switch in the "OFF" position. Record time ____________ STANDARD: Applicant rotates the D/G 1A Sync Switch counterclockwise to the OFF position. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 8 3.2.2 Verify one of the following breakers is closed: ○ ETA Norm Fdr Frm ATC OR ○ ETA Alt Fdr Frm SATA STANDARD: Applicant verifies the red CLSD light lit for the ETA Norm Fdr Frm ATC breaker. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 9 3.2.3 **IF** D/G 1A Bkr To ETA is open, go to Step 3.2.7. STANDARD: Applicant determines that D/G 1A Bkr To ETA is closed by verifying the red CLSD light lit and this step is not applicable. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT

STEP 10 3.2.4 **IF** D/G load is < 2000 KW, **WHILE** maintaining power factor at approximately .95 lagging using "D/G 1A Volt Adjust", adjust generator load using "D/G 1A Gov Ctrl" per the following: {PIP 96-1185}

CRITICAL STEP

CAUTION: The following two steps shall be performed prior to signing off either step to reduce the likelihood of a reverse power D/G Breaker trip.

3.2.4.1 Reduce D/G load to 200 KW

3.2.4.2 Trip D/G 1A Bkr To ETA.

STANDARD:

Applicant depresses the D/G 1A Gov Ctrl LOWER pushbutton to decrease D/G 1A load to 200 KW while depressing the D/G 1A Volt Adjust LOWER pushbutton to maintain power factor at .95 lagging. Once 200 KW load is attained, the applicant depresses the green OPEN pushbutton for D/G 1A Bkr To ETA and verifies the green OPEN light is lit.

___ SAT

___ UNSAT

Examiner Note: If applicant loaded 1A D/G to > 2000 KW, step 3.2.5 will have them lower load to 2000 KW and after 15 minutes at this load, will have them decrease load to 200 KW and trip the D/G 1A breaker. If this is the case, once the applicant decreases D/G 1A load to 2000 KW, provide the following cue: "15 minutes have elapsed".

Examiner Note: Step 3.2.6 should be not applicable.

COMMENTS:

STEP/STANDARD	SAT/UNSAT
STEP 11 3.2.7 Allow diesel to idle unloaded for a minimum of 5 minutes or until the following conditions are met: ○ Jacket water outlet temperature is ≤ 170°F. ○ Lube oil temperature is ≤ 170°F. ○ Turbocharger exhaust temperatures have stabilized. STANDARD: Applicant acknowledges step and continues. **Examiner Cue: "5 minutes has elapsed."** COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 12 3.2.8 Ensure one of the following conditions is met: ○ The D/G Sequencer is "RESET". OR ○ Power has been removed from the D/G Sequencer. STANDARD: Applicant determines based off the initiating cue that D/G 1A load sequencer has been RESET and continues with the procedure. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 13 3.2.9 Depress D/G 1A "OFF" pushbutton. Record time __________ STANDARD: Applicant depresses the D/G 1A green OFF pushbutton. **Examiner Note: This step is critical to shutdown 1A D/G to meet the JPM standard.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 14 3.2.10 **WHEN** the engine stops, dispatch Operators as necessary to verify the following: STANDARD: Applicant describes contacting and dispatching an AO to perform this step. **Examiner Cue: "An AO has been dispatched. Another operator will complete the remaining steps. This JPM is complete."** COMMENTS: **END OF TASK**	___ **SAT** ___ **UNSAT**

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **Unit 1 is recovering from a blackout per AP/1/A/5500/007 Case I (Loss of Normal Power to an Essential Train).**
- **1ATC is energized and available to supply 1ETA.**
- **D/G 1A Mode Select Switch is in the "CTRL-RM" position.**
- **D/G 1A Load Sequencer has been reset.**

INITIATING CUES:

- **The Control Room Supervisor instructs you to parallel D/G 1A to 1ETA's normal power source (1ATC) and shutdown D/G 1A per OP/1/A/6350/002 (Diesel Generator Operation) Enclosure 4.17 (Shutdown of D/G 1A After an Automatic Start) Step 3.2.**
- **Initial Conditions are complete.**
- **Concurrent Verification has been waived.**

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EVALUATION SHEET

Task: Place the 2A Hydrogen Analyzer in Service

Alternate Path: No

Facility JPM #: VX-024

Safety Function: 5 **Title:** Hydrogen Recombiner and Purge Control System (HRPS)

K/A 028 A1.01 Ability to predict and/or monitor changes in parameter (to prevent exceeding design limits) associated with operating the HRPS controls including: Hydrogen concentration

Rating(s): 3.4 / 3.8 **CFR:** 41.5 / 45.5

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ In-**P**lant ___X___ **P**erform ___X___ **S**imulate _________

References: EP/2/A/5000/E-1 (Loss of Reactor or Secondary Coolant) Rev 26
OP/2/A/6450/010 (Containment Hydrogen Control Systems) Rev 26

Task Standard: Hydrogen Analyzer Train 2A in service monitoring upper containment via selection of Position "1".

Validation Time: 15 minutes **Time Critical:** Yes _____ No ___X___

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Applicant: Time Start: __________
NAME____________________________ Docket #_______________ Time Finish: __________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ______________________________ ______________________________/________
NAME SIGNATURE DATE

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COMMENTS

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READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **A large break LOCA has occurred on Unit 2.**
- **The procedure currently in use is EP/2/A/5000/E-1 (Loss of Reactor or Secondary Coolant).**
- **Containment Hydrogen Analyzer 2B is tagged for maintenance.**

INITIATING CUES:

- **The Control Room Supervisor directs you to place Containment Hydrogen Analyzer 2A in service to Position "1" for sampling Upper Containment per OP/2/A/6450/010 (Containment Hydrogen Control Systems) Enclosure 4.9, step 3.1.**
- **All initial conditions are complete.**
- **Peer check has been waived.**

EXAMINER NOTE: After reading cue, provide the applicant with a copy of OP/2/A/6450/010 Enclosure 4.9 with the initial conditions completed.

STEP/STANDARD	SAT/UNSAT

START TIME: _______

STEP 1: 3.1 Place Hydrogen Analyzer Train A **OR** Train B in service. 3.1.1 **IF** aligning Hydrogen Analyzer Train A, proceed as follows: 3.1.1.1 Obtain Hydrogen Analyzer Control Panel Train A (2ELCP0251) key (Key #225) from WCC. STANDARD: Applicant determines from the initiating cue that A train needs to be aligned and obtains the key #225. **Examiner Note: Key not required to be obtained to complete this JPM task. Once key is identified give cue.** **Examiner Cue: "Key 225 has been obtained."** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
NOTE: Steps 3.1.1.2 – 3.1.1.5 will be performed at Hydrogen Analyzer Control Panel 2A HACP-2A 2ELCP0251 (AB-579, DD-61).	**CRITICAL STEP**
STEP 2: 3.1.1.2 Select the desired sample location by positioning the "HYDROGEN ANALYZER SAMPLE VALVES PORTS" switch: • Position "1" (for sampling Upper Containment) • Position "2" (for sampling operating level) • Position "3" (for sampling Steam Generator 1B cavity) • Position "ALL" for sampling ALL 3 locations) STANDARD: Applicant describes placing the HYDROGEN ANALYZER SAMPLE VALVES PORTS" switch in position "1". **Examiner Cue: Once switch is located by applicant and operation described, "Switch is in position "1"."** **Examiner Note: This step is critical to be able to sample upper containment per the JPM standard.** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 3 3.1.1.3 Verify the "POS 1: H2 ANALYZER POS 2: POST ACCIDENT SAMPLE PANEL" switch is in "POS. 1". STANDARD: Applicant describes verifying the switch is in “POS 1”. **Examiner Cue: Once located by applicant, “Switch is in position 1.”** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT

STEP 4 3.1.1.4 Insert key in "HYDROGEN ANALYZER CONT ISOLATION VALVES" key switch and turn to "OPEN" position. STANDARD: Applicant describes inserting the key and turning the key to the "OPEN" position. **Examiner Cue: Once applicant describes inserting the key and operation of the switch, "Key switch is in the OPEN position."** **Examiner Note: This step is critical to open the containment isolation valves in order to be able to sample upper containment.** COMMENTS:	**CRITICAL STEP** **___ SAT** **___ UNSAT**

STEP 5 3.1.1.5 Verify the following indicating lights are lit: • "H2 SAMPLE CONT. ISOLATION VALVES OPEN" • Sample location(s) selected in Step 3.1.1.2. STANDARD: Applicant describes verifying the red OPEN light LIT for H2 Sample Containment Isolation Valves and the "Upper Containment Sample Selected" light lit. **Examiner Cue: Once the lights are located, "Red OPEN light is lit" and "Upper Containment Sample Selected light is lit."** COMMENTS:	**___ SAT** **___ UNSAT**

STEP/STANDARD	SAT/UNSAT
NOTE: Steps 3.1.1.6 – 3.1.1.7 will be performed inside A Train Hydrogen Analyzer Control Unit (PAMS) 2MIMT5320A (AB-579, DD-61). STEP 6 3.1.1.6 Verify the "STANDBY/OFF" switch is in the "STANDBY" position. STANDARD: Applicant describes verifying the "STANDBY/OFF" switch is in the "STANDBY" position. **Examiner Cue: Once switch is located, "Switch is in the "STANDBY" position."** COMMENTS:	**___ SAT** **___ UNSAT**
STEP 7 3.1.1.7 Place the "ON/OFF" switch in the "ON" position. STANDARD: Applicant describes moving the ON/OFF switch up to the "ON" position. **Examiner Cue: Once operation of switch is described, "Switch is in the "ON" position and the green "ON" light is lit."** **Examiner Note: This step is critical to turn the Hydrogen Analyzer on.** COMMENTS:	**CRITICAL STEP** **___ SAT** **___ UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 8 3.1.1.8 Monitor H_2 concentration at either of the following locations: • "Hydrogen Analyzer Control Unit "2MIMT5320A" (AB-579, DD-61) • "CONTAINMENT TRN A H2 ANAL" meter (2MIP5320) located on 2MC7. STANDARD: Applicant describes calling the control room to inform them that the hydrogen analyzers are in service and can be read on the local unit or on 2MC-7. **Examiner Cue: "Hydrogen concentration will be monitored on 2MC-7. This JPM is complete."** COMMENTS: **END OF TASK**	___ **SAT** ___ **UNSAT**

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **A large break LOCA has occurred on Unit 2.**
- **The procedure currently in use is EP/2/A/5000/E-1 (Loss of Reactor or Secondary Coolant).**
- **Containment Hydrogen Analyzer 2B is tagged for maintenance.**

INITIATING CUES:

- **The Control Room Supervisor directs you to place Containment Hydrogen Analyzer 2A in service to Position "1" for sampling Upper Containment per OP/2/A/6450/010 (Containment Hydrogen Control Systems) Enclosure 4.9, step 3.1.**
- **All initial conditions are complete.**
- **Peer check has been waived.**

JPM J

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EVALUATION SHEET

Task: Align Seal Injection to the Unit 1 NC Pumps

Alternate Path: No

Facility JPM #: New

Safety Function: 4S **Title:** Service Water System

K/A 076 A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the SWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of SWS

Rating(s): 3.5 / 3.7 **CFR:** 41.5 / 43.5 / 45.3 / 45.13

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ In-**P**lant __X__ **P**erform __X__ **S**imulate ______

References: AP/0/A/5500/020 (Loss of Nuclear Service Water) Rev 43

Task Standard: Standby Makeup Pump #1 in service providing seal injection to the Unit 1 NC Pumps.

Validation Time: 10 minutes **Time Critical:** Yes _____ No __X__

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Applicant:
NAME______________________________ Docket #________________ Time Start: ___________
Time Finish: ___________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ______________________________ ______________________________/________
NAME SIGNATURE DATE

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COMMENTS

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Catawba Nuclear Station
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READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **A Loss of RN has occurred on Unit 1.**
- **Control room has entered AP/0/A/5500/020 (Loss of Nuclear Service Water).**
- **An operator has aligned the alternate power supply to 1EMXS per AP/20 Enclosure 4 (Align Alternate Power Supply To 1EMXS OR 2EMXS).**

INITIATING CUES:

- **The Control Room Supervisor directs you to place standby makeup pump #1 in service to provide seal injection to the Unit 1 NC pumps per AP/20 Enclosure 6 (Align Seal Injection to the Unit 1 NC Pumps). You are directed to use the local procedure to perform this task.**
- **Peer checks have been waived.**

EXAMINER NOTE: **Once the applicant has located the local copy of the procedure, hand the applicant a copy of AP/0/A/5500/020 Enclosure 6.**

STEP/STANDARD	SAT/UNSAT

START TIME: _______

STEP 1: 1. Ensure 1NV-876 (Stdby M/U To Cont Equip Sump 1A) – CLOSED. STANDARD: Applicant verifies the green CLSD light lit and the red OPEN light dark for 1NV-876. **Examiner Cue: Once located, "Green light is lit."** COMMENTS:	**___ SAT** **___ UNSAT**

STEP 2: 2. **IF** annunciator 0AD-11, C/1 (ESS MCC 1EMXS LOSS OF VOLTAGE) LIT, **THEN**: STANDARD: Applicant verifies 0AD-11, C/1 annunciator is dark and that step 2 is not applicable. **Examiner Cue: Once the alarm window is located, "Alarm is dark."** COMMENTS:	**___ SAT** **___ UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 3 3. **IF** "UNIT 1 SSF CONTROLS ENGAGED" DARK, **THEN**: STANDARD: Applicant verifies the UNIT 1 SSF CONTROLS ENGAGED light is LIT. **Examiner Cue: Once located by applicant, "Unit 1 SSF Controls Engaged light is lit."** COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 4 4. **IF** "UNIT 1 SSF CONTROLS ENGAGED" LIT, **THEN**: a. Ensure the following valves – OPEN: • 1NV-865A (Stdby M/U Pump Suct Frm Xfer Tube) • 1NV-872A (Stdby M/U Pmp Filt Otlt). STANDARD: Applicant describes depressing the red OPEN pushbuttons on 1NV-865A and 1NV-872A and verifying the red OPEN light is lit and green CLSD light is dark for both valves. **Examiner Cue: Once applicant describes operation of each valve, "Red indicating light is lit."** **Examiner Note: This step is critical to align a suction and discharge path for Standby Makeup Pump #1.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 5 4.b. CLOSE 1NV-89A (NC Pmps Seal Ret Cont Isol). STANDARD: Applicant depresses the green CLOSE pushbutton on 1NV-89A and verifies the green CLSD light lit and red OPEN light dark. **Examiner Cue: Once the valve control switch is located and operation described, "Green light is lit."** **Examiner Note: This step is critical to ensure any voids in the seal leakoff line are collapsed prior to initiating flow from the standby makeup pump.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 6 5. Ensure 1NV-877 (Stdby M/U To NC Pump Seal Inj) – OPEN. STANDARD: Applicant describes verifying the red OPEN light lit and green CLSD light dark for 1NV-877. **Examiner Cue: Once the valve control switch is located, "Red light is lit."** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 7 6. Start "STDBY M/U PUMP #1" by depressing "ON" pushbutton on SSF console. STANDARD: Applicant depresses the red ON pushbutton on switch for STDBY M/U PUMP #1 and verifies the red ON light lit and green OFF light dark. Applicant may also check for Unit 1 standby makeup flow on SSF console. **Examiner Cue: Once operation of switch is described, "Red ON light lit."** **If Unit 1 standby makeup flow is checked, "26 GPM indicated."** **Examiner Note: This step is critical to place Standby Makeup Pump #1 in service to provide seal injection flow to the Unit 1 NC Pumps.** COMMENTS:	**CRITICAL STEP** **___ SAT** **___ UNSAT**
STEP 8 7. Notify Control Room Supervisor of status of "STDBY M/U PUMP #1". STANDARD: Applicant contacts the control room and reports that Standby Makeup Pump #1 is in service. **Examiner Cue: "Another operator will finish the procedure. This JPM is complete."** COMMENTS: **END OF TASK**	**___ SAT** **___ UNSAT**

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **A Loss of RN has occurred on Unit 1.**
- **Control room has entered AP/0/A/5500/020 (Loss of Nuclear Service Water).**
- **An operator has aligned the alternate power supply to 1EMXS per AP/20 Enclosure 4 (Align Alternate Power Supply To 1EMXS OR 2EMXS).**

INITIATING CUES:

- **The Control Room Supervisor directs you to place standby makeup pump #1 in service to provide seal injection to the Unit 1 NC pumps per AP/20 Enclosure 6 (Align Seal Injection to the Unit 1 NC Pumps). You are directed to use the local procedure to perform this task.**
- **Peer checks have been waived.**

JPM K

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JPM K
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EVALUATION SHEET

Task: Align Swing Inverter 1EIE to 1ERPA

Alternate Path: No

Facility JPM #: EPL-010

Safety Function: 6 **Title:** AC Electrical Distribution System

K/A 062 A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Types of loads that, if de-energized, would degrade or hinder plant operation.

