2021 INITIAL LICENSE NRC EXAM
SCENARIO # 1

Facility:	Catawba NRC Exam 2021	Scenario No.: 1	Op Test No.: 2021301
Examiners:		Operators:	SRO
			RO
			BOP

Initial Conditions: Unit 1 is at 50% power at the MOL. Unit 2 is at 100% power.

Turnover: Unit 1 is at 50% power at the MOL. Unit 2 is at 100% power. Direction for the crew is to raise reactor power to 100%. A reactivity plan has been provided by Reactor Engineering for raising reactor power.

Event No.	Malf. No.	Event Type*	Event Description
1		R – RO N – BOP N – SRO	Raise Reactor Power
2		C – BOP C – SRO	1KC-132 Fails closed
3		C – BOP C – SRO TS – SRO	1KC-C37A Fails Open
4		C – RO C – SRO	Loss of both KG pumps with failure of auto turbine runback
5		TS – SRO	1A NS Pump Loss of Power
6		C – RO C – SRO	Steam Leak
7		M – ALL	Steam Line Break Inside Containment
8		C – RO C – SRO	MSIVs fail to auto close on Main Steam Isolation
9		C – BOP C – SRO	VA Unfiltered Exhaust Fans fail to secure on S/I

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

Scenario 1 – Summary

Initial Condition
Unit 1 is at 50% power at the MOL. Unit 2 is at 100% power.

Turnover:
Unit 1 is at 50% power at the MOL. Unit 2 is at 100% power. Direction for the crew is to raise reactor power to 100%. A reactivity plan has been provided by Reactor Engineering for raising reactor power.

Event 1
BOP will perform an initial dilution and RO will input desired load rate and target load into the main turbine. RO may also withdraw control rods prior to placing the main turbine in 'GO' to initiate the raise in power.

Event History: 50% power increase at MOL last used 13 (2).

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. Crew will refer to Annunciator Response Procedure for 1AD-7 F/3 (Letdn HX Outlet Hi Temp), place 1KC-132 in Manual, and adjust CCW flow to restore letdown cooling.

Verifiable Action – BOP will manually control 1KC-132 as required.

Event History: This failure last used 19 (1).

Event 3
The Unit 1 'A' train KC miniflow valve 1KC-C37A will fail open. The crew will enter AP/1/A/5500/021 (Loss of Component Cooling Water) to start an additional KC pump. TS evaluation by the SRO is required.

Verifiable Action – The BOP will start an additional KC pump as directed.

Event History: KC miniflow valve failure last used 16 (2).

Event 4
The running KG (Generator Stator Cooling Water) pump will trip and the standby KG pump will fail to start requiring a turbine runback. Automatic runback will be failed requiring the RO to manually runback the main turbine. Crew will enter AP/1/A/5500/003 (Load Rejection) to address the runback. Once the manual runback is complete, the standby KG pump will start.

Verifiable Action – RO will manually runback the turbine to ~ 275 MWe. Crew will stabilize the plant at ~ 25% reactor power, and place control rods to manual once the steam dumps have been closed (Tavg ~ 3°F higher than Tref).

Event History: This failure last used 14 (3).

Event 5
A loss of power will occur to the 1A NS Pump. The SRO will determine appropriate TS.

Event History: This failure has not previously been used on an NRC exam.

Event 6
A steam leak inside containment will develop from the 1C S/G. The crew will enter AP/1/A/5500/028 (Steam Leak) to address.

Verifiable Action – RO will adjust turbine load to maintain reactor power stable. Crew will initiate makeup to Unit 1 Upper Surge Tank. BOP will start all Lower Containment Ventilation Units in low speed, start all Upper Containment Ventilation Units, and place all Lower and Upper Containment Ventilation Units in “MAX” cooling mode.

Event History: This steam leak malfunction allowing use of AP-28 is new.

Event 7
Steam leak size will increase requiring the crew to enter EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) and eventually transition to EP/1/A/5000/E-2 (Faulted Steam Generator Isolation). Crew will isolate the faulted S/G. Once 1C S/G has completely blown down, the RO will throttle S/G PORVs on intact S/Gs to stabilize NC System Thots.

Verifiable Action – BOP will isolate feed flow to the faulted S/G. RO will throttle S/G PORVs on intact S/Gs to stabilize NC System Thots.

Event History: The last steam line break inside containment was performed in 19 (3) but was on 1B S/G.

Event 8
Once steam generator pressures lower to 775 PSIG, a Main Steam Isolation signal will be generated, but the Main Steam Isolation valves will fail to automatically close, requiring the RO to manually close them.

Verifiable Action – RO will manually close the MSIVs on Unit 1.

Event History: CNS has had single MSIVs failing to automatically close on previous exams (last one in 19 (3) – 1SM-5), but the failure of all MSIVs to close automatically on the MSI signal with manual closure of these valves possible has not been used before.

Event 9
Auxiliary Building Ventilation Unfiltered Exhaust Fans will fail to automatically secure following the Safety Injection.

Verifiable Action – BOP will manually secure the Unfiltered Exhaust Fans.

Event History: This failure was last used on 16 (3).

Manual Control of Automatic Functions

Event	Position	Description
2	BOP	Manually control Automatic Letdown HX Temperature Control Valve (1KC-132)
4	RO	Manual turbine runback to ~ 275 MWe

***Critical Task 1* – Runback the Main Turbine prior to Main Turbine Trip (must be below amps for 332 MW within 3.5 minutes).**

***Critical Task 2* – Close MSIVs and isolate CA flow to the faulted S/G prior to a severe challenge (Orange Path) on NC system Integrity CSF.**

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5–8)	8
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)	2

EXERCISE GUIDE WORKSHEET

1. INITIAL CONDITIONS:

   1.1 Reset to IC # 13 and load schedule file for NRC Scenario 1

START TIME:__________

✓	✓	Trigger	Instructor Action	Final	Delay	Ramp	Delete In	Event
			ANN-AD11-B03 (TRANSFORMER A TROUBLE)	ON				
			ANN-AD11-E03 (TRANSFORMER B TROUBLE)	ON				
		2	OV_SLIM16SpIncPB (KC-132 Setpoint Increment pushbutton)	PRESS-ED			:10	2
		2	OV_SLIM16manPB (KC-132 Man Pushbutton)	PRESS-ED	:11		:01	2
			VLV-NV035A (NV153A L/D HX DIVERSION FAIL AUTO ACTIONS)	ACTIVE				2
		3	VLV-KC027F (KCC37A TRAIN A RECIRC LINE ISOL VLV FAIL TO POSITION)	1		:02		3
			MAL-EHC003F (ALL TURBINE AUTO RUNBACK FAILURE)	BLOCK				4
		4	LOA-EGB003 (KG PUMPS)	STOP BOTH				4
		4	LOA-EGB003 (KG PUMPS)	RUN B/A RES	5:00			4
		5	LOA-NS003 (RACKOUT NS PMP 1A)	RACK-OUT				5
		5	MAL-SM007C (STM BRK INSIDE CONTAINMENT LOOP C)	3000		:15		6
		7	MAL-SM007C (STM BRK INSIDE CONTAINMENT LOOP C)	2e+6		:15		7
			MAL-SM006A (SM7 MSIV A FAILURE)	ACTIVE				8
			MAL-SM006B (SM5 MSIV B FAILURE)	ACTIVE				8
			MAL-SM006C (SM3 MSIV C FAILURE)	ACTIVE				8
			MAL-SM006D (SM1 MSIV D FAILURE)	ACTIVE				8
		10	MAL-SM006A (SM7 MSIV A FAILURE)	ACTIVE			:01	8
		11	MAL-SM006B (SM5 MSIV B FAILURE)	ACTIVE			:01	8
		12	MAL-SM006C (SM3 MSIV C FAILURE)	ACTIVE			:01	8
		13	MAL-SM006D (SM1 MSIV D FAILURE)	ACTIVE			:01	8
			MAL-ISE011B (AUX BLDG FANS FAIL TO AUTO STOP)	ACTIVE				9

		17	**LOA-CNT002 (H2 ANALYZERS)**	**BOTH**	**10:00**			
		Ensure Event 10 = x02i071c (1SM-7 Close PB)						
		Ensure Event 11 = x02i074c (1SM-5 Close PB)						
		Ensure Event 12 = x02i079c (1SM-3 Close PB)						
		Ensure Event 13 = x02i082c (1SM-1 Close PB)						
		Ensure CRD Bank Select Switch is in MANUAL and withdraw control rods 2 steps						

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**, Increase Reactor Power

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as DEC-BA (Balancing Authority / SOC) by the crew to inform of commencing power increase, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	WHEN contacted as Secondary Chemistry to obtain maximum blowdown for appropriate load (step 3.2.3.9), **REPORT** “Maintain blowdown at current flow rates.”

3.3 **Scenario EVENT 2**, Letdown Heat Exchanger Temperature Control Valve (1KC-132) Fails Closed

✓	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**, KC Miniflow Valve 1KC-C37A fails open

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 3** to cause KC miniflow valve 1KC-C37A to fail open.

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for 1KC-C37A, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as an AO to perform a post start check out of the started KC pump, after 5 minutes **REPORT**: • "KC pump 1A1, 1B1, 1B2 looks good for continued operation."

3.5 **Scenario EVENT 4**, Loss of both KG pumps / Automatic Turbine Runback Failure

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 4** to cause the running KG pump to trip and failure of the standby KG pump to start.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as an AO to investigate the loss of KG, after 5 minutes **REPORT**: • "I do not see any reason that the running KG pump tripped, and I have the 1B KG pump in service. I will contact SPOC to help with troubleshooting the reason for the 1A KG pump trip."

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for loss of KG or automatic turbine runback failure, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as DEC BA (Balancing Authority) to notify of Unit status, **REPEAT** the information.

3.6 **Scenario EVENTS 5 & 6**, 1A NS Pump Loss of Power / Steam Leak Inside Containment

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 5** to cause a loss of power to 1A NS pump.

✓	BOOTH INSTRUCTOR ACTION
	IF dispatched as an AO to the breaker for 1A NS pump, **REPEAT** the information.
	After 5 minutes, contact the control room crew and **REPORT**: • "All indicating lights on the front of the breaker for 1A NS pump are dark and there is an acrid smell from the upper compartment."

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for 1A NS pump loss of power, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as RP to notify of the steam leak, **REPEAT** the information.

3.8 **Scenario EVENTs 7, 8, and 9**, Steam Line Break Inside Containment / MSIVs fail to close on MSI signal / Auxiliary Building Unfiltered Exhaust Fans fail to secure on S/I

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 7** to initiate a steam line break inside containment from the 1C S/G.

✓	BOOTH INSTRUCTOR ACTION
	IF dispatched as an AO to secure all ice condenser air handling units per G-1 Enclosure 11 and to place the Hydrogen Analyzers in service per OP/1/A/6450/010, **REPEAT** the information and **INSERT SIMULATOR Trigger 17**.
	After 10 minutes **REPORT**: • "Ice condenser air handling units have been secured per G-1 Enclosure 11 and the Hydrogen Analyzers have been placed in service per OP/1/A/6450/010."

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

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

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as an AO to unlock and close 1SA-4, **REPEAT** the information.

Op Test No.:	301	Scenario #	1	Event #	1	Page	12 of 150
Event Description:	Increase Reactor Power						

Note To Evaluator:

The scenario begins with a power increase from 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 4.3 (Dilution)**
- **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.

Enclosure 4.3

Dilution

OP/1/A/6150/009
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2. Initial Conditions

_____ 2.1 Ensure R2 reactivity management controls established per AD-OP-ALL-0203 (Reactivity Management). (R.M.)

_____ 2.2 Verify Unit 1 is in Mode 1 or 2.

_____ 2.3 Verify the NV System is in operation per OP/1/A/6200/001 (Chemical and Volume Control System).

_____ 2.4 Verify sufficient RHT volume is available to receive the reactor coolant displaced during the planned dilution operation.

_____ 2.5 Verify the NB System is in operation per OP/1/A/6200/012 (Reactor Makeup Water).

_____ 2.6 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. 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.)

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

_____ 3.2 IF the blender is set for automatic makeup per Enclosure 4.1 (Automatic Makeup), record the setpoint on 1NV-242A (RMWST To B/A Blender Ctrl): ___________ gpm

NOTE:	The purpose of the following step is to minimize the pressure fluctuation caused by manually diverting to the RHT and effects on Reactor Water Makeup flow.

_____ 3.3 IF desired, adjust the setpoint for 1NV-172A (VCT-LEVEL CTRL) (1NVSS5760) to 55%.

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

- _____ 1NV-242A (RMWST To B/A Blender Ctrl)
- _____ 1NV-181A (B/A Blender Otlt To VCT)

_____ 3.5 Ensure 1NV-242A (RMWST To B/A Blender Ctrl) controller in auto.

_____ 3.6 Ensure at least one reactor makeup water pump is in "AUTO" or "ON".

Enclosure 4.3 OP/1/A/6150/009

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☐ 3.7 Record the desired volume of reactor makeup water to be added. __________ gallons

_____ 3.8 Adjust the total makeup counter to the desired volume of reactor makeup water to be added. (R.M.)

_____ 3.9 Place the "NC MAKEUP MODE SELECT" switch to the "DILUTE" position.

NOTE:	High letdown flow rates result in increased backpressure on the letdown line. If letdown flow is ≥ 90 gpm, it may be desirable to reduce the dilution flow rate to 80 gpm to avoid the Rx Make-up Flow Deviation alarm and associated automatic actions.

_____ 3.10 IF required, adjust the setpoint for 1NV-242A (RMWST To B/A Blender Ctrl) to the desired flow.

_____ 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-242A (RMWST To B/A Blender Ctrl) as necessary to achieve the desired flow.

Enclosure 4.3
Dilution

OP/1/A/6150/009
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_____ 3.13 **IF AT ANY TIME** while dilution is in progress it becomes necessary **OR** it is desired to stop the dilution (for example: loss of all NC Pumps, unexpected results observed or a large makeup being made in multiple batches), perform the following:

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

3.13.2 Ensure the following valves close:

- _____ 1NV-242A (RMWST To B/A Blender Ctrl)
- _____ 1NV-181A (B/A Blender Otlt To VCT)

_____ 3.13.3 **IF** in "AUTO", verify the reactor makeup water pump stops.

☐ 3.13.4 Record reactor makeup water volume added as indicated on the total makeup counter. ____________ gallons

3.13.5 **WHEN** conditions allow resuming the dilution, perform the following:

☐ 3.13.5.1 Determine remaining volume to be added by subtracting the amount previously added (Step 3.13.4) from the desired volume to be added (Step 3.7).

____________ - ____________ = ____________ gallons
(Step 3.7) (Step 3.13.4)

_____ 3.13.5.2 Adjust total makeup counter to the volume of reactor makeup water determined in Step 3.13.5.1. (R.M.)

_____ 3.13.5.3 Place the "NC MAKEUP CONTROL" switch in the "START" position. (R.M.)

_____ 3.13.5.4 Verify the following:

☐ 1NV-242A (RMWST To B/A Blender Ctrl) modulates to establish desired flow
☐ 1NV-181A (B/A Blender Otlt To VCT) opens

_____ 3.13.5.5 **IF** in "AUTO", verify the reactor makeup water pump starts.

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

☐ Control rod motion
☐ NC System Tavg
☐ Reactor Power

Enclosure 4.3

Dilution

OP/1/A/6150/009
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NOTE:	If a small makeup is being performed, placekeeping for Steps 3.15 through 3.17 may be performed after Step 3.18 is performed.

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

_____ 3.16 Verify the following:

- ☐ 1NV-242A (RMWST To B/A Blender Ctrl) modulates to establish desired flow
- ☐ 1NV-181A (B/A Blender Otlt To VCT) opens

_____ 3.17 IF in "AUTO", verify the reactor makeup water pump starts.

NOTE:	The total makeup counter may count up 1 - 5 gallons after termination.

3.18 **WHEN** the desired volume of reactor makeup water is reached on the total makeup counter, ensure the following valves close. (R.M.)

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

_____ • 1NV-181A (B/A Blender Otlt To VCT)

_____ 3.19 IF Step 3.3 was performed, return the setpoint for 1NV-172A (VCT LEVEL CRL) (1NVSS5760) to 75.0 %.

_____ 3.20 IF automatic makeup is desired, perform one of the following:

_____ 3.20.1 IF it is desired to change the blender outlet boron concentration, refer to Enclosure 4.1 (Automatic Makeup).

OR

_____ 3.20.2 IF makeup at the previous concentration is acceptable AND the system was previously aligned per Enclosure 4.1 (Automatic Makeup), perform the following:

_____ 3.20.2.1 Ensure the controller for 1NV-242A (RMWST To B/A Blender Ctrl) is set to the value recorded in Step 3.2. (R.M.)

_____ 3.20.2.2 Place the "NC MAKEUP MODE SELECT" switch in "AUTO".

_____ 3.20.2.3 Place the "NC MAKEUP CONTROL" switch to the "START" position. (R.M.)

3.21 Do NOT file this enclosure.

Event Description: Increase Reactor Power

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

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

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

AA 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

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.

____ 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)

AA 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.

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

____ 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.

Enclosure 4.2
Load Changing

OP/1/B/6300/001
Page 1 of 6

1. Limits and Precautions

1.1 This procedure is Reactivity Management related because it controls activities that can effect reactivity. (R.M.)

1.2 Low load operation limits:

1.2.1 The unit can be operated continuously at low loads when exhaust hood temperature is < 175°F. The load shall, however, be increased slowly until the temperature decreases below 125°F before increasing load at normal rate (Multipoint Recorder on 1MC3).

1.2.2 Excessive use of the exhaust hood sprays shall be avoided to prevent accelerated blade erosion.

1.3 Do **NOT** exceed the load, hydrogen pressure, and power factor limits per the Unit One Revised Data Book Figure 43.

1.4 If the limits of the Unit One Revised Data Book Figure 43 (Generator Capability Curves) are exceeded, the Turbine Generator shall be tripped.

1.5 Under certain environmental conditions, indicated condenser vacuum less than 24.3 inches Hg may be reached at full load. Exhaust hood temperatures are a more accurate indicator of true vacuum. It is recommended the turbine **NOT** be operated under the following conditions at full load:

- Exhaust Hood 1A temperature ≥ 136°F
- Exhaust Hood 1B temperature ≥ 129°F
- Exhaust Hood 1C temperature ≥ 124.5 °F

1.6 The maximum differential pressure between adjacent LP shell pressures shall **NOT** exceed 2.0 inches Hg. (main condenser vacuum gauges on 1MC13, OAC points C1P1669 (D/P between A & B Condensers) and C1P1670 (D/P between B & C Condensers) or Main Condenser graphic (CMCOND)).

1.7 A sudden downward trend on an LP turbine's lower extraction temperature shall be investigated as a possible indication of water induction into the turbine. This is indicated on the recorder on the rear of 1MC8 labeled "TURBINE WATER DETECTION", using any of the LP 8th stage lower temperatures.

1.8 A "LOAD RATE" > "6.2 MW/MIN" shall **NOT** be used during normal load changes.

Enclosure 4.2
Load Changing

OP/1/B/6300/001
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1.9 Differential temperature between adjacent exhaust hoods shall **NOT** exceed 30°F unless evaluated and approved by the responsible engineer (Turbine Generator System Expert). (OAC points C1P1667 (A & B Exhaust Hoods Metal Delta Temp) and C1P1668 (B & C Exhaust Hoods Metal Delta Temp) or Main Condenser graphic (CMCOND)).

1.10 The Main Turbine OIU Work Station has the capability to perform control functions for the Main Turbine, including tripping and resetting of the turbine. If a control function window is inadvertently selected while manipulating the Main Turbine OIU Work Station, the window shall be closed to prevent actuation of the control function.

1.11 To reduce potential for Turbine rubs at low power levels (< 30% Turbine Load) observe the following:

- Steam Seal Header Pressure between 3 and 5 psig.
- Gland Steam Condenser Header vacuum of 10 - 12" H_2O vacuum.
- Condenser Vacuum < 28.0" Hg
- Minimize time that Turbine is at speed no load.
- Minimize time between Turbine Shell Warming and rolling the Turbine.

1.12 Exhaust hood water sprays are used to cool the last-stage buckets and to minimize temporary distortion of the low-pressure hood and shell structures. These sprays have a significant potential for quenching the LP turbine structure, and if they are applied manually should be undertaken very gradually. Large and rapid changes in the temperature of the exhaust hood can also have an impact on bearing alignment and may cause a rub to develop. Excessive use of the sprays may cause unnecessary erosion of the long last-stage buckets during low flow conditions.

2. Initial Conditions

_____ Verify Turbine Generator is On Line per Enclosure 4.1 (Turbine Generator Startup).

Enclosure 4.2
Load Changing

OP/1/B/6300/001
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3. Procedure

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. 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.
4. 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 the curve in the Unit One OAC Databook "Load-Changing Recommendations".

NOTE:
- Several of the parameters required for this procedure can be found on OAC graphics, and a list of all OAC points are found on Enclosure 4.8 (Turbine Generator Roll Computer Points).
- Step 3.1 and Step 3.2 may be performed in any order.

_____ 3.1 **IF** increasing turbine generator load, perform the following:

_____ 3.1.1 Ensure the proper reactivity management controls established per AD-OP-ALL-0203 (Reactivity Management). (R.M.)

AA 3.1.2 **WHILE** increasing Turbine Generator load, perform the following:

N/A 3.1.2.1 **IF AT ANY TIME** Turbine load is < 30%, operate the RC system pumps and fans as required per OP/1/B/6400/001 A (Condenser Circulating Water System) to maintain vacuum in Condenser C < 28" Hg.

N/A 3.1.2.2 **IF** applicable, verify Groups B and C valves on Enclosure 4.6 (Valve Checklist) close at 15% of full load (184 MWe, 107 psig Turbine Impulse Pressure).

N/A 3.1.2.3 **IF** applicable, verify the following valves close at 15% of full load (184 MWe, 107 psig Turbine Impulse Pressure):

☐ 1SM-21 (Ctrl Vlv #2 Stm Lead Drn)

☐ 1SM-29 (Ctrl Vlv #1 Stm Lead Drn)

Event Description: Increase Reactor Power

Enclosure 4.2 OP/1/B/6300/001

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_____ 3.1.2.4 **IF** applicable, **WHEN** CV3 comes off of its fully closed seat (65% of full load, 796 MWe), verify 1SM-25 (Ctrl Vlv #3 Stm Lead Drn) closes.

_____ 3.1.2.5 **IF** applicable, **WHEN** CV4 comes off of its fully closed seat (92% of full load, 1127 MWe), verify 1SM-33 (Ctrl Vlv #4 Stm Lead Drn) closes.

CAUTION:
1. Until it is recognized that the first stage shell metal temperature change rate stays below the allowable limit (150°F/hr), the following loading rate shall **NOT** be exceeded:
   - 1/2%/min - First Stage Inner Shell Temperature (1MC3 or OAC point C1A1140 (Turbine Lower Inner Shell Temp)) ≤ 350°F
   - 1%/min - First Stage Inner Shell Temperature (1MC3 or OAC point C1A1140 (Turbine Lower Inner Shell Temp)) > 350°F
2. Normal steady-state load changes shall be made without exceeding the limits shown on Enclosure 4.7 (Generator Operating Limits) and in the Unit 1 OAC Databook "Recommended Startup and Loading Curves".
3. Unit One Reactor Operating Data, Section 2.4 shall be referred to for allowable ramp rates. A "LOAD RATE" > 6.2 MW/MIN shall **NOT** be used during normal load changes.

3.1.3 Increase turbine generator load by performing the following:

_____ 3.1.3.1 Select "LOAD RATE" and verify it illuminates.

_____ 3.1.3.2 Input the desired load rate.

_____ 3.1.3.3 Select "ENTER" and verify "LOAD RATE" goes dark.

_____ 3.1.3.4 Select "TARGET" and verify it illuminates.

_____ 3.1.3.5 Input the desired load target.

_____ 3.1.3.6 Select "ENTER" and verify "TARGET" light goes dark.

_____ 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.

Note to Evaluator:

At this point, the power increase has begun. At the discretion of the Lead Evaluator, the scenario may continue to the next event by instructing the booth operator to INSERT Trigger 2 (1KC-132 Failure).

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

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
DCS Alarm "Letdown HX TEMP CTRL IN MAN"

<u>Note To Evaluator</u>:

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 and transfer the controller to Manual. The crew will manually control 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.

Op Test No.: 301	Scenario # 1	Event # 2	Page 24 of 150
Event Description:	Letdown Heat Exchanger Temperature Control Valve (1KC-132) Fails Closed		

OP/1/B/6100/010 H
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PANEL: 1AD-7

F/3

LETDN HX OUTLET HI TEMP

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 completes Event 2. At Lead Evaluator discretion, the scenario may continue by directing the booth operator to insert Trigger 3 (KC Miniflow Valve 1KC-C37A Fails Open).

Op Test No.:	301	Scenario #	1	Event #	3	Page	25 of 150

Event Description: KC Miniflow Valve 1KC-C37A Fails Open

Control Room Indications
1AD-9, F/5 "KC TRAIN A SINGLE PUMP RUNOUT" – LIT
RED OPEN indicating light for 1KC-C37A – LIT
Various KC low flow alarms - LIT

Op Test No.:	301	Scenario #	1	Event #	3	Page	26 of 150
Event Description:	KC Miniflow Valve 1KC-C37A Fails Open						

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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.**

Note to Evaluator:

Enclosure 1 can be found as Attachment 3 in the back of this document.

__ 1. **Monitor Enclosure 1 (Foldout Page).**

2. **Verify the following:**

__ • At least one KC pump - ON

AND

__ • Adequate flow to KC loads presently in service.

__ a. Start additional KC pump(s) as necessary.

N/A b. **IF** KC Train HX aligned for maintenance and cross train alignment desired, **THEN** perform the following:

1) **IF** Unit 1 in Mode 5, 6 or No Mode, **THEN** perform the following:

__ • Continue in this procedure

AND

__ • Place KC in cross train cooling alignment. **REFER TO** Enclosure 7 (KC Cross Train Cooling).

N/A c. **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.

Note to Evaluator:

Crew may opt to perform a prudent action to isolate KC to the KF Heat Exchanger to help alleviate the KC Single Pump Runout Alarm.

(RNO continued on next page)

Op Test No.:	301	Scenario #	1	Event #	3	Page	27 of 150
Event Description:	KC Miniflow Valve 1KC-C37A Fails Open						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. (Continued)	
	__ 3) **IF** Unit 2 selected to receive YD cooling to 2A NV pump, **THEN GO TO** Step 4.
	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** 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.
	(RNO continued on next page)

Op Test No.:	301	Scenario #	1	Event #	3	Page	28 of 150
Event Description:	KC Miniflow Valve 1KC-C37A Fails Open						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2. (Continued)

N/A d. **IF** NV pump operating with no KC cooling, **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.

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).

(RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. (Continued)	
	__ 6) **IF AT ANY TIME** 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).
__ 3. **IF AT ANY TIME all KC pumps lost, THEN RETURN TO STEP 2.**	

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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** TRENDING UP, __ **THEN GO TO** Enclosure 6 (Rx Trip Sequence). __ h. **GO TO** Step 6.

Event Description: KC Miniflow Valve 1KC-C37A Fails Open

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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).**

Op Test No.:	301	Scenario #	1	Event #	3	Page	32 of 150
Event Description:	KC Miniflow Valve 1KC-C37A Fails Open						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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.**

8. **Verify KC flow to NC pumps as follows:**

__ • 1AD-20, A/1 "KC SUPPLY HDR FLOW TO NCP BRGS LOW" - DARK

__ • 1AD-21, A/1 "KC SUPPLY HDR FLOW TO NCP BRGS LOW" - DARK.

Perform the following:

a. Ensure the following valves - OPEN:

__ • 1KC-425A (NC Pumps Ret Hdr Cont Isol)

__ • 1KC-338B (NC Pumps Sup Hdr Cont Isol)

__ • 1KC-424B (NC Pumps Ret Hdr Cont Isol).

b. **IF AT ANY TIME** any of the following conditions met:

__ • Time since loss of KC - GREATER THAN 10 MINUTES

OR

__ • Any NC pump trip criteria from Enclosure 1 (Foldout Page) met,

__ **THEN GO TO** Enclosure 6 (Rx Trip Sequence).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. **Verify KC available as follows:**	
	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.
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).	__ a. **WHEN** OAC alarm C1D2215 (KC Train A Low-Low Level Surge Tank Isol) "**NOT** ACTUATED" **AND** cause of valve closure known, **THEN** ensure affected valve(s) open.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
	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.
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).	__ b. **WHEN** OAC alarm C1D2214 (KC Train B Low-Low Level Surge Tank Isol) "**NOT** ACTUATED" **AND** cause of valve closure known, **THEN** ensure affected valve(s) open.
__ c. Start additional KC pump(s) as necessary to supply any KC loads presently in service.	__ c. **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).

Event Description: KC Miniflow Valve 1KC-C37A Fails Open

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 11 of 59 Revision 48

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 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. **NOTE** Normal makeup level is approximately 75%. __ 3) **WHEN** affected KC surge tank(s) level at desired level, **THEN** notify dispatched operator to secure makeup. __ 4) **IF AT ANY TIME** additional YM makeup required and Enclosure 3 (Surge Tank Makeup) **NOT** in progress, **THEN** perform Step 10.a RNO as required. __ 5) **GO TO** Step 11.
__ b. **GO TO** Step 14.	

Event Description: KC Miniflow Valve 1KC-C37A Fails Open

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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 pressurized, **THEN** use it for surge tank makeup. __ 3) **IF** at any time 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)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. (Continued)	
	e. **WHEN** KC surge tank level above lo-lo level setpoint, **THEN** perform the following:
	__ 1) Ensure KC pumps on 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).
	(RNO continued on next page)

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Event Description:	KC Miniflow Valve 1KC-C37A Fails Open						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. (Continued)	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). __ f. **WHEN** one train's non-essential header isolation valves open, **THEN** perform Steps 12 and 13. __ g. **GO TO** Step 14.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 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. c. **IF** KC Surge Tank 1A level continues to trend down **OR** is empty, **THEN** 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. (RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. (Continued)	2) Ensure the following Train A essential equipment - OFF: __ • NV Pump 1A __ • NI Pump 1A __ • ND Pump 1A __ • CA Pump 1A __ • NS 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) __ • 1KC-2B (Aux Bldg Non-Ess Ret Hdr Isol). __ b. Ensure both Train A KC pumps - ON. (RNO continued on next page)

Event Description: KC Miniflow Valve 1KC-C37A Fails Open

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 17 of 59 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. (Continued)	c. **IF** KC Surge Tank 1B level continues to trend down **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.
	2) Ensure the following Train B essential equipment - OFF:
	__ • NV Pump 1B
	__ • NI Pump 1B
	__ • ND Pump 1B
	__ • CA Pump 1B
	__ • NS 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.**	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16. **Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual:**	**TECH SPEC EVALUATION** ***See Attachment 12 for applicable Tech Specs.*** **T.S. 3.7.7** **Condition A: Restore Component Cooling Water Train to OPERABLE in 72 hours.**
__ • SLC 16.9-7 (Boration Systems Flow Path - Shutdown)	
__ • SLC 16.9-8 (Boration Systems Flow Path - Operating)	
__ • SLC 16.9-9 (Boration Systems Pumps - Shutdown)	
__ • SLC 16.9-10 (Boration Systems Charging Pumps - Operating)	
__ • 3.5.2 (ECCS - Operating)	
__ • 3.5.3 (ECCS - Shutdown)	
__ • 3.6.6 (Containment Spray System)	
__ • 3.7.5 (Auxiliary Feedwater (AFW) System)	
__ • 3.7.7 (Component Cooling Water (CCW) System).	
17. **Determine required notifications:**	
__ • **REFER TO** AD-EP-ALL-0111 (Control Room Activation of the ERO)	
__ • **REFER TO** AD-LS-ALL-0006 (Notification/Reportability Evaluation).	
N/A 18. **IF KC Hx leak to RN 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 #	1	Event #	3	Page	43 of 150
Event Description:	KC Miniflow Valve 1KC-C37A Fails Open						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19. **Verify KC surge tanks level as follows:** __ • Greater than 50% __ • Stable or trending up.	__ **<u>RETURN</u> <u>TO</u> Step 9.**
20. **<u>WHEN</u> plant conditions permit, <u>THEN</u> perform the following:** __ • Return KC pumps to normal operation. **<u>REFER</u> <u>TO</u>** OP/1/A/6400/005 (Component Cooling Water System). __ • Return NV Pump 1A to normal cooling as applicable. **<u>REFER</u> <u>TO</u>** Enclosure 2 (Alternate Cooling To NV Pump 1A).	
21. **Verify the following:** __ • 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" - DARK __ • 1AD-7, H/3 "VCT HI TEMP" - DARK __ • Normal letdown - IN SERVICE.	**Perform the following:** __ a. **<u>IF</u>** letdown isolated, **<u>THEN</u> <u>REFER</u> <u>TO</u>** AP/1/A/5500/012 (Loss of Charging or Letdown). __ b. Do not continue in this procedure until Step 21 conditions met.