Rating(s): 3.4 / 3.9 **CFR:** 41.5 / 43.5 / 45.3 / 45.13

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ In-**P**lant __X__ **P**erform __X__ **S**imulate ______

References: OP/1/A/6350/008 (125 VDC/120 VAC Vital Instrument and Control Power System) Enclosure 4.37 Rev 73

Task Standard: 1ERPA energized with power from swing inverter 1EIE.

Validation Time: 20 minutes **Time Critical:** Yes _____ No __X__

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Applicant: Time Start: __________

NAME____________________________ Docket #______________ Time Finish: __________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ______________________________ ______________________________/________

NAME SIGNATURE DATE

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COMMENTS

Catawba Nuclear Station
JPM K
2017 NRC Exam

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **Unit 1 is operating at 100% power.**
- **AC Panelboard 1ERPA is currently being supplied by 1VRD with inverter 1EIA shutdown per OP/1/A/6350/008 (125 VDC/120 VAC Vital Instrument and Control Power System) Enclosure 4.9 (1EIA Shutdown and Return to Service).**

INITIATING CUES:

- **The Control Room Supervisor directs you to align Swing Inverter 1EIE to supply AC Panelboard 1ERPA per OP/1/A/6350/008 Enclosure 4.37 (Placing in Service and Removing from Service 1EIE) beginning at step 3.3.**
- **Initial conditions are complete.**
- **Breaker padlock keys #275 and #277 have been obtained.**
- **All required PPE for this task has been obtained.**
- **Independent Verification requirements have been waived for this JPM.**

EXAMINER NOTE: **After reading cue, provide the applicant with a copy of OP/1/A/6350/008 Enclosure 4.37 with steps through step 3.2 complete.**

STEP/STANDARD	SAT/UNSAT

START TIME: _______

NOTE: Perform either Step 3.3 or 3.4 as per desired supply for 1EIE. STEP 1: 3.3 **IF** Step 2.3 indicates that 1EDA is to supply 1EIE, align as follows: **NOTE:** 1EDA-F01E is padlock interlocked with 1EDC-F01D; only one breaker can be "ON". 3.3.1 Remove the padlock (key #275) on 1EDA-F01E (Channel A Feeder-Swing Inverter 1EIE). STANDARD: Applicant describes opening the padlock on 1EDA-F01E and removing it. **Examiner Cue: Once lock is located, "Padlock removed."** **Examiner Note: This step is critical to be able to operate the breaker in the next step to energize inverter 1EIE.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP/STANDARD	SAT/UNSAT
STEP 2: 3.3.2 Place 1EDA-F01E (Channel A Feeder-Swing Inverter 1EIE) in the "ON" position. STANDARD: Applicant describes rotating breaker 1EDA-F01E clockwise to the ON position. **Examiner Cue: Once breaker is located by applicant and operation described, "Breaker is ON."** **Examiner Note: This step is critical to provide power to swing inverter 1EIE.** COMMENTS:	**CRITICAL STEP** **___ SAT** **___ UNSAT**
STEP 3 3.3.3 Place the padlock (unlocked) near 1EDA-F01E (Channel A Feeder-Swing Inverter 1EIE). STANDARD: Applicant describes placing the padlock. **Examiner Cue: Once described by applicant, "Padlock placed."** COMMENTS:	**___ SAT** **___ UNSAT**

STEP/STANDARD	SAT/UNSAT
NOTE: Step 3.3.5 must be performed immediately after Step 3.3.4 is completed. Failure to close the "DC INPUT" breaker immediately after the "PRE-CHARGE" pushbutton is released may result in blown inverter input fuses.	**CRITICAL STEP**
STEP 4 3.3.4 Hold the "PRE-CHARGE" toggle switch on 1EIE in the "EDA-LEFT" position until the "PRE-CHARGE" indicator lamp has been illuminated for a minimum of 5 seconds. STANDARD: Applicant describes holding the toggle switch on 1EIE in the EDA-LEFT position and verifies the PRE-CHARGE light lit for a minimum of 5 seconds and then releases the toggle switch. **Examiner Cue: Once applicant describes holding the PRE-CHARGE switch in the proper position, "PRE-CHARGE indicator lamp has been illuminated for 5 seconds."** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 5 3.3.5 Place 1EIE B1 (1EIE DC Input From 1EDA) on 1EIE in the "ON" position. STANDARD: Applicant describes placing breaker 1EIE B1 in the ON position. **Examiner Cue: Once the breaker is located and proper operation described, "Breaker is ON."** **Examiner Note: This step is critical to provide power to swing inverter 1EIE.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 6 3.4 **IF** Step 2.3 indicates that 1EDC is to supply 1EIE, align as follows: STANDARD: Applicant determines that this step is not applicable. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 7 3.5 Place the sync selector switch on 1EME (MANUAL BYPASS SWITCH FOR SWING INVERTER 1EIE) in the "SYNC ON" position. STANDARD: Applicant describes placing the sync selector switch on 1EME to the "SYNC ON" position. **Examiner Cue: Once operation of switch is described, "Switch is in the "SYNC ON" position."** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
NOTE: Inverter fans are located in the top of the Inverter cabinet. A visual verification of the fans running requires that the upper cabinet door be opened. STEP 8 3.6 Visually verify that both fans in 1EIE are running. STANDARD: Applicant describes opening the upper cabinet door and verifying that both fans are running. **Examiner Cue: "Both fans are running."** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
NOTE: Inverter output voltage may be higher than specified range until inverter warms up. STEP 9 3.7 **IF** inverter output voltage has NOT settled to 118 – 125 VAC within 15 minutes, contact IAE to adjust voltage. STANDARD: Applicant checks inverter output voltage and determines that this step is not applicable. **Examiner Cue: Once inverter output voltage found, "Voltage reads 120 Volts."** COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 10 3.8 Verify the following on 1EIE: • "INVERTER OUTPUT VOLTAGE" 118 – 125.5 V • "INVERTER OUTPUT FREQUENCY" 59.4 – 60.3 Hz STANDARD: Applicant checks inverter output voltage and frequency within limits given. **Examiner Cue: Once inverter output voltage found, "Voltage reads 120 Volts."** **Once inverter output frequency found, "Frequency reads 60 Hz."** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 11 3.9 Place 1EIE B2 (1EIE Inverter AC Output) on 1EIE in the "ON" position. STANDARD: Applicant describes placing breaker 1EIE B2 to the ON position. **Examiner Cue: Once operation of breaker is described, "Breaker is in the "ON" position."** **Examiner Note: This step is critical to be able to power 1ERPA from swing inverter 1EIE.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

NOTE: 1. Inverter "IN SYNC" lights may take up to 60 minutes to illuminate as inverter circuits warmup if inverter has been shutdown for $\geq$ 8 hours. 2. Both "IN SYNC" lamps listed in following step are powered from the same source. STEP 12 3.10 Verify at least one of the following "IN SYNC" lights is illuminated: • 1EME (MANUAL BYPASS SWITCH FOR SWING INVERTER 1EIE) • 1EIE (TRAIN A VITAL SWING INVERTER) STANDARD: Applicant describes verifying the IN SYNC lights lit. **Examiner Cue: Once the lights are located, "Light is lit."** COMMENTS:	___ SAT ___ UNSAT

STEP/STANDARD	SAT/UNSAT
NOTE: Procedure may continue before completing following step. STEP 13 3.11 **IF** one of the above listed “IN SYNC” lights is **NOT** illuminated, initiate a work request to repair. STANDARD: Applicant determines that this step is not applicable. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 14 3.12 Place the “MANUAL BYPASS SWITCH” on 1EME (MANUAL BYPASS SWITCH FOR SWING INVERTER 1EIE) to the “INVERTER TO LOAD” position. STANDARD: Applicant describes placing the manual bypass switch to the INVERTER TO LOAD position. **Examiner Cue: Once operation of the manual bypass switch is described, “Manual Bypass Switch is in the INVERTER TO LOAD position.”** **Examiner Note: This step is critical to power 1ERPA from swing inverter 1EIE.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
NOTE: Perform either Step 3.13 or 3.14 as per Step 2.2, applicable shutdown inverter. STEP 15 3.13 **IF** Step 2.2 indicates 1EIA is shutdown, verify the output Volts and Amps on 1EIE indicate approximately the same as the AC System output Volts and Amps on the following: • 1EME (MANUAL BYPASS SWITCH FOR SWING INVERTER 1EIE) output Volts and Amps • 1EMA (MANUAL BYPASS SWITCH FOR INVERTER 1EIA) output Volts and Amps STANDARD: Applicant checks inverter output voltage and amps and compares them with 1EME and 1EMA. **Examiner Cue: Once applicant describes how to perform the step, "Voltage is reading 120 Volts and Amps are reading 37 Amps on 1EIE, 1EME, and 1EMA. Another operator will complete the procedure. This JPM is complete."** COMMENTS: **END OF TASK**	___ **SAT** ___ **UNSAT**

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **Unit 1 is operating at 100% power.**
- **AC Panelboard 1ERPA is currently being supplied by 1VRD with inverter 1EIA shutdown per OP/1/A/6350/008 (125 VDC/120 VAC Vital Instrument and Control Power System) Enclosure 4.9 (1EIA Shutdown and Return to Service).**

INITIATING CUES:

- **The Control Room Supervisor directs you to align Swing Inverter 1EIE to supply AC Panelboard 1ERPA per OP/1/A/6350/008 Enclosure 4.37 (Placing in Service and Removing from Service 1EIE) beginning at step 3.3.**
- **Initial conditions are complete.**
- **Breaker padlock keys #275 and #277 have been obtained.**
- **All required PPE for this task has been obtained.**
- **Independent Verification requirements have been waived for this JPM.**

JPM A.1-1

RO / SRO

Catawba Nuclear Station
Admin. JPM A.1-1
June 2017 NRC Exam

EVALUATION SHEET

Task: Perform Manual Shutdown Margin Calculation

Alternate Path: N/A

Facility JPM #: RB-127

Safety Function: N/A

K/A 2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc.

Importance: 3.9 / 4.2 **CFR:** 41.10 / 43.5 / 45.12

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ Classroom __X__ Perform __X__ Simulate ______

References: OP/0/A/6100/006 (Reactivity Balance Calculation)
ROD Book Rev 780

Task Standard: Using OP/0/A/6100/006 Enclosure 4.3, calculates shutdown margin to be 1063 - 1097 pcm and determines that adequate shutdown margin does not exist. This JPM must be complete within the 1 hour completion time required by T.S. 3.1.4.

Validation Time: 15 minutes **Time Critical:** Yes __X__ No ______

Applicant:
NAME____________________________ Docket #________________

Time Start: __________
Time Finish: __________

Time Critical (<1 hour)
Time Start: __________
Time Finish: __________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ______________________________ ______________________________/________
NAME SIGNATURE DATE
===

COMMENTS

Catawba Nuclear Station
Admin. JPM A.1-1
June 2017 NRC Exam

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **The Reactor Eng Analysis and Calc Toolkit (REACT) – CNS is inoperable.**
- **During performance of PT/0/A/4150/030 (RCCA Bank Repositioning), it was determined that Control Rods H4 and K14 were immovable and untrippable.**
- **IAE is investigating.**
- **Unit 1 conditions:**
    - **Mode 1 at 100% RTP**
    - **Cycle burnup is 240 EFPD**
    - **Control Bank 'D' position is 216 steps withdrawn**
    - **All other rods are at 226 steps withdrawn**
    - **Current Boron Concentration is 1200 ppmB**

INITIATING CUES:

- **The Shift Manager has directed you to perform a shutdown margin calculation using OP/0/A/6100/006 (Reactivity Balance Calculations).**
- **Calculation is to be performed for current date and time.**
- **Initial conditions have been verified.**
- **Independent Verification has been waived.**
- **This JPM is time critical.**

Calculated shutdown margin for current conditions __________ pcm
Adequate shutdown margin exists (YES/NO) ___________

EXAMINER NOTE:

After reading cue, provide applicant with a copy of OP/0/A/6100/006.

STEP / STANDARD	SAT / UNSAT

START TIME: _______

STEP / STANDARD	SAT / UNSAT

STEP 1: 3.1 Determine the following information:

NOTE: "Quantity of Misaligned Rods" refers to rods that are misaligned but remain trippable. Only the total number of rods is required. (R.M.)

Step	Description	Reference	Value
3.1.1	Unit	N/A	1
3.1.2	Date/Time	N/A	Todays Date & Time
3.1.3	Present Power	P1385	100 %
3.1.4	NC System Boron Concentration	Latest sample	1200 ppm
3.1.5	Current burnup	P1457	240 EFPD
3.1.6	Present control bank position	OAC or Control Board	216 SWD on Control Bank D
3.1.7	Present shutdown bank position	OAC or Control Board	A 226 B 226 C 226 D 226 E 226
3.1.8	Quantity of misaligned rods	N/A	0
3.1.9	Number of untrippable RCCAs	N/A	2
3.1.10	Untrippable RCCA(s) core location(s)	N/A	H4 , K14

___ SAT

___ UNSAT

STANDARD:

From the cue, the applicant records the information per the table above.

COMMENTS:

STEP / STANDARD	SAT / UNSAT
STEP 2: 3.2 **IF** using the REACT program to complete the calculation, perform the following: STANDARD: Applicant determines based of the initiating cue that this step is not applicable. COMMENTS:	___ SAT ___ UNSAT
NOTE: 1. A dropped rod is considered trippable. (R.M.) 2. All values are assumed positive unless otherwise indicated by parentheses. If parentheses precede the value [i.e. ( ) _________ pcm], the sign provided with data must be recorded. The calculations account for these sign conventions. (R.M.)	**CRITICAL STEP**
STEP 3: 3.3 **IF** performing the calculation manually, perform the following: 3.3.1 Determine available reactivity worth of trippable RCCAs for conditions in Step 3.1: **NOTE:** Interpolation is **NOT** required in Step 3.3.1.1. Reactivity worth may be determined by choosing the lowest reactivity worth from Section 5.7 of the R.O.D. Manual associated with cycle burnups that bound the present cycle burnup recorded in Step 3.1. (R.M.) 3.3.1.1 Determine Total Available Rod Worth _______ pcm (Section 5.7 of R.O.D. manual) STANDARD: Applicant determines Total Available Rod Worth is 4949 pcm from R.O.D. Book Section 5.7 (5149 pcm per table – 200 pcm additional stuck rod worth penalty from note below the table). **Examiner Note: This step is critical to ensure accurate result for final calculation.** COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 4: 3.3.1.2 **IF** only one RCCA is untrippable, determine reactivity worth penalty for untrippable RCCA core location of Step 3.1.10 (Section 5.8 of R.O.D. manual). __________ pcm STANDARD: Applicant determines that this step is not applicable. COMMENTS:	___ SAT ___ UNSAT
STEP 5: 3.3.1.3 **IF** there are multiple untrippable RCCAs, perform the following: A. Determine untrippable RCCA of Step 3.1.10 with the highest reactivity worth penalty (Section 5.8 of R.O.D. manual). Core Location ______ STANDARD: Applicant determines that RCCA Core Location **H4** has the highest reactivity worth penalty. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 6: 3.3.1.3 B. Record reactivity worth of the untrippable RCCA of Step 3.3.1.3.A (Section 3.8 of R.O.D. Manual). _________ pcm	**CRITICAL STEP**
STANDARD: Applicant determines the reactivity worth of rod H4 per R.O.D. Section 5.8 is 473 pcm. **Examiner Note: This step is critical to ensure accurate result for final calculation.** COMMENTS:	___ SAT ___ UNSAT
STEP 7: 3.3.1.3 C. Determine maximum stuck rod worth during cycle (Section 5.7 of the R.O.D. manual). ___________ pcm	**CRITICAL STEP**
STANDARD: Applicant determines maximum stuck rod worth from R.O.D. manual section 5.7 is 885 pcm. **Examiner Note: This step is critical to ensure accurate result for final calculation.** COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT

STEP 8: 3.3.1.3 D. Calculate total untrippable RCCA reactivity worth penalty below:

CRITICAL STEP

Description	Reference	Value
A.Number of Untrippable RCCAs	Step 3.1.9	2
B. Highest Worth Penalty	Step 3.3.1.3 B	473 pcm
C. Max Stuck Rod	Step 3.3.1.3 C	885 pcm
Total untrippable RCCA Worth Penalty for Multiple RCCAs	{ [(A) - 1] X (C) } + (B)	1358 **pcm**

STANDARD:

Applicant calculates the Total untrippable RCCA worth penalty to be 1358 pcm.

___ SAT

___ UNSAT

Examiner Note: This step is critical to ensure accurate result for final calculation.

COMMENTS:

STEP 9: 3.3.1.4 Record Total Untrippable RCCA Penalty from Step 3.3.1.2 or Step 3.3.1.3D, whichever is applicable.
__________ pcm

STANDARD:

Applicant records 1358 pcm from step 3.3.1.3 D.

___ SAT

___ UNSAT

COMMENTS:

STEP / STANDARD	SAT / UNSAT

NOTE: Interpolation is **NOT** required in Step 3.3.1.5. Reactivity worth may be determined by choosing the highest reactivity worth from Section 5.6.3 of the R.O.D. Manual associated with rod positions that bound the present rod position. (R.M.)

STEP 10: 3.3.1.5 Determine Inserted Rod Worth for present bank positions:

Description	Reference	Value
A. HFP, Eq Xenon IRW for current control bank position and current cycle burnup	Step 3.1.6 Step 3.1.5 (Section 5.6.3 of R.O.D. manual)	12 pcm
B. HFP, Eq Xenon IRW for current shutdown bank positions and current cycle burnup	Step 3.1.7 Step 3.1.5 (Section 5.6.3 of R.O.D. manual)	SD E 0 pcm SD D 0 pcm SD C 0 pcm SD B 0 pcm SD A 0 pcm
Inserted Worth of Present Position	**Sum of above**	12 pcm

STANDARD:

Applicant calculates Inserted Worth of Present rod positions to be 12 pcm.

COMMENTS:

___ SAT

___ UNSAT

STEP / STANDARD	SAT / UNSAT

STEP 11: 3.3.1.6 Calculate available reactivity worth of trippable RCCAs:

CRITICAL STEP

Description	Reference	Value
A. Total Available Rod Worth	Step 3.3.1.1	4949 pcm
B. Untrippable RCCAs Penalty	Step 3.3.1.4	1358 pcm
C. Inserted Worth of Present Position	Step 3.3.1.5	12 pcm
Available Reactivity Worth of Trippable RCCAs	(A) - (B) - (C)	3579 pcm

STANDARD:

Applicant calculates Available Reactivity Worth of Trippable RCCAs.

___ SAT

___ UNSAT

Examiner Note: This step is critical to ensure accurate result for final calculation.

COMMENTS:

STEP 12: 3.3.1.7 Calculate total misaligned RCCA reactivity worth below:

Description	Reference	Value
A. Quantity of Misaligned Rods	Step 3.1.8	0
B. Maximum Dropped or Misaligned Rod Worth	Section 5.7 of ROD Manual	200 pcm
Total misaligned RCCA Reactivity Worth	(A) X (B)	0 pcm

STANDARD:

Applicant determines that this step does not apply.

___ SAT

___ UNSAT

COMMENTS:

STEP / STANDARD	SAT / UNSAT

NOTE: Interpolation of Power Defect is **NOT** required for Step 3.3.2. Bounding burnups and power levels may be used to select the highest Power Defect from Section 5.9 of the R.O.D. manual. (R.M.)	**CRITICAL STEP**

STEP 13: 3.3.2 Calculate SDM for present conditions:

Description	Reference	Value
A. Available reactivity worth of Trippable RCCAs	Step 3.3.1.6	3579 pcm
B. Total misaligned RCCA reactivity Worth	Step 3.3.1.7	0 pcm
C. Total Power Defect at present thermal power (Step 3.1.3) and current cycle burnup (Step 3.1.5)	Section 5.9 of R.O.D. manual	2004 (1970) pcm
D. Transient Flux Redistribution Allowance	Section 5.7 of R.O.D. manual	512
Present SDM	**(A) - (B) - (C) - (D)**	**(+)** 1063 (1097) **pcm**

STANDARD:

Applicant calculates Present SDM to be +1063 pcm. Acceptable range of 1063 – 1097 pcm (if interpolation of power defect (1970 pcm) is performed).

___ SAT

___ UNSAT

Examiner Note: It is not critical for the applicant to record the "+" sign in the above calculation. If the applicant were to incorrectly record a "-" sign in the parentheses above, then this critical step would not be met.

Examiner Note: This step is critical to ensure accurate result for final calculation and to determine whether required SDM for present plant conditions is met.

COMMENTS:

STEP / STANDARD	SAT / UNSAT
STEP 14: Adequate shutdown margin exists (YES/NO). STANDARD: Applicant determines that 1300 pcm of SDM is required for the current plant conditions and that an actual SDM of 1063 - 1097 pcm is not adequate. Applicant records NO for 2nd part of answer. **Examiner Note: This step is critical to determine that adequate SDM does not exist for the current plant conditions.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **The Reactor Eng Analysis and Calc Toolkit (REACT) – CNS is inoperable.**
- **During performance of PT/0/A/4150/030 (RCCA Bank Repositioning), it was determined that Control Rods H4 and K14 were immovable and untrippable.**
- **IAE is investigating.**
- **Unit 1 conditions:**
    - **Mode 1 at 100% RTP**
    - **Cycle burnup is 240 EFPD**
    - **Control Bank 'D' position is 216 steps withdrawn**
    - **All other rods are at 226 steps withdrawn**
    - **Current Boron Concentration is 1200 ppmB**

INITIATING CUES:

- **The Shift Manager has directed you to perform a shutdown margin calculation using OP/0/A/6100/006 (Reactivity Balance Calculations).**
- **Calculation is to be performed for current date and time.**
- **Initial conditions have been verified.**
- **Independent Verification has been waived.**
- **This JPM is time critical.**

Calculated shutdown margin for current conditions __________ pcm

Adequate shutdown margin exists (YES/NO) ___________

1. Limit and Precautions

NOTE:	All curves/tables used in this procedure are found in Unit One (Two) Reactor Operating Data (R.O.D.) manual. (R.M.)

1.1 This procedure is reactivity management related because it is used to verify proper balance and manipulation of reactivity using various tools (REACT, R.O.D. Manual, etc.).

1.2 Ensure all data used by this procedure are for the correct unit.

1.3 NC System T-AVG shall be maintained within ±1 °F of T-REF in Modes 1 and 2 to reduce uncertainties in calculations.

1.4 SDM shall be ≥ 1300 pcm in Modes 1, 2, 3, and 4. (Tech Spec 3.1.1 and Enclosure 4.3, 4.4, 4.5 or 4.6)

1.5 REACT and manual calculations may **NOT** yield equal results due to minor differences in methods (i.e. interpolation). Reactor Engineering may be contacted if questions arise.

1.6 Independently performed calculations may **NOT** yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.

2. Initial Conditions

None

3. Procedure

_____ 3.1 Determine the following information:

> **NOTE:** "Quantity of Misaligned Rods" refers to rods that are misaligned but remain trippable. Only the total number of rods is required. (R.M.)

Step	Description	Reference	Value
3.1.1	Unit	N/A	**1**
3.1.2	Date/Time	N/A	**Todays Date & Time**
3.1.3	Present Power	P1385	**100** %
3.1.4	NC System Boron Concentration	Latest sample	**1200** ppm
3.1.5	Current burnup	P1457	**240** EFPD
3.1.6	Present control bank position	OAC or Control Board	**216** SWD on Control Bank **D**
3.1.7	Present shutdown bank position	OAC or Control Board	A **226** B **226** C **226** D **226** E **226**
3.1.8	Quantity of misaligned rods	N/A	**0**
3.1.9	Number of untrippable RCCAs	N/A	**2**
3.1.10	Untrippable RCCA(s) core location(s)	N/A	**H4 , K14**

N/A 3.2 **IF** using the REACT program to complete the calculation, perform the following:

☐ 3.2.1 Access "Reactor Eng Analysis and Calc Toolkit (REACT) - CNS" from DAE.

☐ 3.2.2 Select "View" then "Reactivity Balance Calculations" on toolbar.

☐ 3.2.3 Select "SDM – Mode 1 or 2" tab in Reactivity Balance Calculations window.

CAUTION: All inputs must be checked carefully and corrected as needed before calculating results. The correct Unit must be specified.

NOTE: Untrippable control rods are input by clicking "Select Inoperable Rods" and any inserted shutdown banks are input using "Shutdown Banks Inserted" tab. (R.M.)

_____ 3.2.4 Enter appropriate values from Step 3.1 in "Input Data" section for the following:

- ☐ "Shutdown Margin" tab
- ☐ "Shutdown Banks Inserted" tab

_____ 3.2.5 Obtain results as follows:

- ☐ 3.2.5.1 Click "Calculate" button.
- ☐ 3.2.5.2 Print program results.
- ☐ 3.2.5.3 Label printout appropriately.
- ☐ 3.2.5.4 Attach printout to this enclosure.

3.2.6 Sign below to document performance:

Performed by_________________________Date/Time:______/______

_____ 3.2.7 Ensure that an independent calculation per this enclosure has been separately performed.

NOTE: Independently performed calculations may **NOT** yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.

_____ 3.2.8 Verify that both performances of this enclosure yield equivalent results

_____ 3.2.9 Perform one of the following based on results of the calculations:

_____ 3.2.9.1 **IF** Effective Shutdown Margin for a Present Position is greater than the Required Shutdown Margin, notify the CRS that Effective Shutdown Margin is acceptable.

OR

_____ 3.2.9.2 **IF** Effective Shutdown Margin for a Present Position is less than the Required Shutdown Margin, notify the CRS to apply the applicable Technical Specification Action.

_____ 3.2.10 Submit both performances of this enclosure to the Control Room Supervisor for review.

NOTE:	1. A dropped rod is considered trippable. (R.M.) 2. All values are assumed positive unless otherwise indicated by parentheses. If parentheses precede the value [i.e. ( )______________ pcm], the sign provided with data must be recorded. The calculations account for these sign conventions. (R.M.)

_____ 3.3 **IF** performing the calculation manually, perform the following:

_____ 3.3.1 Determine available reactivity worth of trippable RCCAs for conditions in Step 3.1:

NOTE:	Interpolation is **NOT** required in Step 3.3.1.1. Reactivity worth may be determined by choosing the lowest reactivity worth from Section 5.7 of the R.O.D Manual associated with cycle burnups that bound the present cycle burnup recorded in Step 3.1. (R.M.)

_____ 3.3.1.1 Determine Total Available Rod Worth (Section 5.7 of R.O.D. manual) **4949** pcm

N/A 3.3.1.2 **IF** only one RCCA is untrippable, determine reactivity worth penalty for untrippable RCCA core location of Step 3.1.10 (Section 5.8 of R.O.D. manual). ____________ pcm

_____ 3.3.1.3 **IF** there are multiple untrippable RCCAs, perform the following:

☒ A. Determine untrippable RCCA of Step 3.1.10 with the highest reactivity worth penalty (Section 5.8 of ROD Manual). Core Location **H4**

☒ B. Record reactivity worth of the untrippable RCCA of Step 3.3.1.3.A (Section 5.8 of ROD Manual).
____473_______ pcm

☒ C. Determine maximum stuck rod worth during cycle (Section 5.7 of the R.O.D. manual). ____885______ pcm

☒ D. Calculate total untrippable RCCA reactivity worth penalty below:

Description	Reference	Value
A.Number of Untrippable RCCAs	Step 3.1.9	2
B. Highest Worth Penalty	Step 3.3.1.3 B	473 pcm
C. Max Stuck Rod	Step 3.3.1.3 C	885 pcm
Total untrippable RCCA Worth Penalty for Multiple RCCAs	**{ [(A) - 1] X (C) } + (B)**	1358 **pcm**

_____ 3.3.1.4 Record Total Untrippable RCCA Penalty from Step 3.3.1.2 or Step 3.3.1.3D, whichever is applicable. _____1358_____ pcm

NOTE: Interpolation is **NOT** required in Step 3.3.1.5. Reactivity worth may be determined by choosing the highest reactivity worth from Section 5.6.3 of the R.O.D Manual associated with rod positions that bound the present rod position. (R.M.)

_____ 3.3.1.5 Determine Inserted Rod Worth for present bank positions:

Description	Reference	Value
A. HFP, Eq Xenon IRW for current control bank position and current cycle burnup	Step 3.1.6 Step 3.1.5 (Section 5.6.3 of R.O.D. manual)	___12___ pcm
B. HFP, Eq Xenon IRW for current shutdown bank positions and current cycle burnup	Step 3.1.7 Step 3.1.5 (Section 5.6.3 of R.O.D. manual)	SD E __0__ pcm SD D __0__ pcm SD C __0__ pcm SD B __0__ pcm SD A __0__ pcm
Inserted Worth of Present Position	**Sum of above**	12 **pcm**

_____ 3.3.1.6 Calculate available reactivity worth of trippable RCCAs:

Description	Reference	Value
A. Total Available Rod Worth	Step 3.3.1.1	4949 pcm
B. Untrippable RCCAs Penalty	Step 3.3.1.4	1358 pcm
C. Inserted Worth of Present Position	Step 3.3.1.5	12 pcm
Available Reactivity Worth of Trippable RCCAs	**(A) - (B) - (C)**	3579 **pcm**

_____ 3.3.1.7 Calculate total misaligned RCCA reactivity worth below:

Description	Reference	Value
A. Quantity of Misaligned Rods	Step 3.1.8	0
B. Maximum Dropped or Misaligned Rod Worth	Section 5.7 of ROD Manual	200 pcm
Total misaligned RCCA Reactivity Worth	**(A) X (B)**	0 **pcm**

NOTE: Interpolation of Power Defect is **NOT** required for Step 3.3.2. Bounding burnups and power levels may be used to select the highest Power Defect from Section 5.9 of the R.O.D. manual. (R.M.)

_____ 3.3.2 Calculate SDM for present conditions:

Description	Reference	Value
A. Available reactivity worth of Trippable RCCAs	Step 3.3.1.6	3579 pcm
B. Total misaligned RCCA reactivity Worth	Step 3.3.1.7	0 pcm
C. Total Power Defect at present thermal power (Step 3.1.3) and current cycle burnup (Step 3.1.5)	Section 5.9 of R.O.D. manual	2004 (1970) pcm
D. Transient Flux Redistribution Allowance	Section 5.7 of R.O.D. manual	512
Present SDM	**(A) - (B) - (C) - (D)**	(+) 1063 (1097) **pcm**

3.3.3 Sign below to document performance:

Performed by________________________Date/Time:______/______

_____ 3.3.4 Ensure that an independent calculation per this enclosure has been separately performed

NOTE: Independently performed calculations may **NOT** yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.

_____ 3.3.5 Verify that both performances of this enclosure yield equivalent results

_____ 3.3.6 Perform one of the following based on results of the calculations:

_____ 3.3.6.1 **IF** present SDM is ≥ 1300 pcm per the applicable Technical Specification via COLR, notify the CRS that present SDM is acceptable.