Event Description: KC Miniflow Valve 1KC-C37A Fails Open

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING	PAGE NO. 20 of 59 Revision 48

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) Verify both the following valves - OPEN:	2) Perform the following:
__ • 1NV-188A (VCT Otlt Isol)	__ a) **IF** either valve in intermediate position, **THEN** allow 10 seconds for valve to open.
__ • 1NV-189B (VCT Otlt Isol).	__ b) **IF** both valves open, **THEN GO TO** 22.a.3.
	c) **IF** either valve closed **OR** in intermediate position, **THEN** perform the following:
	(1) CLOSE the following valves:
	__ • 1NV-188A (VCT Otlt Isol)
	__ • 1NV-189B (VCT Otlt Isol).
	__ (2) Notify Station Management that NV pump suction remains aligned to FWST.
	__ (3) **GO TO** Step 22.b.
3) CLOSE the following valves:	
__ • 1NV-252A (NV Pumps Suct From FWST)	
__ • 1NV-253B (NV Pumps Suct From FWST).	

Op Test No.:	301	Scenario #	1	Event #	3	Page	45 of 150
Event Description:	KC Miniflow Valve 1KC-C37A Fails Open						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

22. (Continued)

__ 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** perform the following:

__ • **WHEN** letdown temperature stable, **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:

At lead evaluators discretion, the scenario may continue by having the booth operator insert Trigger 4 (Loss of KG / Automatic Turbine Runback Failure).

Op Test No.: 301 Scenario # 1 Event # 4	Page 46 of 150
Event Description:	Loss of KG / Automatic Turbine Runback Failure

Control Room Indications
1AD-1, F/6 "H2-KG PANEL TROUBLE" – LIT
OAC indications of both KG pumps tripped

Op Test No.:	301	Scenario #	1	Event #	4	Page	47	of	150

Event Description: Loss of KG / Automatic Turbine Runback Failure

CNS AP/1/A/5500/003	LOAD REJECTION Case I Generator Connected To Switchyard	PAGE NO. 3 of 55 Revision 47

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
__ 1. **Verify turbine load - TRENDING DOWN IN AUTOMATIC.**	**Perform the following:** __ a. Select "MANUAL" on turbine control panel. __ b. Depress "CONTROL VALVES LOWER" pushbutton and reduce turbine load as required. **Critical Task #1**
Note to Evaluator: **RO should take Turbine Control to manual and lower Turbine load to ~275 MWe. If the crew fails to get below the amps for 332 MW within 3.5 minutes, a turbine trip will occur.**	
2. **Verify proper reactor response:** __ • Control rods - IN "AUTO" AND STEPPING IN __ • P/R neutron flux - TRENDING DOWN.	**IF AT ANY TIME T-Avg greater than 1.5°F higher than T-Ref, THEN perform the following:** __ a. Insert control rods as required to maintain T-Avg within 1°F of T-Ref. b. IF control rods will NOT insert, THEN perform the following: __ 1) Trip Reactor. __ 2) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).

Op Test No.:	301	Scenario #	1	Event #	4	Page	48 of 150

Event Description: Loss of KG / Automatic Turbine Runback Failure

CNS AP/1/A/5500/003	LOAD REJECTION Case I Generator Connected To Switchyard	PAGE NO. 4 of 55 Revision 47

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. **Verify proper steam dump operation as follows:**	
__ a. Verify T-Ref instrumentation - AVAILABLE.	__ a. **IF** T-Avg Coastdown 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.
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 closed **AND** T-Avg 3°F greater than T-Ref, **THEN** perform the following: __ 1) Place "STM DUMP CTRL" in manual. __ 2) Place steam dumps in pressure mode. __ 3) Operate condenser steam dump valves to maintain T-Avg at T-Ref. __ 4) **IF** steam dump valves fail to operate, **THEN** dump steam as necessary from available S/G PORVs to maintain T-Avg at T-Ref.

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Event Description: Loss of KG / Automatic Turbine Runback Failure

CNS AP/1/A/5500/003	LOAD REJECTION Case I Generator Connected To Switchyard	PAGE NO. 5 of 55 Revision 47

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. (Continued)	
__ d. T-Avg - TRENDING DOWN TO T-REF.	d. Perform the following: __ 1) Place "STM DUMP CTRL" in manual. __ 2) Place steam dumps in pressure mode. __ 3) Operate condenser steam dump valves to maintain T-Avg at T-Ref. __ 4) **IF** steam dump valves fail to operate, **THEN** dump steam as necessary from available S/G PORVs to maintain T-Avg at T-Ref.

CNS AP/1/A/5500/003	LOAD REJECTION Case I Generator Connected To Switchyard	PAGE NO. 6 of 55 Revision 47

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 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** Pzr PORV isolation valve cannot be closed, **THEN** perform the following:
	__ a) Trip Unit 1 reactor.
	__ b) **WHEN** reactor tripped **OR** S/I setpoint reached, **THEN** ensure S/I initiated.
	__ c) **GO TO** EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).
__ b. Normal Pzr spray valves - CLOSED.	b. **IF** Pzr pressure less than 2150 PSIG, **THEN** perform the following:
	__ 1) CLOSE affected spray valve(s).
	__ 2) **REFER TO** AP/1/A/5500/011 (Pressurizer Pressure Anomolies).

Op Test No.:	301	Scenario #	1	Event #	4	Page	51 of 150

Event Description: Loss of KG / Automatic Turbine Runback Failure

CNS AP/1/A/5500/003	LOAD REJECTION Case I Generator Connected To Switchyard	PAGE NO. 7 of 55 Revision 47

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. **Verify proper CM System operation as follows:**	
__ a. **WHEN** reactor power 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".	
7. **Verify S/G levels 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. **IF** any S/G(s) N/R level trending down in uncontrolled manner, **THEN** perform the following:
	__ 1) Trip reactor.
	__ 2) **GO TO** EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 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 unit at appropriate power level. d. **IF AT ANY TIME** reactor power less than or equal to 5%, **THEN** perform the following: __ 1) Ensure steam dumps in pressure mode. __ 2) Ensure turbine - TRIPPED. __ 3) Ensure steam dumps maintain steam header pressure at 1090 PSIG. __ 4) Concurrently insert control rods to shutdown the reactor. **REFER TO** OP/1/A/6150/008 (Rod Control). __ 5) **GO TO** AP/1/A/5500/002 (Turbine Generator Trip). __ e. **GO TO** Step 10.
__ 9. **IF AT ANY TIME reactor power less than or equal to 20%, THEN perform Step 8 RNO.**	

Event Description: Loss of KG / Automatic Turbine Runback Failure

CNS AP/1/A/5500/003	LOAD REJECTION Case I Generator Connected To Switchyard	PAGE NO. 9 of 55 Revision 47

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **Maintain AS header pressure as follows:**	
__ a. Verify runback target load less than 85%.	__ a. **GO TO** Step 10.d.
__ b. Adjust 1AS-2 (Main Stm To Aux Steam) setpoint to maintain AS header pressure at 165 PSIG.	__ b. Adjust 1AS-2 as required to maintain AS header pressure at 165 PSIG.
__ c. **GO TO** Step 11.	
__ d. Verify AS header pressure maintained between 140 PSIG and 165 PSIG.	__ d. Adjust 1AS-2 as required to maintain AS header pressure between 140 PSIG and 165 PSIG.
__ 11. **Adjust 1TL-4 (Stm Seal Reg Byp) as necessary to maintain steam seal pressure between 3 PSIG - 5 PSIG.**	
__ 12. **Monitor Enclosure 3 (Rod Insertion Limit Boration).**	

Note to Evaluator:

Enclosure 3 can be found as Attachment 4 in the back of this document.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 13. **Verify reactor power - LESS THAN 30%.**	**Perform the following:** a. **IF** runback target load less than 30%, **THEN** perform the following: __ 1) **WHEN** time and manpower 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 less than 30%. __ 3) **WHEN** reactor power less than 30%, **THEN GO TO** Step 14. b. **WHEN** appropriate runback target load reached, **THEN** perform the following: __ 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:	Loss of KG / Automatic Turbine Runback Failure						

CNS AP/1/A/5500/003	LOAD REJECTION Case I Generator Connected To Switchyard	PAGE NO. 11 of 55 Revision 47

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 14. **Verify "RESET" light on "AMSAC FOR CF VALVES" switch - DARK.**	**Perform the following:** __ a. **IF** turbine impulse pressure less than 190 PSIG, **THEN** notify IAE to correct cause of AMSAC failure to deactivate. __ b. Depress "BYPASS" pushbutton on "AMSAC FOR CF VALVES" switch. __ c. **WHEN** 2 minutes elapsed, **THEN** verify "RESET" light on "AMSAC FOR CF VALVES" switch remained dark.
__ 15. **Adjust power factor as necessary. REFER TO Unit 1 Revised Data Book, Figure 43 Generator Capability Curves.**	
16. **WHEN appropriate runback target load reached, THEN perform the following:** __ • 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.	

Event Description: Loss of KG / Automatic Turbine Runback Failure

CNS AP/1/A/5500/003	LOAD REJECTION Case I Generator Connected To Switchyard	PAGE NO. 12 of 55 Revision 47

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 17. **Verify at least one KG pump - RUNNING.**	**Perform the following:** **NOTE** Maximum generating time without KG flow is 1 hour at less than 23%. __ a. Restore at least one KG pump to service. __ b. **IF** flow from at least one KG pump cannot be established within 1 hour, **THEN** shutdown turbine/generator. **REFER TO** OP/1/B/6300/001 (Turbine Generator).
18. **Verify the following PCBs - CLOSED:** __ • Generator breaker 1A __ • Generator breaker 1B __ • PCB 14 __ • PCB 15 __ • PCB 17 __ • PCB 18.	**Perform the following:** a. **IF** any generator connection with switchyard lost, **THEN** perform the following: 1) Notify DEC TOP (Transmission Operations) to investigate and repair loss of generator connection with switchyard: • Outside line: __ • 800-326-6534 __ • 800-326-6537. • TOP satellite phone: __ • Local: 1-828-490-7791 __ • International: 011-8816-234-50494. __ • Two-way radio. (RNO continued on next page)

CNS AP/1/A/5500/003	LOAD REJECTION Case I Generator Connected To Switchyard	PAGE NO. 13 of 55 Revision 47

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18. (Continued)	2) **IF** any busline switchyard connection lost as follows: __ • PCB 14 **AND** PCB 15 OPEN **OR** __ • PCB 17 **AND** PCB 18 OPEN, __ **THEN** notify DEC TOP (Transmission Operations) to calculate Catawba RTCA (Real Time Contingency Analysis). __ 3) **WHEN** time and manpower permit, **THEN** restore affected generator connection with switchyard. **REFER TO** Enclosure 1 (Offsite Power Restoration) . b. **IF AT ANY TIME** the following condition exists: __ • Any switchyard bus energized **AND** • Any Unit Tie PCB will be open greater than 1 hour, __ **THEN** coordinate with Station Management to evaluate isolating affected Unit Tie PCB(s) to prevent damage to PCB capacitors. **REFER TO** OP/0/A/6350/010 (Operation of Station Breakers and Disconnects).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

19. **Notify DEC BA (Balancing Authority) of Unit 1 status using one of the following:**

- __ • Red dispatcher phone
- __ • 800-943-7586
- • BA satellite phone:
  - __ • Local: 1-828-490-9313
  - __ • International: 011-8816-234-60905.

__ 20. **Determine and correct cause of load rejection.**

Note to Evaluator:

Once reactor power is stable, and at the lead evaluators discretion, the scenario may continue by having the booth operator insert Trigger 5 (1A NS Pump Loss of Power / Steam Leak Inside Containment).

Op Test No.:	301	Scenario #	1	Event #	5	Page	59 of 150
Event Description:	1A NS Pump Loss of Power						

Control Room Indications
1AD-11, A/1 "4KV ESS PWR TRAIN A TROUBLE" – LIT
'A' Train 1.47 Bypass alarm for 1A NS

<u>Note To Evaluator</u>:

This event does not have any specific crew response. This is an SRO Tech Spec call only.

See Attachment 12 for applicable Tech Specs.

Tech Spec 3.6.6 (Containment Spray System) Condition A (One containment spray train inoperable) – Restore containment spray train to OPERABLE status in 72 hours.

Event Description: Steam Leak Inside Containment on 1C S/G

Control Room Indications
Containment Pressure – RISING
Containment Temperature – RISING
Containment Humidity – RISING

Event Description: Steam Leak Inside Containment on 1C S/G

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. <u>Operator Actions</u>	**Note to Evaluator:** **Enclosure 1 can be found as Attachment 5 in the back of this document.**
__ 1. **Monitor Enclosure 1 (Foldout Page).**	
__ 2. **Verify turbine - ONLINE.**	__ **<u>GO TO</u> 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 - TRENDING DOWN.	__ **<u>IF</u> T-Avg greater than 1.5°F higher than T-Ref, <u>THEN</u> insert control rods as required to maintain T-Avg within 1°F of T-Ref.**
__ 5. **<u>IF AT ANY TIME</u> reactor power greater than 100%, <u>THEN</u> perform Step 3 RNO.**	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 6. **Verify Pzr level - STABLE OR TRENDING UP.**	**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 stable **OR** trending up, **THEN GO TO** Step 7. d. **IF** Pzr level continues to trend down, **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)

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK	PAGE NO. 4 of 43 Revision 12

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** trending up, **THEN** **GO TO** Step 7.

(RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	3) **IF** Pzr level continues to trend down **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 trending down in 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).	

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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) **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.	

Event Description: Steam Leak Inside Containment on 1C S/G

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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. __ 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)

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

3) **WHEN** leaking condenser dump valve isolated **OR** repaired, **THEN** perform the following:

a) **IF** steam dumps in pressure mode, **THEN** perform the following:

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

__ (2) Adjust "STM DUMP CTRL" to 0% demand.

b) Return the following switches to "ON":

__ • "STEAM DUMP INTLK BYP TRN A"

__ • "STEAM DUMP INTLK BYP TRN B".

c) **IF** steam dumps in pressure mode, **THEN** perform the following:

__ (1) Adjust "STM DUMP CTRL" to control steam header pressure at value required by controlling procedure in effect.

__ (2) **WHEN** desired, **THEN** place "STM DUMP CTRL" in auto.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
__ 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** perform the following: a) **IF** steam dumps in pressure mode, **THEN** perform the following: __ (1) Place "STM DUMP CTRL" in manual. __ (2) Adjust "STM DUMP CTRL" to 0% demand. b) Return the following switches to "ON": __ • "STEAM DUMP INTLK BYP TRN A" __ • "STEAM DUMP INTLK BYP TRN B". (RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	c) **IF** steam dumps in pressure mode, **THEN** perform the following: __ (1) Adjust "STM DUMP CTRL" to control steam header pressure at value required by controlling procedure in effect. __ (2) **WHEN** desired, **THEN** place "STM DUMP CTRL" in auto.
__ 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.
g. **IF** leak suspected to be in a doghouse, **THEN** CLOSE the following valves for affected doghouse: • 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).	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
__ h. **WHEN** location of steam leak known, **THEN** notify plant personnel by plant page to stay clear of the area, as required.	
10. **Determine required notifications:**	
__ • **REFER TO** AD-EP-ALL-0111 (Control Room Activation of the ERO)	
__ • **REFER TO** AD-LS-ALL-0006 (Notification/Reportability Evaluation).	**TECH SPEC EVALUATION** ***See Attachment 12 for applicable Tech Specs.*** **T.S. 3.6.4** **Condition A: Restore containment pressure to within limits in 1 hour.**
11. **Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual:**	
__ • 3.6.3 (Containment Isolation Valves)	
__ • 3.7.4 (Steam Generator Power Operated Relief Valves (SG PORVs)).	
__ 12. **Notify RP of leak.**	
__ 13. **Verify - LEAK ISOLATED.**	__ **GO TO Step 15.**
__ 14. **Determine long term plant status. RETURN TO procedure and step in effect.**	
__ 15. **Verify UST level - STABLE OR TRENDING UP.**	**Perform the following:** __ a. Initiate makeup to UST. __ b. Notify Secondary Chemistry of increased makeup.

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK	PAGE NO. 12 of 43 Revision 12

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16. **Evaluate Unit 1 shutdown as follows:**	
__ a. Verify Unit 1 status - IN MODE 1 **OR** 2.	__ a. **GO TO** Step 19.
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	
__ • SM 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.	
__ c. Verify Unit 1 shutdown or load reduction - REQUIRED.	c. Perform the following: __ 1) Maintain present plant conditions until leak can be isolated or repaired. __ 2) **RETURN TO** procedure and step in effect.
__ d. Verify immediate isolation of steam leak - REQUIRED.	__ d. **GO TO** Step 16.i.

Note to Evaluator:

Once determination of Unit shutdown being required, and at the discretion of the lead evaluator, the scenario may continue by having the booth operator insert Trigger 7 (Steam Line Break Inside Containment / MSIVs fail to close on MSI signal / Auxiliary Building Unfiltered Exhaust Fans Fail to secure on S/I).

Op Test No.: 301	Scenario # 1	Event # 6	Page 72 of 150
Event Description:	Steam Leak Inside Containment on 1C S/G		

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK	PAGE NO. 13 of 43 Revision 12

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16. (Continued)	
__ e. Verify steam leak - KNOWN TO BE ISOLABLE BY TURBINE TRIP.	e. 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).
__ f. Verify reactor power - GREATER THAN 69%.	f. Perform the following: __ 1) Trip turbine. __ 2) **GO TO** AP/1/A/5500/002 (Turbine Generator Trip).
__ g. Trip Unit 1 reactor.	
__ h. **GO TO** EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).	
i. Initiate Unit 1 shutdown. **REFER TO** one of the following: __ • OP/1/A/6100/003 (Controlling Procedure For Unit Operation) OR __ • OP/1/A/6100/002 (Controlling Procedure For Unit Shutdown) OR __ • AP/1/A/5500/009 (Rapid Downpower).	

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	73	of	150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

Control Room Indications
1FO-1, D/5 “HI CONT PRESS S/I RX TRIP” – LIT
Unit 1 Reactor Trip and Safety Injection

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	74	of	150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 4 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

C. Operator Actions

Note to Evaluator:

Enclosure 1 can be found as Attachment 6 in the back of this document.

__ 1. **Monitor Enclosure 1 (Foldout Page).**

2. **Verify Reactor Trip:**

- __ All rod bottom lights - LIT
- __ All reactor trip and bypass breakers - OPEN
- __ I/R power - TRENDING DOWN.

RESPONSE NOT OBTAINED:

Perform the following:

__ a. Trip reactor.

b. **IF** reactor will not trip, **THEN** concurrently perform the following:

- __ 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.

Note to Evaluator:

Operators should isolate CA flow to the 1C S/G per Encl. 1 (Foldout Page) Step 6. This is part of Critical Task #1.

RESPONSE NOT OBTAINED:

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 the following valves:

- __ All MSIVs
- __ All MSIV bypass valves.

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	75	of	150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 5 of 49 Revision 46

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).

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	76 of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 6 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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 perform the following: • **IF** 1ETA **OR** 1ETB de-energized, **THEN** ensure the following pumps running on energized bus: __ • NV pump __ • KC pumps __ • RN pump. __ • 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.
__ 6. **Announce "Unit 1 Safety Injection".**	

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	77 of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 7 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **Determine required notifications:**	
__ • **REFER TO** AD-EP-ALL-0111 (Control Room Activation of the ERO)	
__ • **REFER TO** AD-LS-ALL-0006 (Notification/Reportability Evaluation).	
__ 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.

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	78 of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 8 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **Verify 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.
	N/A__ b) **IF** Phase B Isolation "RESET" lights lit, **THEN** initiate Phase B Isolation.
	c) Verify following monitor light panel lights on energized train(s) - 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.
	(RNO continued on next page)

Op Test No.: 301 Scenario # 1 Event # 7,8,9 Page 79 of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 9 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
	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).
Note to Evaluator: **Enclosure 5 can be found as Attachment 7 in the back of this document.**	__ 6) **WHEN** 9 minutes elapsed, **THEN** verify proper VX System operation. **REFER TO** Enclosure 5 (VX System Operation).
	__ 7) **GO TO** Step 11.
__ b. **IF AT ANY TIME** containment pressure exceeds 3 PSIG while in this procedure, **THEN** perform Step 10.a.	

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	80 of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 10 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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.

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	81	of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 11 of 49 Revision 46

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 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 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).	**<u>Note to Evaluator:</u>** **Enclosure 2 can be found as Attachment 8 in the back of this document. BOP will use this Enclosure to secure the Auxiliary Building Unfiltered Exhaust Fans that failed to automatically secure following the S/I.**

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	82 of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 12 of 49 Revision 46

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.
CRITICAL TASK #2	__ 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.

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	83 of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 13 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17. (Continued)	
__ 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 goes down to less than 285 PSIG in uncontrolled manner, **THEN** restart ND pump. __ 3) **GO TO** Step 18.
__ c. NI pumps - INDICATING FLOW.	__ c. Start NI pump(s) and align valves.

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	84	of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 14 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17. (Continued)	
__ d. NC pressure - LESS THAN 285 PSIG.	d. Perform the following: __ 1) Ensure ND pump miniflow valve on operating ND pump(s) - OPEN. N/A 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 goes down to less than 285 PSIG in uncontrolled manner, **THEN** restart ND pump. __ 3) **GO TO** Step 18.
__ e. ND pumps - INDICATING FLOW TO C-LEGS.	__ e. Start ND pump(s) and align valves.
__ 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).**	

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	85 of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 15 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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 perform the following: __ • 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 on intact S/Gs - OPEN.**	__ **OPEN valve(s).**
__ 21. **Verify S/I equipment status based on monitor light panel(s) - IN PROPER ALIGNMENT.**	__ **Align equipment.**

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	86	of	150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 16 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE Enclosure 4 (NC Temperature Control) shall remain in effect until subsequent procedures provide alternative NC temperature control guidance.

Note to Evaluator:

Enclosure 4 can be found as Attachment 9 in the back of this document.

__ 22. **Control NC temperature. REFER TO Enclosure 4 (NC Temperature Control).**

23. **Verify Pzr PORV and Pzr Spray Valve status as follows:**

__ a. All Pzr PORVs - CLOSED.

RESPONSE NOT OBTAINED:

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)

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 17 of 49 Revision 46

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 H_2 analyzers in service. **REFER TO** OP/1/A/6450/010 (Containment Hydrogen Control Systems).

c) **IF AT ANY TIME** 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)

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	88 of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 18 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. (Continued)	
	d) Concurrently perform the following: __ • 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.

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	89 of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 19 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25. **Verify main steamlines intact:**	**<u>IF</u> any S/G faulted, <u>THEN</u> perform the following:**
__ • All S/G pressures - STABLE OR TRENDING UP	__ a. Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).
__ • ALL S/Gs - PRESSURIZED.	__ b. **<u>GO TO</u>** EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).
26. **Verify S/G tubes intact as follows:**	**<u>IF</u> any EMF trip 1 light lit <u>OR</u> any S/G level trending up in uncontrolled manner, <u>THEN</u> concurrently:**
__ • All S/G levels - STABLE OR TRENDING UP IN A CONTROLLED MANNER.	__ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).
• Verify the following EMF trip 1 lights - DARK:	__ • **<u>GO TO</u>** EP/1/A/5000/E-3 (Steam Generator Tube Rupture).
__ • 1EMF-33 (Condenser Air Ejector Exhaust)	
__ • 1EMF-26 (Steamline 1A)	
__ • 1EMF-27 (Steamline 1B)	
__ • 1EMF-28 (Steamline 1C)	
__ • 1EMF-29 (Steamline 1D).	

Op Test No.: 301	Scenario # 1	Event # 7,8,9	Page 90	of 150			

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-2	FAULTED STEAM GENERATOR ISOLATION	PAGE NO. 2 of 28 Revision 16

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	**Note to Evaluator:** **Enclosure 1 can be found as Attachment 10 in the back of this document.**
__ 1. **Monitor Enclosure 1 (Foldout Page).**	
__ 2. **Maintain any faulted S/G or secondary break isolated during subsequent recovery actions unless needed for NC System cooldown.**	
3. **Verify the following valves - CLOSED:** __ • All MSIVs __ • All MSIV bypass valves.	__ **CLOSE valve(s).**
4. **WHEN TSC staffed, THEN notify TSC of the following:** __ • IF feedline OR steamline break has occurred inside doghouse, THEN ensure affected doghouse curtains opened within 24 hours of rupture inside of the doghouse.	
__ 5. **Verify any S/G pressure - STABLE OR TRENDING UP.**	__ **IF all S/Gs faulted, THEN GO TO EP/1/A/5000/ECA-2.1 (Uncontrolled Depressurization of All Steam Generators).**
6. **Identify faulted S/G(s) as follows:** __ • Verify any S/G pressure - TRENDING DOWN IN UNCONTROLLED MANNER OR __ • Verify any S/G - DEPRESSURIZED.	**Perform the following:** a. Dispatch operators to search for initiating break at the following locations: __ • Main steamlines __ • Main feedlines __ • Other secondary piping. __ b. GO TO Step 11.

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-2	FAULTED STEAM GENERATOR ISOLATION	PAGE NO. 3 of 28 Revision 16

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 7. **Maintain at least one S/G available for NC System cooldown in subsequent steps.**	
__ 8. **Verify faulted S/G(s) PORV - CLOSED.**	**Perform the following:** __ a. CLOSE faulted S/G(s) PORV. __ b. <u>**IF**</u> S/G PORV cannot be closed, <u>**THEN**</u> CLOSE S/G PORV isolation valve. __ c. <u>**IF**</u> S/G PORV isolation valve cannot be closed, <u>**THEN**</u> dispatch operator to close valve.
__ 9. **Ensure CA System valve control - RESET.**	
10. **Isolate all faulted S/G(s) as follows:** • <u>S/G 1A</u>: __ a. Verify S/G 1A Feedwater Isolation status light (1SI-5) - LIT.	a. Perform the following: 1) Ensure the following valves - CLOSED: __ • 1CF-28 (S/G 1A CF Ctrl) __ • 1CF-30 (S/G 1A CF Byp Ctrl) __ • 1CF-33 (S/G 1A CF Cont Isol) __ • 1CF-90 (S/G 1A CF Cont Isol Byp) __ • 1CA-149 (S/G 1A CF Byp To CA Nozzle) __ • 1CA-185 (S/G 1A CA Nozz Tempering Isol). (RNO continued on next page)

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CNS EP/1/A/5000/E-2	FAULTED STEAM GENERATOR ISOLATION	PAGE NO. 4 of 28 Revision 16

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
	2) **IF** 1CA-185 (S/G 1A CA Nozz Tempering Isol) cannot be closed, **THEN** perform the following:
	a) CLOSE the following valves:
	__ • 1CF-100 (S/G CA Nozz Tempering Ctrl)
	__ • 1CF-156 (Byp Valve For 1CF-100).
	b) **IF** 1CF-100 **OR** 1CF-156 cannot be closed, **THEN** dispatch operator to close affected valve(s):
	__ • 1CF-100 (S/G CA Nozz Tempering Ctrl) (TB1-580, 1H-33) (Ladder needed)
	__ • 1CF-156 (Byp Valve For 1CF-100) (TB1-577, 1H-33) (Ladder needed).
	__ 3) **IF** more than one Feedwater Isolation valve above open **AND** CM still aligned to feed faulted S/G, **THEN** evaluate alternate means to stop CM flow to faulted S/G.

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Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-2	FAULTED STEAM GENERATOR ISOLATION	PAGE NO. 5 of 28 Revision 16

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
b. CLOSE the following valves:	
__ 1) 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) 1CA-62A (CA Pmp A Disch To S/G 1A Isol).	2) Perform the following: __ a) CLOSE 1CA-60 (CA Pump 1A Flow To S/G 1A). __ b) Dispatch operator to close 1CA-62A (CA Pmp A Disch To S/G 1A Isol) (DH-587, DD-EE, 44-45, Rm 591). __ c) **IF** exterior doghouse not accessible **OR** CA cannot be isolated, **THEN** dispatch operator to unlock and close 1CA-59 (CA Pump 1A Disch To S/G 1A Ctrl Inlet Isol) (AB-551, BB,49-50, Rm 250) (Ladder needed) (Key #633).

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Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-2	FAULTED STEAM GENERATOR ISOLATION	PAGE NO. 6 of 28 Revision 16

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
__ 3) 1CA-66B (CA Pmp 1 Disch To S/G 1A Isol).	3) Perform the following: __ a) CLOSE 1CA-64 (CA Pump #1 Flow To S/G 1A). __ b) Dispatch operator to close 1CA-66B (CA Pmp 1 Disch To S/G 1A Isol) (DH-584, DD-EE, 44-45, Rm 591). __ c) **IF** exterior doghouse not accessible **OR** CA cannot be isolated, **THEN** dispatch operator to unlock and close 1CA-63 (CA Pump No 1 Disch To S/G 1A Ctrl Inlet Isol) (AB-556, BB-50, Rm 250) (Ladder needed) (Key #633).
c. Verify the following blowdown isolation valves - CLOSED:	
__ 1) 1BB-56A (S/G 1A Bldwn Cont Isol Insd).	__ 1) CLOSE valve.

CNS EP/1/A/5000/E-2	FAULTED STEAM GENERATOR ISOLATION	PAGE NO. 7 of 28 Revision 16

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
__ 2) 1BB-148B (S/G 1A Bldwn Cont Isol Byp).	2) Perform the following: __ a) CLOSE valve. b) **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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CNS EP/1/A/5000/E-2	FAULTED STEAM GENERATOR ISOLATION	PAGE NO. 8 of 28 Revision 16

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
__ 3) 1BB-57B (S/G 1A Bldwn Cont Isol Otsd).	3) Perform the following: __ a) CLOSE valve. b) **<u>IF</u>** valve will not close **<u>AND</u>** 1BB-56A open, **<u>THEN</u>** 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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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
• S/G 1B:	
__ a. Verify S/G 1B Feedwater Isolation status light (1SI-5) - LIT.	a. Perform the following: 1) Ensure the following valves - CLOSED: __ • 1CF-37 (S/G 1B CF Ctrl) __ • 1CF-39 (S/G 1B CF Byp Ctrl) __ • 1CF-42 (S/G 1B CF Cont Isol) __ • 1CF-89 (S/G 1B CF Cont Isol Byp) __ • 1CA-150 (S/G 1B CF Byp To CA Nozzle) __ • 1CA-186 (S/G 1B CA Nozz Tempering Isol). 2) **IF** 1CA-186 (S/G 1B CA Nozz Tempering Isol) cannot be closed, **THEN** perform the following: a) CLOSE the following valves: __ • 1CF-100 (S/G CA Nozz Tempering Ctrl) __ • 1CF-156 (Byp Valve For 1CF-100). (RNO continued on next page)

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-2	FAULTED STEAM GENERATOR ISOLATION	PAGE NO. 10 of 28 Revision 16

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
	b) **IF** 1CF-100 **OR** 1CF-156 cannot be closed, **THEN** dispatch operator to close affected valve(s):
	__ • 1CF-100 (S/G CA Nozz Tempering Ctrl) (TB1-580, 1H-33) (Ladder needed)
	__ • 1CF-156 (Byp Valve For 1CF-100) (TB1-577, 1H-33) (Ladder needed).
	__ 3) **IF** more than one Feedwater Isolation valve above open **AND** CM still aligned to feed faulted S/G, **THEN** evaluate alternate means to stop CM flow to faulted S/G.
b. CLOSE the following valves:	
__ 1) 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).

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CNS EP/1/A/5000/E-2	FAULTED STEAM GENERATOR ISOLATION	PAGE NO. 11 of 28 Revision 16

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
__ 2) 1CA-58A (CA Pmp A Disch To S/G 1B Isol).	2) Perform the following:
	__ a) CLOSE 1CA-56 (CA Pump 1A Flow To S/G 1B).
	__ b) Dispatch operator to close 1CA-58A (CA Pmp A Disch To S/G 1B Isol) (DH-586, DD-EE, 52-53, Rm 572).
	__ c) **IF** interior doghouse not accessible **OR** CA cannot be isolated, **THEN** dispatch operator to unlock and close 1CA-55 (CA Pump 1A Disch To S/G 1B Inlet Isol) (AB-550, DD-52, Rm 250) (Key #633).
__ c. Verify CA Pump 1A or 1B - AVAILABLE.	c. **IF** CA Pump #1 only source of feedwater, **THEN** perform the following:
	__ 1) Maintain at least one S/G available to supply steam to CA Pump #1.
	__ 2) Ensure feed flow maintained available to S/G used to supply steam to CA Pump #1.
	__ 3) **IF** desired to isolate CA Pump #1 from 1B S/G, **THEN GO TO** Step 10.d.
	__ 4) **GO TO** Step 10.f.

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CNS EP/1/A/5000/E-2	FAULTED STEAM GENERATOR ISOLATION	PAGE NO. 12 of 28 Revision 16

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
__ d. CLOSE 1CA-54B (CA Pmp 1 Disch To S/G 1B Isol).	d. Perform the following: __ 1) CLOSE 1CA-52 (CA Pump #1 Flow To S/G 1B). __ 2) Dispatch operator to close 1CA-54B (CA Pmp 1 Disch To S/G 1B Isol) (DH-584, DD-EE, 52-53, Rm 572). __ 3) **IF** interior doghouse not accessible **OR** CA cannot be isolated, **THEN** dispatch operator to unlock and close 1CA-51 (CA Pump No 1 Disch To S/G 1B Inlet Isol) (AB-552, DD-52, Rm 250) (Key #633).
__ e. Dispatch operator to unlock and close 1SA-1 (1B S/G Main Steam to CAPT Maintenance Isol) (DH-624, FF-53, Rm 572) (Breakaway lock).	__ e. Dispatch operator to unlock and close 1SA-3 (1B S/G Main Steam to CAPT Stop Check) (AB-551, DD-53, Rm 217) (Breakaway lock).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
f. Verify the following blowdown isolation valves - CLOSED:	
__ 1) 1BB-19A (S/G 1B Bldwn Cont Isol Insd).	__ 1) CLOSE valve.
__ 2) 1BB-150B (S/G 1B Bldwn Cont Isol Byp).	2) Perform the following: __ a) CLOSE valve. b) **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).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
__ 3) 1BB-21B (S/G 1B Bldwn Cont Isol Otsd).	3) Perform the following: __ a) CLOSE valve. b) **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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CNS EP/1/A/5000/E-2	FAULTED STEAM GENERATOR ISOLATION	PAGE NO. 15 of 28 Revision 16

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
• S/G 1C:	
__ a. Verify S/G 1C Feedwater Isolation status light (1SI-5) - LIT.	a. Perform the following: 1) Ensure the following valves - CLOSED: __ • 1CF-46 (S/G 1C CF Ctrl) __ • 1CF-48 (S/G 1C CF Byp Ctrl) __ • 1CF-51 (S/G 1C CF Cont Isol) __ • 1CF-88 (S/G 1C CF Cont Isol Byp) __ • 1CA-151 (S/G 1C CF Byp To CA Nozzle) __ • 1CA-187 (S/G 1C CA Nozz Tempering Isol). 2) **IF** 1CA-187 (S/G 1C CA Nozz Tempering Isol) cannot be closed, **THEN** perform the following: a) CLOSE the following valves: __ • 1CF-100 (S/G CA Nozz Tempering Ctrl) __ • 1CF-156 (Byp Valve For 1CF-100). (RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
	b) **IF** 1CF-100 **OR** 1CF-156 cannot be closed, **THEN** dispatch operator to close affected valve(s):
	__ • 1CF-100 (S/G CA Nozz Tempering Ctrl) (TB1-580, 1H-33) (Ladder needed)
	__ • 1CF-156 (Byp Valve For 1CF-100) (TB1-577, 1H-33) (Ladder needed).
	__ 3) **IF** more than one Feedwater Isolation valve above open **AND** CM still aligned to feed faulted S/G, **THEN** evaluate alternate means to stop CM flow to faulted S/G.
b. CLOSE the following valves:	
__ 1) 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).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
__ 2) 1CA-46B (CA Pmp B Disch To S/G 1C Isol).	2) Perform the following: __ a) CLOSE 1CA-44 (CA Pump 1B Flow To S/G 1C). __ b) Dispatch operator to close 1CA-46B (CA Pmp B Disch To S/G 1C Isol) (DH-586, DD, 53-54, Rm 572). __ c) **IF** interior doghouse not accessible **OR** CA cannot be isolated, **THEN** dispatch operator to unlock and close 1CA-43 (CA Pump 1B Disch To S/G 1C Ctrl Inlet Isol) (AB-552, DD-52, Rm 250) (Key #633).
__ c. Verify CA Pump 1A or 1B - AVAILABLE.	c. **IF** CA Pump #1 only source of feedwater, **THEN** perform the following: __ 1) Maintain at least one S/G available to supply steam to CA Pump #1. __ 2) Ensure feed flow maintained available to S/G used to supply steam to CA Pump #1. __ 3) **IF** desired to isolate CA Pump #1 from 1C S/G, **THEN GO TO** Step 10.d. __ 4) **GO TO** Step 10.f.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
__ d. CLOSE 1CA-50A (CA Pmp 1 Disch To S/G 1C Isol).	d. Perform the following: __ 1) CLOSE 1CA-48 (CA Pump #1 Flow To S/G 1C). __ 2) Dispatch operator to close 1CA-50A (CA Pmp 1 Disch To S/G 1C Isol) (DH-584, EE-53, Rm 572). __ 3) **IF** interior doghouse not accessible **OR** CA cannot be isolated, **THEN** dispatch operator to unlock and close 1CA-47 (CA Pump No 1 Disch To S/G 1C Ctrl Inlet Isol) (AB-552, DD-53, Rm 250) (Key #633).
__ e. Dispatch operator to unlock and close 1SA-4 (1C S/G Main Steam to CAPT Maintenance Isol) (DH-624, FF-53, Rm 572) (Breakaway lock installed).	__ e. Dispatch operator 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).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
f. Verify the following blowdown isolation valves - CLOSED:	
__ 1) 1BB-60A (S/G 1C Bldwn Cont Isol Insd).	__ 1) CLOSE valve.
__ 2) 1BB-149B (S/G 1C Bldwn Cont Isol Byp).	2) Perform the following: __ a) CLOSE valve. b) **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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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued) __ 3) 1BB-61B (S/G 1C Bldwn Cont Isol Otsd).	3) Perform the following: __ a) CLOSE valve. b) **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).

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Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-2	FAULTED STEAM GENERATOR ISOLATION	PAGE NO. 21 of 28 Revision 16

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
• S/G 1D:	
__ a. Verify S/G 1D Feedwater Isolation status light (1SI-5) - LIT.	a. Perform the following: 1) Ensure the following valves - CLOSED: __ • 1CF-55 (S/G 1D CF Ctrl) __ • 1CF-57 (S/G 1D CF Byp Ctrl) __ • 1CF-60 (S/G 1D CF Cont Isol) __ • 1CF-87 (S/G 1D CF Cont Isol Byp) __ • 1CA-152 (S/G 1D CF Byp To CA Nozzle) __ • 1CA-188 (S/G 1D CA Nozz Tempering Isol). 2) **IF** 1CA-188 (S/G 1D CA Nozz Tempering Isol) cannot be closed, **THEN** perform the following: a) CLOSE the following valves: __ • 1CF-100 (S/G CA Nozz Tempering Ctrl) __ • 1CF-156 (Byp Valve For 1CF-100). (RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
	b) **IF** 1CF-100 **OR** 1CF-156 cannot be closed, **THEN** dispatch operator to close affected valve(s): __ • 1CF-100 (S/G CA Nozz Tempering Ctrl) (TB1-580, 1H-33) (Ladder needed) __ • 1CF-156 (Byp Valve For 1CF-100) (TB1-577, 1H-33) (Ladder needed).
	__ 3) **IF** more than one Feedwater Isolation valve above open **AND** CM still aligned to feed faulted S/G, **THEN** evaluate alternate means to stop CM flow to faulted S/G.
b. CLOSE the following valves:	
__ 1) 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).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
__ 2) 1CA-42B (CA Pmp B Disch To S/G 1D Isol).	2) Perform the following: __ a) CLOSE 1CA-40 (CA Pump 1B Flow To S/G 1D). __ b) Dispatch operator to close 1CA-42B (CA Pmp B Disch To S/G 1D Isol) (DH-586, DD-EE, 43-44, Rm 591). __ c) <u>**IF**</u> exterior doghouse not accessible <u>**OR**</u> CA cannot be isolated, <u>**THEN**</u> dispatch operator to unlock and close 1CA-39 (CA Pump 1B Disch To S/G 1D Ctrl Inlet Isol) (AB-551, BB, 49-50, Rm 250) (Ladder needed) (Key #633).
__ 3) 1CA-38A (CA Pmp 1 Disch To S/G 1D Isol).	3) Perform the following: __ a) CLOSE 1CA-36 (CA Pump #1 Flow To S/G 1D). __ b) Dispatch operator to close 1CA-38A (CA Pmp 1 Disch To S/G 1D Isol) (DH-584, DD-EE, 43-44, Rm 591). __ c) <u>**IF**</u> exterior doghouse not accessible <u>**OR**</u> CA cannot be isolated, <u>**THEN**</u> dispatch operator to unlock and close 1CA-35 (CA Pump No 1 Disch To S/G 1D Ctrl Inlet Isol) (AB-555, BB-50, Rm 250) (Ladder needed) (Key #633).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
c. Verify the following blowdown isolation valves - CLOSED:	
__ 1) 1BB-8A (S/G 1D Bldwn Cont Isol Insd).	__ 1) CLOSE valve.
__ 2) 1BB-147B (S/G 1D Bldwn Cont Isol Byp).	2) Perform the following: __ a) CLOSE valve. b) **<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-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
10. (Continued)	
__ 3) 1BB-10B (S/G 1D Bldwn Cont Isol Otsd).	3) Perform the following: __ a) CLOSE valve. b) **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-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).
__ 11. **WHEN NC T-Hots start to trend up, THEN dump steam from intact S/G PORVs to stabilize NC T-Hots.**	

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	114 of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-2	FAULTED STEAM GENERATOR ISOLATION	PAGE NO. 26 of 28 Revision 16

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. **Verify secondary radiation normal as follows:**	
a. Ensure the following signals - RESET:	
__ 1) Phase A containment isolations.	
__ 2) CA System valve control.	
__ 3) 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.	
d. Verify the following EMF trip 1 lights - DARK:	__ d. **GO TO** EP/1/A/5000/E-3 (Steam Generator Tube Rupture).
__ • 1EMF-33 (Condenser Air Ejector Exhaust)	
__ • 1EMF-26 (Steamline 1A)	
__ • 1EMF-27 (Steamline 1B)	
__ • 1EMF-28 (Steamline 1C)	
__ • 1EMF-29 (Steamline 1D).	
__ e. Verify S/G(s) fault - INSIDE CONTAINMENT.	e. Request RP to perform the following: __ 1) Monitor area of steam fault for radiation. __ 2) Notify Control Room of any abnormal radiation conditions.

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	115 of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/E-2	FAULTED STEAM GENERATOR ISOLATION	PAGE NO. 27 of 28 Revision 16

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. (Continued)	
__ f. **WHEN** activity results reported, **THEN** notify Station Management to evaluate S/G(s) activity results.	
13. **Verify S/I termination criteria:**	
__ a. NC subcooling based on core exit T/Cs - GREATER THAN 0°F.	__ a. **GO TO** Step 14.
b. Verify secondary heat sink as follows:	__ b. **GO TO** Step 14.
__ • Any intact S/G N/R level - GREATER THAN 11% (29% ACC)	
OR	
__ • Total feed flow to intact S/Gs - GREATER THAN 450 GPM.	
__ c. NC pressure - STABLE OR TRENDING UP.	__ c. **GO TO** Step 14.
__ d. Pzr level - GREATER THAN 11% (30% ACC).	__ d. **GO TO** Step 14.
__ e. **GO TO** EP/1/A/5000/ES-1.1 (Safety Injection Termination).	
__ 14. **GO TO EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant).**	

END

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	116	of	150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/ES-1.1	SAFETY INJECTION TERMINATION	PAGE NO. 2 of 58 Revision 35

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	**Note to Evaluator:** **Enclosure 1 can be found as Attachment 11 in the back of this document.**
__ 1. **Monitor Enclosure 1 (Foldout Page).**	
2. **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.	

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	117 of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/ES-1.1	SAFETY INJECTION TERMINATION	PAGE NO. 3 of 58 Revision 35

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. **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).
__ 4. **Ensure only one NV pump - ON.**	
__ 5. **Verify NC pressure - STABLE OR TRENDING UP.**	**Perform the following:** __ a. Ensure Pzr spray valves - CLOSED. __ b. **IF** NC pressure continues to trend down, **THEN GO TO** EP/1/A/5000/ES-1.2 (POST LOCA Cooldown and Depressurization).
__ 6. **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).

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	118 of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/ES-1.1	SAFETY INJECTION TERMINATION	PAGE NO. 4 of 58 Revision 35

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **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 9.
b. Verify 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) OPEN affected valve(s). __ 2) **IF** 1NV-203A **AND** 1NV-202B open, **THEN GO TO** Step 7.c. 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. **GO TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 13 (Aligning Charging With NV Miniflow Valves Closed). __ 5) **WHEN** 1NV-203A **AND** 1NV-202B open, **THEN** charging flow may be reduced below 80 GPM. __ 6) **GO TO** Step 9.

Op Test No.:	301	Scenario #	1	Event #	7,8,9	Page	119 of 150

Event Description: Steam Line Break Inside Containment / MSIVs fail to close on MSI / Aux. Bldg. UFXFs fail to secure on S/I

CNS EP/1/A/5000/ES-1.1	SAFETY INJECTION TERMINATION	PAGE NO. 5 of 58 Revision 35

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. (Continued)	
c. CLOSE the following valves: __ • 1NI-9A (NV Pmp C/L Inj Isol) __ • 1NI-10B (NV Pmp C/L Inj Isol).	c. 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) Do not continue until both 1NI-9A and 1NI-10B - CLOSED.
Note to Evaluator: **This is the end of the scenario. At the lead evaluators discretion, the scenario may be terminated by having the booth operator place the simulator in FREEZE.**	
8. **Establish charging as follows:**	
a. Verify all of the following valves - OPEN: __ • 1NV-44A (NC Pmp A Seal Supply Cont Isol) __ • 1NV-55A (NC Pmp B Seal Supply Cont Isol) __ • 1NV-66A (NC Pmp C Seal Supply Cont Isol) __ • 1NV-77A (NC Pmp D Seal Supply Cont Isol).	a. **IF** all valves closed, **THEN** perform the following: __ 1) OPEN 1NV-309 (Seal Water Injection Flow). __ 2) **IF** control of 1NV-309 lost from Control Room, **THEN** dispatch operator with radio to open 1NV-311 (Seal Wtr Inj Flow Ctrl Byp) (AB-555, JJ-54, Rm 233). 3) OPEN the following valves: __ • 1NV-312A (Chrg Line Cont Isol) __ • 1NV-314B (Chrg Line Cont Isol). (RNO continued on next page)

Attachment List

Scenario 1

ATTACHMENT 1 -	Crew Critical Task Summary
ATTACHMENT 2 -	Shift Turnover Information
ATTACHMENT 3 -	AP/1/A/5500/021 Enclosure 1 (Foldout Page)
ATTACHMENT 4 -	AP/1/A/5500/003 Enclosure 3 (Rod Insertion Limit Boration)
ATTACHMENT 5 -	AP/1/A/5500/028 Enclosure 1 (Foldout Page)
ATTACHMENT 6 -	EP/1/A/5000/E-0 Enclosure 1 (Foldout Page)
ATTACHMENT 7 -	EP/1/A/5000/E-0 Enclosure 5 (VX System Operation)
ATTACHMENT 8 -	EP/1/A/5000/E-0 Enclosure 2 (Ventilation System Verification)
ATTACHMENT 9 -	EP/1/A/5000/E-0 Enclosure 4 (NC Temperature Control)
ATTACHMENT 10	EP/1/A/5000/E-2 Enclosure 1 (Foldout Page)
ATTACHMENT 11	EP/1/A/5000/ES-1.1 Enclosure 1 (Foldout Page)
ATTACHMENT 12 -	Scenario Specific Technical Specifications

ATTACHMENT 1

CREW CRITICAL TASK SUMMARY			
SAT	**UNSAT**	**CT #**	**CRITICAL TASK**
		1	Runback the Main Turbine prior to Main Turbine Trip (must be below amps for 332 MW within 3.5 minutes).
		2	Close MSIVs and isolate CA flow to the faulted S/G prior to a severe challenge (Orange or Red Path) to the NC Integrity CSF status tree.

Comments:

ATTACHMENT 2

<table>
<tr><th colspan="4">SHIFT TURNOVER INFORMATION</th></tr>
<tr><td colspan="4">Unit 1 Status</td></tr>
<tr><td>Power Level</td><td>Power History</td><td>NCS Boron</td><td>Xenon</td></tr>
<tr><td>50 %</td><td>MOL</td><td>1117 PPM</td><td>per OAC</td></tr>
<tr><td colspan="4">Controlling Procedure</td></tr>
<tr><td colspan="4">• OP/1/A/6100/003 (Controlling Procedure for Unit Operation), Enclosure 4.1 (Power Increase). The steps up to step 3.52 are complete.</td></tr>
<tr><td colspan="4">Other Information Needed to Assume the Shift</td></tr>
<tr><td colspan="4">• Unit 1 is at 50% power at the MOL. Unit 2 is at 100% power. Direction for the crew is to raise reactor power to 100%. A reactivity plan has been provided by Reactor Engineering for raising reactor power.</td></tr>
<tr><td colspan="4">AOs Available</td></tr>
<tr><td colspan="4">Eight AOs are available as listed on the status board</td></tr>
<tr><td colspan="4">METEOROLOGICAL CONDITIONS</td></tr>
<tr><td colspan="4">• Upper wind direction = 125 degrees, speed = 3 mph
• Lower wind direction = 127 degrees, speed = 4.5 mph
• Forecast calls for clear skies over the next 24 hours.</td></tr>
</table>

ATTACHMENT 3

CNS AP/1/A/5500/021	LOSS OF COMPONENT COOLING Enclosure 1 - Page 1 of 2 **Foldout Page**	PAGE NO. 22 of 59 Revision 48

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 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 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) 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 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 3

NOTE The following step prevents damage to the 1B2 KC pump as a result of deadheading. (NCR #01406467)

3. **IF AT ANY TIME the following conditions 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 lost, THEN RETURN TO Section C. (Operator Actions), Step 2.**

5. **IF operators dispatched to align alternate cooling to NV pump 1A, THEN perform the following:**

__ a. **WHEN** alternate cooling aligned, **THEN** perform Enclosure 5 (Maximize NV Pump Run Time), Step 7.

6. **IF AT ANY TIME KC cooling to operating KF pump(s) 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 4

CNS AP/1/A/5500/003	LOAD REJECTION Enclosure 3 - Page 1 of 2 **Rod Insertion Limit Boration**	PAGE NO. 53 of 55 Revision 47

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.

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

   a. Stop any dilutions in progress.

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

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

2. **Perform one of the following to restore control rods above insertion limits:**

   a. **IF** initial reactor power was 100%, **THEN** borate NC System as required to restore control rods above insertion limits. **REFER TO** Unit 1 R.O.D. book, section 4.8 (Reactivity Data Sheet).

ATTACHMENT 4

2. (Continued)

b. **IF** initial reactor power was less than 100% **OR** Unit 1 R.O.D. book, section 4.8 (Reactivity Data Sheet) is **NOT** available, **THEN** perform the following as required to restore control rods above insertion limits:

NOTE OAC point C1P1448 (Low Bank Insertion Limit Margin) and R.O.D Book (Section 2.2) provide rod insertion limit indication.

1) Determine control rod insertion limit. _________.

2) Calculate "A" (reactivity difference between required rod position and current rod position). **REFER TO** Unit 1 R.O.D. book section 5.6.3.

R = Required rod position IRW _________ PCM

P = Current rod position IRW _________ PCM

(R - P = A __________ PCM).

3) Determine "B" (differential boron worth). **REFER TO** Unit 1 R.O.D. book section 5.5 ______________ PCM/PPM.

4) Calculate "C" (difference in reactivity) as follows:

A / B = C ______________ PPM.

5) Calculate "D" (required boron concentration) as follows:

E = Current Boron concentration _________ PPM.

E + C = D__________ PPM.

6) Determine required boric acid needed to raise NC System boron concentration to value "D" calculated in Step 2.b.5. **REFER TO** Unit 1 R.O.D. book table 4.1 or REACT Boration/Dilution module. ___________.

NOTE
- The boric acid added to the NC System should be added in several increments within the first hour of the runback.
- Due to the post transient Xenon build-in rate, the total boric acid value calculated in Step 2.b.6, may not need to be added to restore control rods above insertion limits.

7) Borate NC System as required to restore control rods above insertion limits.

ATTACHMENT 5

CNS AP/1/A/5500/028	SECONDARY STEAM LEAK Enclosure 1 - Page 1 of 2 **Foldout Page**	PAGE NO. 26 of 43 Revision 12

1. **Reactor trip criteria:**

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).

IF any of the following conditions exist:

__ • Steam leak endangering personnel or jeopardizing plant equipment

__ • S/G levels - TRENDING DOWN IN UNCONTROLLED MANNER

__ • Tavg 5°F less than T-Ref **AND** trending down in uncontrolled manner

__ • Reactor power - TRENDING UP IN UNCONTROLLED MANNER

__ • Secondary condensate inventory - TRENDING DOWN IN 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 5

2. **Uncontrolled cooldown:**

   IF Tavg less than 554°F **AND** trending down, **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 goes up, THEN RETURN TO C. (Operator Actions), Step 2.**

ATTACHMENT 6

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 1 of 3 **Foldout Page**	PAGE NO. 34 of 49 Revision 46

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
  - Reactor power - LESS THAN 5%.

2. **Open Phase Criteria:**

- **IF** operating NV **AND** KC pumps automatically trip, **THEN** perform the following:

  a. Start the following pumps on opposite train:
     - NV pump
     - KC pumps
     - RN pump.

  b. **IF** pumps do not start, **OR** trip after starting, **THEN** restart pumps on previously operating train.

  c. **IF** all KC pumps off, **THEN** ensure all NC pumps - OFF.

  d. **IF** Unit 2 4160V bus energized by Unit 1 busline, **THEN** immediately notify Unit 2 to perform same actions on Unit 2.

3. **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).

4. **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.

ATTACHMENT 6

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 2 of 3 **Foldout Page**	PAGE NO. 35 of 49 Revision 46

NOTE CA flow control valves fail open on CA auto start. Isolating flow with the motor operated isolation valve will not require re-isolation on subsequent CA auto starts.

5. **Ruptured S/G CA Isolation Criteria:**
   - **IF** both the following conditions met, **THEN** stop CA flow to affected S/G(s):
     - Level going up in uncontrolled manner or radiation level in that S/G abnormal
     - N/R level - GREATER THAN 11% (29% ACC).

NOTE CA flow control valves fail open on CA auto start. Isolating flow with the motor operated isolation valve will not require re-isolation on subsequent CA auto starts.

6. **Faulted S/G CA isolation Criteria:**
   - **IF** all the following conditions met, **THEN** stop CA flow to affected S/G:
     - S/G pressure trends down in 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).

ATTACHMENT 6

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 3 of 3 **Foldout Page**	PAGE NO. 36 of 49 Revision 46

7. **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.

8. **IF AT ANY TIME KC cooling to operating KF pump(s) 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 7

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 5 - Page 1 of 1 **VX System Operation**	PAGE NO. 49 of 49 Revision 46

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).	__ **<u>IF</u> equipment not in proper alignment, <u>THEN</u> 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.	**<u>IF</u> equipment not in proper alignment, <u>THEN</u> perform the following:** a. **<u>IF</u>** containment pressure less than 0.3 PSIG, **<u>THEN</u>** verify the following Monitor Light Panel Group 1 Sp lights - DARK: __ • I/3 __ • I/10. __ b. Align or start affected component(s). __ c. **<u>IF</u>** any VX System equipment cannot be started, **<u>THEN</u> <u>REFER TO</u>** 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:** __ • **<u>IF AT ANY TIME</u>** containment pressure greater than 0.9 PSIG, **<u>THEN</u>** ensure containment air return fans - ON. __ • **<u>IF AT ANY TIME</u>** containment pressure less than 0.3 PSIG, **<u>THEN</u>** ensure containment air return fans - OFF.	

ATTACHMENT 8

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 1 of 6 **Ventilation System Verification**	PAGE NO. 37 of 49 Revision 46

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).
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 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. (RNO continued on next page)

ATTACHMENT 8

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 2 of 6 **Ventilation System Verification**	PAGE NO. 38 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

1. (Continued)

2) **IF** Unit 1 intake HI chlorine detector(s) in alarm, **THEN** 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) **GO TO** Step 1.d.

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).

ATTACHMENT 8

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

1. (Continued)

   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.

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 8

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) **IF** annulus pressure more positive than -1.4 in. WC, **THEN** perform the following: a) Verify flow indicated on the following indications: __ • 1VEP5180 (VE 1A Flow To Stack) __ • 1VEP5200 (VE 1B Flow To Stack). b) **IF** flow not indicated, **THEN** 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 8

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 8

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 6 of 6 **Ventilation System Verification**	PAGE NO. 42 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 4. **Record time ventilation systems verified on following table:**

TIME	SYSTEM (VC, VE)	INITIALS

ATTACHMENT 9

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 1 of 5 **NC Temperature Control**	PAGE NO. 44 of 49 Revision 46

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 9

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 TRENDING UP IN AN UNCONTROLLED MANNER OR • NC temperature - GREATER THAN 557°F AND STABLE OR • NC temperature - LESS THAN 557°F AND TRENDING DOWN IN UNCONTROLLED MANNER.	
8. **Verify NC temperature - LESS THAN 557°F AND TRENDING DOWN.**	**Perform the following:** a. **IF** NC temperature greater than 557°F **AND** trending up, **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.

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 3 of 5 **NC Temperature Control**	PAGE NO. 46 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. **Attempt to stop 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.	
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.

ATTACHMENT 9

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 4 of 5 **NC Temperature Control**	PAGE NO. 47 of 49 Revision 46

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

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 5 of 5 **NC Temperature Control**	PAGE NO. 48 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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 10

CNS EP/1/A/5000/E-2	FAULTED STEAM GENERATOR ISOLATION Enclosure 1 - Page 1 of 1 **Foldout Page**	PAGE NO. 28 of 28 Revision 16

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

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

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. **N_2 to Pzr PORV Criteria:**

   - **IF** Containment pressure greater than or equal to 3 psig and VI isolated to Containment, **THEN** 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).

ATTACHMENT 11

CNS EP/1/A/5000/ES-1.1	SAFETY INJECTION TERMINATION Enclosure 1 - Page 1 of 1 **Foldout Page**	PAGE NO. 38 of 58 Revision 35

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 trending down in uncontrolled manner **OR** completely depressurized, **THEN GO TO** EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).

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

   - **IF** FWST level lowers 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).

ATTACHMENT 12

Event #3
KC Miniflow Valve 1KC-C37A Failed Open

3.7 PLANT SYSTEMS

3.7.7 Component Cooling Water (CCW) System

LCO 3.7.7 Two CCW trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CCW train inoperable.	A.1 -------------NOTE------------- Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops—MODE 4," for residual heat removal loops made inoperable by CCW. --------------------------------- Restore CCW train to OPERABLE status.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

ATTACHMENT 12

Event #3

KC Miniflow Valve 1KC-C37A Failed Open

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.7.1	-----NOTE----- Isolation of CCW flow to individual components does not render the CCW System inoperable. ----- Verify each CCW manual, power operated, and automatic valve in the flow path servicing safety related equipment, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.7.7.2	Verify each CCW automatic valve in the flow path servicing safety related equipment that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.7.7.3	Verify each CCW pump starts automatically on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program

ATTACHMENT 12

Event #5
1A NS Pump Loss of Power

3.6 CONTAINMENT SYSTEMS

3.6.6 Containment Spray System

LCO 3.6.6 Two containment spray trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One containment spray train inoperable.	A.1 Restore containment spray train to OPERABLE status.	72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 84 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.6.1	-----------------------------------NOTE---------------------------------- Not required to be met for system vent flow paths opened under administrative control. --- Verify each containment spray manual and power operated valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position.	In accordance with the Surveillance Frequency Control Program

(continued)

ATTACHMENT 12

Event #5

1A NS Pump Loss of Power

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.6.2	Verify each containment spray pump's developed head at the flow test point is greater than or equal to the required developed head.	In accordance with the INSERVICE TESTING PROGRAM
SR 3.6.6.3	Deleted.	
SR 3.6.6.4	Deleted.	
SR 3.6.6.5	Verify that each spray pump is de-energized and prevented from starting upon receipt of a terminate signal and is allowed to manually start upon receipt of a start permissive from the Containment Pressure Control System (CPCS).	In accordance with the Surveillance Frequency Control Program
SR 3.6.6.6	Verify that each spray pump discharge valve closes or is prevented from opening upon receipt of a terminate signal and is allowed to manually open upon receipt of a start permissive from the Containment Pressure Control System (CPCS).	In accordance with the Surveillance Frequency Control Program
SR 3.6.6.7	Verify each spray nozzle is unobstructed.	Following activities which could result in nozzle blockage
SR 3.6.6.8	Verify containment spray locations susceptible to gas accumulation are sufficiently filled with water.	In accordance with the Surveillance Frequency Control Program

ATTACHMENT 12

Event #6
Steam Leak on 1C Steam Generator

3.6 CONTAINMENT SYSTEMS

3.6.4 Containment Pressure

LCO 3.6.4 Containment pressure shall be $\geq$ -0.1 psig and $\leq$ +0.3 psig.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Containment pressure not within limits.	A.1 Restore containment pressure to within limits.	1 hour
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.6.4.1 Verify containment pressure is within limits.	In accordance with the Surveillance Frequency Control Program

2021 INITIAL LICENSE NRC EXAM
SCENARIO # 2

Facility:	Catawba NRC Exam 2021	Scenario No.: 2	Op Test No.: 2021301
Examiners:		Operators:	SRO
			RO
			BOP

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

Turnover: Unit 1 is at 75% power at the MOL following maintenance of the 1A CFPT LF pumps. 1A CFPT has been placed back in service and current power level is being maintained while maintenance continues to monitor LF system performance. Unit 2 is at 100% power. Direction for the crew is to swap LCVUs by securing 1A LCVU and starting 1C LCVU using OP/1/A/6450/001 Encl. 4.13. The “NOTE” on page 4 prior to step 3.2.1.5 has been evaluated by the previous shift and a determination has been made that there is no time delay needed prior to starting 1C LCVU.