OR

_____ 3.3.6.2 **IF** present SDM is < 1300 pcm notify the CRS to apply the applicable Technical Specification Action.

JPM A.1-2R

RO

Catawba Nuclear Station
Admin. JPM A.1-2R
June 2017 NRC Exam

EVALUATION SHEET

Task: Calculate Boric Acid and Water Addition to FWST

Alternate Path: N/A

Facility JPM #: 2016 NRC Exam JPM A.1-2R

Safety Function: N/A

K/A 2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation.

Importance: 4.3 / 4.4 **CFR:** 41.10 / 43.5 / 45.2 / 45.6

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ Classroom __X__ Perform __X__ Simulate ______

References: OP/1/A/6200/014 (Refueling Water System), Enclosure 4.4 (FWST Makeup From Blender)

Task Standard: Applicant determines required boric acid addition of 368.8 gallons (368-370 acceptable) and reactor makeup water addition of 3402.2 gallons (3401-3403 acceptable) to complete the required FWST makeup.

Validation Time: 15 minutes **Time Critical:** Yes ______ No __X__

Applicant:
NAME______________________________ Docket #________________ Time Start: ___________
Time Finish: ___________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ______________________________ ______________________________/________
NAME SIGNATURE DATE

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COMMENTS

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Catawba Nuclear Station
Admin. JPM A.1-2R
June 2017 NRC Exam

<u>READ TO APPLICANT</u>

<u>DIRECTION TO APPLICANT:</u>

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

<u>INITIAL CONDITIONS:</u>

- **It has been discovered that an incorrect valve lineup decreased FWST level to 95%. Current conditions as follows:**
  - **The valve lineup has been immediately corrected securing the level decrease.**
  - **Current FWST level is 95%.**
  - **Current FWST boron concentration is 2740 ppmB.**
  - **Unit 1 BAT boron concentration is 7500 ppmB.**
  - **Unit 2 BAT boron concentration is 7300 ppmB.**
  - **Unit 1 RMWST boron concentration is 4 ppmB.**

<u>INITIATING CUES:</u>

Using OP/1/A/6200/014 (Refueling Water System), determine the required amount of Boric Acid and RMWST water necessary to perform an FWST makeup from the blender as follows:

- **Consider any initial conditions complete.**
- **Final FWST level of 96% at 2720 ppmB.**
- **S. Jackson (Primary Chemistry) has been notified and directed use of the Unit 1 BAT.**
- **Concurrent Verification is waived for this task.**

Boric Acid ________________ **RMWST Water** ________________

<u>EXAMINER NOTE</u>:
After reading cue, provide applicant with a copy of OP/1/A/6200/014.

STEP / STANDARD	SAT / UNSAT

START TIME: _______

STEP / STANDARD	SAT / UNSAT
NOTE: To prevent an inadvertent reduction in the shutdown margin during NC fill evolutions, makeup to the FWST shall be performed with a water source having a Boron concentration which is greater than or equal to the required NC system Boron concentration. STEP 1: 3.1 Notify Chemistry that the following Boric Acid Tank will be used for Tech Spec blending calculations {PIP 91-0449}: Person notified ________________________ ______________ Boric Acid Tank #1 ______________ Boric Acid Tank #2 STANDARD: From the cue, applicant records S. Jackson as Chemistry person notified and checks Boric Acid Tank #1. COMMENTS:	___ SAT ___ UNSAT

STEP 2: 3.2 Document current boron concentration in the Boric Acid Tank as specified by Chemistry in Step 3.1 {PIP 91-0449}: ______________ ppmB STANDARD: From the cue, applicant determines that BAT #1 will be used and records 7500 ppmB. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
NOTE: The final boron concentration used in the next step shall comply with COLR requirements for the current mode of operation. STEP 3: 3.3 Determine the boron concentration of the makeup water to the FWST (C_f) to attain the final boron concentration, C_{FW}. 3.3.1 Initial volume of FWST _______ = V_i. STANDARD: Using supplied information applicant enters the initial level of 373,875 gallons. COMMENTS:	___ SAT ___ UNSAT
STEP 4: 3.3.2 Final volume of FWST after makeup _______ = V_{FW}. STANDARD: Using supplied information applicant enters the final level of 377,646 gallons. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 5: 3.3.3 Compute the total gallons of makeup water to be added to the FWST _________ = V_f.. STANDARD: Applicant calculates, and records, makeup volume of 3,771 gallons. 377,646 - 373,875 = 3,771 **Examiner Note: This step is critical to ensure accurate result for final calculation.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 6: 3.3.4 Initial boron concentration of water in the FWST ______ = C_i. STANDARD: From the cue, applicant records initial FWST boron concentration of 2740 ppmB. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	**SAT / UNSAT**
STEP 7: 3.3.5 Solve for the desired makeup water boron concentration, Cf. $C_f = \frac{C_{FW} V_{FW} - C_i V_i}{V_f}$ C_f = ___________ STANDARD: Applicant calculates desired concentration of makeup water to be 737.1 ppmB C_f = (2720 x 377646) – (2740 x 373875) / 3771 = 737.1 ppmB (737-738 ppmB acceptable) **Examiner Note: This step is critical to ensure accurate result for final calculation.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 8: 3.4 Determine the amount of boric acid and reactor makeup water to add as follows: 3.4.1 Boron Concentration of water in BAT _________ = C_1. STANDARD: From the cue, applicant records Unit 1 BAT boron concentration of 7500 ppmB. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 9: 3.4.2 Boron concentration of water in RMWST ___________ = C_2.: STANDARD: From the cue, applicant records Unit 1 RMWST boron concentration of 4 ppmB. COMMENTS:	___ SAT ___ UNSAT
STEP 10: 3.4.3 Total gallons of makeup water to be added to FWST _________ = V_f from Step 3.3.3.: STANDARD: Applicant records total makeup volume of 3,771 from step 3.3.3. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 11: 3.4.4 Solve for the amount of boric acid to be added (V_1) using C_f obtained in Step 3.3.5. $V_1 = \frac{V_f\,(C_f - C_2)}{C_1 - C_2}$ V_1 = ____________ STANDARD: Applicant calculates boric acid total of 368.8 gallons. V_1 = 3771 (737.1 – 4) / (7500 – 4) = 368.8 (368-370 acceptable) **Examiner Note: This step is critical to ensure accurate result for final calculation.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 12: 3.4.5 If V_1 is negative, contact the OWPM Staff for instruction on adjusting the boron concentration in the FWST. STANDARD: Applicant determines that this step does not apply. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 13: 3.4.6 Solve for the amount of RMWST water to be added (V_2). $V_2 = V_f - V_1$ $V_2 =$ __________ gal. STANDARD: Applicant calculates required RMWST water to be 3402.2 gallons. 3771 – 368.8 = 3402.2 (3401-3403 acceptable) **Examiner Note: This step is critical to ensure accurate result for final calculation.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **It has been discovered that an incorrect valve lineup decreased FWST level to 95%. Current conditions as follows:**
  - **The valve lineup has been immediately corrected securing the level decrease.**
  - **Current FWST level is 95%.**
  - **Current FWST boron concentration is 2740 ppmB.**
  - **Unit 1 BAT boron concentration is 7500 ppmB.**
  - **Unit 2 BAT boron concentration is 7300 ppmB.**
  - **Unit 1 RMWST boron concentration is 4 ppmB.**

INITIATING CUES:

Using OP/1/A/6200/014 (Refueling Water System), determine the required amount of Boric Acid and RMWST water necessary to perform an FWST makeup from the blender as follows:

- **Consider any initial conditions complete.**
- **Final FWST level of 96% at 2720 ppmB.**
- **S. Jackson (Primary Chemistry) has been notified and directed use of the Unit 1 BAT.**
- **Concurrent Verification is waived for this task.**

Boric Acid ________________ **RMWST Water** ________________

JPM A.1-2S

SRO

Catawba Nuclear Station
Admin. JPM A.1-2S
June 2017 NRC Exam

EVALUATION SHEET

Task: Calculate Boric Acid and Water Addition to FWST and determine Tech Spec actions.

Alternate Path: N/A

Facility JPM #: 2016 NRC Exam JPM A.1-2S

Safety Function: N/A

K/A 2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation.

Importance: 4.3 / 4.4 **CFR:** 41.10 / 43.5 / 45.2 / 45.6

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ Classroom ___X___ Perform ___X___ Simulate _________

References: OP/1/A/6200/014 (Refueling Water System), Enclosure 4.4 (FWST Makeup From Blender)

Task Standard: Applicant determines required boric acid addition of 368.8 gallons (368-370 acceptable) and reactor makeup water addition of 3402.2 gallons (3401-3403 acceptable) to complete the required FWST makeup and determines the following SLC/TS required LCO entries: 1000 - SLC 16-9.12 Condition D and TS 3.5.4 Condition B, 1100 – SLC 16-9.12 Condition D and TS 3.5.4 Condition B and Condition C.

Validation Time: 30 minutes **Time Critical:** Yes _____ No ___X___

Applicant:
NAME____________________________ Docket #_______________ Time Start: __________
Time Finish: __________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ______________________________ ______________________________/________
NAME SIGNATURE DATE

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COMMENTS

Catawba Nuclear Station
Admin. JPM A.1-2S
June 2017 NRC Exam

READ TO APPLICANT

DIRECTION TO APPLICANT:

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INITIAL CONDITIONS:

Unit 1 is in Mode 3 during a refueling outage. The following events have occurred at the given times:

- **0945**: 1AD-9 B/8 "FWST AT MAKEUP LEVEL" annunciator received. Operators are dispatched to investigate decreasing Unit 1 FWST level.
- **1000**: Unit 1 BOP reports that FWST volume is 377,536.9 gallons.
- **1015**: An improperly executed FW system clearance is discovered and determined to be the cause of FWST level decrease.
  Current conditions are as follows:
    - The valve lineup has been immediately corrected securing the level decrease.
    - Current FWST level is 95%.
    - Current FWST boron concentration is 2740 ppmB.
    - Unit 1 BAT boron concentration is 7500 ppmB.
    - Unit 2 BAT boron concentration is 7300 ppmB.
    - Unit 1 RMWST boron concentration is 4 ppmB.
    - Total Blender Makeup flowrate = 90 gpm

INITIATING CUES:

Using OP/1/A/6200/014 (Refueling Water System), perform an FWST makeup from the blender as follows:

- **Consider any initial conditions complete.**
- **Final FWST level of 96% at 2720 ppmB.**
- **S. Jackson (Primary Chemistry) has been notified and directed use of the Unit 1 BAT.**
- **Concurrent Verification is waived for this task.**

Boric Acid ________________ **RMWST Water** ________________

1. **Assuming the required makeup begins at time 1030, determine which Active SLC and TS LCO entries (if any) will be required at 1000 and 1100.**

1000: ____

1100: ____

Catawba Nuclear Station
Admin. JPM A.1-2S
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<u>EXAMINER NOTE</u>:
After reading cue, provide applicant with a copy of OP/1/A/6200/014.

STEP / STANDARD	SAT / UNSAT

QUESTION 1

START TIME: _______

STEP / STANDARD	SAT / UNSAT
NOTE: To prevent an inadvertent reduction in the shutdown margin during NC fill evolutions, makeup to the FWST shall be performed with a water source having a Boron concentration which is greater than or equal to the required NC system Boron concentration. STEP 1: 3.1 Notify Chemistry that the following Boric Acid Tank will be used for Tech Spec blending calculations {PIP 91-0449}: Person notified ________________________ ______________ Boric Acid Tank #1 ______________ Boric Acid Tank #2 STANDARD: From the cue, applicant records S. Jackson as Chemistry person notified and checks Boric Acid Tank #1. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 2: 3.2 Document current boron concentration in the Boric Acid Tank as specified by Chemistry in Step 3.1 {PIP 91-0449}: _____________ ppmB STANDARD: From the cue, applicant determines that BAT #1 will be used and records 7500 ppmB. COMMENTS:	___ SAT ___ UNSAT

NOTE The final boron concentration used in the next step shall comply with COLR requirements for the current mode of operation. STEP 3: 3.3 Determine the boron concentration of the makeup water to the FWST (C_f) to attain the final boron concentration, C_{FW}. 3.3.1 Initial volume of FWST _______ = V_i. STANDARD: Using supplied information applicant enters the initial level of 373,875 gallons. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 4: 3.3.2 Final volume of FWST after makeup _______ = V_{FW}. STANDARD: Using supplied information applicant enters the final level of 377,646 gallons. COMMENTS:	___ SAT ___ UNSAT
STEP 5: 3.3.3 Compute the total gallons of makeup water to be added to the FWST _________ = V_f.. STANDARD: Applicant calculates, and records, makeup volume of 3,771 gallons. 377,646 - 373,875 = 3,771 **Examiner Note: This step is critical to ensure accurate result for final calculation.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP / STANDARD	**SAT / UNSAT**
STEP 6: 3.3.4 Initial boron concentration of water in the FWST _______ = C_i. STANDARD: From the cue, applicant records initial FWST boron concentration of 2740 ppmB. COMMENTS:	___ SAT ___ UNSAT
STEP 7: 3.3.5 Solve for the desired makeup water boron concentration, Cf. $C_f = \frac{C_{FW} V_{FW} - C_i V_i}{V_f}$ $C_f =$ ___________ STANDARD: Applicant calculates desired concentration of makeup water to be 737.1 ppmB $C_f =$ (2720 x 377646) – (2740 x 373875) / 3771 = 737.1 ppmB (737-738 ppmB acceptable) **Examiner Note: This step is critical to ensure accurate result for final calculation.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 8: 3.4 Determine the amount of boric acid and reactor makeup water to add as follows: 3.4.1 Boron Concentration of water in BAT _________ = C_1. STANDARD: From the cue, applicant records Unit 1 BAT boron concentration of 7500 ppmB. COMMENTS:	___ SAT ___ UNSAT

STEP 9: 3.4.2 Boron concentration of water in RMWST __________ = C_2.: STANDARD: From the cue, applicant records Unit 1 RMWST boron concentration of 4 ppmB. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 10: 3.4.3 Total gallons of makeup water to be added to FWST ________ = V_f from Step 3.3.3.: STANDARD: Applicant records total makeup volume of 3,771 from step 3.3.3. COMMENTS:	___ SAT ___ UNSAT
STEP 11: 3.4.4 Solve for the amount of boric acid to be added (V_1) using C_f obtained in Step 3.3.5. $V_1 = \frac{V_f (C_f - C_2)}{C_1 - C_2}$ V_1 = ____________ STANDARD: Applicant calculates boric acid total of 368.8 gallons. V_1 = 3771 (737.1 – 4) / (7500 – 4) = 368.8 (368-370 acceptable) **Examiner Note: This step is critical to ensure accurate result for final calculation.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 12: 3.4.5 If V_1 is negative, contact the OWPM Staff for instruction on adjusting the boron concentration in the FWST. STANDARD: Applicant determines that this step does not apply. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 13: 3.4.6 Solve for the amount of RMWST water to be added (V_2). $V_2 = V_f - V_1$ V_2 = __________ gal. STANDARD: Applicant calculates required RMWST water to be 3402.2 gallons. 3771 – 368.8 = 3402.2 (3401-3403 acceptable) **Examiner Note: This step is critical to ensure accurate result for final calculation.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
QUESTION 2	**CRITICAL STEP**
1000: SLC 16-9.12 Condition D / LCO 3.5.4, Condition B The minimum volume requirement of SLC 16-9.12 (Boration Systems Borated Water Sources – Operating) is not met. Therefore, Condition D (RWST non-functional) entry will be required. The Required Action associated with this condition is to declare the RWST inoperable and enter the applicable conditions of TS 3.5.4 Immediately. The requirement of SR 3.5.4.2 (Verify RWST borated water volume is ≥ 377,537 gallons) is not met. Therefore, TS 3.5.4, Condition B (RWST inoperable for reasons other than Condition A) entry will be required. The Required Action associated with this condition is to Restore RWST to OPERABLE status within 1 hour. **NOTE:** The applicant may also determine SLC 16-9.8 (Boration Systems Flow Paths - Operating), Condition A (One required Boration System Flow Path non-functional) applies if familiar with the associated plant testing procedure. This procedure requires the FWST to be functional in order to meet the acceptance criteria. However , the surveillance requirements of this SLC do not list this particular requirement so this determination will not be critical to this task. **1100: SLC 16-9.12 Condition D / LCO 3.5.4, Conditions B & C** With an initial volume of 373,875 gallons and an available makeup rate of 90 gpm (beginning at 1030), the total FWST volume at 1100 will be 376,575 gallons which remains below the required minimum of SR 3.5.4.2. 373,875 (initial volume) + {90 gpm x 30 min} = 376,575 gallons Therefore, SLC 16-9.12 Condition D and TS 3.5.4 Condition B will remain in effect **AND** TS 3.5.4 Condition C (Required Action and associated Completion Time not met) must be entered. **Examiner Note: Determination of SLC 16-9.12 and TS 3.5.4 required actions (only) are critical to ensure proper actions are entered to address this adverse condition.** **END OF TASK**	___ SAT ___ UNSAT

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

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INITIAL CONDITIONS:

Unit 1 is in Mode 3 during a refueling outage. The following events have occurred at the given times:

- **0945**: 1AD-9 B/8 “FWST AT MAKEUP LEVEL” annunciator received. Operators are dispatched to investigate decreasing Unit 1 FWST level.
- **1000**: Unit 1 BOP reports that FWST volume is 377,536.9 gallons.
- **1015**: An improperly executed FW system clearance is discovered and determined to be the cause of FWST level decrease.