Event No.	Malf. No.	Event Type*	Event Description
1		N – BOP N – SRO	Swap operating LCVUs
2		C – BOP C – SRO TS - SRO	1B RN Pump trip
3		C – RO C – SRO	Main Generator Voltage Regulator Failure
4		C – BOP C – SRO TS – SRO	1C SGTL
5		R – RO R – SRO N – BOP	AP/09 Rapid Downpower
6		C – RO C – SRO	Rods fail to insert in automatic during AP/09 Rapid Shutdown
7		M – ALL	1C Steam Generator Tube Rupture
8		C – RO C – SRO	1C CA Flow Control Valve will not close
9		C – BOP C – SRO	1NI-9A and 1NI-10B fail to open automatically on S/I
10		C – RO C – SRO	MSIVs fail to close manually

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

Scenario 2 – Summary

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

Turnover:
Unit 1 is at 75% power at the MOL following maintenance of the 1A CFPT LF pumps. 1A CFPT has been placed back in service and current power level is being maintained while maintenance continues to monitor LF system performance. Unit 2 is at 100% power. Direction for the crew is to swap LCVUs by securing 1A LCVU and starting 1C LCVU using OP/1/A/6450/001 Encl. 4.13. The "NOTE" on page 4 prior to step 3.2.1.5 has been evaluated by the previous shift and a determination has been made that there is no time delay needed prior to starting 1C LCVU.

Event 1
BOP will swap operating LCVUs per OP/1/A/6450/001 Encl. 4.13.

Event History: This event has previously been performed as a JPM (2019), but has never been used as a normal evolution in a scenario.

Event 2
1B RN pump will trip. Crew will enter AP/0/A/5500/020 (Loss of Nuclear Service Water) Case 1 (Loss of RN train) and start an RN pump. SRO will address Tech Specs.

Verifiable Action – BOP will manually start an RN pump as directed.

Event History: This failure last used 13 (3).

Event 3
The Unit 1 Main Generator voltage regulator will fail low. Crew will enter AP/1/A/5500/037 (Generator Voltage and Electric Grid Disturbances) Case 1 (Abnormal Generator or Grid Voltage). Crew will manually adjust Unit 1 Generator Voltage to return voltage to normal per the voltage schedule.

Verifiable Action – The RO will manually adjust Generator voltage to restore to normal per the voltage schedule.

Event History: Voltage Regulator failure last used 17 (3). However, this is the first time that voltage has been failed low.

Event 4
A S/G Tube Leak will develop on the 1C S/G. Crew will enter AP/1/A/5500/010 (Reactor Coolant Leak) Case 1 (Steam Generator Tube Leak). Crew will adjust charging and letdown flow to stabilize Pressurizer level, will quantify the leak size, and initiate a rapid downpower. SRO will address Tech Specs.

Verifiable Action – BOP will throttle charging and letdown flow to stabilize Pressurizer level and quantify the size of the tube leak.

Event History: The last S/G Tube leak was on 1B S/G on 17(3). A 1C S/G tube leak has not been used before.

Event 5
Crew will enter AP/1/A/5500/009 (Rapid Downpower) when directed by AP/10.

Verifiable Action – RO will enter desired turbine target load and load rate and place the main turbine in 'GO' to begin power decrease. BOP will perform boration.

Event History: Rapid downpower last used in 17 (3).

Event 6

Control rods will fail to insert automatically during the rapid downpower. The RO will place control rods in MANUAL to control NC system Tavg.

Verifiable Action – RO will manually insert control rods to mimic automatic control.

Event History: The last automatic control rod failure was in 19 (3), but was during a spurious turbine trip. This is the first time that this failure has been used during a rapid downpower.

Event 7

The S/G tube leak size will increase requiring the crew to manually trip the reactor and initiate safety injection due to not being able to maintain Pressurizer level. Crew will enter EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) to ensure safeguards equipment is in service as required. Crew will eventually transition to EP/1/A/5000/E-3 (Steam Generator Tube Rupture).

Verifiable Action – RO will manually trip Unit 1 reactor. BOP will initiate Safety Injection.

Event History: The last S/G tube rupture was in 17 (3) on 1B S/G. A 1C S/G tube rupture has not been used before.

Event 8

The CA flow control valve will fail to close when attempted by the RO per E-0 foldout page guidance.

Verifiable Action – RO will isolate CA flow to 1C S/G using the motor operated isolation valve.

Event History: This failure is new.

Event 9

NV pumps to Cold Leg isolation valves 1NI-9A and 1NI-10B will fail to automatically open on the Safety Injection signal.

Verifiable Action – BOP will manually open 1NI-9A and 1NI-10B.

Event History: Similar failure used on 19 (4) except 1NI-9A would not open automatically or manually.

Event 10

During implementation of E-3, the MSIVs on all S/Gs will fail to close manually. Since the ruptured S/G cannot be isolated from the intact S/Gs, a transition to EP/1/A/5000/ECA-3.1 (SGTR With Loss of Reactor Coolant – Subcooled Recovery Desired) will be made. Crew will initiate a less than 100°F/hour cooldown.

Verifiable Action – RO will initiate a less than 100°F/hour cooldown.

Event History: This failure is new.

Manual Control of Automatic Functions		
Event	**Position**	**Description**
3	RO	Main Generator Voltage Regulator Failure
6	RO	Manual Insertion of Control Rods during Rapid Downpower

***Critical Task 1* – Restore RN flow prior to any NC pump motor bearing reaching 195°F.**

***Critical Task 2* – Establish high head ECCS flow prior to transition from E-0.**

***Critical Task 3* – Initiate Cooldown at less than 100°F/hour in order to prevent S/G overfill (S/G N/R level ≥100%).**

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5–8)	8
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)	2
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 # 169 (password = gallus21) and load schedule file for NRC Scenario 2

START TIME: __________

✓	✓	Trigger	Instructor Action	Final	Delay	Ramp	Delete In	Event
		2	LOA-RN003 (RACKOUT RN PUMP 1B)	RACK-OUT				2
		3	OVR-EGB004D (VOLTAGE ADJUST LOWER PB)	ON			:10	3
		4	MAL-SG001C (S/G C TUBE LEAK)	65		:10		4
			MAL-IRX009 (RODS FAIL TO MOVE)	AUTO				6
		7	MAL-SG001C (S/G C TUBE LEAK)	400				7
			MAL-CA009C (MD CA CTRL VLV CA44 FAILURE)	100				8
			VLV-NI001A (NI9A B.I.T. DISCHARGE ISOL VLV FAIL AUTO ACTIONS)	ACTIVE				9
			VLV-NI002A (NI10B B.I.T. DISCHARGE ISOL VLV FAIL AUTO ACTIONS)	ACTIVE				9
			MAL-SM006E (ALL MSI (MSIV) VLV FAIL)	ACTIVE				10
		13	LOA-VC039 (MNL RST OF LATCH FOR CHILLER B HI COND PRESS TRP DUE TO LOSS RN)	RESET	5:00			2

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 2**, 1B RN Pump Trip

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 2** to cause 1B RN Pump to trip.

✓	BOOTH INSTRUCTOR ACTION
	IF dispatched as an AO to perform a post start check of 1A/2A/2B RN pump, **REPEAT** the information.
	After 5 minutes, contact the control room crew and **REPORT**: • "Post start check of 1A/2A/2B RN pump is complete. The pump looks good for continued operation."

✓	BOOTH INSTRUCTOR ACTION
	WHEN contacted as an AO to locally reset YC chiller, **REPEAT** the information. **INSERT SIMULATOR Trigger 13**.
	After 5 minutes **REPORT**: • "YC Chiller 'B' has been reset and has re-started."

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

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as Environmental chemistry to report RN pump shifts, **REPEAT** the information.

3.3 **Scenario EVENT 3**, Main Generator Voltage Regulator Failure

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 3** to cause Main Generator Voltage to fail low.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as DEC TOP to monitor RTCA indications, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for the Main Generator Voltage Regulator, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as DEC BA to determine CNS Generator Voltage requirements, **REPORT:** • "Adjust voltage per the operating schedule."

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as DEC TOP or BA to determine if switchyard (grid) voltage adequate and reliable, **REPORT**: • "Yes, switchyard and grid voltage are adequate and reliable."

3.4 **Scenario EVENT 4**, 1C S/G Tube Leak

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 4** to cause a 1C S/G Tube Leak.

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for 1C S/G tube leakage, **REPEAT** the information.

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as RP to frisk all S/G cation columns, **REPEAT** the information.

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

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as RP to notify of the size of the S/G tube leak, **REPEAT** the information.

3.5 **Scenario EVENTS 7/8/9/10**, 1C SGTR / 1C CA Flow Ctrl Vlv failed open / 1NI-9A & 1NI-10B fail to auto open / MSIVs fail to close manually

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR** Trigger 7 to cause a 1C S/G Tube Rupture.

✓	BOOTH INSTRUCTOR ACTION
	IF dispatched as an AO to unlock and close 1SA-4, **REPEAT** the information.

Enclosure 4.13

Shifting Operating Lower Containment Ventilation Units And Pipe Tunnel Booster Fans

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1. Limits and Precautions

1.1 Observe the upper and lower containment temperature limits of Tech Spec 3.6.5.

1.2 All operating lower containment ventilation units, and the operating pipe tunnel booster fan, are normally operated at the same speed.

1.3 When CLAs are pressurized above 175 psig, lower containment temperature shall be maintained greater than 60°F to maintain accumulator temperature greater than 60°F due to brittle fracture concerns of the accumulator vessel.

2. Initial Conditions

None

3. Procedure

N/A 3.1 **IF** two LCVUs are operating **AND** it is desired, shift the operating units as follows:

_____ 3.1.1 **IF** the LCVUs are operating in "LOW" speed, perform the following:

> **NOTE:** If two LCVUs are to remain in service, it is preferable to run a vent unit in each fan room (A/D, B/C) in order to maximize air distribution in the lower containment. Due to the temperature characteristics in lower containment and the Digital Rod Position Indication (DRPI) Panels area, use of the 1D LCVU is preferred. Failure to operate with at least one vent unit in each fan room during Modes 1 - 3 can result in high pressurizer and/or steam generator cavity air temperatures.

3.1.1.1 Start an idle LCVU by placing its control switch in the "LOW" position:

- _____ "VV LCVU 1A"
- _____ "VV LCVU 1B"
- _____ "VV LCVU 1C"
- _____ "VV LCVU 1D"

_____ 3.1.1.2 Verify the red indicating light illuminates for the LCVU placed in service.

_____ 3.1.1.3 Verify the red "OPEN" indicating light illuminates for the LCVU dampers associated with the LCVU placed in service.

_____ 3.1.1.4 Verify the red "MAX" indicating light illuminates for the LCVU placed in service.

Event Description: Swap Operating Lower Containment Ventilation Units

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Shifting Operating Lower Containment Ventilation Units And Pipe Tunnel Booster Fans

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3.1.1.5 Stop the LCVU to be removed from service by placing its control switch in the "OFF" position:

_____ • "VV LCVU 1A"
_____ • "VV LCVU 1B"
_____ • "VV LCVU 1C"
_____ • "VV LCVU 1D"

NOTE: The procedure may continue up to and including Step 3.1.1.9 before completing the following step.

_____ 3.1.1.6 Verify the green indicating light illuminates for the LCVU stopped.

_____ 3.1.1.7 Verify the red "MAX" indicating light extinguishes for the LCVU stopped.

_____ 3.1.1.8 Verify the green "CLOSED" indicating light illuminates for the LCVU damper associated with the LCVU stopped.

_____ 3.1.2 __IF__ the LCVUs are operating in "HIGH" speed, perform the following:

CAUTION: Operating the lower containment vent units in "HIGH" speed for more than 24 hours will cause bearing problems in the fans.

NOTE:
- It is preferable to run a vent unit in each fan room (A/D, B/C) in order to maximize air distribution in the lower containment. Due to the temperature characteristics in lower containment and the Digital Rod Position Indication (DRPI) Panels area, use of the 1D LCVU is preferred. Failure to operate with at least one vent unit in each fan room during Modes 1 - 3 can result in high pressurizer and/or steam generator cavity air temperatures.
- Operating the lower containment vent units in "HIGH" speed will fail the bypass chilled water valves open.

3.1.2.1 Start an idle LCVU by placing its control switch in the "HIGH" position:

_____ • "VV LCVU 1A"
_____ • "VV LCVU 1B"
_____ • "VV LCVU 1C"
_____ • "VV LCVU 1D"

_____ 3.1.2.2 Verify the red indicating light illuminates for the LCVU placed in service.

Enclosure 4.13

Shifting Operating Lower Containment Ventilation Units And Pipe Tunnel Booster Fans

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_____ 3.1.2.3 Verify the red "OPEN" indicating light illuminates for the LCVU damper associated with the LCVU started.

_____ 3.1.2.4 Verify the red "OPEN" light illuminates for the valve corresponding to the LCVU started (rear of 1MC3):

- ☐ "1RN-473 LWR CONT VENT UNT 1A FULL FLOW"
- ☐ "1RN-455 LWR CONT VENT UNT 1B FULL FLOW"
- ☐ "1RN-447 LWR CONT VENT UNT 1C FULL FLOW"
- ☐ "1RN-481 LWR CONT VENT UNT 1D FULL FLOW"

3.1.2.5 Stop the LCVU to be removed from service by placing its control switch in the "OFF" position:

- _____ • "VV LCVU 1A"
- _____ • "VV LCVU 1B"
- _____ • "VV LCVU 1C"
- _____ • "VV LCVU 1D"

NOTE: The procedure may continue up to and including Step 3.1.2.8 before completing the following step.

_____ 3.1.2.6 Verify the green indicating light illuminates for the LCVU stopped.

_____ 3.1.2.7 Verify the green "CLOSED" indicating light illuminates for the LCVU damper associated with the LCVU stopped.

_____ 3.1.2.8 Verify the green "CLOSED" light illuminates for the valve corresponding to the LCVU stopped (rear of 1MC3):

- ☐ "1RN-473 LWR CONT VENT UNT 1A FULL FLOW"
- ☐ "1RN-455 LWR CONT VENT UNT 1B FULL FLOW"
- ☐ "1RN-447 LWR CONT VENT UNT 1C FULL FLOW"
- ☐ "1RN-481 LWR CONT VENT UNT 1D FULL FLOW"

_____ 3.1.2.9 Inform Engineering that lower containment vent units have been placed in "HIGH" speed.

Engineer notified ______________________________

Enclosure 4.13
Shifting Operating Lower Containment Ventilation Units And Pipe Tunnel Booster Fans

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_____ 3.2 **IF** three LCVUs are operating **AND** it is desired, shift the operating units as follows:

_____ 3.2.1 **IF** the LCVUs are operating in "LOW" speed, perform the following:

3.2.1.1 Stop the LCVU to be removed from service by placing its control switch in the "OFF" position:

_____ • "VV LCVU 1A"
_____ • "VV LCVU 1B"
_____ • "VV LCVU 1C"
_____ • "VV LCVU 1D"

NOTE:	The procedure may continue up to and including Step 3.2.1.9 before completing the following step.

_____ 3.2.1.2 Verify the green indicating light illuminates for the LCVU stopped.

_____ 3.2.1.3 Verify the red "MAX" indicating light extinguishes for the LCVU stopped.

_____ 3.2.1.4 Verify the green "CLOSED" indicating light illuminates for the LCVU damper associated with the LCVU stopped.

NOTE:	• If Unit 1 is in Mode 1 and LCVU 1C or 1D is the idle unit that is being placed in service, a delay of approximately 15 to 30 minutes may be needed before starting LCVU 1C or 1D to allow lower containment air temperature to trend up. This will prevent exceeding the Tech Spec low limit for air temperature. {PIP 00-0763, PIP 05-3785} • Adequate margin of VQ pressure may be required to allow containment temperature to trend up if waiting 15 to 30 minutes to start LCVU 1C or 1D.

3.2.1.5 Start the idle LCVU by placing its control switch in the "LOW" position:

_____ • "VV LCVU 1A"
_____ • "VV LCVU 1B"
_____ • "VV LCVU 1C"
_____ • "VV LCVU 1D"

_____ 3.2.1.6 Verify the red indicating light illuminates for the LCVU placed in service.

_____ 3.2.1.7 Verify the red "OPEN" indicating light illuminates for the LCVU damper associated with the LCVU started.

Event Description: Swap Operating Lower Containment Ventilation Units

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Shifting Operating Lower Containment Ventilation Units And Pipe Tunnel Booster Fans

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_____ 3.2.1.8 Verify the red "MAX" indicating light illuminates for the LCVU placed in service.

N/A 3.2.2 **IF** the LCVUs are operating in "HIGH" speed, perform the following:

3.2.2.1 Stop the lower containment vent unit to be removed from service by placing its control switch in the "OFF" position:

- _____ "VV LCVU 1A"
- _____ "VV LCVU 1B"
- _____ "VV LCVU 1C"
- _____ "VV LCVU 1D"

NOTE:	The procedure may continue up to and including Step 3.2.2.8 before completing the following step.

_____ 3.2.2.2 Verify the green indicating light illuminates for the LCVU stopped.

_____ 3.2.2.3 Verify the green "CLOSED" indicating light illuminates for the LCVU damper associated with the LCVU stopped.

_____ 3.2.2.4 Verify the green "CLOSED" light illuminates for the valve corresponding to the LCVU stopped (rear of 1MC3):

- ☐ "1RN-473 LWR CONT VENT UNT 1A FULL FLOW"
- ☐ "1RN-455 LWR CONT VENT UNT 1B FULL FLOW"
- ☐ "1RN-447 LWR CONT VENT UNT 1C FULL FLOW"
- ☐ "1RN-481 LWR CONT VENT UNT 1D FULL FLOW"

CAUTION:	Operating the lower containment vent units in "HIGH" speed for more than 24 hours will cause bearing problems in the fans.

NOTE:	Operating the lower containment vent units in "HIGH" speed will fail the bypass chilled water valves open.

3.2.2.5 Start the idle lower containment vent unit by placing its control switch in the "HIGH" position:

- _____ "VV LCVU 1A"
- _____ "VV LCVU 1B"
- _____ "VV LCVU 1C"
- _____ "VV LCVU 1D"

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Shifting Operating Lower Containment Ventilation Units And Pipe Tunnel Booster Fans

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_____ 3.2.2.6 Verify the red indicating light illuminates for the LCVU placed in service.

_____ 3.2.2.7 Verify the red "OPEN" indicating light illuminates for the LCVU damper associated with the LCVU started.

_____ 3.2.2.8 Verify the red "OPEN" light illuminates for the valve corresponding to the LCVU started (rear of 1MC3):

- ☐ "1RN-473 LWR CONT VENT UNT 1A FULL FLOW"
- ☐ "1RN-455 LWR CONT VENT UNT 1B FULL FLOW"
- ☐ "1RN-447 LWR CONT VENT UNT 1C FULL FLOW"
- ☐ "1RN-481 LWR CONT VENT UNT 1D FULL FLOW"

_____ 3.2.2.9 Inform Engineering that lower containment vent units have been placed in "HIGH" speed.

Engineer notified ________________________________

N/A 3.3 **IF** shifting the operating pipe tunnel booster fan, perform the following:

3.3.1 Stop the operating fan by placing its control switch in the "OFF" position:

- _____ "PIPE TUNNEL BSTR FAN 1A"
- _____ "PIPE TUNNEL BSTR FAN 1B"

_____ 3.3.2 Verify the green indicating light illuminates for the pipe tunnel booster fan stopped.

_____ 3.3.3 **IF** the operating lower containment ventilation units are running in "LOW" speed, start the pipe tunnel booster fan to be placed in service by placing its control switch in the "LOW" speed position:

- _____ "PIPE TUNNEL BSTR FAN 1A"
- _____ "PIPE TUNNEL BSTR FAN 1B"

_____ 3.3.4 **IF** the operating lower containment ventilation units are running in "HIGH" speed, start the pipe tunnel booster fan to be placed in service by placing its control switch in the "HIGH" speed position:

- _____ "PIPE TUNNEL BSTR FAN 1A"
- _____ "PIPE TUNNEL BSTR FAN 1B"

_____ 3.3.5 Verify that the red indicating light illuminates for the pipe tunnel booster fan placed in service.

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Shifting Operating Lower Containment Ventilation Units And Pipe Tunnel Booster Fans

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_____ 3.4 Indicate below the operating Pipe Tunnel Booster Fan:

☐ "PIPE TUNNEL BSTR FAN 1A"
☐ "PIPE TUNNEL BSTR FAN 1B"

_____ 3.5 Indicate below the operating LCVUs:

☐ "VV LCVU 1A"
☐ "VV LCVU 1B"
☐ "VV LCVU 1C"
☐ "VV LCVU 1D"

3.6 File a copy of this enclosure in the designated storage cabinet.

Note to Evaluator:

At the discretion of the Lead Evaluator, the scenario may continue to the next event by instructing the booth operator to INSERT Trigger 2 (1B RN pump trip).

Op Test No.:	301	Scenario #	2	Event #	2	Page	18 of 156
Event Description:	1B RN Pump Trip						

Control Room Indications
1AD-12, A/2 "RN ESSENTIAL HDR A PRESSURE – LO" – LIT
1AD-12, A/5 "RN ESSENTIAL HDR B PRESSURE – LO" – LIT
1AD-11, D/1 "4KV ESS PWR TRAIN B TROUBLE" – LIT
Indicating lights for 1B RN pump – DARK
OAC alarm for RN Header A & B pressure – LOW

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

C. Operator Actions

Critical Task #1

__ 1. **Start idle RN pump(s) as required.**

Note to Evaluator:

Enclosure 1 can be found as Attachment 3 in the back of this document.

__ 2. **Ensure Unit 1 and Unit 2 OATC monitors Enclosure 1 (Foldout Page).**

3. **Verify RN System in normal alignment as follows:**

- __ Both RN Supply headers - ALIGNED

AND

- __ Both RN Discharge headers - ALIGNED.

Perform the following:

__ a. **IF** RN aligned for single supply header operation with "A" train supply header isolated, **THEN GO TO** Case III (Loss of RN With "A" Supply Header Isolated).

__ b. **IF** RN aligned for single supply header operation with "B" train supply header isolated, **THEN GO TO** Case IV (Loss of RN With "B" Supply Header Isolated).

__ c. **IF** RN aligned for single discharge header operation with "A" train discharge header isolated, **THEN GO TO** Case V (Loss of RN With "A" Discharge Header Isolated).

__ d. **IF** RN aligned for single discharge header operation with "B" train discharge header isolated, **THEN GO TO** Case VI (Loss of RN With "B" Discharge Header Isolated).

__ e. **IF** RN aligned for single SNSWP discharge header operation with "A" train discharge header isolated, **THEN GO TO** Case VII (Loss of RN With "A" Pond Return Header Isolated).

__ f. **IF** RN aligned for single SNSWP discharge header operation with "B" train discharge header isolated, **THEN GO TO** Case VIII (Loss of RN With "B" Pond Return Header Isolated).

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Event Description:	1B RN Pump Trip						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 4. **Verify each operating RN pump discharge flow - GREATER THAN 8,600 GPM.**	**Perform the following:** __ a. Stop any RN pump(s) not required to support system operation. b. Ensure the following suction valves to Lake - OPEN: __ • 1RN-1A (RN P/H Pit A Isol From Lake) __ • 1RN-2B (RN P/H Pit A Isol From Lake) __ • 1RN-5A (RN P/H Pit B Isol From Lake) __ • 1RN-6B (RN P/H Pit B Isol From Lake). c. Ensure the following essential header isolation valves for required trains - OPEN: __ • 1RN-67A (RN Hdr 1A Supply Isol) __ • 1RN-69B (RN Hdr 1B Supply Isol) __ • 2RN-67A (RN Hdr 2A Supply Isol) __ • 2RN-69B (RN Hdr 2B Supply Isol). d. Ensure the following RN to RL discharge valves - OPEN: __ • 1RN-57A (Station RN Disch To RL Sys) __ • 1RN-843B (Station RN Disch To RL Sys). (RNO continued on next page)

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Event Description:	1B RN Pump Trip						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
	e. Ensure one of the following RL discharge valves - OPEN: __ • 1RL-54 (RN System Disch To A RL Header) OR __ • 1RL-62 (RN System Disch To B RL Header). f. Ensure the following station RN discharge header crossover valves - OPEN: __ • 1RN-54A (Station RN Disch Hdr X-Over) __ • 1RN-53B (Station RN Disch Hdr X-Over). g. **IF** either of the following conditions met: __ • RN cannot be aligned to Lake **OR** __ • No flow indicated on operating RN pump(s), (RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4. (Continued)

THEN align RN to SNSWP as follows:

__ 1) Align valves for RN swap to SNSWP. **REFER TO** Enclosure 2 (RN Valve Alignment for RN Swap to SNSWP).

__ 2) **IF** WL discharge in progress, **THEN** coordinate with Radwaste Chemistry to secure all controlled WL discharges.

__ 3) **IF** any RN chemical addition in progress, **THEN** notify Chemistry to secure it.

__ 4) **WHEN** corrective action has been taken, **THEN** restore RN to normal alignment. **REFER TO** Enclosure 3 (Returning RN alignment To Normal After Transfer To SNSWP).

h. Verify the following alarms - DARK:

- __ 1AD-12, C/2 "RN PMP A STRAINER HI D/P"
- __ 1AD-12, C/5 "RN PMP B STRAINER HI D/P"
- __ 2AD-12, C/2 "RN PMP A STRAINER HI D/P"
- __ 2AD-12, C/5 "RN PMP B STRAINER HI D/P".

__ i. **IF** any of the previous alarms lit, **THEN** backflush affected strainer. **REFER TO** OP/0/A/6400/006C (Nuclear Service Water System).

Event Description: 1B RN Pump Trip

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 5. **Verify each operating RN pump discharge flow - LESS THAN 23,000 GPM.**	**Perform the following:** **<u>CAUTION</u> The following steps may result in loss of an essential header until an opposite train pump is started.** a. Ensure the following RN isolation valves - CLOSED: __ • 1RN-47A (RN Supply X-Over Isol) __ • 1RN-48B (RN Supply X-Over Isol) __ • 2RN-47A (RN Supply X-Over Isol) __ • 2RN-48B (RN Supply X-Over Isol). __ • 1RN-51A (Non-Ess Ret Hdr Isol) __ • 1RN-52B (Non-Ess Ret Hdr Isol) __ • 2RN-51A (Non-Ess Ret Hdr Isol) __ • 2RN-52B (Non-Ess Ret Hdr Isol). __ b. Ensure 1RN-58B (RN Hdr B Ret To SNSWP) - OPEN. c. **<u>WHEN</u>** 1RN-58B open, **<u>THEN</u>** CLOSE the following valves: __ • 1RN-54A (Station RN Disch Hdr X-Over) __ • 1RN-53B (Station RN Disch Hdr X-Over). __ d. **<u>IF</u>** flow returning to normal, **<u>THEN GO TO</u>** Step 6. (RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. (Continued)	
	e. **IF** flow still excessive, **THEN** perform the following: __ 1) Ensure both RN pump(s) on affected train - OFF. __ 2) Dispatch operators to locate any piping leaks. **REFER TO** AP/0/A/5500/030 (Plant Flooding).
__ 6. **Ensure RN pumps - IN OPERATION AS NEEDED.**	
7. **Ensure proper alignment of RN to KC Hx(s) as follows:**	
__ a. Verify RN - ALIGNED TO IN SERVICE KC HX(s).	a. Shift KC train in service as needed. **REFER TO** the following procedures: __ • OP/1/A/6400/005 (Component Cooling Water System) __ • OP/2/A/6400/005 (Component Cooling Water System).
__ b. Ensure KC Hx Otlt Mode switches - PROPERLY ALIGNED.	
__ 8. **Verify each operating RN pump discharge flow - GREATER THAN 8,600 GPM.**	**Perform the following:** __ a. Do not exceed 4650 GPM through an NS Hx. __ b. Align RN flow through NS Hx(s) as needed to raise each operating RN pump's discharge flow to greater than 8,600 GPM. **REFER TO** OP/0/A/6400/006C (Nuclear Service Water System).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 9. **Verify RN - AVAILABLE TO ALL UNIT 1 AND UNIT 2 D/G(s).**	**Dispatch operator to remove any D/G(s) without cooling water supply from standby readiness. <u>REFER TO</u> the following procedures:** __ • OP/1/A/6350/002 (Diesel Generator Operation) __ • OP/2/A/6350/002 (Diesel Generator Operation).
10. **Determine VC/YC status as follows:** __ • Verify VC/YC - ALIGNED TO OPERATING RN TRAIN __ • Verify YC Chiller - RUNNING.	**Perform the following:** __ • <u>**IF**</u> YC Chiller tripped due to loss of RN flow and RN flow restored, <u>**THEN**</u> dispatch operator to reset YC Chiller trip. __ • Align VC/YC to operating RN train as required. <u>**REFER TO**</u> OP/0/A/6450/011 (Control Room Area Ventilation/Chilled Water System).
__ 11. **Determine and correct cause of loss of RN train.**	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. **Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual:** __ • SLC 16.7-6 (RN Discharge Instrumentation) __ • 3.6.5 (Containment Air Temperature) __ • 3.6.6 (Containment Spray System) __ • 3.6.17 (Containment Valve Injection Water System (CVIWS)) __ • 3.7.5 (Auxiliary Feedwater (AFW) System) __ • 3.7.7 (Component Cooling Water (CCW) System) __ • 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)) __ • 3.8.1 (A.C. Sources - Operating) __ • 3.8.2 (A.C. Sources - Shutdown).	**TECH SPEC EVALUATION** ***See Attachment 11 for applicable Tech Specs.*** **Both Units are in:** **T.S. 3.7.8** **Condition A: Restore Nuclear Service Water System Train to OPERABLE in 72 hours.** **Unit 1 is temporarily in T.S. 3.7.11 Condition A (Restore CRACWS train to OPERABLE in 30 days) until the B YC Chiller is restarted.**
13. **Determine required notifications:** __ • **REFER TO** AD-EP-ALL-0111 (Control Room Activation of the ERO) __ • **REFER TO** AD-LS-ALL-0006 (Notification/Reportability Evaluation).	
__ 14. **Notify Environmental Chemistry of any RN pump shifts.**	**Note to Evaluator:** **At the discretion of the Lead Evaluator, the scenario may continue to the next event by instructing the booth operator to INSERT Trigger 3 (Main Generator Voltage Regulator Failure).**
__ 15. **Determine long term plant status. RETURN TO procedure in effect.**	

END

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Event Description: Main Generator Voltage Regulator Failure

Control Room Indications
OAC alarm for Generator Voltage – LOW
1AD-1, D/6 “EHC SYSTEM FAULT” – LIT

CNS AP/1/A/5500/037	GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES Case I Abnormal Generator or Grid Voltage	PAGE NO. 4 of 21 Revision 08

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. **Operator Actions**	
__ 1. **Verify Generator - TIED TO GRID.**	**Perform the following:** a. **IF** notified by DEC TOP (Transmission Operations) degraded switchyard (grid) voltage conditions exist, **THEN** ensure compliance with the following Tech Specs: __ • 3.8.1 (AC Sources - Operating) __ • 3.8.2 (AC Sources - Shutdown). __ 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).	**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.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. **Perform the following to adjust Generator MVARs:**	
a. Adjust Generator MVARs to operate within Generator Capability Curve limits as follows: __ • Depress "LOWER" on VOLTAGE ADJUST to reduce lagging MVARs **OR** __ • Depress "RAISE" on VOLTAGE ADJUST to reduce leading MVARs.	a. Perform the following: 1) **IF** voltage regulator in "AUTO", **THEN** perform the following: __ a) Place voltage regulator in "MANUAL". __ b) Adjust MVARs to within GENERATOR CAPABILITY CURVE limits. 2) **IF** unable to maintain MVARs within Generator Capability Curve limits, **THEN** remove generator from service as follows: a) **IF** reactor power greater than or equal to 69%, **THEN** perform the following: __ (1) Trip reactor. __ (2) **GO TO** EP/1/A/5000/E-0 (Reactor Trip or Safety Injection). b) **IF** reactor power less than 69%, **THEN** perform the following: __ (1) Trip turbine. __ (2) **GO TO** AP/1/A/5500/002 (Turbine Generator Trip).
__ b. **IF** Generator voltage operated outside Generator Voltage Schedule for more than 30 continuous minutes, **THEN** notify DEC TOP (Transmission Operations)/DEC BA (Balancing Authority).	

Event Description: Main 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 08

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. (Continued)	
c. **<u>IF</u>** voltage regulator in "MANUAL", **<u>THEN</u>** perform the following:	
__ 1) Notify DEC TOP (Transmission Operations)/DEC BA (Balancing Authority) voltage regulator in manual.	
__ 2) **<u>WHEN</u>** voltage regulator returned to auto, **<u>THEN</u>** notify DEC TOP (Transmission Operations)/DEC BA (Balancing Authority).	
__ 4. **Notify Engineering to evaluate generator abnormal operating conditions.**	

<u>NOTE</u> The DEC TOP "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.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 5. **Verify DEC TOP (Transmission Operations) reported "Real Time Contingency Analysis" (RTCA) indicates CNS switchyard voltage would <u>NOT</u> be adequate if the unit should trip.**	**Perform the following:** __ a. **<u>IF</u>** DEC TOP (Transmission Operations) has not reported "RTCA" indications, **<u>THEN</u>** notify DEC TOP to monitor "RTCA" and report results to Control Room Supervisor. __ b. **<u>IF AT ANY TIME</u>** DEC TOP (Transmission Operations) reports "RTCA" indicates CNS switchyard voltage would **<u>NOT</u>** be adequate if the unit should trip, **<u>THEN GO TO</u>** Step 6. __ c. Observe Note prior to Step 17 and **<u>GO TO</u>** Step 17.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 6. **Record time DEC TOP (Transmission Operations) "RTCA" indicated CNS switchyard (grid) voltage <u>NOT</u> adequate:**

____

__ 7. **Start 2 hour timer from time DEC TOP (Transmission Operations) "RTCA" indicated CNS switchyard (grid) voltage <u>NOT</u> adequate.**

<u>NOTE</u> When DEC TOP "RTCA" indicates switchyard voltage would **<u>NOT</u>** 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.

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)

__ • 3.8.2 (AC Sources - Shutdown)

__ • 3.5.2 (ECCS - Operating).

__ b. Ensure compliance with Tech Spec 3.0.3 due to both trains of ECCS inoperable.

CNS AP/1/A/5500/037	GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES Case I Abnormal Generator or Grid Voltage	PAGE NO. 8 of 21 Revision 08

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE The DEC TOP (Transmission Operations)/DEC BA (Balancing Authority) response to a degraded grid voltage condition may restore voltage to adequate status within one hour.	
9. **Activate TSC as follows:**	
__ a. Verify DEC TOP (Transmission Operations) expects switchyard (grid) voltage restoration to adequate status in less than one hour.	a. Perform the following: __ 1) Activate TSC. **<u>REFER TO</u>** RP/0/B/5000/027 (Augmentation of Shift Utilizing the Emergency Response Organization without Emergency Declaration) __ 2) Observe Note prior to Step 10 and **<u>GO TO</u>** Step 10.
__ b. Evaluate activating TSC. **<u>REFER TO</u>** 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).	
10. **Determine required notifications:**	
__ • **<u>REFER TO</u>** AD-EP-ALL-0111 (Control Room Activation of the ERO)	
__ • **<u>REFER TO</u>** AD-LS-ALL-0006 (Notification/Reportability Evaluation).	
11. **Evaluate the following:**	
__ • Stopping in progress surveillance testing.	
__ • Stopping in progress maintenance activities.	
__ • Returning systems to normal/functional status.	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

12. **IF AT ANY TIME DEC TOP (Transmission Operations) 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 Shift Manager to evaluate DEC TOP (Transmission Operations) requested actions to restore grid reliability.

__ b. Notify DEC TOP (Transmission Operations) of actions that cannot be performed.

__ c. Perform Shift Manager approved actions to restore grid reliability.

__ d. Document all DEC TOP (Transmission Operations) requested action(s) and resolution in logbook.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE The DEC BA (Balancing Authority)/DEC TOP (Transmission Operations) is allowed 2 hours to restore switchyard (grid) voltage to adequate. The 2 hour time limit may be adjusted based on Shift Manager assessment of plant or grid conditions.

13. **Do not continue in this procedure until one of the following conditions exist:**

__ • 2 hours elapsed since DEC TOP (Transmission Operations) "RTCA" indicated switchyard voltage **NOT** adequate

OR

__ • Notification from DEC TOP (Transmission Operations) that "RTCA" indicates switchyard voltage would be adequate should the unit trip

OR

__ • Shift Manager adjust 2 hour time limit based on assessment of plant conditions.

Event Description: Main 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 08

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 14. **Verify DEC TOP (Transmission Operations) 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.
__ 15. **Do not continue in this procedure until DEC TOP (Transmission Operations) reports "RTCA" indicates switchyard voltage would be adequate should the unit trip.**	

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 08

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

16. **WHEN DEC TOP (Transmission Operations) reports "RTCA" indicates switchyard voltage returned to adequate voltage 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)

__ • 3.8.2 (AC Sources - Shutdown)

__ • 3.5.2 (ECCS - Operating)

__ • Tech Spec LCO 3.0.3.

__ c. Notify Regulatory Compliance of Tech Spec LCO action status.

NOTE Do not exceed any generator limits when adjusting generator voltage.

17. **Coordinate with DEC BA (Balancing Authority) 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 DEC BA (Balancing Authority) request.

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Event Description: Main Generator Voltage Regulator Failure

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 18. **WHEN DEC TOP (Transmission Operations) or DEC BA (Balancing Authority) verifies switchyard (grid) voltage adequate and reliable, THEN RETURN TO procedure step in effect.**	

END

Note to Evaluator:

At the discretion of the Lead Evaluator, the scenario may continue to the next event by instructing the booth operator to INSERT Trigger 4 (1C S/G Tube Leak).

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
Count rate on 1EMF-28 – RISING
Pressurizer Level – LOWERING

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

C. **Operator Actions**

Note to Evaluator:

Enclosure 1 can be found as Attachment 4 in the back of this document.

__ 1. **Monitor Enclosure 1 (Case I Steam Generator Tube Leak Foldout Page).**

__ 2. **Verify Pzr level - STABLE OR TRENDING UP.**

RNO: **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 stable **OR** trending up, **THEN GO TO** Step 3.

d. **IF** Pzr level continues to trend down, **THEN** reduce or isolate letdown as follows:

1) **IF** desired to reduce letdown flow, **THEN** perform the following:

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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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 stable at 350 PSIG, **THEN** place 1NV-148 (Letdn Press Control) in auto.

N/A 2) **IF** letdown isolation required, **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** trending up, **THEN GO TO** Step 3.

(RNO continued on next page)

Op Test No.:	301	Scenario #	2	Event #	4,5,6	Page	41 of 156

Event Description: 1C Steam Generator Tube Leak / Rapid Downpower / Rods Fail to Insert in Auto

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. (Continued)	4) **<u>IF</u>** Pzr level continues to trend down **<u>OR</u>** Pzr level cannot be maintained greater than 4%, **<u>THEN</u>** perform the following: __ a) Trip Unit 1 reactor. __ b) **<u>WHEN</u>** reactor tripped verified, **<u>THEN</u>** initiate S/I. __ c) **<u>GO TO</u>** EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).
__ 3. **<u>IF AT ANY TIME</u> Pzr level trends down in uncontrolled manner or cannot be maintained greater than 4%, <u>THEN</u> perform Step 2.**	

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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 - TRENDING UP IN AN UNCONTROLLED MANNER

OR

NOTE S/G Leakage EMFs are highly sensitive which may cause EMFs located on adjacent steamline to be trending up or in alarm.

• Verify any of the following S/G leakage EMF indication(s) - TRENDING UP 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) - TRENDING UP 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.

Op Test No.:	301	Scenario #	2	Event #	4,5,6	Page	43 of 156
Event Description:	1C Steam Generator Tube Leak / Rapid Downpower / Rods Fail to Insert in Auto						

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE Consideration should be given to evacuating non-essential personnel from the Unit 1 Turbine Building and affected Doghouse based on severity of the leak.

__ 5. **Announce event on plant page.**

6. **Determine required notifications:**
   - __ **REFER TO** AD-EP-ALL-0111 (Control Room Activation of the ERO)
   - __ **REFER TO** AD-LS-ALL-0006 (Notification/Reportability Evaluation).

NOTE If reactor trip required, the E-0 foldout page item "Ruptured S/G CA Isolation Criteria" does not apply unless S/I is initiated.

7. **Verify VCT level able to be maintained by normal makeup as follows:**

   a. One of the following conditions exists:
   - __ S/G tube leak less than 90 gpm

     OR
   - __ Automatic makeup stabilizes or raises VCT level

     OR
   - __ Manual makeup stabilizes or raises VCT level.

   RESPONSE NOT OBTAINED:

   a. Perform the following:

   1) Align NV pumps 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).

(RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. (Continued)	2) **IF** reactor trip breakers closed, **THEN** perform the following: __ a) Continue concurrent use of this procedure for S/G tube leak at Step 8. __ b) Trip Unit 1 reactor. __ c) **IF** Unit 1 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). __ 3) **IF** reactor trip breakers open, **THEN GO TO** Step 8.
b. **IF AT ANY TIME** the following conditions exist: __ • 1AD-7, I/1 "VCT LO LVL" alarm - LIT **AND** • Reactor trip breakers closed, __ **THEN** perform Step 7.a RNO.	
__ 8. **IF AT ANY TIME S/G tube leak greater than 25 GPM, THEN notify Emergency Coordinator.**	

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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".

9. **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

- 36,000 GPD is equivalent to 25 GPM.
- S/G Leakage EMFs are highly sensitive which may cause EMFs located on the adjacent steamline to be trending up 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

Event Description: 1C Steam Generator Tube Leak / Rapid Downpower / Rods Fail to Insert in Auto

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

9. (Continued)

OR

__ • Initiate OAC Program "RCSLEAK"

OR

__ • Monitor OAC point C1P0976 (U1 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).

10. **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 bypassed.

__ b. Align auxiliary systems to minimize secondary side contamination. **REFER TO** 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.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. **Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual:** __ • 3.4.13 (RCS Operational Leakage) __ • 3.4.14 (RCS Pressure Isolation Valve (PIV) Leakage) __ • 3.4.18 (Steam Generator (SG) Tube Integrity __ • 3.5.5 (Seal Injection Flow) __ • 3.7.17 (Secondary Specific Activity) __ • SLC 16.7-9 (Standby Shutdown System).	**TECH SPEC EVALUATION** ***See Attachment 11 for applicable Tech Specs.*** **T.S. 3.4.13 & 3.4.18** **Condition B: Be in Mode 3 in 6 hours AND be in Mode 5 in 36 hours.** **SLC 16.7-9** **Condition B: Declare the standby makeup pump non-functional and enter Condition A Immediately.**
__ 12. **Verify Unit 1 in Mode 1.**	**Perform the following:** a. IF any of the following exist: __ • Leak rate greater than or equal to 75 gpd in any one S/G __ • Leak rate trending up 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 1 in Mode 2, THEN GO TO Step 13. __ d. GO TO Step 19.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

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
__ 13. **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.
__ 14. **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). (RNO continued on next page)

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

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.

3) **IF AT ANY TIME** the following conditions 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).

(RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. (Continued)	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 requirements of this procedure.
15. **Verify at least one of the following:** __ • Leak rate 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 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) **IF** 1RAD-1, B/1 "1EMF 33 CSAE EXHAUST HI RAD - LIT, **THEN** ensure blowdown flow controllers 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. (RNO continued on next page)

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 15 of 164 Revision 62

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

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 **AND** increase frequency to daily.

3) **IF AT ANY TIME** the following conditions met:

__ • Any main steam line N-16 radiation monitor - INOPERABLE

AND

__ • C1P0187 (Estimated Total Pri To Sec Leakrate) - INVALID,

__ **THEN** notify Secondary Chemistry to determine frequency to perform PT/1/B/4600/028 (Determination of Steam Generator Tube Leak For Unit 1).

(RNO continued on next page)

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 16 of 164 Revision 62

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15. (Continued)	**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 goes up. __ 6) Evaluate secondary contamination potential. Review EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 3 (Turbine Building Sump Isolation). 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.

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 17 of 164 Revision 62

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16. **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).
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 1 shutdown may be suspended __ • **RETURN TO** Step 11.	
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).	

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 18 of 164 Revision 62

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16. (Continued) 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. Review EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 3 (Turbine Building Sump Isolation).	

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 19 of 164 Revision 62

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

17. **Determine Unit 1 shutdown requirements as follows:**

a. **IF AT ANY TIME** leak rate greater than or equal to 100 gpd, **THEN** perform the following:

__ 1) Ensure reactor power less than 50% within 1 hr.

__ 2) Ensure Unit 1 in Mode 3 within the following 2 hrs.

__ 3) **IF** leak rate greater than or equal to 150 gpd, **THEN** ensure Unit 1 in Mode 5 within 36 hours.

__ 4) Observe Note prior to Step 18 and **GO TO** Step 18.

b. **IF** leak rate greater than or equal to 75 gpd and less than 100 gpd, **THEN** perform the following:

- **IF AT ANY TIME** the following conditions 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 1 in Mode 3 within the following 2 hrs.

  __ 3) Observe Note prior to Step 18 and **GO TO** Step 18.

__ c. **IF** leak rate greater than or equal to 75 gpd and less than 100 gpd sustained for one hour, **THEN** ensure Unit 1 in Mode 3 within 24 hrs.

CNS AP/1/A/5500/010	REACTOR COOLANT LEAK Case I Steam Generator Tube Leak	PAGE NO. 20 of 164 Revision 62

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE EMF indications may trend down during unit shutdown. Unit shutdown should not be suspended based solely on lower radiation monitor indications.	
18. **Shutdown Unit 1 as follows:**	
__ a. Notify Engineering of occurrence.	
__ b. Verify reactor power - GREATER THAN 15%.	b. Perform the following: __ 1) Initiate Unit 1 shutdown. **REFER TO** OP/1/A/6100/002 (Controlling Procedure For Unit Shutdown). __ 2) Ensure adequate shutdown margin maintained. **REFER TO** Unit 1 ROD Book, Section 5.11. __ 3) **GO TO** Step 19.
NOTE A more rapid shutdown is prudent for larger leaks to minimize secondary contamination or offsite dose.	
c. Initiate Unit 1 shutdown. **REFER TO** the following procedures: __ • OP/1/A/6100/003 (Controlling Procedure For Unit Operation) OR __ • AP/1/A/5500/009 (Rapid Downpower).	
__ d. Ensure adequate shutdown margin maintained. **REFER TO** Unit 1 ROD Book, Section 5.11.	
__ 19. **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.**	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	**Note to Evaluator:** **Enclosure 1 can be found as Attachment 5 in the back of this document.**
__ 1. **Monitor Enclosure 1 (Foldout Page).**	
2. **Determine required notifications:**	
__ • **REFER TO** AD-EP-ALL-0111 (Control Room Activation of the ERO)	
__ • **REFER TO** AD-LS-ALL-0006 (Notification/Reportability Evaluation).	
__ 3. **IF AT ANY TIME prompt separation from grid required, THEN GO TO Step 26.**	
N/A 4. **IF load reduction 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.

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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. **WHEN** required target power level and available time known, **THEN** perform Steps 5 through 10. __ b. **GO TO** Step 10.
__ 7. **Verify time required to reduce load - GREATER THAN OR EQUAL TO 15 MINUTES.**	__ **GO TO Step 10.**

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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 required power reduction rate (MW/Min) from 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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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 9. **Determine target load from 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

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.

RNO: a. 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.

(RNO continued on next page)

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
	__ 2) **IF AT ANY TIME** auto turbine control available **AND** desired, **THEN** perform Steps 5 through 11.
	__ 3) **GO TO** Step 12.
__ b. Enter desired "LOAD RATE" on turbine control panel.	
__ c. Enter desired "TARGET" on turbine control panel.	
__ d. Depress "GO" pushbutton on turbine control panel.	
__ e. Verify turbine load - TRENDING DOWN 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** turbine controls fail to respond properly, **THEN** perform Step 10.e.	
__ 11. **IF AT ANY TIME turbine load reduction rate OR 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.**	

Event Description: 1C Steam Generator Tube Leak / Rapid Downpower / Rods Fail to Insert in Auto

CNS AP/1/A/5500/009	RAPID DOWNPOWER	PAGE NO. 7 of 40 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. **Attempt to control T-Avg as follows:**	
__ a. Verify T-Ref instrumentation - AVAILABLE.	__ a. **IF** T-Avg Coastdown 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 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.
__ c. Maintain T-Avg greater than or equal to 551°F.	
__ d. Verify Reactor Engineering Power Maneuvering Guidance 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** Unit 1 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.	
__ f. Ensure operator monitors Enclosure 2 (Rod Insertion Limit Boration).	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. **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** Pzr PORV isolation valve cannot be closed, **THEN** perform the following: __ 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 trending down in uncontrolled manner, **THEN** perform the following: __ 1) CLOSE spray valve. __ 2) **IF** affected spray valve cannot be closed, **THEN REFER TO** AP/1/A/5500/011 (Pressurizer Pressure Anomolies).
__ 15. **Operate RC pumps and fans as necessary to maintain RC temperature greater than 60°F. REFER TO OP/1/B/6400/001A (Condenser Circulating Water System).**	

CNS AP/1/A/5500/009	RAPID DOWNPOWER	PAGE NO. 9 of 40 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 16. **Verify reactor power - LESS THAN 85%.**	**Perform the following:** a. IF target load less than 85%, THEN perform the following: __ 1) WHEN time and manpower 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 less than 85%. __ 3) WHEN reactor power less than 85%, THEN GO TO Step 17. b. WHEN target load reached, THEN perform the following: __ 1) Stabilize unit at current 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 41.
__ 17. **Dispatch operator to secure both C-Htr drain pumps. REFER TO OP/1/B/6250/004 (Feedwater Heater Vents, Drains and Bleed System).**	

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Event Description: 1C Steam Generator Tube Leak / Rapid Downpower / Rods Fail to Insert in Auto

CNS AP/1/A/5500/009	RAPID DOWNPOWER	PAGE NO. 10 of 40 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18. **Align AS supply to CF pumps as follows:**	
__ a. Adjust 1AS-2 (Main Stm To Aux Steam) as necessary to maintain AS header pressure 165 PSIG.	
__ b. Ensure 1AS-12 (AS To CFPT Isol) - OPEN.	
__ c. Dispatch operator to close 1SP-3 (SC To CFPT 1A & 1B) (TB1-640, 1G-24).	
__ 19. **Adjust 1TL-4 (Stm Seal Reg Byp) as necessary to maintain steam seal pressure between 3 PSIG - 5 PSIG.**	

CNS AP/1/A/5500/009	RAPID DOWNPOWER	PAGE NO. 11 of 40 Revision 34

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 20. **Verify reactor power - LESS THAN 69%.**	**Perform the following:** a. **IF** target load less than 69%, **THEN** perform the following: __ 1) **WHEN** time and manpower 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 less than 69%. __ 3) **WHEN** reactor power less than 69%, **THEN GO TO** Step 21. b. **WHEN** target load reached, **THEN** perform the following: __ 1) Stabilize unit at current 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 41.
Note to Evaluator: **At the discretion of the Lead Evaluator, the scenario may continue to the next event by instructing the booth operator to INSERT Trigger 7 (1C S/G Tube Rupture).**	
__ 21. **Verify "P9-REACTOR TRIP ON TURBINE TRIP BLOCKED" status light (1SI-18) - LIT.**	

Op Test No.:	301	Scenario #	2	Event #	7,8,9,10	Page	67	of 156

Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

Control Room Indications
Pressurizer Level – LOWERING UNCONTROLLED
1RAD-3, E/5 "1EMF26, 27, 28, 29, S/G A, B, C, D STEAMLINE" – LIT
1C S/G N/R Level – RISING UNCONTROLLED

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Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 4 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	**Note to Evaluator:** **Enclosure 1 can be found as Attachment 6 in the back of this document.**
__ 1. **Monitor Enclosure 1 (Foldout Page).**	
2. **Verify Reactor Trip:** __ • All rod bottom lights - LIT __ • All reactor trip and bypass breakers - OPEN __ • I/R power - TRENDING DOWN.	**Perform the following:** __ a. Trip reactor. b. IF reactor will not trip, THEN concurrently perform the following: __ • 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 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 the following valves: __ • All MSIVs __ • All MSIV bypass valves.

Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 5 of 49 Revision 46

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).

Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 6 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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 perform the following: • **IF** 1ETA **OR** 1ETB de-energized, **THEN** ensure the following pumps running on energized bus: __ • NV pump __ • KC pumps __ • RN pump. __ • 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.
__ 6. **Announce "Unit 1 Safety Injection".**	**Note to Evaluator:** **Once immediate actions are complete, the crew should use foldout page guidance #5 to isolate CA flow to the 1C S/G. The normal method to do this is using the CA flow control valve. This valve is failed open, so the operator will have to use the CA motor operated isolation valve to complete this task.**

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Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 7 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **Determine required notifications:**	
__ • **REFER TO** AD-EP-ALL-0111 (Control Room Activation of the ERO)	
__ • **REFER TO** AD-LS-ALL-0006 (Notification/Reportability Evaluation).	
__ 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.

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Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 8 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **Verify 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. __ b) **IF** Phase B Isolation "RESET" lights lit, **THEN** initiate Phase B Isolation. c) Verify following monitor light panel lights on energized train(s) - 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. (RNO continued on next page)

Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 9 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
	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.
__ b. **IF AT ANY TIME** containment pressure exceeds 3 PSIG while in this procedure, **THEN** perform Step 10.a.	

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Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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.

Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

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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. **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.** **Note to Evaluator:** **Crew may make the decision to transition to the RNO at this step due to 1B RN pump tripping earlier in the scenario. However resetting ECCS and D/G load sequencer will not allow starting of this pump, so the crew may determine that all available RN pumps are in service.**	**Perform the following:** __ a. **IF** any Unit 2 RN pump off, **THEN** start affected pump(s). 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). __ 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).	**Note to Evaluator:** **Enclosure 2 can be found as Attachment 7 in the back of this document.**

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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.
	Critical Task #2
17. **Verify proper S/I flow as follows:**	
__ a. "NV S/I FLOW" - INDICATING FLOW.	__ a. Start NV pump(s) and align valves.

Note to Evaluator:

BOP will have to manually open 1NI-9A and/or 1NI-10B to establish high head ECCS flow.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17. (Continued)	
__ 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) **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 goes down to less than 285 PSIG in uncontrolled manner, **THEN** restart ND pump. __ 3) **GO TO** Step 18.
__ c. NI pumps - INDICATING FLOW.	__ c. Start NI pump(s) and align valves.

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17. (Continued)	
__ 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 goes down to less than 285 PSIG in uncontrolled manner, **THEN** restart ND pump. __ 3) **GO TO** Step 18.
__ e. ND pumps - INDICATING FLOW TO C-LEGS.	__ e. Start ND pump(s) and align valves.
__ 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).**	

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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 perform the following: __ • 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 on intact S/Gs - OPEN.**	__ **OPEN valve(s).**
__ 21. **Verify S/I equipment status based on monitor light panel(s) - IN PROPER ALIGNMENT.**	__ **Align equipment.** Critical Task #2

Note to Evaluator:

BOP will have to manually open 1NI-9A and/or 1NI-10B to establish high head ECCS flow.

Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE Enclosure 4 (NC Temperature Control) shall remain in effect until subsequent procedures provide alternative NC temperature control guidance.

Note to Evaluator:

Enclosure 4 can be found as Attachment 8 in the back of this document.

__ 22. **Control NC temperature. <u>REFER TO</u> Enclosure 4 (NC Temperature Control).**

23. **Verify Pzr PORV and Pzr Spray Valve status as follows:**

__ a. All Pzr PORVs - CLOSED.

RESPONSE NOT OBTAINED:

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)

Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

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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 H_2 analyzers in service. **REFER TO** OP/1/A/6450/010 (Containment Hydrogen Control Systems).

c) **IF AT ANY TIME** 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 perform the following: __ • 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 TRENDING UP __ • ALL S/Gs - PRESSURIZED.	**IF any S/G faulted, 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:** __ • All S/G levels - STABLE OR TRENDING UP IN A CONTROLLED MANNER. • 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).	**IF any EMF trip 1 light lit OR any S/G level trending up in 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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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	**Note to Evaluator:** **Enclosure 1 can be found as Attachment 9 in the back of this document.**
__ 1. **Monitor Enclosure 1 (Foldout Page).**	
2. **Identify ruptured S/G(s) as follows:** __ • Any S/G level - TRENDING UP IN UNCONTROLLED MANNER OR __ • Chemistry or RP 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) 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. **WHEN** ruptured S/G(s) pressure less than 1090 PSIG, **THEN** perform the following: __ 1) Ensure ruptured S/G(s) PORV - CLOSED. __ 2) **IF** ruptured S/G(s) PORV will not close, **THEN** CLOSE ruptured S/G(s) PORV isolation valve. __ 3) **IF** ruptured S/G(s) PORV isolation valve will not close, **THEN** 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:
	__ 1) **IF** both motor driven CA pumps available, **THEN** CLOSE "CAPT TRIP T/V CTRL".
	N/A 2) **IF** CA Pump #1 only source of feedwater, **THEN** maintain steam flow to CA Pump #1 from at least one S/G.
	N/A 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).
	__ 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).
	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)

Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

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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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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).

Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

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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).

Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

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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).

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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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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).

Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

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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).

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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. (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).

Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 13 of 95 Revision 44

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) **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-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).

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Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE	PAGE NO. 14 of 95 Revision 44

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. **CLOSE the following valves on all ruptured S/G(s):** __ • MSIV __ • MSIV bypass valve.	**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. N/A __ 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)
Note to Evaluator: **Operators will not be able to close any of the MSIVs from the control room. Therefore the ruptured S/G can not be isolated from the intact S/Gs requiring a transition to EP/1/A/5000/ ECA-3.1 (SGTR With Loss of Reactor Coolant - Subcooled Recovery Desired).**	

Op Test No.:	301	Scenario #	2	Event #	7,8,9,10	Page	97 of 156

Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	PAGE NO. 3 of 102 Revision 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	**Note to Evaluator:** **Enclosure 1 can be found as Attachment 10 in the back of this document.**
__ 1. **Monitor Enclosure 1 (Foldout Page).**	
2. **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: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	PAGE NO. 4 of 102 Revision 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. **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).
4. **Verify all AC busses energized by offsite power as follows:** • A Train: __ • "FTA B/O NORM FDR FRM ATC" - CLOSED __ • "D/G 1A BKR TO ETA" - OPEN __ • 1ETA - ENERGIZED. • B Train: __ • "FTB B/O NORM FDR FRM ATD" - CLOSED __ • "D/G 1B BKR TO ETB" - OPEN __ • 1ETB - ENERGIZED.	**Perform the following:** __ a. Restore offsite power while continuing with this procedure. **REFER TO** AP/1/A/5500/007 (Loss of Normal Power). b. Start the following equipment: __ • Start all available CRD vent fans __ • Dispatch operator to start available VI compressors.

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Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	PAGE NO. 5 of 102 Revision 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<u>CAUTION</u> **Pzr heaters shall remain off until directed by subsequent steps.**	
__ 5. **Place all Pzr heaters in manual and off.**	
6. **Control ruptured S/G(s) level as follows:**	
__ a. Verify ruptured S/G(s) N/R level - GREATER THAN 11% (29% ACC).	a. Perform the following: __ 1) **<u>IF</u>** any ruptured S/G also faulted, **<u>THEN</u>** do not establish feed flow to ruptured S/G unless needed for NC System cooldown. 2) **<u>IF</u>** any ruptured S/G(s) not faulted **<u>OR</u>** required for cooldown, **<u>THEN</u>** perform the following: __ a) Establish and maintain feed flow to affected S/G(s). __ b) **<u>WHEN</u>** affected S/G(s) N/R level greater than 11% (29% ACC), **<u>THEN</u>** perform Steps 6.b and 6.c. __ 3) **<u>GO TO</u>** Step 7.

CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	PAGE NO. 6 of 102 Revision 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	
b. Isolate feed flow to all ruptured S/G(s) as follows:	
• For 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 to close 1CA-62A (CA Pmp A Disch To S/G 1A Isol) (DH-587, DD-EE, 44-45, Rm 591). __ c) **IF** exterior doghouse not accessible **OR** CA cannot be isolated, **THEN** dispatch operator to unlock and close 1CA-59 (CA Pump 1A Disch To S/G 1A Ctrl Inlet Isol) (AB-551, BB,49-50, Rm 250) (Ladder needed) (Key #633).
__ 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 to close 1CA-66B (CA Pmp 1 Disch To S/G 1A Isol) (DH-584, DD-EE, 44-45, Rm 591). __ c) **IF** exterior doghouse not accessible **OR** CA cannot be isolated, **THEN** dispatch operator to unlock and close 1CA-63 (CA Pump No 1 Disch To S/G 1A Ctrl Inlet Isol) (AB-556, BB-50, Rm 250) (Ladder needed) (Key #633).

CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	PAGE NO. 7 of 102 Revision 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	
• For S/G 1B:	
__ 1) CLOSE 1CA-58A (CA Pmp A Disch To S/G 1B Isol).	1) Perform the following: __ a) CLOSE 1CA-56 (CA Pump 1A Flow To S/G 1B). __ b) Dispatch operator to close 1CA-58A (CA Pmp A Disch To S/G 1B Isol) (DH-586, DD-EE, 52-53, Rm 572). __ c) **IF** interior doghouse not accessible **OR** CA cannot be isolated, **THEN** dispatch operator to unlock and close 1CA-55 (CA Pump 1A Disch To S/G 1B Inlet Isol) (AB-550, DD-52, Rm 250) (Key #633).
__ 2) CLOSE 1CA-54B (CA Pmp 1 Disch To S/G 1B Isol).	2) Perform the following: __ a) CLOSE 1CA-52 (CA Pump #1 Flow To S/G 1B). __ b) Dispatch operator to close 1CA-54B (CA Pmp 1 Disch To S/G 1B Isol) (DH-584, DD-EE, 52-53, Rm 572). __ c) **IF** interior doghouse not accessible **OR** CA cannot be isolated, **THEN** dispatch operator to unlock and close 1CA-51 (CA Pump No 1 Disch To S/G 1B Inlet Isol) (AB-552, DD-52, Rm 250) (Key #633).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	
• For 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 to close 1CA-46B (CA Pmp B Disch To S/G 1C Isol) (DH-586, DD, 53-54, Rm 572). __ c) **IF** interior doghouse not accessible **OR** CA cannot be isolated, **THEN** dispatch operator to unlock and close 1CA-43 (CA Pump 1B Disch To S/G 1C Ctrl Inlet Isol) (AB-552, DD-52, Rm 250) (Key #633).
__ 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 to close 1CA-50A (CA Pmp 1 Disch To S/G 1C Isol) (DH-584, EE-53, Rm 572). __ c) **IF** interior doghouse not accessible **OR** CA cannot be isolated, **THEN** dispatch operator to unlock and close 1CA-47 (CA Pump No 1 Disch To S/G 1C Ctrl Inlet Isol) (AB-552, DD-53, Rm 250) (Key #633).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	
• <u>For S/G 1D</u>:	
__ 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 to close 1CA-42B (CA Pmp B Disch To S/G 1D Isol) (DH-586, DD-EE, 43-44, Rm 591). __ c) <u>IF</u> exterior doghouse not accessible <u>**OR**</u> CA cannot be isolated, <u>**THEN**</u> dispatch operator to unlock and close 1CA-39 (CA Pump 1B Disch To S/G 1D Ctrl Inlet Isol) (AB-551, BB, 49-50, Rm 250) (Ladder needed) (Key #633).
__ 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 to close 1CA-38A (CA Pmp 1 Disch To S/G 1D Isol) (DH-584, DD-EE, 43-44, Rm 591). __ c) <u>IF</u> exterior doghouse not accessible <u>**OR**</u> CA cannot be isolated, <u>**THEN**</u> dispatch operator to unlock and close 1CA-35 (CA Pump No 1 Disch To S/G 1D Ctrl Inlet Isol) (AB-555, BB-50, Rm 250) (Ladder needed) (Key #633).