  Current conditions are as follows:
  - The valve lineup has been immediately corrected securing the level decrease.
  - Current FWST level is 95%.
  - Current FWST boron concentration is 2740 ppmB.
  - Unit 1 BAT boron concentration is 7500 ppmB.
  - Unit 2 BAT boron concentration is 7300 ppmB.
  - Unit 1 RMWST boron concentration is 4 ppmB.
  - Total Blender Makeup flowrate = 90 gpm

INITIATING CUES:

1. **Using OP/1/A/6200/014 (Refueling Water System), determine the required amount of Boric Acid and RMWST water necessary to perform an FWST makeup from the blender as follows:**
   - **Consider any initial conditions complete.**
   - **Final FWST level of 96% at 2720 ppmB.**
   - **S. Jackson (Primary Chemistry) has been notified and directed use of the Unit 1 BAT.**
   - **Concurrent Verification is waived for this task.**

   Boric Acid ________________ **RMWST Water** ________________

2. **Assuming the required makeup begins at time 1030, determine which Active <u>SLC and TS</u> LCO entries (if any) will be required at 1000 and 1100.**

1000: ____

1100: ____

1. Limits and Precautions

1.1 Misaligning the FW System can result in draining the Refueling Water Storage Tank (FWST).

1.2 Miscalculating an FWST addition can result in boron concentration being lower than that required by the COLR.

1.3 If a Safety Injection occurs with the FW Pump in operation, the pump will lose its flowpath due to its suction valves receiving a close signal.

1.4 If either of the following occurs, a release concern may be created:

- A large quantity (more than normal makeup) of non-degassed water is used for makeup to the FWST.
  OR
- Any quantity of water with high activity (back leakage from NC into FWST) is added to the FWST.

2. Initial Conditions

_____ 2.1 Verify FWST operation per one of the following:

- ☐ Normal operation per Enclosure 4.1 (FWST Normal Operation)
  OR
- ☐ Purification per Enclosure 4.5 (FWST Purification) with the FW Pump secured
  OR
- ☐ Recirculation per Enclosure 4.6 (FWST Recirculation) with the FW Pump secured

_____ 2.2 Verify boron concentration control systems are available per OP/1/A/6150/009 (Boron Concentration Control).

_____ 2.3 **IF** charging has been established per OP/1/A/6200/001 (Chemical and Volume Control System), verify VCT level is adequate to allow boric acid blender alignment to the FWST for the duration of the FWST makeup.

_____ 2.4 Ensure that a pre-job briefing has been performed per AD-HU-ALL-0003 (Conduct of Pre-Job Briefings and Post-Job Critiques) that includes a discussion of reactivity management concerns with this procedure.

3. Procedure

NOTE:	To prevent an inadvertent reduction in the shutdown margin during NC fill evolutions, makeup to the FWST shall be performed with a water source having a Boron concentration which is greater than or equal to the required NC system Boron concentration.

_____ 3.1 Notify Chemistry that the following Boric Acid Tank will be used for Tech Spec blending calculations {PIP 91-0449}:

Person notified ___Stephanie Jackson___

___✓___ Boric Acid Tank #1
______ Boric Acid Tank #2

_____ 3.2 Document current boron concentration in the Boric Acid Tank as specified by Chemistry in Step 3.1 {PIP 91-0449}:

___7500___ ppmB

NOTE:	The final boron concentration used in the next step shall comply with COLR requirements for the current mode of operation.

_____ _____ 3.3 Determine the boron concentration of the makeup water to the FWST (C_f) to attain the final boron concentration, C_{FW}.

3.3.1 Initial volume of FWST ___373,875___ = V_i.

3.3.2 Final volume of FWST after makeup ___377,646___ = V_{FW}.

3.3.3 Compute the total gallons of makeup water to be added to the FWST ___3,771___ = V_f.

$V_f = V_{FW} - V_i$

3.3.4 Initial boron concentration of water in the FWST ___2,740___ = C_i.

3.3.5 Solve for the desired makeup water boron concentration, C_f.

$$C_f = \frac{C_{FW}V_{FW} - C_iV_i}{V_f} \qquad C_f = \frac{(2720)(377646)-(2740)(373875)}{3771}$$

$= 737.1$

_____ _____ 3.4 Determine the amount of boric acid and reactor makeup water to add as follows:

3.4.1 Boron Concentration of water in BAT 7,500 = C_1.

3.4.2 Boron concentration of water in RMWST 4 = C_2.

3.4.3 Total gallons of makeup water to be added to FWST 3,771 = V_f from Step 3.3.3.

3.4.4 Solve for the amount of boric acid to be added (V_1) using C_f obtained in Step 3.3.5.

$$V_1 = \frac{V_f (C_f - C_2)}{C_1 - C_2} \qquad V_1 = \frac{3771(737.1-4)}{(7500-4)} = 368.8$$

_____ 3.4.5 **IF** V_1 is negative, contact the OWPM Staff for instructions on adjusting the boron concentration in the FWST.

3.4.6 Solve for the amount of RMWST water to be added (V_2).

$V_2 = V_f - V_1$ 3771-368.8 V_2 = 3402.2 gal.

> **NOTE:** Step 3.5 assumes boric acid for FWST makeup will be supplied from BAT #1. If BAT #2 is aligned to Unit 1 per OP/1/A/6150/009 (Boron Concentration Control), Step 3.5 may be N/A'ed since both BATs are non-functional while in that alignment.

_____ 3.5 Determine effect on BAT #1 level as follows:

_____ 3.5.1 Record volume of BAT #1. (OAC Point C1P5645 (BAT Volume))
_____________ gallons

_____ 3.5.2 Determine final BAT volume by subtracting amount of acid to be added to FWST (Step 3.4.4) from initial volume (Step 3.5.1).

(_____________) - (_____________) = _____________ gallons
Step 3.5.1 Step 3.4.4

_____ 3.5.3 **IF** final BAT volume will be less than COLR requirements, perform one of the following:

_____ • Place BAT #2 in service for Unit 1 per OP/1/A/6150/009 (Boron Concentration Control).
OR

_____ SRO • Declare BAT #1 non-functional per the following:

- Unit 1 boric acid flow path SLC 16.9-7 or 16.9-8
- Unit 1 borated water source SLC 16.9-11 or 16.9-12

_____ _____ 3.6 Determine the final counter readings as follows:

3.6.1 Initial TOTAL MAKEUP COUNTER reading ________ = T_{mi}.

3.6.2 Initial BORIC ACID COUNTER reading ________ = T_{Bi}.

3.6.3 Solve for final TOTAL MAKEUP COUNTER reading (T_{mf}) using V_f obtained in Step 3.3.3.

$T_{mf} = T_{mi} + V_f$ T_{mf} = ____________

3.6.4 Solve for final BORIC ACID COUNTER reading (T_{Bf}) using V_1 obtained in Step 3.4.4.

$T_{Bf} = T_{Bi} + V_1$ T_{Bf} = ____________

3.7 Set the following blender flow controllers to achieve the desired boron concentration and volume:

_____ • 1NV-238A (B/A Xfer Pmp To Blender Ctrl)

_____ • 1NV-242A (RMWST To B/A Blender Ctrl)

3.8 Ensure the selector switches for the following valves are in "AUTO":

_____ • 1NV-238A (B/A Xfer Pmp To Blender Ctrl)

_____ • 1NV-242A (RMWST To B/A Blender Ctrl)

3.9 Set the following counters to achieve the desired boron concentration and volume:

_____ • BORIC ACID

_____ • TOTAL MAKEUP

_____ _____ 3.10 Verify 1NI-96B (C-Leg Accum Chk Vlv Tst Isol) is closed.

_____ 3.11 Verify 1NB-5 (Unit 1 VCT To NB Evap Feed Demin Isol) (1ELCC0024) (AB-560, MM-52) is closed.

3.12 Place the switches for the following valves in the "CLOSE" position:

_____ • 1NV-181A (B/A Blender Otlt To VCT)

_____ • 1NV-186A (B/A Blender Otlt To VCT Otlt)

_____ 3.13 Close 1NV-187 (Boric Acid Blender Outlet To VCT Outlet Isol) (AB-583, KK-50, Rm 419).

3.14 Open the following valves:

_____ • 1NV-183 (Boric Acid Blender Outlet To FWST & RHT Isol) (AB-585, KK-51, Rm 419)

_____ • 1NV-185 (Boric Acid To FWST Isol) (AB-581, KK-51, Rm 419)

_____ 3.15 Place "NC MAKEUP MODE SELECT" switch in the "MANUAL" position.

3.16 Ensure <u>one</u> of the following Reactor Makeup Water Pumps is in "AUTO":

_____ • "RX M/U WTR PUMP 1A"
OR

_____ • "RX M/U WTR PUMP 1B"

3.17 Ensure the Reactor Makeup Water Pump **<u>NOT</u>** selected to "AUTO" in Step 3.15 is in "OFF":

_____ • "RX M/U WTR PUMP 1A"
OR

_____ • "RX M/U WTR PUMP 1B"

3.18 Ensure at least <u>one</u> of the following Boric Acid Transfer Pumps is in "AUTO":

_____ • "B/A XFER PUMP 1A"
AND/OR

_____ • "B/A XFER PUMP 1B"

_____ 3.19 **<u>IF</u>** a Boric Acid Transfer Pump was **<u>NOT</u>** selected to "AUTO" in Step 3.18, ensure it is in "OFF":

_____ • "B/A XFER PUMP 1A"
OR

_____ • "B/A XFER PUMP 1B"

_____ 3.20 **IF** Unit 1 is in Mode 1, 2, 3 or 4, perform the following:

_____ 3.20.1 Step 3.20.2 is an action to maintain the FWST within analyzed conditions during a Safety Injection. The designated individuals shall sign in the indicated places to document understanding of responsibilities. All required actions are to be completed prior to reaching FWST Lo Level (20%) to ensure no air entrainment occurs due to vortex formation in the FWST.

Operator in Control Room ________________________________

Shift Manager approval ___________________________________

_____ 3.20.2 **IF AT ANY TIME** while FWST makeup is in progress a Safety Injection occurs on Unit 1, terminate the makeup by performing the following:

_____ 3.20.2.1 Turn the "NC MAKEUP CONTROL" switch to the "STOP" position.

3.20.2.2 Ensure the following:

- _____ Selected Reactor Makeup Water Pump stops.
- _____ 1NV-238A (B/A Xfer Pmp To Blender Ctrl) closes.
- _____ 1NV-242A (RMWST To B/A Blender Ctrl) closes.

_____ 3.21 Energize makeup control circuit by turning the "NC MAKEUP CONTROL" switch to the "START" position.

3.22 Ensure the following:

- _____ Selected Reactor Makeup Water Pump starts.
- _____ Selected Boric Acid Transfer Pump starts.
- _____ 1NV-238A (B/A Xfer Pmp To Blender Ctrl) positions to produce desired boric acid flow.
- _____ 1NV-242A (RMWST To B/A Blender Ctrl) positions to produce desired total makeup flow.

_____ 3.23 **WHEN** makeup is complete, turn the "NC MAKEUP CONTROL" switch to the "STOP" position.

3.24 Ensure the following:

- _____ Selected Reactor Makeup Water Pump stops.
- _____ Selected Boric Acid Transfer Pump stops.
- _____ 1NV-238A (B/A Xfer Pmp To Blender Ctrl) closes.
- _____ 1NV-242A (RMWST To B/A Blender Ctrl) closes.

3.25 Flush the flowpath for one minute as follows:

3.25.1 Place both Boric Acid Transfer Pumps in "OFF".

_____ • "B/A XFER PUMP 1A"

_____ • "B/A XFER PUMP 1B"

_____ 3.25.2 Place the selector switch for 1NV-238A (B/A Xfer Pmp To Blender Ctrl) in the "CLOSED" position.

_____ 3.25.3 Place the selector switch for 1NV-242A (RMWST To B/A Blender Ctrl) in the "OPEN" position.

_____ 3.25.4 Turn the "NC MAKEUP CONTROL" switch to the "START" position.

3.25.5 Ensure the following:

_____ • Selected Reactor Makeup Water Pump starts.

_____ • Total makeup flow indicates flow.

_____ 3.25.6 **<u>WHEN</u>** flushing is completed, turn the "NC MAKEUP CONTROL" switch to the "STOP" position.

3.25.7 Ensure the following:

_____ • Selected Reactor Makeup Water Pump stops.

_____ • Total makeup flow indicates no flow.

3.26 Place the selector switches for the following valves in "AUTO":

_____ • 1NV-238A (B/A Xfer Pmp To Blender Ctrl)

_____ • 1NV-242A (RMWST To B/A Blender Ctrl)

3.27 Close the following valves:

_____ • 1NV-183 (Boric Acid Blender Outlet To FWST & RHT Isol) (AB-585, KK-51, Rm 419)

_____ • 1NV-185 (Boric Acid To FWST Isol) (AB-581, KK-51, Rm 419)

_____ 3.28 Open 1NV-187 (Boric Acid Blender Outlet To VCT Outlet Isol) (AB-583, KK-50, Rm 419).

3.29 Place at least <u>one</u> of the following Boric Acid Transfer Pumps in "AUTO":

_____ • "B/A XFER PUMP 1A"
AND/OR
_____ • "B/A XFER PUMP 1B"

_____ 3.30 **<u>IF</u>** needed to support plant conditions, place desired Boric Acid Transfer Pump in "ON":

_____ • "B/A XFER PUMP 1A"

_____ • "B/A XFER PUMP 1B"

_____ 3.31 **<u>IF</u>** desired, place the second Reactor Makeup Water Pump in "AUTO":

_____ • "RX M/U WTR PUMP 1A"

_____ • "RX M/U WTR PUMP 1B"

_____ 3.32 **<u>IF</u>** needed to support plant conditions, place desired Reactor Makeup Water Pump in "ON":

_____ • "RX M/U WTR PUMP 1A"

_____ • "RX M/U WTR PUMP 1B"

3.33 Place the selector switches for the following valves in "AUTO":

_____ • 1NV-181A (B/A Blender Otlt To VCT)

_____ • 1NV-186A (B/A Blender Otlt To VCT Otlt)

_____ 3.34 Align for makeup to the VCT per OP/1/A/6150/009 (Boron Concentration Control).

NOTE: FWST sample is required within 24 hours of completion of makeup.

_____ 3.35 **IF** either of the following conditions exists, recirculate the FWST using an NS pump:

- ☐ A time constraint exists that prohibits the use of the normal recirculation of the FWST.
- ☐ Unit/WCC SRO determines that NS System Availability is **NOT** a concern, and that recirculation via the NS is desired.

_____ 3.35.1 Place the FWST in recirculation via an NS pump per OP/1/A/6200/007 (Containment Spray System) at a flow rate of 900 GPM.

_____ 3.35.2 Notify Chemistry of the following:
Person notified ______________________________________

- FWST is in recirculation with an NS Pump.
- FWST is to be sampled per OP/1/A/6200/027 (Sampling Local Primary Sample Points).