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ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	
__ c. **IF AT ANY TIME** ruptured S/G(s) N/R level less than 11% (29% ACC), **THEN** perform Step 6.	
7. **Verify criteria to stop operating ND pumps as follows:**	
__ a. Any ND pump - ON.	__ a. **GO TO** Step 7.f.
__ b. Running ND pump suction - ALIGNED TO FWST.	__ b. **GO TO** Step 8.
__ c. NC pressure - GREATER THAN 285 PSIG.	__ c. **GO TO** Step 8.
__ d. NC pressure - STABLE OR TRENDING UP.	__ d. **GO TO** Step 8.
__ e. Stop ND pumps.	
__ f. **IF AT ANY TIME** NC pressure trends down to less than 285 PSIG in uncontrolled manner, **THEN** restart ND pumps.	

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CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	PAGE NO. 11 of 102 Revision 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. **Initiate evaluation of plant status as follows:**	
a. Verify auxiliary building radiation normal as follows: __ • EMF-41 (Aux Bldg Ventilation) trip 1 light - DARK __ • All area monitor EMF trip 1 lights - DARK.	a. Perform the following: __ 1) Monitor OAC EMF alarms, OAC VA Graphic, and area monitor EMFs to determine location of activity. __ 2) Dispatch operator to locate and isolate potential Unit 1 leak.
b. Ensure the following signals - RESET: __ 1) Phase A Containment Isolations. __ 2) KC NC NI NM St signals.	
__ c. **<u>WHEN</u>** TSC activated **<u>AND</u>** staffed, **<u>THEN</u>** notify TSC to perform Enclosure 2 (TSC Actions).	
9. **Verify main steamlines intact as follows:** __ • All S/G pressures - STABLE OR TRENDING UP __ • All S/Gs - PRESSURIZED.	**<u>IF</u> any S/G pressure trending down in uncontrolled manner <u>OR</u> depressurized, <u>THEN</u> perform the following:** __ a. **<u>IF</u>** EP/1/A/5000/E-2 (Faulted Steam Generator Isolation) has been implemented for all faulted S/G(s), **<u>THEN</u> <u>GO TO</u>** Step 10. __ b. **<u>IF</u>** faulted S/G(s) needed for NC System cooldown, **<u>THEN</u> <u>GO TO</u>** Step 10. __ c. **<u>IF</u>** any S/G(s) faulted, **<u>THEN</u> <u>GO TO</u>** EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).

CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	PAGE NO. 12 of 102 Revision 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **Control intact S/G levels as follows:**	
__ a. Verify N/R level in any 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 at least one 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 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 trend up in uncontrolled manner, **THEN** perform the following: __ 1) Stop NC System cooldown. __ 2) **GO TO** EP/1/A/5000/E-3 (Steam Generator Tube Rupture).

Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	PAGE NO. 13 of 102 Revision 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE • TSC will monitor shutdown margin during cooldown. Shutdown margin results are not required prior to initiating 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.	
11. **Initiate NC System cooldown to Cold Shutdown as follows:**	
a. **WHEN** "P-11 PZR S/I BLOCK PERMISSIVE" status light (1SI-18) lit, **THEN** perform the following:	
__ 1) Depress ECCS steam pressure "BLOCK" pushbuttons.	
__ 2) Verify main steam isolation blocked status lights (1SI-13) - LIT.	
N/A b. **IF** ND System in RHR mode, **THEN** initiate cooldown with ND System while maintaining cooldown rate based on NC T-Colds less than 100°F in an hour.	
__ c. Verify "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT.	__ c. **GO TO** Step 11.i.

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CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	PAGE NO. 14 of 102 Revision 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. (Continued)	
__ d. Verify MSIVs on all intact S/Gs - OPEN.	d. Perform the following:
	__ 1) **IF** any S/G faulted, **THEN GO TO** Step 11.i.
	__ 2) **IF** any ruptured S/G MSIV not fully closed, **THEN GO TO** Step 11.i.
	__ 3) **IF** intact S/G MSIVs required closed to isolate leak, **THEN GO TO** Step 11.i.
	4) Reset Main Steam Isolation signal as follows:
	__ a) Ensure manual loaders for all MSIV bypass valves - ADJUSTED TO 0%.
	__ b) Reset SM Isolation.
	__ c) Reset S/G PORVs.
	5) Place steam dumps in pressure mode as follows:
	__ a) Place "STM DUMP CTRL" in manual.
	__ b) Adjust "STM DUMP CTRL" to 0% demand.
	__ c) Place steam dumps in pressure mode.
	(RNO continued on next page)

CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	PAGE NO. 15 of 102 Revision 40

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

6) Perform the following to equalize pressure across MSIVs on intact S/Gs:

__ a) OPEN MSIV bypass valve on intact S/Gs.

__ b) **IF AT ANY TIME** pressure does not equalize as required, **THEN** isolate steam loads off main steam header. **REFER TO** Enclosure 3 (Equalizing Across MSIVs).

7) **WHEN** all intact S/Gs pressure within 50 psig of steam header pressure, **THEN** perform the following:

__ a) OPEN all MSIVs on intact S/Gs.

__ b) CLOSE all MSIV bypass valves.

__ c) Restore any alignments made using Enclosure 3 (Equalizing Across MSIVs).

__ d) **WHEN** "P-12 LO-LO TAVG" status light (1SI-18) lit, **THEN** place steam dump interlock bypass switches in "BYP INTLK".

__ e) Dump steam to condenser while maintaining cooldown rate based on NC T-Colds less than 100°F in an hour.

__ f) **WHEN** condenser dumps established, **THEN** S/G PORVs may be closed.

(RNO continued on next page)

CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	PAGE NO. 16 of 102 Revision 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. (Continued)	
	__ 8) **GO TO** Step 11.i to dump steam using S/G PORVs while pressure equalizing across MSIVs.
__ e. Verify steam dumps - IN PRESSURE MODE.	e. Place steam dumps in pressure mode as follows: __ 1) Place "STM DUMP CTRL" slim station in manual. __ 2) Place steam dumps in pressure mode.
__ f. **WHEN** "P-12 LO-LO TAVG" status light (1SI-18) lit, **THEN** place steam dump interlock bypass switches in "BYP INTLK".	
__ g. Dump steam to condenser while maintaining cooldown rate based on NC T-Colds less than 100°F in an hour. **Critical Task #3**	__ g. **IF** steam cannot be dumped to condenser, **THEN GO TO** Step 11.i.
__ h. **GO TO** Step 11.j.	

CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	PAGE NO. 17 of 102 Revision 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. (Continued)	
__ i. Dump steam from intact S/G(s) PORV while maintaining cooldown rate based on NC T-Colds less than 100°F in an hour.	i. Perform the following: 1) **IF** any intact S/G PORV cannot be operated from Control Room, **THEN** perform the following: __ a) Dispatch operator(s) to operate affected S/G(s) PORV. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 10 (Local Operation of S/G PORVs). __ b) Obtain sound powered phone from storage box on rear wall of Control Room. __ c) Connect sound powered phone to jack on 1MC-11. __ d) Monitor sound powered phone for communication from Doghouse(s). __ e) **IF** 1B **OR** 1C S/G intact and associated S/G PORV unavailable, **THEN** evaluate starting CA Pump #1. 2) **IF** no intact S/G available **AND** ND not in RHR mode, **THEN** contact Station Management to determine which of the following to perform: __ • Use faulted S/G OR __ • Use ruptured S/G.

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CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	PAGE NO. 18 of 102 Revision 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. (Continued)	
__ j. Verify main steam isolation blocked status lights (1SI-13) - LIT.	j. 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.

CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	PAGE NO. 19 of 102 Revision 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. **Determine whether subcooled recovery appropriate as follows:**	
__ a. Verify FWST level - GREATER THAN 62%.	a. Perform the following: __ 1) Determine required Containment Sump level based on existing FWST level. **REFER TO** Enclosure 4 (Adequate Water Inventory). __ 2) **IF AT ANY TIME** Containment Sump level less than required level **OR** transfer to Cold Leg Recirc not available, **THEN GO TO** EP/1/A/5000/ECA-3.2 (SGTR With Loss of Reactor Coolant - Saturated Recovery Desired). __ 3) **IF AT ANY TIME** while in this procedure ruptured S/G(s) N/R level greater than 92% (80% ACC), **THEN** perform Step 12.b RNO. __ 4) **GO TO** Step 13.
__ b. Verify all ruptured S/G(s) N/R level - LESS THAN 92% (80% ACC).	b. Perform the following: __ 1) Consult with Station Management to determine if recovery should be completed using EP/1/A/5000/ECA-3.2 (SGTR With Loss of Reactor Coolant - Saturated Recovery Desired). __ 2) **IF AT ANY TIME** while in this procedure FWST level less than 62%, **THEN** perform Step 12.a RNO. __ 3) **GO TO** Step 13.

Op Test No.:	301	Scenario #	2	Event #	7,8,9,10	Page	114 of 156

Event Description: 1C Steam Generator Tube Rupture / 1C CA Flow Control Valve Failed Open / 1NI-9A & 1NI-10B Fail to Auto Open / MSIVs Fail to Close Manually

CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	PAGE NO. 20 of 102 Revision 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. (Continued) __ c. **<u>IF AT ANY TIME</u>** while in this procedure FWST level less than 62% **<u>OR</u>** ruptured S/G(s) level greater than 92% (80% ACC), **<u>THEN</u>** perform Step 12.	
__ 13. **Verify NC subcooling based on core exit T/Cs - GREATER THAN 0°F.**	__ **<u>GO TO</u> Step 30.**
14. **Verify S/I in service as follows:** __ • Any NI pump - ON OR __ • 1NI-9A (NV Pmp C/L Inj Isol) - OPEN OR __ • 1NI-10B (NV Pmp C/L Inj Isol) - OPEN OR __ • Any ND pump - ON WITH SUCTION ALIGNED TO FWST **<u>OR</u>** CONTAINMENT SUMP.	__ **<u>GO TO</u> Step 24.**

Note to Evaluator:

At this point all Critical Tasks are complete. At the lead evaluators discretion, the scenario may be terminated by having the booth operator place the simulator in FREEZE.

Attachment List

Scenario 1

ATTACHMENT 1 -	Crew Critical Task Summary
ATTACHMENT 2 -	Shift Turnover Information
ATTACHMENT 3 -	AP/0/A/5500/020 Enclosure 1 (Foldout Page)
ATTACHMENT 4 -	AP/1/A/5500/010 Enclosure 1 (Foldout Page)
ATTACHMENT 5 -	AP/1/A/5500/009 Enclosure 1 (Foldout Page)
ATTACHMENT 6 -	EP/1/A/5000/E-0 Enclosure 1 (Foldout Page)
ATTACHMENT 7 -	EP/1/A/5000/E-0 Enclosure 2 (Ventilation System Verification)
ATTACHMENT 8 -	EP/1/A/5000/E-0 Enclosure 4 (NC Temperature Control)
ATTACHMENT 9	EP/1/A/5000/E-3 Enclosure 1 (Foldout Page)
ATTACHMENT 10	EP/1/A/5000/ECA-3.1 Enclosure 1 (Foldout Page)
ATTACHMENT 11 -	Scenario Specific Technical Specifications

ATTACHMENT 1

CREW CRITICAL TASK SUMMARY			
SAT	**UNSAT**	**CT #**	**CRITICAL TASK**
		1	Restore RN flow prior to any NC pump motor bearing temperature reaching 195°F.
		2	Establish high head ECCS flow prior to transition from E-0.
		3	Initiate cooldown at less than 100°F/hour in order to prevent S/G overfill (S/G N/R level $\geq$ 100%.

Comments:

ATTACHMENT 2

SHIFT TURNOVER INFORMATION

Unit 1 Status

Power Level	Power History	NCS Boron	Xenon
75 **%**	MOL	998 PPM	per OAC

Controlling Procedure

- OP/1/A/6100/003 (Controlling Procedure for Unit Operation), Enclosure 4.1 (Power Increase). The steps up to step 3.49 are complete.

Other Information Needed to Assume the Shift

- Unit 1 is at 75% power at the MOL following maintenance of the 1A CFPT LF pumps. 1A CFPT has been placed back in service and current power level is being maintained while maintenance continues to monitor LF system performance.
- Unit 2 is at 100% power.
- Direction for the crew is to swap LCVUs by securing 1A LCVU and starting 1C LCVU using OP/1/A/6450/001 Encl. 4.13. The “NOTE” on page 4 prior to step 3.2.1.5 has been evaluated by the previous shift and a determination has been made that there is no time delay needed prior to starting 1C LCVU.

AOs Available

Eight AOs are available as listed on the status board

METEOROLOGICAL CONDITIONS

- Upper wind direction = 125 degrees, speed = 3 mph
- Lower wind direction = 127 degrees, speed = 4.5 mph
- Forecast calls for clear skies over the next 24 hours.

ATTACHMENT 3

CNS AP/0/A/5500/020	LOSS OF NUCLEAR SERVICE WATER Enclosure 1 - Page 1 of 2 **Foldout Page**	PAGE NO. 71 of 137 Revision 49

1. **SSF Manning Criteria:**

- **<u>IF AT ANY TIME</u>** 1EMXS **<u>OR</u>** 2EMXS de-energized, **<u>THEN</u>** perform the following:

  a. Dispatch operator to align alternate power supply(s). **<u>REFER TO</u>** Enclosure 4 (Align Alternate Power Supply To 1EMXS OR 2EMXS).

  b. Notify operator at SSF (Ext. 5251 or 5212) operator has been dispatched to align alternate power supply to 1EMXS (2EMXS).

<u>CAUTION</u> **Higher KC System temperature due to loss of RN could result in a loss of KC and NV pumps supplying NC pump seal cooling. Failure to restore NC pump seal cooling via thermal barrier cooling or NV seal injection within ten minutes will cause damage to NC pump seals resulting in NC System inventory loss.**

- **<u>IF AT ANY TIME</u>** RN cooling to operating KC Hx lost, **<u>THEN</u>** dispatch operator to SSF to standby at SSF to establish seal injection.

- **<u>IF AT ANY TIME</u>** KC **<u>AND</u>** NV seal cooling for any NC pump lost, **<u>THEN</u>** ensure operator dispatched to SSF to establish NC pump seal injection. **<u>REFER TO</u>** Enclosure 5 (Establishing NC Makeup/Seal Injection From The SSF) for affected Unit(s).

2. **Alternate Cooling to NV Pump Criteria:**

   a. **<u>IF</u>** S/I actuated on either Unit, **<u>THEN</u>** discontinue monitoring this criterion.

   b. **<u>IF</u>** RN **<u>NOT</u>** available to KC, **<u>THEN</u>** perform the following:

   <u>CAUTION</u> **YD can only supply one Unit's NV pump at a time.**

   1) Determine which Unit will receive alternate NV pump cooling from YD.

   2) **<u>IF</u>** Unit 1 selected, **<u>THEN</u>** align alternate YD cooling to 1A NV pump. **<u>REFER TO</u>** Enclosure 8 (Maximize NV Pump 1A Run Time).

   3) **<u>IF</u>** Unit 2 selected, **<u>THEN</u>** align alternate YD cooling to 2A NV pump. **<u>REFER TO</u>** Enclosure 9 (Maximize NV Pump 2A Run Time).

ATTACHMENT 3

CNS AP/0/A/5500/020	LOSS OF NUCLEAR SERVICE WATER Enclosure 1 - Page 2 of 2 **Foldout Page**	PAGE NO. 72 of 137 Revision 49

3. **Spent Fuel Pool Criteria:**

- **IF AT ANY TIME** RN cooling to operating KC Hx lost, **THEN** perform the following:

    a. **IF** either of the following Unit 1 annunciators lit, **THEN** secure KF pump(s) and **REFER TO** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level):

    - 1AD-13, D/6 "KF PUMP A MTR CLR HI TEMP"

      OR

    - 1AD-13, D/7 "KF PUMP B MTR CLR HI TEMP".

    b. **IF** either of the following Unit 2 annunciators lit, **THEN** secure KF pump and **REFER TO** AP/2/A/5500/041 (Loss of Spent Fuel Cooling or Level):

    - 2AD-13, D/6 "KF PUMP A MTR CLR HI TEMP"

      OR

    - 2AD-13, D/7 "KF PUMP B MTR CLR HI TEMP".

ATTACHMENT 4

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. 84 of 164 Revision 62

Case I (Steam Generator Tube Leak) Safety Injection Initiation Criteria:

a. **IF** Pzr level cannot be maintained greater than 4% **OR** Pzr pressure trending down in uncontrolled manner, **THEN** perform the following:

1) Trip Unit 1 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 5

CNS AP/1/A/5500/009	RAPID DOWNPOWER Enclosure 1 - Page 1 of 2 **Foldout Page**	PAGE NO. 30 of 40 Revision 34

1. **Turbine Trip Criteria:**
   - **IF** T-Avg less than T-Ref **AND** trending down in uncontrolled manner, **THEN** perform the following:
     a. **IF** reactor power greater than or equal to 69%, **THEN** trip reactor.
     b. Ensure turbine - TRIPPED.
     c. **IF** reactor tripped, **THEN GO TO** EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).
     d. **GO TO** AP/1/A/5500/002 (Turbine Generator Trip).
   - **IF** any turbine trip parameter reached **OR** automatic turbine trip occurs, **THEN** perform the following:
     a. **IF** reactor power greater than or equal to 69%, **THEN** trip reactor.
     b. Ensure turbine - TRIPPED.
     c. **IF** reactor tripped, **THEN GO TO** EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).
     d. **GO TO** AP/1/A/5500/002 (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 greater than 587°F
     - NC T-Avg stable or trending up.

   OR
   - Any reactor trip setpoint exceeded,

   THEN 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) lit, **THEN** ensure rod control in manual.

ATTACHMENT 5

CNS AP/1/A/5500/009	RAPID DOWNPOWER Enclosure 1 - Page 2 of 2 **Foldout Page**	PAGE NO. 31 of 40 Revision 34

4. **IF AT ANY TIME prompt separation from grid required AND it is desired to carry in-house loads, THEN GO TO Section C. (Operator Actions), Step 26.**

ATTACHMENT 6

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 1 of 3 **Foldout Page**	PAGE NO. 34 of 49 Revision 46

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
     - Reactor power - LESS THAN 5%.

2. **Open Phase Criteria:**

   - **IF** operating NV **AND** KC pumps automatically trip, **THEN** perform the following:

     a. Start the following pumps on opposite train:
        - NV pump
        - KC pumps
        - RN pump.

     b. **IF** pumps do not start, **OR** trip after starting, **THEN** restart pumps on previously operating train.

     c. **IF** all KC pumps off, **THEN** ensure all NC pumps - OFF.

     d. **IF** Unit 2 4160V bus energized by Unit 1 busline, **THEN** immediately notify Unit 2 to perform same actions on Unit 2.

3. **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).

4. **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.

ATTACHMENT 6

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 2 of 3 **Foldout Page**	PAGE NO. 35 of 49 Revision 46

NOTE CA flow control valves fail open on CA auto start. Isolating flow with the motor operated isolation valve will not require re-isolation on subsequent CA auto starts.

5. **Ruptured S/G CA Isolation Criteria:**

- **IF** both the following conditions met, **THEN** stop CA flow to affected S/G(s):
  - Level going up in uncontrolled manner or radiation level in that S/G abnormal
  - N/R level - GREATER THAN 11% (29% ACC).

NOTE CA flow control valves fail open on CA auto start. Isolating flow with the motor operated isolation valve will not require re-isolation on subsequent CA auto starts.

6. **Faulted S/G CA isolation Criteria:**

- **IF** all the following conditions met, **THEN** stop CA flow to affected S/G:
  - S/G pressure trends down in 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).

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 3 of 3 **Foldout Page**	PAGE NO. 36 of 49 Revision 46

7. **NS Pump Trip Criterion:**

- **<u>IF</u>** NS pump in recirc and S/I occurs, **<u>THEN</u>** perform one of the following:
  - **<u>IF</u>** train affected ECCS and D/G load sequencer - RESET, **<u>THEN</u>** stop NS pump

    OR

  - **<u>WHEN</u>** sequencer loading complete, **<u>THEN</u>** 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. **<u>IF AT ANY TIME</u>** B/O occurs, **<u>THEN</u>** restart S/I equipment previously on.

8. **<u>IF AT ANY TIME</u> KC cooling to operating KF pump(s) lost, <u>THEN</u> perform the following:**

- **<u>IF</u>** annunciator 1AD-13, D/6 "KF PUMP A MTR CLR HI TEMP" lit, **<u>THEN</u>** secure 1A KF pump and **<u>REFER TO</u>** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).
- **<u>IF</u>** annunciator 1AD-13, D/7 "KF PUMP B MTR CLR HI TEMP" lit, **<u>THEN</u>** secure 1B KF pump and **<u>REFER TO</u>** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).

ATTACHMENT 7

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 1 of 6 **Ventilation System Verification**	PAGE NO. 37 of 49 Revision 46

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. **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).
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. **IF** chlorine odor detected in Control Room, **THEN** perform the following based on the status of given alarms: 1) **IF** detectors on both unit intakes in alarm, **THEN** 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) **GO TO** Step 1.d. (RNO continued on next page)

ATTACHMENT 7

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 2 of 6 **Ventilation System Verification**	PAGE NO. 38 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. (Continued)	
	2) **IF** Unit 1 intake HI chlorine detector(s) in alarm, **THEN** 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) **GO TO** Step 1.d.
	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).	

ATTACHMENT 7

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 3 of 6 **Ventilation System Verification**	PAGE NO. 39 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

1. (Continued)

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.

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 7

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 7

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 7

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 6 of 6 **Ventilation System Verification**	PAGE NO. 42 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 4. **Record time ventilation systems verified on following table:**

TIME	SYSTEM (VC, VE)	INITIALS

ATTACHMENT 8

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 1 of 5 **NC Temperature Control**	PAGE NO. 44 of 49 Revision 46

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 8

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 TRENDING UP IN AN UNCONTROLLED MANNER OR • NC temperature - GREATER THAN 557°F AND STABLE OR • NC temperature - LESS THAN 557°F AND TRENDING DOWN IN UNCONTROLLED MANNER.	
8. **Verify NC temperature - LESS THAN 557°F AND TRENDING DOWN.**	**Perform the following:** a. **IF** NC temperature greater than 557°F **AND** trending up, **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.

ATTACHMENT 8

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. **Attempt to stop 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.	
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.

ATTACHMENT 8

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

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 5 of 5 **NC Temperature Control**	PAGE NO. 48 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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 9

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE Enclosure 1 - Page 1 of 2 **Foldout Page**	PAGE NO. 71 of 95 Revision 44

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):

     1) Start one or more S/I pumps.

     2) 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 trending down in 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 lowers 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 9

CNS EP/1/A/5000/E-3	STEAM GENERATOR TUBE RUPTURE Enclosure 1 - Page 2 of 2 **Foldout Page**	PAGE NO. 72 of 95 Revision 44

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 trends up in 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 10

CNS EP/1/A/5000/ECA-3.1	SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED Enclosure 1 - Page 1 of 1 **Foldout Page**	PAGE NO. 67 of 102 Revision 40

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 as necessary to restore subcooling and Pzr level:

     - 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).

2. **Secondary Integrity Criteria:**

   - **IF** any unisolated S/G pressure trending down in 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.

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

   - **IF** FWST level lowers 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).

5. **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.

ATTACHMENT 11

Event #2
1B RN Pump Trip

3.7 PLANT SYSTEMS

3.7.8 Nuclear Service Water System (NSWS)

LCO 3.7.8 Two NSWS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ------------NOTE------------ Not applicable while in Condition C of this LCO unless entry is directed by Note 2 of Condition C. ------------------------------- One NSWS train inoperable.	A.1 ------------NOTES------------ 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources—Operating," for emergency diesel generator made inoperable by NSWS. 2. Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops—MODE 4," for residual heat removal loops made inoperable by NSWS. ------------------------------- Restore NSWS train to OPERABLE status.	72 hours

(continued)

ATTACHMENT 11

Event #2
1B RN Pump Trip

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. -----------NOTES----------- 1. Entry into this Condition shall only be allowed for pre-planned activities as described in the Bases of this Specification. 2. Immediately enter Condition A of this LCO if one or more NSWS components become inoperable while in this Condition and one NSWS train remains OPERABLE. 3. Immediately enter LCO 3.0.3 if one or more NSWS components become inoperable while in this Condition and no NSWS train remains OPERABLE. ------------------------------- One NSWS supply header inoperable due to NSWS being aligned for single supply header operation.	B.1 Restore NSWS supply header to OPERABLE status.	30 days

(continued)

ATTACHMENT 11

Event #2

1B RN Pump Trip

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. -----------NOTES----------- 1. Entry into this Condition shall only be allowed for Unit 1 and for pre-planned activities as described in the Bases of this Specification. Entry into this Condition shall not be allowed while Unit 2 is in MODE 1, 2, 3, or 4. 2. Immediately enter Condition A of this LCO if one or more Unit 1 required NSWS components become inoperable while in this Condition and one NSWS train remains OPERABLE. 3. Immediately enter LCO 3.0.3 if one or more Unit 1 required NSWS components become inoperable while in this Condition and no NSWS train remains OPERABLE. -------------------------------- One NSWS train inoperable due to NSWS being aligned for single Auxiliary Building discharge header operation.	C.1 Restore NSWS train to OPERABLE status.	14 days

(continued)

ATTACHMENT 11

Event #2
1B RN Pump Trip

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. -----------NOTES----------- 1. Entry into this Condition shall only be allowed for pre-planned activities. 2. Immediately enter Condition A of this LCO if one or more NSWS components become inoperable while in this Condition and one NSWS train remains OPERABLE. 3. Immediately enter LCO 3.0.3 if one or more NSWS components become inoperable while in this Condition and no NSWS train remains OPERABLE. 4. Entry into this Condition shall only be allowed for 60 days per 12-month period. -------------------------------- One NSWS Pond return header inoperable due to NSWS being aligned for single Pond return header operation.	D.1 Restore NSWS Pond return header to OPERABLE status.	30 days

(continued)

ATTACHMENT 11

Event #2

1B RN Pump Trip

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time of Condition A, B, C, or D not met.	E.1 Be in MODE 3. AND E.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.8.1	-----NOTE----- Isolation of NSWS flow to individual components does not render the NSWS inoperable. ---------- Verify each NSWS manual, power operated, and automatic valve in the flow path servicing safety related equipment, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.7.8.2	-----NOTE----- Not required to be met for valves that are maintained in position to support NSWS single supply header operation, single Auxiliary Building discharge header operation, or single Pond return header operation. ---------- Verify each NSWS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.7.8.3	Verify each NSWS pump starts automatically on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program

Event #2
1B RN Pump Trip

3.7 PLANT SYSTEMS

3.7.11 Control Room Area Chilled Water System (CRACWS)

LCO 3.7.11 Two CRACWS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6,
During movement of recently irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CRACWS train inoperable.	A.1 Restore CRACWS train to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, 3, or 4.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours
C. Required Action and associated Completion Time of Condition A not met in MODE 5 or 6, or during movement of recently irradiated fuel assemblies.	C.1 Place OPERABLE CRACWS train in operation. OR C.2 Suspend movement of recently irradiated fuel assemblies.	Immediately Immediately

(continued)

ATTACHMENT 11

Event #2

1B RN Pump Trip

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Two CRACWS trains inoperable in MODE 5 or 6, or during movement of recently irradiated fuel assemblies.	D.1 Suspend movement of recently irradiated fuel assemblies.	Immediately
E. Two CRACWS trains inoperable in MODE 1, 2, 3, or 4.	E.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.11.1 Verify the control room temperature is $\leq$ 90°F.	In accordance with the Surveillance Frequency Control Program

ATTACHMENT 11

Event #4
1C S/G Tube Leak

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.13 RCS Operational LEAKAGE

LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

a. No pressure boundary LEAKAGE;

b. 1 gpm unidentified LEAKAGE;

c. 10 gpm identified LEAKAGE; and

d. 150 gallons per day (Unit 1) and 45 gallons per day (Unit 2) primary to secondary LEAKAGE through any one steam generator (SG).

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE.	A.1 Reduce LEAKAGE to within limits.	4 hours
B. Required Action and associated Completion Time of Condition A not met. OR Pressure boundary LEAKAGE exists. OR Primary to secondary LEAKAGE not within limit.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

ATTACHMENT 11

Event #4
1C S/G Tube Leak

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.13.1	-----NOTES----- 1. Not required to be performed until 12 hours after establishment of steady state operation. 2. Not applicable to primary to secondary LEAKAGE. ---------- Verify RCS Operational LEAKAGE within limits by performance of RCS water inventory balance.	------NOTE------ Only required to be performed during steady state operation ---------- In accordance with the Surveillance Frequency Control Program
SR 3.4.13.2	-----NOTE----- Not required to be performed until 12 hours after establishment of steady state operation. ---------- Verify primary to secondary LEAKAGE is $\leq$ 150 gallons per day (Unit 1) and $\leq$ 45 gallons per day (Unit 2) through any one SG.	--------NOTE-------- Only required to be performed during steady state operation ---------- In accordance with the Surveillance Frequency Control Program

ATTACHMENT 11

Event #4
1C S/G Tube Leak

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.18 Steam Generator (SG) Tube Integrity

LCO 3.4.18 SG tube integrity shall be maintained.

AND

All SG tubes satisfying the tube plugging criteria shall be plugged in accordance with the Steam Generator Program.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

--NOTE--
Separate Condition entry is allowed for each SG tube.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more SG tubes satisfying the tube plugging criteria and not plugged in accordance with the Steam Generator Program.	A.1 Verify tube integrity of the affected tube(s) is maintained until the next inspection.	7 days
	AND	
	A.2 Plug the affected tube(s) in accordance with the Steam Generator Program.	Prior to entering MODE 4 following the next refueling outage or SG tube inspection

(continued)

ATTACHMENT 11

Event #4

1C S/G Tube Leak

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met. OR SG tube integrity not maintained.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.4.18.1	Verify SG tube integrity in accordance with the Steam Generator Program.	In accordance with the Steam Generator Program
SR 3.4.18.2	Verify that each inspected SG tube that satisfies the tube plugging criteria is plugged in accordance with the Steam Generator Program.	Prior to entering MODE 4 following a SG tube inspection

ATTACHMENT 11

Event #4
1C S/G Tube Leak

16.7 INSTRUMENTATION

16.7-9 Standby Shutdown System (SSS)

COMMITMENT The SSS shall be FUNCTIONAL.

APPLICABILITY: MODES 1, 2, and 3.

REMEDIAL ACTIONS

---NOTE---
SLC 16.2.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SSS non-functional.	A.1 Restore SSS to FUNCTIONAL status.	7 days
B. Total accumulative LEAKAGE from unidentified LEAKAGE, identified LEAKAGE, and reactor coolant pump seal LEAKAGE > 20 gpm.	B.1 Declare the standby makeup pump non-functional and enter Condition A.	Immediately
C. A required cell in a 24-Volt battery bank is < 1.36 volts on float charge.	C.1 Enter Condition A.	Immediately
D. Required Action and associated Completion Time of Condition A not met.	D.1 Prepare and submit a Special Report to the NRC outlining the extent of repairs required, schedule for completing repairs, and basis for continued operation.	14 days

ATTACHMENT 11

Event #4
1C S/G Tube Leak

TESTING REQUIREMENTS

TEST		FREQUENCY
TR 16.7-9-1	Verify that the electrolyte level of each SSS diesel starting 24-Volt battery is $\geq$ the low mark and $\leq$ the high mark.	7 days
TR 16.7-9-2	Verify that the overall SSS diesel starting 24-Volt battery voltage is $\geq$ 24 volts on float charge.	7 days
TR 16.7-9-3	Verify that the requirements of SLC 16.9-21 are met and the boron concentration in the storage pool is $\geq$ the minimum specified in the COLR.	7 days
TR 16.7-9-4	Verify the fuel level in the SSS diesel generator fuel storage tank is $\geq$ 67 inches.	31 days
TR 16.7-9-5	Verify the SSS diesel generator starts from ambient conditions and operates for $\geq$ 30 minutes at $\geq$ 700 kW.	31 days
TR 16.7-9-6	Verify that the electrolyte level of each SSS 250/125-Volt battery is above the plates.	31 days
TR 16.7-9-7	Verify the total SSS 250/125-Volt battery terminal voltage is $\geq$ 258/129 volts on float charge.	31 days
TR 16.7-9-8	Perform CHANNEL CHECK of each SSS instrumentation device.	31 days
TR 16.7-9-9	Verify the fuel oil properties of new and stored fuel oil for the SSS diesel generator are tested in accordance with, and maintained within the limits of, the Diesel Fuel Oil Testing Program.	In accordance with the Diesel Fuel Oil Testing Program
TR 16.7-9-10	Verify that the individual battery cell voltage of the required cells in the SSS diesel starting 24-Volt battery is $\geq$ 1.36 volts on float charge.	92 days

(continued)

ATTACHMENT 11

Event #4
1C S/G Tube Leak

TESTING REQUIREMENTS (continued)

TEST		FREQUENCY
TR 16.7-9-11	Verify that the Standby Makeup Pump's developed head at the test flow point is ≥ the required developed head, in accordance with the Inservice Testing Program.	92 days
TR 16.7-9-12	Verify that the specific gravity of the SSS 250/125-Volt battery is appropriate for continued service of the battery.	92 days
TR 16.7-9-13	Subject the SSS diesel generator to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for the class of service.	18 months
TR 16.7-9-14	Verify that the SSS diesel starting 24-Volt batteries, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration.	18 months
TR 16.7-9-15	Verify that the SSS diesel starting 24-Volt battery-to-battery and terminal connections are clean, tight, and free of corrosion.	18 months
TR 16.7-9-16	Verify that the SSS 250/125-Volt batteries, cell plates, and battery racks show no visual indications of physical damage or abnormal deterioration.	18 months
TR 16.7-9-17	Verify that the SSS 250/125-Volt battery-to-battery and terminal connections are clean, tight, free of corrosion, and coated with anti-corrosion material.	18 months
TR 16.7-9-18	Verify that the steam turbine driven auxiliary feedwater pump and controls from the Standby Shutdown Facility function as designed from the SSS.	18 months
TR 16.7-9-19	Perform CHANNEL CALIBRATION of each SSS instrumentation device.	18 months

(continued)

ATTACHMENT 11

Event #4

1C S/G Tube Leak

TESTING REQUIREMENTS (continued)

TEST		FREQUENCY
TR 16.7-9-20	Verify proper installation of pressurizer insulation.	18 months
TR 16.7-9-21	Verify pressurizer heaters powered from the SSS have a capacity of ≥ 65 kW measured at motor control center SMXG.	18 months
TR 16.7-9-22	Verify flowpath from the reactor vessel head through the valves powered from the SSS is unobstructed.	18 months

BASES

The SSS is designed to mitigate the consequences of certain postulated fire, security, and station blackout incidents by providing capability to maintain MODE 3 conditions and by controlling and monitoring vital systems from locations external to the main control room. This capability is consistent with the requirements of 10 CFR Part 50.48(c).

When the SSS is under Condition A and it is anticipated that Condition D will be utilized, establish the bases for continued operation (including any supporting actions) prior to entering Condition D. Risks associated with the continued operation under Condition D are evaluated and managed through existing processes and procedures. These risk contributors, risk insights, risk-informed information, and/or risk mitigation actions assessed and managed during periods when Condition D is applied, are to be included in the 14-day special report.

The TESTING REQUIREMENTS ensure that the SSS systems and components are capable of performing their intended functions. The required level in the SSS diesel generator fuel storage tank ensures sufficient fuel for 72 hours uninterrupted operation. It is assumed that, within 72 hours, either offsite power can be restored or additional fuel can be added to the storage tank.

Although the standby makeup pump is not nuclear safety related and was not designed according to ASME Code requirements, it is tested quarterly to ensure its FUNCTIONALITY. The TESTING REQUIREMENT concerning the standby makeup pump water supply ensures that an adequate water volume is available to supply the pump continuously for 72 hours.

Total accumulative LEAKAGE is calculated in the NC System Leakage Calculation procedure as identified + unidentified + seal leakoff (References 2 and 3). The REMEDIAL ACTION limit of 20 gpm total accumulative LEAKAGE provides additional margin to allow for

BASES (continued)

instrument inaccuracy, and for the predicted increase in seal leakoff rate due to heatup of the reactor coolant pump seal injection water supply temperature following the SSS event (due to spent fuel pool heatup). Following the increase in seal injection temperature, the standby makeup pump flow of 26 gpm is sufficient to provide in excess of this total accumulative LEAKAGE, thereby assuring that reactor coolant system inventory is maintained at MODE 3 conditions. The supporting evaluation is provided in CNC-1223.04-00-0072 (Ref. 4).

A visual inspection of the diesel starting 24-volt batteries, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. Since the battery cell jars are not transparent, a direct visual inspection of the cell plates cannot be performed. Instead, the cell plates are inspected for physical damage and abnormal deterioration by: 1) visually inspecting the jar sides of each cell for excessive bowing and/or deformation, and 2) visually inspecting the electrolyte of each cell for abnormal appearance.

Verifying individual cell voltage while on float charge for the SSS diesel starting 24-Volt batteries ensures that each cell is capable of supporting its intended function. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery (or battery cell) and maintain the battery (or battery cell) in a fully charged state. The battery cell voltage limit of 1.36 volts is consistent with the nominal design voltage of the battery and is based on the manufacturer's recommended minimum float charge voltage for a fully charged cell with adequate capacity. The 24-Volt starting battery is designed with two battery banks, each battery bank contains 20 individual battery cells. The 24-Volt starting battery has sufficient capacity margin to maintain SSS diesel starting functionality with one cell in each battery bank to be fully degraded with a voltage < 1.36 volts. The 24-Volt starting battery is required to have 19 individual battery cells per battery bank to maintain SSS diesel starting functionality with sufficient capacity margin. The battery sizing calculation accounts for one degraded cell in each battery bank by assuming the degraded cells undergo a worst case polarity reversal during SSS diesel starting. The supporting evaluation is provided in CNC-1381.06-00-0056 (Ref.12).

Verification of proper installation of pressurizer insulation ensures that pressurizer heat losses during an SSS event do not exceed the capacity of the pressurizer heaters powered from the SSS.

Testing of the pressurizer heater capacity ensures the full capacity of the heaters is available to maintain a steam bubble in the pressurizer during an SSS event. The acceptance criterion includes an allowance for the voltage drop in the power cables between the SSS and the pressurizer.

ATTACHMENT 11

Event #4

1C S/G Tube Leak

BASES (continued)

Testing of the flowpath from the reactor vessel head to the pressurizer relief tank ensures sufficient flow capacity for reactor coolant inventory control during an SSS event.

REFERENCES

1. Letter from NRC to Gary R. Peterson, Duke, Issuance of Improved Technical Specifications Amendments for Catawba, September 30, 1998.
2. PT/1(2)/A/4150/001D, NC System Leakage Calculation.
3. PT/1(2)/A/4150/001I, Manual NC Leakage Calculation.
4. CNC-1223.04-00-0072, Reactor Coolant Pumps No. 1 Seal Leakoff Annunciator Alarm Setpoint for Unit 1 and Unit 2.
5. CNS-1560.SS-00-0001, Design Basis Specification for the Standby Shutdown Facility.
6. Catawba Technical Specification Amendments 206/200, July 10, 2003.
7. Catawba UFSAR, Section 18.2.4.
8. Catawba License Renewal Commitments, CNS-1274.00-00-0016, Section 4.5.
9. CNC-1223.03-00-0033, Determination of Pressurizer Heater Capacity Powered from the SSF Diesel.
10. Catawba Nuclear Station 10 CFR 50.48(c) Fire Protection Safety Evaluation (SE).
11. 10 CFR 50.48(c), Fire Protection.
12. CNC-1381.06-00-0056, SSF Diesel Generator Battery Sizing Calculation.

2021 INITIAL LICENSE NRC EXAM
SCENARIO # 3

Facility:	Catawba NRC Exam 2021	Scenario No.: 3	Op Test No.: 2021301
Examiners:		Operators:	SRO
			RO
			BOP

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

Turnover: Unit 1 is at 100% power at the BOL. Unit 2 is at 100% power. 1B CA Pump is removed from service for PMs. 1B CA Pump has been inoperable for 3 hours and is expected to be returned to service in 6 hours. Tech Spec 3.7.5 Condition B is in effect. Direction for the crew is to initiate a downpower to ~85% in preparation for performing the Turbine Control Valve Movement PT.

Event No.	Malf. No.	Event Type*	Event Description
1		R – RO N – BOP N – SRO	Unit 1 Downpower to ~85%
2		C – BOP C – SRO	1NV-294 fails open
3		C – RO C – SRO TS – SRO	1NC-32B fails open, able to be manually closed
4		C – BOP C – SRO TS – SRO	1ETA Blackout (D/G does not start)
5		C – RO C – SRO	Continuous rod motion / 2 stuck rods on reactor trip
6**		M – ALL	CAPT#1 Overspeed Trip / Loss of CFPT Vacuum / Loss of Heat Sink
7		C – BOP C – SRO	1NV-37A failed closed

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

** During the loss of heat sink event, the crew attempted and successfully started the 1A Turbine Driven Main Feed Pump. The pump started and came up to rated turbine speed. It was expected that the Turbine Driven Feed Pumps would not RESET due to low vacuum conditions and it was not the success path written into the scenario. To drive the crew to depressurize SGs and to feed the SG's with the Condensate System, the operating booth tripped the 1A Turbine Main Feed Pump by inserting a low vacuum signal. When the crew attempted the 1B Turbine Main Feed Pump, it would not reset due to the low vacuum signal. The crew then proceeded to SG depressurization and feeding with the Condensate system. The allowance of the Main Feed Pump start with a C-9, low vacuum condition is under evaluation by the licensee training and simulator personnel.

Scenario 3 – Summary

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

Turnover:
Unit 1 is at 100% power at the BOL. Unit 2 is at 100% power. 1B CA Pump is removed from service for PMs. 1B 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 downpower to ~85% in preparation for performing the Turbine Control Valve Movement PT.

Event 1
Unit 1 downpower to ~85%. BOP will perform a boration per OP/1/A/6150/009 (Boron Concentration Control) Encl. 4.2 (Boration). RO will input a target load and load rate into the Main Turbine control panel and initiate the downpower per OP/1/B/6300/001 (Turbine Generator).

Event History: This downpower at BOL has not been performed before.

Event 2
1NV-294 (Charging flow control valve) will fail full open.

Verifiable Action – BOP will place 1NV-294 in manual and will manually control charging flow to stabilize Pressurizer Level.

Event History: This failure has not been used before on an NRC exam.

Event 3
Pressurizer PORV 1NC-32B fails open. RO will manually close 1NC-32B. Crew will enter AP/1/A/5500/011 (Pressurizer Pressure Anomalies) Case 1 (Pressurizer Pressure Decreasing). SRO will refer to Tech Specs.

Verifiable Action – RO will manually close 1NC-32B.

Event History: This Pressurizer PORV failure last used on 17(1), but was not able to be manually closed.

Event 4
A Blackout will occur on essential bus 1ETA. D/G 1A will fail to start resulting in no power on 1ETA. Crew will enter AP/1/A/5500/007 (Loss of Normal Power) Case 2 (Loss of All Power to an Essential Train) to address the failure. SRO will refer to Tech Specs.

Verifiable Action – The BOP will start an RN pump and KC pumps on 'B' train on Unit 1. RO will maintain reactor power.

Event History: This failure has not been used before on an NRC exam.

Event 5
Control rods will begin to insert continuously. RO will perform the immediate actions of AP/1/A/5500/015 (Rod Control Malfunctions) Case II (Continuous Rod Movement) and trip the Unit 1 reactor.

Verifiable Action – RO will perform the immediate actions of AP/1/A/5500/015 (Rod Control Malfunctions) Case 2 (Continuous Rod Movement), and manually trip Unit 1 Reactor. During the reactor trip, 2 control rods will fail to fully insert. This will require the BOP to initiate emergency boration in EP/1/A/5000/ES-0.1 (Reactor Trip Response) to maintain shutdown margin.

Event History: Continuous rod movement last used in 16 (3). Having 2 stuck rods on reactor trip last used in 19 (1).

Event 6
Following reactor trip, the crew will enter EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) and subsequently transition to EP/1/A/5000/ES-0.1 (Reactor Trip Response). CAPT#1 will eventually trip on overspeed. Once S/G N/R levels lower to < 11% in all S/Gs, crew will transition to EP/1/A/5000/FR-H.1 (Loss of Secondary Heat Sink). Following reactor trip, both CFPTs will lose vacuum.

Verifiable Action – BOP will trip the NC pumps and RO will depressurize S/Gs to allow feed flow to be provided to the S/Gs via Hotwell and Condensate Booster Pumps.

Event History: Similar failure was last used in 16 (2). Loss of CFPT vacuum failure last used in 19 (1) but was prior to the reactor trip.

Event 7
When step is reached in FR-H.1 to initiate NC system depressurization, Auxiliary Spray Valve 1NV-37A will not open.

Verifiable Action – BOP will use a Pressurizer PORV to lower NC system pressure.

Event History: This failure was last used in 16 (2).

Manual Control of Automatic Functions		
Event	**Position**	**Description**
2	BOP	1NV-294 Failing open requiring manual control of Pressurizer Level

***Critical Task 1* – Control charging line flow to prevent a reactor trip on Pressurizer Hi level (2/3 Pressurizer Levels $\geq$ 92%).**

***Critical Task 2* – Close Pressurizer PORV prior to a manual or automatic reactor trip on Pressurizer low pressure.**

***Critical Task 3* – Establish feedwater flow to at least one S/G before NC feed and bleed is required (<24% W/R level in 3 out of 4 S/G).**

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)	2
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 # 152 and load schedule file for NRC Scenario 3

START TIME: __________

✓	✓	Trigger	Instructor Action	Final	Delay	Ramp	Delete In	Event
			LOA-CA018 (RACKOUT CA PUMP 1B)	RACK-OUT				
		2	MAL-NV012E (NV VLV 294 FAIL OPEN)	ACTIVE				2
		9	MAL-NV012E (NV VLV 294 FAIL OPEN)	ACTIVE			:01	2
		4	MAL-EP008A (LOSS OF 4160V BUS ETA)	ACTIVE				4
		3	ANN-AD19-F04 (YN CRITICAL TROUBLE)	ON			:05	3
		11	VLV-NC005F (NC32B PZR PORV FAIL TO POSITION)	1		:05		3
		13	VLV-NC005F (NC32B PZR PORV FAIL TO POSITION)	1			:01	3
		5	OVR-IRX005B (SEL SW – CRD BANK SELECT MAN POS)	ON				5
		5	OVR-IRX006A (ROD MOTION SW IN POS)	ON				5
		14	MAL-IRX015K8 (PERMANENTLY STUCK ROD K8-38A)	130				5
		14	MAL-IRX015D4 (PERMANENTLY STUCK ROD D4)	220				5
		14	MAL-CA005 (CA PUMP OVERSPEED TRIP)	MECH-ANICAL	1:00			6
		14	MAL-EHC002 (TURBINE TRIP FAILURE)	AUTO			:06	6
		14	MAL-CF001A (LOSS OF CFPT 1A VACUUM)	100				7
		14	MAL-CF001B (LOSS OF CFPT 1B VACUUM)	100				
			VLV-NV014F (NV37A PRZR SPRAY LINE ISOL VLV FAIL TO POSITION)	0				8
		5	OVR-IRX005A (SEL SW – CRD BANK SELECT AUTO POS)	OFF				5
		Ensure red cover placed on 1B CA Pump						
		Ensure EVENT 9 = ov_d9mod111slimbytes(7) (1NV-294 Manual PB)						
		Ensure EVENT 11 = x5ri017a (AD-19 Alarm Acknowledge PB)						
		Ensure EVENT 13 = x10i279c						
		Ensure EVENT 14 = jpplp4(1) | jpplp4(2) (Reactor Trip Either Train)						
		Ensure 1B NV pump is in service						

		Ensure control rods are in MANUAL

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 2**, 1NV-294 Fails Open

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 2** to cause 1NV-294 to fail open.

✓	BOOTH INSTRUCTOR ACTION
	IF the SWM is contacted to initiate an NCR or W/R for 1NV-294, **REPEAT** the information.

3.3 **Scenario EVENT 3**, YN Critical Trouble Alarm / Pressurizer PORV 1NC-32B fails open

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 3** to cause a YN critical trouble alarm.

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

3.4 **Scenario EVENT 4**, 1ETA blackout

✓	BOOTH INSTRUCTOR ACTION
	WHEN directed by the lead examiner, **THEN INSERT SIMULATOR Trigger 4** to cause a blackout of 1ETA.

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

✓	BOOTH INSTRUCTOR ACTION
	IF contacted as an AO to perform a load shed of 1ETA per Enclosure 8, wait 5 minutes and then run schedule file to load shed 1ETA.
	After 5 minutes contact the Control Room crew and **REPORT**: • "Load Shed of 1ETA per Enclosure 8 is complete. There is an 86N relay picked up on 1ETA."

3.5 **Scenario EVENT 5**, Continuous Rod Motion / 2 Stuck Rods on Reactor Trip

✓	BOOTH INSTRUCTOR ACTION
	WHEN control rods begin to insert, **THEN ENSURE SIMULATOR Trigger 5 INSERTED** to cause control rods to continuously insert.

3.6 **Scenario EVENTs 6, 7, 8**, CAPT#1 Overspeed Trip / Loss of Secondary Heat Sink / Loss of CFPT vacuum / 1NV-37A failed closed

Event Description: Unit 1 Power Decrease

Note To Evaluator:

The scenario begins with a power decrease from 100% 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.

Enclosure 4.2

Boration

OP/1/A/6150/009
Page 1 of 6

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.

1.4 Due to Electromagnetic Interference within the Unit 1 Reactor Makeup Control System, the Unit 1 Boric Acid Counter may sporadically count up during dilution activities. OFF indications for the Boric Acid Xfer Pumps and Closed indication for valve 1NV-238A can be used by the Reactor Operators to validate that sporadic counts are indication only. (NCR 02081372).

2. Initial Conditions

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

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

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

AA 2.4 **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. 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.)

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

Enclosure 4.2

Boration

OP/1/A/6150/009
Page 2 of 6

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 AT ANY TIME** it is desired to divert letdown to the RHT manually operate 1NV-172A (3-Way Divert To VCT-RHT) as follows:

____ 3.10.1 Place the control switch for 1NV-172A (3-Way Divert To VCT-RHT) to the "RHT" position.

____ 3.10.2 Ensure VCT level is monitored continuously while diverting to the RHT.

NOTE:	Procedure may continue while performing the following step.

3.10.3 **WHEN** desired VCT level is reached return 1NV-172A (3-Way Divert To VCT-RHT) to auto as follows:

____ 3.10.3.1 Place the control switch for 1NV-172A (3-Way Divert To VCT-RHT) in the "VCT" position.

____ 3.10.3.2 Place the control switch for 1NV-172A (3-Way Divert To VCT-RHT) in the "AUTO" position.

____ 3.11 **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.

Enclosure 4.2
Boration

OP/1/A/6150/009
Page 3 of 6

_____ 3.12 **IF AT ANY TIME** while boration is in progress it becomes necessary **OR** it is desired to stop the boration, perform the following:

_____ 3.12.1 Place the "NC MAKEUP CONTROL" switch to the "STOP" position.

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

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

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

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

☐ 3.12.4.1 Determine remaining volume to be added by subtracting the amount previously added (Step 3.12.3) from the desired volume to be added (Step 3.5).

__________ - __________ = ___________ gallons
(Step 3.5) (Step 3.12.3)

_____ 3.12.4.2 Adjust boric acid counter to the volume of boric acid determined in Step 3.12.4.1. (R.M.)

_____ 3.12.4.3 Place the "NC MAKEUP CONTROL" switch in the "START" position. (R.M.)

_____ 3.12.4.4 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

_____ 3.12.4.5 **IF** in "AUTO", verify the boric acid pump starts.

_____ 3.13 **WHILE** makeup is in progress, monitor the following for expected results:

☐ Control rod motion
☐ NC System Tavg
☐ Reactor Power

Enclosure 4.2

Boration

OP/1/A/6150/009
Page 4 of 6

NOTE:	If a small makeup is being performed, placekeeping for Steps 3.14 through 3.17 may be performed after Step 3.18 is performed.

_____ 3.14 Place the "NC MAKEUP CONTROL" switch to the "START" position. (R.M.)

_____ 3.15 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

_____ 3.16 IF in "AUTO", verify the boric acid transfer pump starts.

☐ 3.17 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.

3.18 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)

Enclosure 4.2
Boration

OP/1/A/6150/009
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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 3.19 **IF** desired, flush the makeup line as follows:

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

_____ 3.19.2 Place controller for 1NV-242A (RMWST To B/A Blender Ctrl) in manual.

_____ 3.19.3 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 3.19.4, 3.19.5, and 3.19.6 may be performed prior to signing off the steps.

3.19.4 Open the following valves:

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

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

_____ 3.19.5 Ensure one reactor makeup water pump is in "ON".

NOTE:	Valves in the following step shall be positioned as sequenced to preclude unanticipated additional reactor makeup water flow due to seat leak by on 1NV-186A.

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

_____ 3.19.6.1 1NV-242A (RMWST To B/A Blender Ctrl)

_____ 3.19.6.2 1NV-186A (B/A Blender Otlt To VCT Otlt)

3.19.7 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)

_____ 3.19.8 Ensure controller for 1NV-242A (RMWST To B/A Blender Ctrl) is set to the value recorded in Step 3.19.1. (R.M.)

_____ 3.19.9 Place controller for 1NV-242A (RMWST To B/A Blender Ctrl) in auto.

Enclosure 4.2

Boration

OP/1/A/6150/009
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_____ 3.19.10 **IF NOT** required for current plant operation, place the reactor makeup water pump started in Step 3.19.5 in "AUTO".

_____ 3.20 **IF** automatic makeup is desired, perform one of the following:

AA 3.20.1 **IF** it is desired to change the blender outlet boron concentration, refer to Enclosure 4.1 (Automatic Makeup).

OR

_____ 3.20.2 **IF** makeup at the previous concentration is acceptable **AND** the system was previously aligned per Enclosure 4.1 (Automatic Makeup), perform the following:

_____ 3.20.2.1 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.)

_____ 3.20.2.2 Place the "NC MAKEUP MODE SELECT" switch in "AUTO".

_____ 3.20.2.3 Place the "NC MAKEUP CONTROL" switch to the "START" position. (R.M.)

3.21 Do **NOT** file this enclosure.

Enclosure 4.16
Control Bank Manual Operation At Power

OP/1/A/6150/008
Page 1 of 2

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

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

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

AA 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

Enclosure 4.16
Control Bank Manual Operation At Power

OP/1/A/6150/008
Page 2 of 2

3. Procedure

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

AA 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)

AA 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.

AA 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.

Enclosure 4.2
Load Changing

OP/1/B/6300/001
Page 1 of 6

1. Limits and Precautions

1.1 This procedure is Reactivity Management related because it controls activities that can effect reactivity. (R.M.)

1.2 Low load operation limits:

1.2.1 The unit can be operated continuously at low loads when exhaust hood temperature is < 175°F. The load shall, however, be increased slowly until the temperature decreases below 125°F before increasing load at normal rate (Multipoint Recorder on 1MC3).

1.2.2 Excessive use of the exhaust hood sprays shall be avoided to prevent accelerated blade erosion.

1.3 Do **NOT** exceed the load, hydrogen pressure, and power factor limits per the Unit One Revised Data Book Figure 43.

1.4 If the limits of the Unit One Revised Data Book Figure 43 (Generator Capability Curves) are exceeded, the Turbine Generator shall be tripped.

1.5 Under certain environmental conditions, indicated condenser vacuum less than 24.3 inches Hg may be reached at full load. Exhaust hood temperatures are a more accurate indicator of true vacuum. It is recommended the turbine **NOT** be operated under the following conditions at full load:

- Exhaust Hood 1A temperature ≥ 136°F
- Exhaust Hood 1B temperature ≥ 129°F
- Exhaust Hood 1C temperature ≥ 124.5 °F

1.6 The maximum differential pressure between adjacent LP shell pressures shall **NOT** exceed 2.0 inches Hg. (main condenser vacuum gauges on 1MC13, OAC points C1P1669 (D/P between A & B Condensers) and C1P1670 (D/P between B & C Condensers) or Main Condenser graphic (CMCOND)).

1.7 A sudden downward trend on an LP turbine's lower extraction temperature shall be investigated as a possible indication of water induction into the turbine. This is indicated on the recorder on the rear of 1MC8 labeled "TURBINE WATER DETECTION", using any of the LP 8th stage lower temperatures.

1.8 A "LOAD RATE" > "6.2 MW/MIN" shall **NOT** be used during normal load changes.

Enclosure 4.2 OP/1/B/6300/001

Load Changing Page 2 of 6

1.9 Differential temperature between adjacent exhaust hoods shall **NOT** exceed 30°F unless evaluated and approved by the responsible engineer (Turbine Generator System Expert). (OAC points C1P1667 (A & B Exhaust Hoods Metal Delta Temp) and C1P1668 (B & C Exhaust Hoods Metal Delta Temp) or Main Condenser graphic (CMCOND)).

1.10 The Main Turbine OIU Work Station has the capability to perform control functions for the Main Turbine, including tripping and resetting of the turbine. If a control function window is inadvertently selected while manipulating the Main Turbine OIU Work Station, the window shall be closed to prevent actuation of the control function.

1.11 To reduce potential for Turbine rubs at low power levels (< 30% Turbine Load) observe the following:

- Steam Seal Header Pressure between 3 and 5 psig.
- Gland Steam Condenser Header vacuum of 10 - 12" H_2O vacuum.
- Condenser Vacuum < 28.0" Hg
- Minimize time that Turbine is at speed no load.
- Minimize time between Turbine Shell Warming and rolling the Turbine.

1.12 Exhaust hood water sprays are used to cool the last-stage buckets and to minimize temporary distortion of the low-pressure hood and shell structures. These sprays have a significant potential for quenching the LP turbine structure, and if they are applied manually should be undertaken very gradually. Large and rapid changes in the temperature of the exhaust hood can also have an impact on bearing alignment and may cause a rub to develop. Excessive use of the sprays may cause unnecessary erosion of the long last-stage buckets during low flow conditions.

2. Initial Conditions

AA Verify Turbine Generator is On Line per Enclosure 4.1 (Turbine Generator Startup).

Enclosure 4.2
Load Changing

OP/1/B/6300/001
Page 3 of 6

3. Procedure

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. 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.
4. 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 the curve in the Unit One OAC Databook "Load-Changing Recommendations".

NOTE:
- Several of the parameters required for this procedure can be found on OAC graphics, and a list of all OAC points are found on Enclosure 4.8 (Turbine Generator Roll Computer Points).
- Step 3.1 and Step 3.2 may be performed in any order.

N/A 3.1 **IF** increasing turbine generator load, perform the following:

_____ 3.1.1 Ensure the proper reactivity management controls established per AD-OP-ALL-0203 (Reactivity Management). (R.M.)

_____ 3.1.2 **WHILE** increasing Turbine Generator load, perform the following:

_____ 3.1.2.1 **IF AT ANY TIME** Turbine load is < 30%, operate the RC system pumps and fans as required per OP/1/B/6400/001 A (Condenser Circulating Water System) to maintain vacuum in Condenser C < 28" Hg.

_____ 3.1.2.2 **IF** applicable, verify Groups B and C valves on Enclosure 4.6 (Valve Checklist) close at 15% of full load (184 MWe, 107 psig Turbine Impulse Pressure).

_____ 3.1.2.3 **IF** applicable, verify the following valves close at 15% of full load (184 MWe, 107 psig Turbine Impulse Pressure):

☐ 1SM-21 (Ctrl Vlv #2 Stm Lead Drn)

☐ 1SM-29 (Ctrl Vlv #1 Stm Lead Drn)

Enclosure 4.2 OP/1/B/6300/001

Load Changing Page 4 of 6

_____ 3.1.2.4 **IF** applicable, **WHEN** CV3 comes off of its fully closed seat (65% of full load, 796 MWe), verify 1SM-25 (Ctrl Vlv #3 Stm Lead Drn) closes.

_____ 3.1.2.5 **IF** applicable, **WHEN** CV4 comes off of its fully closed seat (92% of full load, 1127 MWe), verify 1SM-33 (Ctrl Vlv #4 Stm Lead Drn) closes.

CAUTION:

1. Until it is recognized that the first stage shell metal temperature change rate stays below the allowable limit (150°F/hr), the following loading rate shall **NOT** be exceeded:
   - 1/2%/min - First Stage Inner Shell Temperature (1MC3 or OAC point C1A1140 (Turbine Lower Inner Shell Temp)) ≤ 350°F
   - 1%/min - First Stage Inner Shell Temperature (1MC3 or OAC point C1A1140 (Turbine Lower Inner Shell Temp)) > 350°F
2. Normal steady-state load changes shall be made without exceeding the limits shown on Enclosure 4.7 (Generator Operating Limits) and in the Unit 1 OAC Databook "Recommended Startup and Loading Curves".
3. Unit One Reactor Operating Data, Section 2.4 shall be referred to for allowable ramp rates. A "LOAD RATE" > 6.2 MW/MIN shall **NOT** be used during normal load changes.

3.1.3 Increase turbine generator load by performing the following:

_____ 3.1.3.1 Select "LOAD RATE" and verify it illuminates.

_____ 3.1.3.2 Input the desired load rate.

_____ 3.1.3.3 Select "ENTER" and verify "LOAD RATE" goes dark.

_____ 3.1.3.4 Select "TARGET" and verify it illuminates.

_____ 3.1.3.5 Input the desired load target.

_____ 3.1.3.6 Select "ENTER" and verify "TARGET" light goes dark.

_____ 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.

Op Test No.: 301 Scenario # 3 Event # 1 Page 23 of 121

Event Description: Unit 1 Power Decrease

Enclosure 4.2
Load Changing

OP/1/B/6300/001
Page 5 of 6

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:

AA 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 AT ANY TIME** Turbine load is < 30%, operate the RC system pumps and fans as required per OP/1/B/6400/001 A (Condenser Circulating Water System) to maintain vacuum in Condenser C < 28" Hg.