_____ 3.35.3 **WHEN** notified by Chemistry that they are ready to obtain the sample, secure the NS pump per OP/1/A/6200/007 (Containment Spray System).

NOTE: FWST sample is required within 24 hours of completion of makeup.

_____ 3.36 **IF** FWST was **NOT** recirculated with the NS pump, perform the following:

3.36.1 Place the FWST in recirculation per one of the following:

- _____ Enclosure 4.6 (FWST Recirculation).
  OR
- _____ Enclosure 4.5 (FWST Purification).

_____ 3.36.2 Notify Chemistry of the following:

Person notified ______________________________________

- FWST is in recirculation with the FW Pump.
- FWST is to be sampled per OP/1/A/6200/027 (Sampling Local Primary Sample Points).

NOTE: The FWST has been returned to normal operation as defined by Enclosure 4.1 (FWST Normal Operation) of this procedure.

3.37 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

JPM A.2

RO / SRO

Catawba Nuclear Station
Admin. JPM A.2
June 2017 NRC Exam

EVALUATION SHEET

Task: Use Flow Diagrams, Electrical Prints and Load Lists To Determine Leak Isolation Boundary

Alternate Path: N/A

Facility JPM #: 2012 NRC Exam

Safety Function: N/A

K/A 2.2.41 Ability to obtain and interpret station electrical and mechanical drawings.

Importance: 3.5 / 3.9 **CFR:** 41.10 / 45.12 / 45.13

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ Classroom ___X___ Perform ___X___ Simulate _________

References: Flow diagrams of the CM system (CN 1590-1.5, CN 1590-1.7), Load List for 1MXB, 6.9 KV bus one line electrical drawings

Task Standard: Mechanical and electrical isolation boundary determined for work on 1CM-327 per JPM A.2 key.

Validation Time: 30 minutes **Time Critical:** Yes _____ No ___X___

Applicant:
NAME______________________________ Docket #________________ Time Start: ___________
Time Finish: ___________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ________________________________ ________________________________/_________
NAME SIGNATURE DATE

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COMMENTS

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Catawba Nuclear Station
Admin. JPM A.2
June 2017 NRC Exam

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **The 1B Condensate Booster Pump has been shutdown in accordance with OP/1/A/6250/001 (Condensate and Feedwater System) and is to be tagged out for removal and replacement of 1CM-327 (1B Condensate Booster Pump Suction Header Relief Valve).**

INITIATING CUES:

- **The SM has directed you to use the provided materials to determine the required boundary for isolation for this work.**
- **You are to use the valves closest to the work being performed for isolation to minimize drain and fill time.**
- **Identify components, including the required position, for creation of a Clearance for replacement of 1CM-327, including:**
  - **Mechanical isolations**
  - **Electrical isolations**
  - **Applicable Vent and Drain path**
- **Record your answer in the table on the following page.**

EXAMINER NOTE:

After reading cue, provide applicant with a copy of CM flow diagrams (CN 1590-1.5 and CN 1590-1.7), load list for 1MXB, and 6.9 KV Switchgear one line diagrams (CN 1702-1.1, CN 1702-1.2, CN 1702-1.3, and CN 1702-1.4).

STEP / STANDARD	SAT / UNSAT

START TIME: _______

STEP 1: Determine clearance boundary for 1CM-327 boundary. STANDARD: Applicant identifies clearance boundary per table on the next page. Note that only one vent valve or one drain valve is needed to meet the critical step. **Examiner Note: This step is critical to be able to correctly isolate the 1B Condensate Booster Pump for replacement of 1CM-327.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT

Component	Position
1TB-11	Racked Out
1CM-93	Closed
1CM-94	Closed
1CM-96	Closed
1CM-97	Closed
1CM-58	Closed
1CM-306	Closed
1MXB F01D	Off/Open
1MXB-R01B	Off/Open
*1CM-334 (Drain)	Open
*1CM-335 (Drain)	Open
*1CM-424 (Drain)	Open
*1CM-916 (Vent)	Open
*1CM-330 (Vent)	Open
*1CM-917 (Vent)	Open

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **The 1B Condensate Booster Pump has been shutdown in accordance with OP/1/A/6250/001 (Condensate and Feedwater System) and is to be tagged out for removal and replacement of 1CM-327 (1B Condensate Booster Pump Suction Header Relief Valve).**

INITIATING CUES:

- **The SM has directed you to use the provided materials to determine the required boundary for isolation for this work.**
- **You are to use the valves closest to the work being performed for isolation to minimize drain and fill time.**
- **Identify components, including the required position, for creation of a Clearance for replacement of 1CM-327, including:**
  - **Mechanical isolations**
  - **Electrical isolations**
  - **Applicable Vent and Drain path**
- **Record your answer in the table on the following page.**

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

Answer

Component	Position

JPM A.3R

RO

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Admin. JPM A.3R
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EVALUATION SHEET

Task: Calculate Total RL Discharge Flow

Alternate Path: N/A

Facility JPM #: WL-002

Safety Function: 9

K/A 2.3.11 Ability to control radiation releases

Importance: 3.8 / 4.3 **CFR:** 41.11 / 43.4 / 45.10

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ Classroom __X__ Perform __X__ Simulate ________

References: PT/0/A/4250/011 (RL Temperature and Discharge Flow Determination)

Task Standard: Total RL Discharge Flow calculated to be 48,608 gpm (48,608 to 50,179 gpm acceptable range)

Validation Time: 22 minutes **Time Critical:** Yes _____ No __X__

Applicant:
NAME______________________________ Docket #________________ Time Start: __________
Time Finish: __________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ______________________________ ______________________________/________
NAME SIGNATURE DATE

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COMMENTS

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Catawba Nuclear Station
Admin. JPM A.3R
June 2017 NRC Exam

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **An LWR is in progress from Waste Monitor Tank "A".**
- **The RL discharge header flow instrumentation is inoperable.**
- **PT/0/A/4250/011 (RL Temperature and Discharge Flow Determination) is in progress.**

INITIATING CUES:

- **The CRS directs you to calculate and record the total RL discharge flow per Enclosure 13.2 (Total Discharge Flow Calculation Sheet) of PT/0/A/4250/011.**
- **The following plant indications are noted:**

Unit 1 Power	**100%**
Unit 2 Power	**NO Mode**
0RLP5030 (RL Discharge Pressure)	**67 psig**
0RNP7380 (Lake Elevation)	**568 feet**
C1P5856 (RN Calculate Total Flow)	**Out of service**
C1P5854 (RN Train A Calculated Total Flow)	**14130 gpm**
C1P5855 (RN Train B Calculated Total Flow)	**4840 gpm**
C1P5853 (Unit 1 Cooling Tower Evaporation)	**12260 gpm**
RL Pumps A and B are in service	
RN discharge is aligned to RL discharge header	
OAC Databook is not available	

EXAMINER NOTE:

After reading cue, provide applicant with a copy of PT/0/A/4250/011 Enclosures 13.2 and 13.7.

STEP / STANDARD	SAT / UNSAT

START TIME: _______

STEP / STANDARD	SAT / UNSAT
STEP 1: 1.1 Obtain Total RL Supply (A) as follows: 1.1.1 **IF** 0RLP5030 (Conventional LP Service Wtr Press) is **NOT** available contact engineering for optional indications and elevation corrections. STANDARD: Applicant determines per initiating cue that this step is not applicable. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT

STEP 2: 1.1.2 Perform the following calculations to obtain Total Discharge Head:

CRITICAL STEP

RL Disch Pressure = 0RLP5030 + 3.9 psi

RL Disch Pressure = 67 + 3.9 psi = 70.9 psig

Lake Elevation = 568 — 0RNP7380 (Lake Wylie Level) or obtained from hydro central per Step 1.1.4.2 of Enclosure 13.1 or Step 1.1.2.2 of Enclosure 13.8.

(70.9 psig x 2.311 ft/psig) + (571.75 - 568 ft) = 167.6 ft

RL Disch Pressure — Lake Elev — Total Disch Head

167 - 168 Acceptable

STANDARD:

Applicant Calculates Total Discharge Head of 167.6 feet. (167 -168 Acceptable)

___ SAT

___ UNSAT

Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard.

COMMENTS:

STEP / STANDARD	SAT / UNSAT
STEP 3: 1.1.3 Using Total Discharge Head from Step 1.1.2 obtain the RL Pump Flow value using one of the following: • Enclosure 13.7 OR • OAC Databook in "Secondary Systems Databook Calcs" using "RL Total Discharge Head vs. RL Pump Flow Rate". STANDARD: Applicant determines that Enclosure 13.7 should be used to determine RL pump flow value since the OAC Databook is not available per the initiating cue. Applicant determines RL pump flow to be 34,036 gpm. (34,036 – 35,244 gpm Acceptable) **Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT

STEP 4: 1.1.4 Once RL Pump Flow value is obtained, calculate Total RL Supply based on number of RL pumps in operation: 34,036 (RL Pump Flow Value) X 2 (# of pumps in operation) = 68,072 (Total RL Supply) gpm (A) STANDARD: Applicant calculates Total RL Supply to be 68,072 gpm. (68,072 – 70,488 gpm Acceptable) **Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 5: 1.1.5 Enter Total RL Supply (A) value in Step 1.4. STANDARD: Applicant records value for (A) in Step 1.4. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 6: 1.2 **IF** RN discharge is aligned to the RL discharge header, obtain Total RN Flow (B) as follows: 1.2.1 **IF** OAC point C1P5856 (RN Calculated Total Flow) is available, perform the following: STANDARD: Applicant determines per initiating cue that OAC point C1P5856 is not available and that this step is not applicable. COMMENTS:	___ SAT ___ UNSAT
STEP 7: 1.2.2 **IF** OAC points C1P5854 (RN Train A Calculated Total Flow) **AND** C1P5855 (RN Train B Calculated Total Flow) are available, perform the following to obtain total RN flow: _____ 1.2.2.1 Record the value of C1P5854 (RN Train A Calculated Total Flow) below: C1P5854 14,130 gpm (RN Pump Train A Flow) _____ 1.2.2.2 Record the value of C1P5855 (RN Train B Calculated Total Flow) below: C1P5855 4,840 gpm (RN Pump Train B Flow) STANDARD: Applicant records values for RN trains A and B calculated flow from values given in the initiating cue. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 8: 1.2.3 **IF** either C1P5854 (RN Train A Calculated Total Flow) **OR** C1P5855 (RN Train B Calculated Total Flow) is **NOT** available, perform the following to obtain total RN flow: STANDARD: Applicant determines that this step is not applicable. COMMENTS:	___ SAT ___ UNSAT

STEP 9: 1.2.4 Perform the following calculations to obtain Total RN Flow: __14,130__ + __4,840__ = __18,970__ gpm (B) RN Pump Train A Flow + RN Pump Train B Flow = Total RN Flow STANDARD: Applicant calculates Total RN Flow (B) to be 18,970 gpm. **Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 10: 1.2.5 Enter Total RN Flow (B) in Step 1.4. STANDARD: Applicant records value in Step 1.4. COMMENTS:	___ SAT ___ UNSAT
NOTE: Normal Cooling Tower evaporation loss @ 100% power is 9,000 to 14,000 gpm/unit. STEP 11: 1.3 Obtain Total Cooling Tower Evaporation (C) as follows: 1.3.1 **IF** a Unit 1 NC Pump is **NOT** inservice **AND** Unit 1 is in Mode 5, 6, or No Mode, enter 0 for Unit 1 Cooling Tower Evaporation in Step 1.3.3. STANDARD: Applicant determines that this step is not applicable. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 12: 1.3.2 **IF** a Unit 2 NC Pump is **NOT** inservice **AND** Unit 2 is in Mode 5, 6, or No Mode, enter 0 for Unit 2 Cooling Tower Evaporation in Step 1.3.3. STANDARD: Applicant determines per initiating cue that Unit 2 is in No Mode and enters 0 for Unit 2 evaporation in Step 1.3.3. COMMENTS:	___ SAT ___ UNSAT
STEP 13: 1.3.3 Calculate Cooling Tower Total Evaporation as follows: __12,260__ + __0__ = __12,260__gpm (C) Unit 1 Cooling Tower Evaporation + Unit 2 Cooling Tower Evaporation = Total Evaporation (C1P5853 or Step 1.3.1) (C2P5853 or Step 1.3.2) STANDARD: Applicant calculates Total Evaporation (C) to be 12,260 gpm. **Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP / STANDARD	**SAT / UNSAT**
STEP 14: 1.3.4 Enter Total Evaporation (C) in Step 1.4. STANDARD: Applicant enters value for Total Evaporation (C) in Step 1.4. COMMENTS:	___ SAT ___ UNSAT

STEP 15: 1.4 Perform the following to obtain Calculated Total RL Disch Flow: 68,072 + 18,970 - 12,260 = 74,782 gpm Total RL Supply (A) + Total RN Flow (B) - Total Evaporation (C) = Calculated Total RL Disch Flow 74,782 - 77,198 Acceptable STANDARD: Applicant calculates the Calculated Total RL Disch Flow to be 74,782 gpm. (74,782 – 77,198 gpm Acceptable) **Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
NOTE: Due to problems with current RL instrumentation (PIP C-10-4540) and discrepancies between calculated and OAC RL flow (PIP C-12-1399), a safety factor is applied to the Calculated Total RL Disch Flow of Step 1.4 to ensure conservative Total RL Disch Flow rates are used for dilution purposes. This is a temporary conservative action for use till RL discharge flow instrumentation problems are resolved.	**CRITICAL STEP**
STEP 16: 1.5 Apply dilution safety factor to obtain Total RL Discharge Flow from the Calculated Total RL Discharge Flow from Step 1.4 as follows: 74,782 X 0.65 = 48,608 gpm Calculated Total RL Disch Flow Step 1.4 / Total RL Disch Flow 48,608 - 50,179 Acceptable STANDARD: Applicant calculates Total RL Disch Flow to be 48,608 gpm. (48,608 – 50,179 gpm Acceptable) **Examiner Note: This step is critical to correctly determine Total RL Discharge Flow to meet the JPM standard.** COMMENTS: **END OF TASK**	___ SAT ___ UNSAT

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **An LWR is in progress from Waste Monitor Tank "A".**
- **The RL discharge header flow instrumentation is inoperable.**
- **PT/0/A/4250/011 (RL Temperature and Discharge Flow Determination) is in progress.**

INITIATING CUES:

- **The CRS directs you to calculate and record the total RL discharge flow per Enclosure 13.2 (Total Discharge Flow Calculation Sheet) of PT/0/A/4250/011.**
- **The following plant indications are noted:**

Unit 1 Power	**100%**
Unit 2 Power	**NO Mode**
0RLP5030 (RL Discharge Pressure)	**67 psig**
0RNP7380 (Lake Elevation)	**568 feet**
C1P5856 (RN Calculate Total Flow)	**Out of service**
C1P5854 (RN Train A Calculated Total Flow)	**14130 gpm**
C1P5855 (RN Train B Calculated Total Flow)	**4840 gpm**
C1P5853 (Unit 1 Cooling Tower Evaporation)	**12260 gpm**
RL Pumps A and B are in service	
RN discharge is aligned to RL discharge header	
OAC Databook is not available	

Total RL Discharge Flow (Step 1.5): _____________ gpm

JPM A.3S

SRO

Catawba Nuclear Station
Admin. JPM A.3S
June 2017 NRC Exam

EVALUATION SHEET

Task: Calculate Total RL Discharge Flow

Alternate Path: N/A

Facility JPM #: WL-001

Safety Function: N/A

K/A 2.3.11 Ability to control radiation releases.

Importance: 3.8 / 4.3 **CFR:** 41.11 / 43.4 / 45.10

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ Classroom __X__ Perform __X__ Simulate ______

References: PT/0/A/4250/011 (RL Temperature and Discharge Flow Determination)

Task Standard: Total RL Discharge Flow calculated to be 48,608 gpm (48,608 to 50,179 gpm acceptable range) and determination that sufficient dilution flow exists for LWR #2017025 approval.

Validation Time: 30 minutes **Time Critical:** Yes _____ No __X__

Applicant: Time Start: __________
NAME____________________________ Docket #______________ Time Finish: __________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ______________________________ ______________________________/________
NAME SIGNATURE DATE
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COMMENTS

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Catawba Nuclear Station
Admin. JPM A.3S
June 2017 NRC Exam

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **The RL discharge header flow instrumentation is inoperable.**
- **An LWR package has been delivered to the control room for approval.**

INITIATING CUES:

- **You are directed to calculate and record the total RL discharge flow per Enclosure 13.2 (Total Discharge Flow Calculation Sheet) of PT/0/A/4250/011 and determine whether sufficient dilution flow exists to approve the LWR.**
- **The following plant indications are noted:**

Unit 1 Power	**100%**
Unit 2 Power	**NO Mode**
0RLP5030 (RL Discharge Pressure)	**67 psig**
0RNP7380 (Lake Elevation)	**568 feet**
C1P5856 (RN Calculate Total Flow)	**Out of service**
C1P5854 (RN Train A Calculated Total Flow)	**14130 gpm**
C1P5855 (RN Train B Calculated Total Flow)	**4840 gpm**
C1P5853 (Unit 1 Cooling Tower Evaporation)	**12260 gpm**
RL Pumps A and B are in service	
RN discharge is aligned to RL discharge header	
OAC Databook is not available	

EXAMINER NOTE:

After reading cue, provide applicant with a copy of PT/0/A/4250/011 Enclosures 13.2 and 13.7 and copy of LWR #2017025.

STEP / STANDARD	SAT / UNSAT

START TIME: _______

STEP / STANDARD	SAT / UNSAT
STEP 1: 1.1 Obtain Total RL Supply (A) as follows: 1.1.1 **IF** 0RLP5030 (Conventional LP Service Wtr Press) is **NOT** available contact engineering for optional indications and elevation corrections. STANDARD: Applicant determines per initiating cue that this step is not applicable. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT

STEP 2: 1.1.2 Perform the following calculations to obtain Total Discharge Head:

CRITICAL STEP

RL Disch Pressure = 0RLP5030 + 3.9 psi

RL Disch Pressure = 67 + 3.9 psi = 70.9 psig

Lake Elevation = 568 0RNP7380 (Lake Wylie Level) or obtained from hydro central per Step 1.1.4.2 of Enclosure 13.1 or Step 1.1.2.2 of Enclosure 13.8.

(70.9 psig x 2.311 ft/psig) + (571.75 - 568 ft) = 167.6 ft

RL Disch Pressure, Lake Elev, Total Disch Head

167 - 168 Acceptable

STANDARD:

Applicant Calculates Total Discharge Head of 167.6 feet. (167 -168 Acceptable)

Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard.

COMMENTS:

___ SAT

___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 3: 1.1.3 Using Total Discharge Head from Step 1.1.2 obtain the RL Pump Flow value using one of the following: • Enclosure 13.7 OR • OAC Databook in “Secondary Systems Databook Calcs” using “RL Total Discharge Head vs. RL Pump Flow Rate”.	**CRITICAL STEP**
STANDARD: Applicant determines that Enclosure 13.7 should be used to determine RL pump flow value since the OAC Databook is not available per the initiating cue. Applicant determines RL pump flow to be 34,036 gpm. (34,036 – 35,244 gpm Acceptable) **Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard.** COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT

STEP 4: 1.1.4 Once RL Pump Flow value is obtained, calculate Total RL Supply based on number of RL pumps in operation: 34,036 (RL Pump Flow Value) X 2 (# of pumps in operation) = 68,072 (Total RL Supply) gpm (A) STANDARD: Applicant calculates Total RL Supply to be 68,072 gpm. (68,072 – 70,488 gpm Acceptable) **Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 5: 1.1.5 Enter Total RL Supply (A) value in Step 1.4. STANDARD: Applicant records value for (A) in Step 1.4. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 6: 1.2 **IF** RN discharge is aligned to the RL discharge header, obtain Total RN Flow (B) as follows: 1.2.1 **IF** OAC point C1P5856 (RN Calculated Total Flow) is available, perform the following: STANDARD: Applicant determines per initiating cue that OAC point C1P5856 is not available and that this step is not applicable. COMMENTS:	___ SAT ___ UNSAT
STEP 7: 1.2.2 **IF** OAC points C1P5854 (RN Train A Calculated Total Flow) **AND** C1P5855 (RN Train B Calculated Total Flow) are available, perform the following to obtain total RN flow: _____ 1.2.2.1 Record the value of C1P5854 (RN Train A Calculated Total Flow) below: C1P5854 __14,130__ gpm (RN Pump Train A Flow) _____ 1.2.2.2 Record the value of C1P5855 (RN Train B Calculated Total Flow) below: C1P5855 __4,840__ gpm (RN Pump Train B Flow) STANDARD: Applicant records values for RN trains A and B calculated flow from values given in the initiating cue. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 8: 1.2.3 **IF** either C1P5854 (RN Train A Calculated Total Flow) **OR** C1P5855 (RN Train B Calculated Total Flow) is **NOT** available, perform the following to obtain total RN flow: STANDARD: Applicant determines that this step is not applicable. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 9: 1.2.4 Perform the following calculations to obtain Total RN Flow: __14,130__ + __4,840__ = __18,970__ gpm (B) RN Pump Train A Flow + RN Pump Train B Flow = Total RN Flow STANDARD: Applicant calculates Total RN Flow (B) to be 18,970 gpm. **Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 10: 1.2.5 Enter Total RN Flow (B) in Step 1.4. STANDARD: Applicant records value in Step 1.4. COMMENTS:	___ SAT ___ UNSAT
NOTE: Normal Cooling Tower evaporation loss @ 100% power is 9,000 to 14,000 gpm/unit. STEP 11: 1.3 Obtain Total Cooling Tower Evaporation (C) as follows: 1.3.1 **IF** a Unit 1 NC Pump is **NOT** inservice **AND** Unit 1 is in Mode 5, 6, or No Mode, enter 0 for Unit 1 Cooling Tower Evaporation in Step 1.3.3. STANDARD: Applicant determines that this step is not applicable. COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 12: 1.3.2 **IF** a Unit 2 NC Pump is **NOT** inservice **AND** Unit 2 is in Mode 5, 6, or No Mode, enter 0 for Unit 2 Cooling Tower Evaporation in Step 1.3.3. STANDARD: Applicant determines per initiating cue that Unit 2 is in No Mode and enters 0 for Unit 2 evaporation in Step 1.3.3. COMMENTS:	___ SAT ___ UNSAT

STEP 13: 1.3.3 Calculate Cooling Tower Total Evaporation as follows: __12,260__ + __0__ = __12,260__gpm (C) Unit 1 Cooling Tower Evaporation + Unit 2 Cooling Tower Evaporation = Total Evaporation (C1P5853 or Step 1.3.1) (C2P5853 or Step 1.3.2) STANDARD: Applicant calculates Total Evaporation (C) to be 12,260 gpm. **Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 14: 1.3.4 Enter Total Evaporation (C) in Step 1.4. STANDARD: Applicant enters value for Total Evaporation (C) in Step 1.4. COMMENTS:	___ SAT ___ UNSAT
STEP 15: 1.4 Perform the following to obtain Calculated Total RL Disch Flow: 68,072 + 18,970 - 12,260 = 74,782 gpm Total RL Supply (A) + Total RN Flow (B) - Total Evaporation (C) = Calculated Total RL Disch Flow 74,782 - 77,198 Acceptable STANDARD: Applicant calculates the Calculated Total RL Disch Flow to be 74,782 gpm. (74,782 – 77,198 gpm Acceptable) **Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
NOTE: Due to problems with current RL instrumentation (PIP C-10-4540) and discrepancies between calculated and OAC RL flow (PIP C-12-1399), a safety factor is applied to the Calculated Total RL Disch Flow of Step 1.4 to ensure conservative Total RL Disch Flow rates are used for dilution purposes. This is a temporary conservative action for use till RL discharge flow instrumentation problems are resolved.	**CRITICAL STEP**
STEP 16: 1.5 Apply dilution safety factor to obtain Total RL Discharge Flow from the Calculated Total RL Discharge Flow from Step 1.4 as follows: ___74,782___ X 0.65 = ___48,608___ gpm Calculated Total RL Disch Flow Step 1.4 / Total RL Disch Flow 48,608 - 50,179 Acceptable STANDARD: Applicant calculates Total RL Disch Flow to be 48,608 gpm. (48,608 – 50,179 gpm Acceptable) **Examiner Note: This step is critical to correctly determine Total RL Discharge Flow to meet the JPM standard.** COMMENTS:	___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT
STEP 17: Determine whether LWR #2017025 should be approved. STANDARD: Applicant determines that the RL Low Flow Interlock would be set for 45,000 gpm and that sufficient dilution flow exists to approve the LWR. **Examiner Note: This step is critical to correctly determine that Total RL Flow is greater than the RL Low Flow Interlock Setpoint and that sufficient dilution flow exists to approve the LWR.** COMMENTS: **END OF TASK**	**CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **The RL discharge header flow instrumentation is inoperable.**
- **An LWR package has been delivered to the control room for approval.**

INITIATING CUES:

- **You are directed to calculate and record the total RL discharge flow per Enclosure 13.2 (Total Discharge Flow Calculation Sheet) of PT/0/A/4250/011 and determine whether sufficient dilution flow exists to approve the LWR.**
- **The following plant indications are noted:**

Unit 1 Power	**100%**
Unit 2 Power	**NO Mode**
0RLP5030 (RL Discharge Pressure)	**67 psig**
0RNP7380 (Lake Elevation)	**568 feet**
C1P5856 (RN Calculate Total Flow)	**Out of service**
C1P5854 (RN Train A Calculated Total Flow)	**14130 gpm**
C1P5855 (RN Train B Calculated Total Flow)	**4840 gpm**
C1P5853 (Unit 1 Cooling Tower Evaporation)	**12260 gpm**
RL Pumps A and B are in service	
RN discharge is aligned to RL discharge header	
OAC Databook is not available	

Total RL Discharge Flow (Step 1.5): _____________ gpm

Sufficient dilution flow for LWR #2017025 approval? (YES/NO) _____________

1. Procedure

1.1 Obtain Total RL Supply (A) as follows:

N/A 1.1.1 **IF** 0RLP5030 (Conventional LP Service Wtr Press) is **NOT** available contact engineering for optional indications and elevation corrections.

Engineer contacted: ______________________________

NOTE: Engineering specified optional indications and elevation corrections may be substituted for 0RLP5030 (Conventional LP Service Wtr Press) and the 3.9 psi elevation correction of following step to obtain Total Discharge Head.

_____ 1.1.2 Perform the following calculations to obtain Total Discharge Head:

RL Disch Pressure = 0RLP5030 + 3.9 psi

RL Disch Pressure = 67 + 3.9 psi = 70.9 psig

Lake Elevation = 568 0RNP7380 (Lake Wylie Level) or obtained from hydro central per Step 1.1.4.2 of Enclosure 13.1 or Step 1.1.2.2 of Enclosure 13.8.

(70.9 psig x 2.311 ft/psig) + (571.75 - 568 ft) = 167.6 ft

RL Disch Pressure — Lake Elev — Total Disch Head

167 - 168 Acceptable

_____ 1.1.3 Using Total Discharge Head from Step 1.1.2 obtain the RL Pump Flow value using <u>one</u> of the following:

- [X] Enclosure 13.7 (RL Pumps Head / Capacity Table)

OR

- ☐ OAC Databook in "Secondary Systems Databook Calcs" using "RL Total Discharge Head vs. RL Pump Flow Rate".

_____ 1.1.4 Once RL Pump Flow value is obtained, calculate Total RL Supply based on number of RL pumps in operation:

34,036 X 2 = 68,072 gpm (A)

RL Pump Flow Value — # of pumps in operation — Total RL Supply

_____ 1.1.5 Enter Total RL Supply (A) value in Step 1.4.

68,072 - 70,488 Acceptable based on Encl 13.7 Acceptable Range

JPM A.3 Answer Key

_____ 1.2 **IF** RN discharge is aligned to the RL discharge header, obtain Total RN Flow (B) as follows:

N/A 1.2.1 **IF** OAC point C1P5856 (RN Calculated Total Flow) is available, perform the following:

☐ 1.2.1.1 Record the current value of C1P5856 (RN Calculated Total Flow)

C1P5856 __________ gpm

☐ 1.2.1.2 Enter above value as Total RN Flow (B) in Step 1.4.

☐ 1.2.1.3 N/A Step 1.2.2 thru Step 1.2.5.

_____ 1.2.2 **IF** OAC points C1P5854 (RN Train A Calculated Total Flow) **AND** C1P5855 (RN Train B Calculated Total Flow) are available, perform the following to obtain total RN flow:

_____ 1.2.2.1 Record the value of C1P5854 (RN Train A Calculated Total Flow) below:

C1P5854 **14,130** gpm (RN Pump Train A Flow)

_____ 1.2.2.2 Record the value of C1P5855 (RN Train B Calculated Total Flow) below:

C1P5855 **4,840** gpm (RN Pump Train B Flow)

N/A 1.2.3 **IF** either C1P5854 (RN Train A Calculated Total Flow) **OR** C1P5855 (RN Train B Calculated Total Flow) is **NOT** available, perform the following to obtain total RN flow:

_____ 1.2.3.1 Calculate RN Pump Train A flow:

__________ + __________ = __________gpm
1RNP7520 + 2RNP7520 = RN Pump Train A flow

_____ 1.2.3.2 Calculate RN Pump Train B flow:

__________ + __________ = __________gpm
1RNP7510 + 2RNP7510 = RN Pump Train B flow

_____ 1.2.4 Perform the following calculations to obtain Total RN Flow:

14,130 + **4,840** = **18,970** gpm (B)
RN Pump Train A Flow + RN Pump Train B Flow = Total RN Flow

_____ 1.2.5 Enter Total RN Flow (B) in Step 1.4.

JPM A.3 Answer Key

Enclosure 13.2

Total Discharge Flow Calculation Sheet

NOTE:	Normal Cooling Tower evaporation loss @ 100% power is 9,000 to 14,000 gpm/unit.

1.3 Obtain Total Cooling Tower Evaporation (C) as follows:

N/A 1.3.1 **<u>IF</u>** a Unit 1 NC Pump is **<u>NOT</u>** inservice **<u>AND</u>** Unit 1 is in Mode 5, 6, or No Mode, enter 0 for Unit 1 Cooling Tower Evaporation in Step 1.3.3.

_____ 1.3.2 **<u>IF</u>** a Unit 2 NC Pump is **<u>NOT</u>** inservice **<u>AND</u>** Unit 2 is in Mode 5, 6, or No Mode, enter 0 for Unit 2 Cooling Tower Evaporation in Step 1.3.3.

_____ 1.3.3 Calculate Cooling Tower Total Evaporation as follows:

12,260 + 0 = 12,260 gpm (C)

Unit 1 Cooling Tower Evaporation (C1P5853 or Step 1.3.1) + Unit 2 Cooling Tower Evaporation (C2P5853 or Step 1.3.2) = Total Evaporation

_____ 1.3.4 Enter Total Evaporation (C) in Step 1.4.

_____ 1.4 Perform the following to obtain Calculated Total RL Disch Flow:

68,072 + 18,970 - 12,260 = 74,782 gpm

Total RL Supply (A) + Total RN Flow (B) - Total Evaporation (C) = Calculated Total RL Disch Flow

74,782 - 77,198 Acceptable

NOTE:	Due to problems with current RL instrumentation (PIP C-10-4540) and discrepancies between calculated and OAC RL flow (PIP C-12-1399), a safety factor is applied to the Calculated Total RL Disch Flow of Step 1.4 to ensure conservative Total RL Disch Flow rates are used for dilution purposes. This is a temporary conservative action for use till RL discharge flow instrumentation problems are resolved.

_____ 1.5 Apply dilution safety factor to obtain Total RL Discharge Flow from the Calculated Total RL Discharge Flow from Step 1.4 as follows:

74,782 X 0.65 = 48,608 gpm

Calculated Total RL Disch Flow Step 1.4 — Total RL Disch Flow

48,608 - 50,179 Acceptable

Calculated By ______________________________ ________________
Operator/Initials Date/Time

Verified By ______________________________ ________________
Operator/Initials Date/Time

Enclosure 13.7

RL Pumps Head / Capacity Table

Head	Flow	Head	Flow	Head	Flow	Head	Flow
100	57192	146	46803	175.50	24110	200	15185
101	56997	147	46524	175.75	23824	201	14965
102	56800	148	46238	176.00	23544	202	14737
103	56602	149	45942	176.25	23271	203	14499
104	56403	150	45636	176.50	23005	204	14252
105	56202	151	45318	176.75	22747	205	13997
106	55999	152	44984	177.00	22496	206	13733
107	55795	153	44633	177.25	22252	207	13460
108	55590	154	44262	177.50	22016	208	13180
109	55383	155	43867	177.75	21787	209	12891
110	55175	156	43444	178.00	21566	210	12595
111	54966	157	42987	178.25	21352	211	12292
112	54755	158	42493	178.50	21146	212	11982
113	54543	159	41954	178.75	20947	213	11665
114	54330	160	41365	179.00	20756	214	11342
115	54116	161	40717	179.25	20571	215	11012
116	53900	162	40004	179.50	20394	216	10677
117	53683	163	39219	179.75	20224	217	10335
118	53465	164	38354	180.00	20061	218	9988
119	53246	165	37405	180.25	19904	219	9635
120	53025	166	36368	180.50	19754	220	9277
121	52804	167	35244	180.75	19611	221	8914
122	52581	168	34036	181.00	19473	222	8546
123	52357	169	32755	181.25	19341	223	8174
124	52132	170.00	31416	181.50	19215	224	7796
125	51906	170.25	31074	181.75	19095	225	7414
126	51679	170.50	30731	182.00	18980	226	7028
127	51451	170.75	30386	182.25	18870	227	6638
128	51222	171.00	30040	182.50	18764	228	6243
129	50991	171.25	29693	183	18568	229	5845
130	50760	171.50	29345	184	18224	230	5443
131	50527	171.75	28998	185	17935	231	5036
132	50293	172.00	28652	186	17689	232	4627
133	50058	172.25	28306	187	17475	233	4213
134	49821	172.50	27962	188	17286	234	3796
135	49583	172.75	27620	189	17112	235	3376
136	49343	173.00	27281	190	16949	236	2952
137	49102	173.25	26944	191	16791	237	2525
138	48859	173.50	26611	192	16635	238	2095
139	48613	173.75	26281	193	16476	239	1662
140	48365	174.00	25955	194	16314	240	1226
141	48114	174.25	25634	195	16146	241	786
142	47860	174.50	25318	196	15971	242	344
143	47603	174.75	25008	197	15788		
144	47341	175.00	24703	198	15596		
145	47075	175.25	24403	199	15395		

Acceptable Range

JPM A.3 Answer Key

Catawba Nuclear Station
Admin. JPM A.4
June 2017 NRC Exam

JPM A.4

SRO

Catawba Nuclear Station
Admin. JPM A.4
June 2017 NRC Exam

EVALUATION SHEET

Task: Classify an Event and fill out the Emergency Notification Form

Alternate Path: N/A

Facility JPM #: NEW

Safety Function: N/A

K/A 2.4.40 Knowledge of SRO responsibilities in emergency plan implementation.

Importance: 2.7 / 4.5 **CFR:** 41.10 / 43.5 / 45.11

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ Classroom __X__ Perform __X__ Simulate ______

References: RP/0/A/5000/001 (Classification of Emergency)
NEI Rev 6 EAL Wallchart
RP/0/A/5000/006 A (Notifications to States and Counties from the Control Room)

Task Standard: Using NEI Rev 6 EAL Wallchart and RP/0/A/5000/001, applicant classifies the event as a Site Area Emergency (SA9.1) in ≤ 15 minutes, and then completes the Emergency Notification Form in ≤ 15 minutes.

Validation Time: 30 minutes **Time Critical:** Yes __X__ No ______

Applicant:
NAME______________________________ Docket #________________

Time Start: __________
Time Finish: __________

Time Critical 1 (<15 min):
Time Start: __________
Time Finish: __________

Time Critical 2 (<15 min):
Time Start: __________
Time Finish: __________

Performance Rating:

Performance Time _____

SAT ____ UNSAT ____

Examiner: ______________________________ ______________________________/________
NAME SIGNATURE DATE

===

COMMENTS

____

____

____

Catawba Nuclear Station
Admin. JPM A.4
June 2017 NRC Exam

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **Both Units are at 100% RTP.**
- **A tornado warning has been issued for York County.**
- **The following events have occurred:**
    - **AO on rounds contacts the control room to report a tornado sighted in the Switchyard.**
    - **A Loss of Offsite Power (LOOP) occurs on Unit 2.**
    - **A lighting pole has punctured the FWST on Unit 1 and water is spilling out into the missile shield.**

INITIATING CUES:

- **You are the Emergency Coordinator.**
- **Classify this event per RP/0/A/5000/001 (Emergency Classification).**
- **Emergency Coordinator Judgment is NOT to be used when making this classification.**
- **Fill out the Emergency Notification Form per RP/0/A/5000/006 A (Notifications to the States And Counties From the Control Room).**
- **This JPM is time critical.**

EXAMINER NOTE:

After reading cue, provide applicant with a copy of RP/0/A/5000/001, RP/0/A/5000/006 A, and NEI Rev 6 EAL wallcharts.

STEP / STANDARD	SAT / UNSAT

START TIME: _______

<table>
<tr><th>STEP / STANDARD</th><th>SAT / UNSAT</th></tr>
<tr><td>
<u>Time Critical 1 Start:</u> ____________

<u>STEP 1:</u> Classify the Event:

Unit 2 is in an Unusual Event (SU1.1) due to the loss of offsite power capability for > 15 minutes. Note 1 states “The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.”

Unit 1 is in an Alert (SA9.1) due to a tornado strike on site and the event has caused VISIBLE DAMAGE to a SAFETY SYSTEM component or structure needed for the current operating mode.

Since Unit 1 is in a higher classification than Unit 2, the emergency classification for the site will be an Alert (SA9.1).

<u>STANDARD</u>:

Applicant determines from NEI Rev 6 EAL Wallchart, that Catawba is in an Alert SA9.1.

<u>Time Critical 1 Finish:</u> ____________

Examiner Note: This step is critical to determine the proper Emergency Action Level prior to notification of the States and Counties. This time critical must be complete in <u><</u> 15 minutes.

<u>COMMENTS:</u>
</td><td>
CRITICAL STEP

___ SAT

___ UNSAT
</td></tr>
</table>

STEP / STANDARD	SAT / UNSAT
Time Critical 2 Start: ____________ STEP 2: Fill out Emergency Notification Form: STANDARD: Applicant properly fills out the emergency notification form within 15 minutes. **Time Critical 2 Finish:** ____________ **Examiner Note: This step is critical to ensure timely and accurate notification of the States and Counties. This time critical must be complete in ≤ 15 minutes.** COMMENTS: **END OF TASK**	**CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- **Both Units are at 100% RTP.**
- **A tornado warning has been issued for York County.**
- **The following events have occurred:**
  - **AO on rounds contacts the control room to report a tornado sighted in the Switchyard.**
  - **A Loss of Offsite Power (LOOP) occurs on Unit 2.**
  - **A lighting pole has punctured the FWST on Unit 1 and water is spilling out into the missile shield.**

INITIATING CUES:

- **You are the Emergency Coordinator.**
- **Classify this event per RP/0/A/5000/001 (Emergency Classification).**
- **Emergency Coordinator Judgment is NOT to be used when making this classification.**
- **Fill out the Emergency Notification Form per RP/0/A/5000/006 A (Notifications to the States And Counties From the Control Room).**
- **This JPM is time critical.**

Declared EAL: _______________

Declaration Time: ______________

Items marked with a * indicate critical tasks

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

MESSAGE # 1 **Confirmation Phone #:** SIM:(803) ###-#### **AUTHENTICATION CODE #:** ____________

Lines 1 – 6 are required for INITIAL Notifications

1. EVENT: ■ DRILL ☐ ACTUAL DECLARATION ☐ TERMINATION (ONLY Lines 1, 2, & 4 required)

****2. AFFECTED SITE:**

Catawba

****3. EMERGENCY CLASSIFICATION**

☐ UNUSUAL EVENT ■ ALERT ☐ SITE AREA EMERGENCY ☐ GENERAL EMERGENCY

****4. EAL #** SA9.1 * **Declaration Date**: ____/____/____ **Time:** ________

Termination Date: ____/____/____ **Time:** ________(mark "N/A" for EAL # &Description)

EAL DESCRIPTION: The occurrence of any Table S-5 hazardous event AND EITHER: Event damage has caused indications of degraded performance in at least one train of a SAFETY SYSTEM needed for the current operating mode OR The event has caused VISIBLE DAMAGE to a SAFETY SYSTEM component or structure needed for the current operating mode

****5. RELEASE TO THE ENVIRONMENT** (caused by the emergency): ☒ NONE ☐ IS OCCURRING ☐ HAS OCCURRED

****6. PROTECTIVE ACTION RECOMMENDATIONS**:

■ NONE

☐ EVACUATE: ____________________

☐ SHELTER: ____________________

☐ CONSIDER THE USE OF KI (POTASSIUM IODIDE) IN ACCORDANCE WITH ORO PLANS AND POLICIES

☐ OTHER: ____________________

*Lines 7-11 are **NOT** required for INITIAL notifications. Lines 7-11 may be provided separately for follow-up notifications.*

7. PROGNOSIS: Upgrade in classification or PAR change is likely before the next follow-up notification ☐ Yes ☐ No

8. SITE UNIT(S) STATUS:

AFFECTED UNIT

☐ YES Unit 1 - ________% Power Shutdown: Date ___/_____/____Time __________

☐ YES Unit 2 - ________% Power Shutdown: Date ___/_____/____Time __________

9. METEOROLOGICAL DATA:

Wind direction from: ________ degrees Wind Speed: _______ mph Precipitation: _______ inches

Stability Class: ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G

*Lines 10 - 11 are completed for follow-up notifications, **IF** Line 5 IS OCCURRING or HAS OCCURRED is selected*

10. AIRBORNE RELEASE CHARACTERIZATION: ☐ GROUND ☐ MIXED ☐ ELEVATED

MAGNITUDE UNITS: ☐ Ci ☐ Ci/sec ☐ µCi/sec

Noble Gases: ____________ Iodines: ____________ Particulates: ____________

11. DOSE PROJECTION: Projection period: __________ Hours Estimated Release Duration ________Hours

Performed: Date ___/_____/____ Time: _________	**DISTANCE**	**TEDE (mrem)**	**Thyroid CDE (mrem)**
	Site Boundary		
	2 Miles		
	5 Miles		
	10 Miles		

12. REMARKS (As Applicable): ____________________

* **13. APPROVED BY:** Operator Name TITLE: Emergency Coordinator Date XX/ XX / XX Time __________

14. NOTIFIED BY: ____________________ Date ___/_____/____Time __________

15. RECEIVED BY (ORO use only): ____________________ Date ___/_____/____Time __________

GOVERNMENT AGENCIES NOTIFIED

Record the name, date, time, and agencies notified as applicable.

1. ______________________________ York County WP/EOC
(name)
______________________________ deleted
(date) (time)

2. ______________________________ Mecklenburg County WP/EOC
(name) deleted
____
(date) (time)

3. ______________________________ Gaston County WP/EOC
(name)
____
(date) (time)

4. ______________________________ North Carolina EOC/WP
(name) deleted
____
(date) (time)

5. ______________________________ North Carolina Alt. WP
(name) deleted
____
(date) (time)

6. ______________________________ North Carolina Alt. EOC
(name) deleted
____
(date) (time)

7. ______________________________ South Carolina WP
(name) deleted
____
(date) (time)

8. ______________________________ South Carolina Alt. WP
(name)
______________________________ deleted
(date) (time)

9. ______________________________ South Carolina EOC
(name) deleted
____
(date) (time)

Items marked with a * indicate critical tasks

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

MESSAGE # 1 **Confirmation Phone #:** SIM:(803) ###-#### **AUTHENTICATION CODE #:** ______

Lines 1 – 6 are required for INITIAL Notifications

1. EVENT: ☒ DRILL ☐ ACTUAL DECLARATION ☐ TERMINATION (ONLY Lines 1, 2, & 4 required)

*__2. AFFECTED SITE:__

Catawba

*__3. EMERGENCY CLASSIFICATION__

☐ UNUSUAL EVENT ☒ ALERT ☐ SITE AREA EMERGENCY ☐ GENERAL EMERGENCY

*__4. EAL #__ SA9.1 * **Declaration Date**: ___/___/___ **Time:** ______

Termination Date: ___/___/___ **Time:** ______ (mark "N/A" for EAL # &Description)

EAL DESCRIPTION: The occurrence of any Table S-5 hazardous event AND EITHER: Event damage has caused indications of degraded performance in at least one train of a SAFETY SYSTEM needed for the current operating mode OR The event has caused VISIBLE DAMAGE to a SAFETY SYSTEM component or structure needed for the current operating mode

*__5. RELEASE TO THE ENVIRONMENT__ (caused by the emergency): ☒ NONE ☐ IS OCCURRING ☐ HAS OCCURRED

*__6. PROTECTIVE ACTION RECOMMENDATIONS__:

☒ NONE

☐ EVACUATE: ______

☐ SHELTER: ______

☐ CONSIDER THE USE OF KI (POTASSIUM IODIDE) IN ACCORDANCE WITH ORO PLANS AND POLICIES

☐ OTHER: ______

*Lines 7-11 are **NOT** required for INITIAL notifications. Lines 7-11 may be provided separately for follow-up notifications.*

7. PROGNOSIS: Upgrade in classification or PAR change is likely before the next follow-up notification ☐ **Yes** ☐ **No**

8. SITE UNIT(S) STATUS:

AFFECTED UNIT

☐ YES Unit 1 - ______% Power Shutdown: Date ___/___/___ Time ______

☐ YES Unit 2 - ______% Power Shutdown: Date ___/___/___ Time ______

9. METEOROLOGICAL DATA:

Wind direction from: ______ degrees Wind Speed: ______ mph Precipitation: ______ inches

Stability Class: ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G

*Lines 10 - 11 are completed for follow-up notifications, **IF** Line 5 IS OCCURRING or HAS OCCURRED is selected*

10. AIRBORNE RELEASE CHARACTERIZATION: ☐ GROUND ☐ MIXED ☐ ELEVATED

MAGNITUDE UNITS: ☐ Ci ☐ Ci/sec ☐ µCi/sec

Noble Gases: ______ Iodines: ______ Particulates: ______

11. DOSE PROJECTION: Projection period: ______ Hours Estimated Release Duration ______ Hours

Performed:	**DISTANCE**	**TEDE (mrem)**	**Thyroid CDE (mrem)**
Date ___/___/___	Site Boundary		
Time: ______	2 Miles		
	5 Miles		
	10 Miles		

12. REMARKS (As Applicable): ______

*__13. APPROVED BY:__ Operator Name TITLE: Emergency Coordinator Date XX/ XX / XX Time ______

14. NOTIFIED BY: ______ Date ___/___/___ Time ______

15. RECEIVED BY (ORO use only): ______ Date ___/___/___ Time ______

GOVERNMENT AGENCIES NOTIFIED

Record the name, date, time, and agencies notified as applicable.

1. ________________________________ York County WP/EOC
(name)
________________________________ deleted
(date) (time)

2. ________________________________ Mecklenburg County WP/EOC
(name) deleted
____
(date) (time)

3. ________________________________ Gaston County WP/EOC
(name)
________________________________ deleted
(date) (time)

4. ________________________________ North Carolina EOC/WP
(name) deleted
____
(date) (time)

5. ________________________________ North Carolina Alt. WP
(name) deleted
____
(date) (time)

6. ________________________________ North Carolina Alt. EOC
(name) deleted
____
(date) (time)

7. ________________________________ South Carolina WP
(name) deleted
____
(date) (time)

8. ________________________________ South Carolina Alt. WP
(name)
________________________________ deleted
(date) (time)

9. ________________________________ South Carolina EOC
(name) deleted
____
(date) (time)