_____ 3.2.2.2 **IF** CV4 fully closes (92% of full load, 1127 MWe), verify 1SM-33 (Ctrl Vlv #4 Stm Lead Drn) opens.

_____ 3.2.2.3 **IF** CV3 fully closes (65% of full load, 796 MWe), verify 1SM-25 (Ctrl Vlv #3 Stm Lead Drn) opens.

Enclosure 4.2
Load Changing

OP/1/B/6300/001
Page 6 of 6

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 NOT file a copy of this enclosure in the designated storage cabinet.

Note to Evaluator:

At this time the power decrease is in progress. At the discretion of the Lead Evaluator, the scenario may continue to the next event by instructing the booth operator to INSERT Trigger 2 (1NV-294 Fails Open).

Op Test No.:	301	Scenario #	3	Event #	2	Page	25 of 121
Event Description:	Charging Control Valve 1NV-294 Fails Open						

Control Room Indications
DCS alarm for 1NV-294 being full open
Pressurizer Level – RISING

Note To Evaluator:

The failing open of 1NV-294 will initially only cause a DCS alarm. The crew should notice the rise in charging line flow. The crew should place 1NV-294 in manual and set a control band for Pressurizer Level for the BOP to maintain. Preventing Pressurizer Level from raising above 92% is Critical Task #1. Once the BOP has control of 1NV-294, and Pressurizer Level is trending towards reference level, the scenario may continue at the discretion of the lead evaluator by having the booth operator INSERT Trigger 3 (YN Critical Trouble alarm). When this alarm is acknowledged on 1AD-19, Pressurizer PORV 1NC-32B will fail open.

B/9

PZR HI LEVEL

SETPOINT: 70% level

ORIGIN:

Instrument	DCS	Description
1NCLT5160	1NCAA5165	PZR LEVEL CH 1
1NCLT5150	1NCAA5155	PZR LEVEL CH 2
1NCLT5170	1NCAA5179	PZR LEVEL CH 3

PROBABLE CAUSE:

NOTE: PZR press and level channels have common reference legs. PZR press Ch. 3 and 4 share a reference leg with PZR level Ch. 3 and PZR level cold cal. PZR press Ch. 1 shares a reference leg with PZR level Ch. 1 and PZR press Ch. 2 shares a reference leg with PZR level Ch. 2.

1. Charging and/or letdown flow mismatch
2. Load transient condition

AUTOMATIC ACTIONS: None

IMMEDIATE ACTIONS:

1. Ensure charging and letdown flows are correcting the high level.

SUPPLEMENTARY ACTIONS:

1. Refer to OP/1/A/6200/001 (Chemical and Volume Control System) for controlling letdown and/or charging and increasing letdown.
2. IF charging and letdown are NOT correcting the hi level, establish excess letdown per OP/1/A/6200/001 (Chemical and Volume Control System).
3. IF a channel malfunction has occurred, perform the following:
   3.1 Refer to TS 3.3.1-1 for required number of channels.
   3.2 Initiate a work request to have the channel repaired.
4. Refer to TS 3.4.9.

CONTINUED ON THE NEXT PAGE

Op Test No.:	301	Scenario #	3	Event #	2	Page	27	of	121

Event Description: Charging Control Valve 1NV-294 Fails Open

Op Test No.:	301	Scenario #	3	Event #	3	Page	28 of 121

Event Description: YN Critical Trouble alarm / Pressurizer PORV 1NC-32B Fails Open

Control Room Indications
1AD-6, C/13 “PORV NC-32B ACTUATED” – LIT
1AD-6, F/8 “PZR LO PRESS CONTROL” – LIT
Pressurizer Pressure – LOWERING

Op Test No.:	301	Scenario #	3	Event #	3	Page	29 of 121
Event Description:	YN Critical Trouble alarm / Pressurizer PORV 1NC-32B Fails Open						

CNS AP/1/A/5500/011	PRESSURIZER PRESSURE ANOMALIES Case I Pressurizer Pressure Trending Down	PAGE NO. 2 of 10 Revision 25

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. **Operator Actions** __ 1. **Verify all Pzr PORVs - CLOSED.** Critical Task #2	**Perform the following:** __ a. CLOSE Pzr PORV(s). N/A b. **IF** any Pzr PORV cannot be closed, **THEN**: __ 1) CLOSE affected PORV(s) isolation valve. 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 #	3	Event #	3	Page	30 of 121

Event Description: YN Critical Trouble alarm / Pressurizer PORV 1NC-32B Fails Open

CNS AP/1/A/5500/011	PRESSURIZER PRESSURE ANOMALIES Case I Pressurizer Pressure Trending Down	PAGE NO. 3 of 10 Revision 25

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE Control rods may withdraw on NC pressure trending down.	
__ 2. **Verify Pzr spray valve(s) - CLOSED.**	**Perform the following:** __ a. CLOSE **malfunctioning** 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".
N/A 3. **IF NC pressure continues to trend down due to malfunctioning spray valve, THEN perform the following:** 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).	

Op Test No.:	301	Scenario #	3	Event #	3	Page	31	of 121

Event Description: YN Critical Trouble alarm / Pressurizer PORV 1NC-32B Fails Open

CNS AP/1/A/5500/011	PRESSURIZER PRESSURE ANOMALIES Case I Pressurizer Pressure Trending Down	PAGE NO. 4 of 10 Revision 25

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 4. **Verify all Pzr heaters - ENERGIZED.**	**Perform the following:** __ a. **IF** Pzr pressure less than 2220 PSIG **AND** stable or trending down, **THEN** ensure all Pzr heaters energized. __ b. **IF** Pzr pressure less than 2220 PSIG **AND** trending up, **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.
__ 5. **Ensure 1NV-37A (NV Supply To Pzr Aux Spray) - CLOSED.**	

NOTE Positive reactivity is inserted during a rise in NC pressure which may cause auto rod insertion.

__ 6. **Verify NC pressure - STABLE OR TRENDING UP.**	__ **IF pressure continues to trend down, THEN REFER TO AP/1/A/5500/010 (Reactor Coolant Leak).**
7. **WHEN NC pressure stable, THEN perform the following:** __ • 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.	

Op Test No.:	301	Scenario #	3	Event #	3	Page	32 of 121

Event Description: YN Critical Trouble alarm / Pressurizer PORV 1NC-32B Fails Open

CNS AP/1/A/5500/011	PRESSURIZER PRESSURE ANOMALIES Case I Pressurizer Pressure Trending Down	PAGE NO. 5 of 10 Revision 25

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
N/A 8. **<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 #	3	Event #	3	Page	33	of 121

Event Description: YN Critical Trouble alarm / Pressurizer PORV 1NC-32B Fails Open

CNS AP/1/A/5500/011	PRESSURIZER PRESSURE ANOMALIES Case I Pressurizer Pressure Trending Down	PAGE NO. 6 of 10 Revision 25

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

9. **Ensure compliance with appropriate Tech Specs:**
   - __ 3.3.1 (Reactor Trip System (RTS) Instrumentation)
   - __ 3.3.2 (Engineered Safety Features Actuation System (ESFAS) Instrumentation)
   - __ 3.3.3 (Post Accident Monitoring (PAM) Instrumentation)
   - __ 3.3.4 (Remote Shutdown System)
   - __ 3.4.1 (RCS Pressure, Temperature, and Flow Departure From Nucleate Boiling (DNB) Limits)
   - __ 3.4.4 (RCS Loops - MODES 1 and 2)
   - __ 3.4.5 (RCS Loops - MODE 3)
   - __ 3.4.6 (RCS Loops - MODE 4)
   - __ 3.4.9 (Pressurizer)
   - __ 3.4.10 (Pressurizer Safety Valves)
   - __ 3.4.11 (Pressurizer Power Operated Relief Valves (PORVs))
   - __ 3.4.13 (RCS Operational Leakage).

TECH SPEC EVALUATION

See Attachment 10 for applicable Tech Specs.

T.S. 3.4.11

Condition A: Close and maintain power to applicable block valve in 1 hour.

__ 10. **Determine long term plant status. <u>RETURN TO</u> procedure in effect.**

<u>END</u>

Note to Evaluator:

At the discretion of the Lead Evaluator, the scenario may continue to the next event by instructing the booth operator to INSERT Trigger 4 (Blackout of 1ETA).

Op Test No.:	301	Scenario #	3	Event #	4	Page	34	of	121
Event Description:	1ETA Blackout with failure of 1A D/G to start								

Control Room Indications
Multiple alarms for annunciator panel 1AD-11 – LIT
Alarms associated with RN and KC low flows – LIT
‘A’ train essential equipment indications – DARK

Op Test No.:	301	Scenario #	3	Event #	4	Page	35 of 121
Event Description:	1ETA Blackout with failure of 1A D/G to start						

CNS AP/1/A/5500/007	LOSS OF NORMAL POWER Case II Loss of All Power to an Essential Train	PAGE NO. 24 of 280 Revision 86

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. <u>Operator Actions</u>	**Note to Evaluator:** **Enclosure 1 can be found as Attachment 3 in the back of this document.**
__ 1. **Monitor Enclosure 1 (Foldout Page).**	
2. **Verify essential loads powered from energized train as follows:**	
__ a. RN pump(s) - IN SERVICE AS NEEDED.	__ a. Ensure pump(s) placed in service as required.
__ b. KC pump(s) - IN SERVICE AS NEEDED.	b. Perform the following: __ 1) Ensure pump(s) placed in service as required. 2) <u>**IF AT ANY TIME**</u> all the following conditions exist: __ • Unit 1 in Mode 5, 6 or No Mode __ • Loss of KC pumps due to blackout <u>**AND**</u> energized train KC HX <u>**NOT**</u> available __ • KC cross train cooling alignment desired, <u>**THEN**</u> concurrently perform the following: __ • Continue in this procedure <u>**AND**</u> __ • Place KC in cross train cooling alignment. <u>**REFER TO**</u> Enclosure 39 (KC Cross Train Cooling).
__ c. At least one NV pump - ON.	__ c. <u>**REFER TO**</u> AP/1/A/5500/012 (Loss of Charging or Letdown).

CNS AP/1/A/5500/007	LOSS OF NORMAL POWER Case II Loss of All Power to an Essential Train	PAGE NO. 25 of 280 Revision 86

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. (Continued)	
__ d. CA pump - ON.	__ d. **IF** CA pump required to maintain S/G levels, **THEN** ensure pump(s) placed in service as required.
__ e. Ensure KC Hx outlet mode switches - PROPERLY ALIGNED.	
__ f. VC/YC chiller - ON.	__ f. **REFER TO** OP/0/A/6450/011 (Control Room Area Ventilation/Chilled Water System).
__ 3. **Verify CA Pump #1 - ON.**	N/A __ **IF CA Pump #1 required to maintain S/G levels, THEN start CA Pump #1.**
4. **Maintain reactor power as follows:**	
__ • Maintain reactor power less than or equal to 100%	
__ • **IF** reactor power less than 100% prior to loss of power, **THEN** maintain reactor power stable at current power level.	
__ 5. **Verify Emergency D/G on affected bus - RUNNING.**	__ **GO TO Step 7.**

CNS AP/1/A/5500/007	LOSS OF NORMAL POWER Case II Loss of All Power to an Essential Train	PAGE NO. 26 of 280 Revision 86

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 6. **Verify RN cooling to affected Emergency D/G.**	**Perform the following for affected D/G:** • D/G 1A: __ a. Depress and hold D/G "OFF" pushbutton. __ b. Dispatch operator to open 1EDE-F01F (Diesel Generator Load Sequencer Panel 1DGLSA) (AB-577, BB-46, Rm 496). __ c. **<u>WHEN</u>** 1EDE-F01F (Diesel Generator Load Sequencer Panel 1DGLSA) open, **<u>THEN</u>** release D/G "OFF" pushbutton. OR • D/G 1B: __ a. Depress and hold D/G "OFF" pushbutton. __ b. Dispatch operator to open 1EDF-F01F (Diesel Generator Load Sequencer Panel 1DGLSB) (AB-560, BB-46, Rm 372). __ c. **<u>WHEN</u>** 1EDF-F01F (Diesel Generator Load Sequencer Panel 1DGLSB) open, **<u>THEN</u>** release D/G "OFF" pushbutton.

Op Test No.:	301	Scenario #	3	Event #	4	Page	38 of 121

Event Description: 1ETA Blackout with failure of 1A D/G to start

CNS AP/1/A/5500/007	LOSS OF NORMAL POWER Case II Loss of All Power to an Essential Train	PAGE NO. 27 of 280 Revision 86

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE The affected essential bus is the de-energized essential bus. If ESPS is energizing an essential bus then the opposite bus should be load shed.

7. **Dispatch operator with screwdriver to load shed affected essential bus as follows:**
   - __ **REFER TO** Enclosure 8 (Local Load Shed Of 1ETA)

   OR

   - __ **REFER TO** Enclosure 9 (Local Load Shed Of 1ETB).

__ 8. **Verify operating RN pump(s) flow - LESS THAN 23,000 GPM.**
   - RNO: __ **REFER TO AP/0/A/5500/020 (Loss of Nuclear Service Water).**

__ 9. **Stop any dilutions in progress.**

10. **Verify S/I status as follows:**
    - __ a. S/I - HAS ACTUATED.
      - RNO: __ a. **GO TO** Step 11.
    - __ b. **GO TO** Step 12.

Op Test No.:	301	Scenario #	3	Event #	4	Page	39 of 121
Event Description:	1ETA Blackout with failure of 1A D/G to start						

CNS AP/1/A/5500/007	LOSS OF NORMAL POWER Case II Loss of All Power to an Essential Train	PAGE NO. 28 of 280 Revision 86

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. **Verify ND System status as follows:**	
__ a. ND System - ALIGNED IN RESIDUAL HEAT REMOVAL MODE.	__ a. **<u>GO</u> <u>TO</u>** Step 12.
__ b. At least one ND pump - ON.	__ b. **<u>REFER</u> <u>TO</u>** AP/1/A/5500/019 (Loss of Residual Heat Removal System).

Op Test No.:	301	Scenario #	3	Event #	4	Page	40 of 121
Event Description:	1ETA Blackout with failure of 1A D/G to start						

CNS AP/1/A/5500/007	LOSS OF NORMAL POWER Case II Loss of All Power to an Essential Train	PAGE NO. 29 of 280 Revision 86

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. (Continued)	
__ c. 1AD-11, K/3 "4KV B/O BUS FTA VOLTAGE LO" - DARK.	c. Perform the following: **NOTE** Both ND Hx Bypass valves fail closed on loss of 1LXI (1FTA). 1) **IF** ND pump 1A operating in Residual Heat Removal Mode, **THEN** perform the following: __ a) Place "PWR DISCON FOR 1NI173A" in "THROT". __ b) THROTTLE 1NI-173A (ND Hdr 1A To Cold Legs C&D) to stabilize NC temperature. __ c) **WHEN** 1AD-11, K/3 "4KV B/O BUS FTA VOLTAGE LO" dark, **THEN** return 1NI-173A to normal alignment. 2) **IF** ND pump 1B operating in Residual Heat Removal Mode, **THEN** perform the following: __ a) Place "PWR DISCON FOR 1NI178B" in "THROT". __ b) THROTTLE 1NI-178B (ND Hdr 1B To Cold Legs A&B) to stabilize NC temperature. __ c) **WHEN** 1AD-11, K/3 "4KV B/O BUS FTA VOLTAGE LO" dark, **THEN** return 1NI-178B to normal alignment.
__ 12. **Ensure CA System - RESET.**	

Op Test No.:	301	Scenario #	3	Event #	4	Page	41 of 121

Event Description: 1ETA Blackout with failure of 1A D/G to start

CNS AP/1/A/5500/007	LOSS OF NORMAL POWER Case II Loss of All Power to an Essential Train	PAGE NO. 30 of 280 Revision 86

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. **Control S/G levels as follows:**	
__ a. Verify CF flow - MAINTAINING STABLE S/G LEVELS.	a. Perform the following: __ 1) **REFER TO** Enclosure 15 (S/G Level Control). __ 2) **GO TO** Step 14.
__ b. **IF AT ANY TIME** CF flow control to S/Gs lost, **THEN** perform Step 13.	

CAUTION **Battery depletion may occur as early as two hours. Battery depletion results in affected CA control valves failing full open. Failure to take local control of S/G level prior to battery depletion may result in S/G overfill.**

__ c. **IF AT ANY TIME** any vital or auxiliary control channel battery charger de-energized for greater than 1 hour, **THEN** dispatch operators to control affected CA flow path. **REFER TO** Enclosure 15 (S/G Level Control).

CNS AP/1/A/5500/007	LOSS OF NORMAL POWER Case II Loss of All Power to an Essential Train	PAGE NO. 31 of 280 Revision 86

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 14. **Verify "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT.**	**To prevent overpressurizing condenser perform the following:** a. Dispatch operator to close the following valves: __ • 1SA-22 (Main Steam To CSAE) (TB1-594, 1M-32) __ • 1SA-27 (Aux Steam To CSAE) (TB-594, 1M-27). b. **WHEN** notified by dispatched operator SA supplies closed, **THEN** perform the following: __ 1) OPEN "COND A-B-C VAC BKR VLVS". 2) **IF** power not available to operate "COND A-B-C VAC BKR VLVS", **THEN** dispatch operator to open the following valves: __ • 1CM-368 (1A Main Cond Shell Vacuum Bkr) (TB1-600,1F-26) (Ladder needed) __ • 1CM-369 (1B Main Cond Shell Vacuum Bkr) (TB1-603, 1F-24) (Ladder needed) __ • 1CM-370 (1C Main Cond Shell Vacuum Bkr) (TB1-605, 1F-22) (Ladder needed). __ 3) **WHEN** time permits, **THEN** dispatch operator to complete breaking condenser vacuum. **REFER TO** OP/1/B/6300/006 (Main Vacuum). __ 4) Shutdown steam seals. **REFER TO** OP/1/B/6300/005 (Steam Seal System).

CNS AP/1/A/5500/007	LOSS OF NORMAL POWER Case II Loss of All Power to an Essential Train	PAGE NO. 32 of 280 Revision 86

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15. **Control charging as follows:**	
__ a. Maintain charging flow less than 180 GPM.	
__ b. Adjust charging flow as necessary to maintain Pzr level in program band.	
16. **Control letdown as follows:**	
__ a. Verify normal letdown - IN SERVICE.	a. Perform the following: __ 1) Attempt to restore letdown. **REFER TO** AP/1/A/5500/012 (Loss of Charging or Letdown). __ 2) **WHEN** normal letdown established, **THEN** place additional letdown orifice in service as necessary to control Pzr level. __ 3) **GO TO** Step 17.
__ b. Place additional letdown orifice in service as necessary to control Pzr level.	

NOTE Identifying tripped relays to the DEC TOP (Transmission Operations) will aid the power restoration.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 17. **Determine and correct cause of blackout.**	
__ 18. **Verify VI pressure - GREATER THAN 85 PSIG AND STABLE.**	__ **REFER TO AP/0/A/5500/022 (Loss of Instrument Air).**

CNS AP/1/A/5500/007	LOSS OF NORMAL POWER Case II Loss of All Power to an Essential Train	PAGE NO. 33 of 280 Revision 86

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
N/A __ 19. **IF Spent Fuel Pool instrumentation failed, THEN dispatch operator to monitor Unit 1 Spent Fuel Pool conditions. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 24 (Local Spent Fuel Pool Monitoring).**	
	CAUTION **Failure to disconnect battery prior to voltage less than 105 VDC will result in damage to battery.**
__ 20. **Verify all Vital and Aux Control Power DC busses - ALIGNED TO OPERATING CHARGER.**	__ **IF any Vital or Aux Control Power DC bus energized solely from its battery, THEN REFER TO AP/1/A/5500/029 (Loss of Vital or Aux Control Power).**

NOTE The following step is for pre-staging FLEX equipment. If both essential busses become de-energized, then FLEX equipment will be in place and ready to be aligned to plant equipment when required.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
N/A __ 21. **IF only one Emergency D/G available and supplying an essential bus concurrent with loss of offsite power, THEN notify Shift Manager to initiate pre-staging FLEX equipment. REFER TO EP/1/A/5000/ECA-0.0 (Loss of All AC Power), Enclosure 45 (ELAP FSG Implementation) for implementation criteria, priority, and time limit considerations.**	

CNS AP/1/A/5500/007	LOSS OF NORMAL POWER Case II Loss of All Power to an Essential Train	PAGE NO. 34 of 280 Revision 86

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

22. **Ensure compliance with appropriate Tech Specs:**
   - __ • 3.4.9 (Pressurizer)
   - __ • 3.8.1 (AC Sources - Operating)
   - __ • 3.8.2 (AC Sources - Shutdown)
   - __ • 3.8.4 (DC Sources - Operating)
   - __ • 3.8.5 (DC Sources - Shutdown)
   - __ • 3.8.7 (Inverters - Operating)
   - __ • 3.8.8 (Inverters - Shutdown)
   - __ • 3.8.9 (Distribution Systems - Operating)
   - __ • 3.8.10 (Distribution Systems - Shutdown)
   - __ • 3.7.7 (Component Cooling Water (CCW) System).
   - __ • 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 Exhaust System (ABFVES)).

TECH SPEC EVALUATION

See Attachment 10 for applicable Tech Specs.

T.S. 3.8.9

Condition A: Restore Electrical Power distribution subsystem to OPERABLE in 8 hours AND 16 hours from discovery of failure to meet the LCO.

T.S. 3.7.5

Condition C: Be in Mode 3 in 6 hours AND be in Mode 4 in 12 hours.

23. **Determine required notifications:**
   - __ • **REFER TO** AD-EP-ALL-0111 (Control Room Activation of the ERO)
   - __ • **REFER TO** AD-LS-ALL-0006 (Notification/Reportability Evaluation).

Event Description: 1ETA Blackout with failure of 1A D/G to start

CNS AP/1/A/5500/007	LOSS OF NORMAL POWER Case II Loss of All Power to an Essential Train	PAGE NO. 35 of 280 Revision 86

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 24. **Verify all 6.9 KV busses - ENERGIZED.**	**Perform the following:** **NOTE** SSF D/G is placed in service to maintain SSF batteries charged and Security equipment in service. __ a. **IF AT ANY TIME** offsite power not restored within 1 hour, **THEN** dispatch operator to place SSF D/G in service. **REFER TO** Enclosure 24 (Energize 1SLXG). __ b. **IF AT ANY TIME** IPB fans expected to be off greater than 48 hours, **THEN** notify TSC and Engineering to evaluate moisture accumulation in IPB ductwork prior to energizing 6.9 KV busses. __ c. Concurrently continue with Case II (Loss of All Power to an Essential Train) **AND** perform applicable steps of Case III. **REFER TO** Case III (Loss of All 6.9 KV Busses).
25. **Do not continue in this procedure until the following satisfied:** __ • Status of all lockout relays determined __ • Station Management approved power restoration to affected bus.	

Note to Evaluator:

At the discretion of the Lead Evaluator, the scenario may continue to the next event by instructing the booth operator to INSERT Trigger 5 (Continuous Rod Movement).

Op Test No.:	301	Scenario #	3	Event #	5	Page	47 of 121

Event Description: Control Rods Insert Continuously / Two Rods Fail to Insert on Reactor Trip

Control Room Indications
Control Rods – INSERTING with no demand
NC System Tavg – LOWERING

Event Description: Control Rods Insert Continuously / Two Rods Fail to Insert on Reactor Trip

CNS AP/1/A/5500/015	ROD CONTROL MALFUNCTIONS Case II Continuous Rod Movement	PAGE NO. 8 of 10 Revision 17

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

C. Operator Actions

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 1. **Ensure "CRD BANK SELECT" switch - NOT IN AUTO.**	
__ 2. **Verify all rod motion - STOPS.**	**Perform the following:** __ a. Trip reactor. __ b. **GO TO** EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).

NOTE For T-Ref failures, T-Ref will need to be determined for current power level.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 3. **Adjust control rods as necessary to maintain T-Avg within 1°F of T-Ref.**	**Adjust the following as necessary to maintain T-Avg within 1°F of T-Ref:** __ • Turbine load __ • NC System boron concentration.

Op Test No.:	301	Scenario #	3	Event #	6,7,8	Page	49 of 121
Event Description:	CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed						

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 4 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	**Note to Evaluator:** **Enclosure 1 can be found as Attachment 4 in the back of this document.**
__ 1. **Monitor Enclosure 1 (Foldout Page).**	
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 perform the following:
__ • I/R power - TRENDING DOWN.	__ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees)
Note to Evaluator: **Emergency boration for the 2 stuck rods will be performed in ES-0.1 step 8.b.**	__ • 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 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 the following valves: __ • All MSIVs __ • All MSIV bypass valves.

Op Test No.:	301	Scenario #	3	Event #	6,7,8	Page	50 of 121
Event Description:	CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed						

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 5 of 49 Revision 46

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).

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION	PAGE NO. 6 of 49 Revision 46

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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 perform the following: • **IF** 1ETA **OR** 1ETB de-energized, **THEN** ensure the following pumps running on energized bus: __ • NV pump __ • KC pumps __ • RN pump. __ • 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.
__ 6. **Announce "Unit 1 Safety Injection".**	

Op Test No.:	301	Scenario #	3	Event #	6,7,8	Page	52 of 121
Event Description:	CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed						

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 2 of 41 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

C. Operator Actions

Note to Evaluator:

Enclosure 1 can be found as Attachment 5 in the back of this document.

__ 1. **Monitor Enclosure 1 (Foldout Page).**

2. **Verify the following:**

- __ All 6.9 KV busses - ENERGIZED
- __ VI pressure - GREATER THAN 85 PSIG.

RESPONSE NOT OBTAINED:

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.

(RNO continued on next page)

Event Description: CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 3 of 41 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2. (Continued)

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%.

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).**

Note to Evaluator:

Enclosure 2 can be found as Attachment 6 in the back of this document.

5. **Determine required notifications:**

__ • **REFER TO** AD-EP-ALL-0111 (Control Room Activation of the ERO)

__ • **REFER TO** AD-LS-ALL-0006 (Notification/Reportability Evaluation).

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 4 of 41 Revision 48

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.

Op Test No.:	301	Scenario #	3	Event #	6,7,8	Page	55 of 121

Event Description: CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 5 of 41 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **Verify feedwater status as follows:**	
__ a. T-Avg - LESS THAN 564°F.	a. Perform the following: __ 1) **WHEN** T-Avg less than 564°F, **THEN** perform Steps 7.b and 7.c. __ 2) **GO TO** Step 7.c.
__ b. All Feedwater Isolation status lights (1SI-5) - LIT.	b. Perform the following: __ 1) Initiate Feedwater Isolation. __ 2) **IF** any status light remains dark, **THEN** 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% **OR** total feed flow greater than 450 GPM using one of the following: __ • CA pumps OR __ • Main Feedwater System. **REFER TO** OP/1/A/6250/001 (Condensate and Feedwater System).

Op Test No.: 301	Scenario # 3	Event # 6,7,8	Page 56 of 121				
Event Description:	CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed						

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 6 of 41 Revision 48

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) <u>**IF**</u> 1NV-236B will not open, <u>**THEN**</u> dispatch operator to open 1NV-236B (Boric Acid To NV Pumps Suct) (AB-550, HH-JJ, 53-54, Rm 234). c) <u>**WHEN**</u> 1NV-236B open, <u>**THEN**</u> perform the following: __ (1) Start boric acid transfer pumps. __ (2) Calculate required injection time based on boric acid flowrate. __ (3) <u>**WHEN**</u> required boric acid injected, <u>**THEN**</u> secure emergency boration. __ 2) Notify Reactor Group Duty Engineer to perform analysis to determine required shutdown margin. __ 3) <u>**GO TO**</u> Step 8.c.

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 7 of 41 Revision 48

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 254 PPM for each rod not fully inserted as follows:
	__ a) OPEN 1NV-236B (Boric Acid To NV Pumps Suct).
	N/A 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).
Note to Evaluator: Crew should calculate approximately 2850 gallons of boric acid need to be added to the NC system. At ~100 GPM, boric acid will need to be added for 28.5 minutes.	c) **WHEN** 1NV-236B open, **THEN** perform the following:
	__ (1) Start boric acid transfer pumps.
	__ (2) Calculate required boron addition. **REFER TO** Unit 1 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 #	3	Event #	6,7,8	Page	58 of 121
Event Description:	CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed						

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 8 of 41 Revision 48

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** Unit 1 ROD Book, Section 2.6. __ 4) **IF** lowest T-Cold less than allowable limit, **THEN** immediately add 40 gallons of 7000 PPM boron solution at greater than or equal to 30 GPM for each degree lowest T-Cold below limit of Unit 1 ROD Book, Section 2.6. __ 5) **GO TO** Step 9.
__ e. **IF AT ANY TIME** NC T-Colds trend down to less than or equal to 545°F, **THEN** perform Step 8.d.	

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 9 of 41 Revision 48

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 41 Revision 48

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 throttled 1NV-295 and 1NV-311, **THEN** depress manual pushbutton and raise 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.

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 11 of 41 Revision 48

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).

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Event Description: CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE	PAGE NO. 12 of 41 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 11. **Verify 1A and 1B NC pumps - ON.**	__ **Ensure Pzr spray valve for stopped NC pump - IN MANUAL AND CLOSED.**
__ 12. **Verify Pzr pressure - STABLE AT OR TRENDING TO 2235 PSIG.**	**Perform one of the following:**

Note to Evaluator:

Once all S/G N/R levels lower to < 11%, the crew will transition to EP/1/A/5000/FR-H.1 which begins on the next page of this guide.

a. **IF** Pzr pressure less than 2235 PSIG **AND** trending down, **THEN** perform the following:

__ 1) Ensure all Pzr PORVs - CLOSED.

__ 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) Ensure Pzr spray valves - CLOSED.

5) **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 NC pump.

__ 6) Ensure all Pzr heaters - ON.

__ 7) **GO TO** Step 13.

(RNO continued on next page)

Op Test No.:	301	Scenario #	3	Event #	6,7,8	Page	63	of 121

Event Description: CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 2 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
N/A __ 1. **IF total feed flow 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 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 in 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 established, **THEN RETURN TO** procedure and step in effect.
	Note to Evaluator: **Enclosure 1 can be found as Attachment 7 in the back of this document.**
__ 3. **Monitor Enclosure 1 (Foldout Page).**	
__ 4. **Verify at least one NV pump - AVAILABLE.**	__ **GO TO Step 21.**

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 3 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. **Verify NC System feed and bleed required as follows:**	
__ a. W/R level in at least 3 S/Gs - LESS THAN 24% (36% ACC).	a. Perform the following: __ 1) Monitor feed and bleed initiation criteria. **<u>REFER TO</u>** Enclosure 1 (Foldout Page). __ 2) **<u>WHEN</u>** criteria satisfied, **<u>THEN GO TO</u>** Step 21. __ 3) **<u>GO TO</u>** Step 6.
__ b. **<u>GO TO</u>** Step 21.	
__ 6. **Ensure S/G BB and NM valves closed. <u>REFER TO</u> Enclosure 9 (S/G BB and NM Valve Checklist).**	**Note to Evaluator:** **Enclosure 9 can be found as Attachment 8 in the back of this document.**
7. **Attempt to establish CA flow to at least one S/G as follows:**	
__ a. Verify 1AD-8, B/1 "UST LO LEVEL" - DARK.	a. Perform the following: __ 1) **<u>REFER TO</u>** AP/1/A/5500/006 (Loss of S/G Feedwater). __ 2) **<u>GO TO</u>** Step 7.c.

Op Test No.:	301	Scenario #	3	Event #	6,7,8	Page	65 of 121

Event Description: CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 4 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. (Continued)	
__ b. Verify 1CA-4 (CA Pmps Suct From UST) - OPEN.	b. Perform the following: __ 1) OPEN 1CA-4. 2) **IF** no suction source can be aligned, **THEN** OPEN the following valves: __ • 1RN-250A (RN Hdr A To CA Pmp Suct Isol) __ • 1CA-116A (CA Pump #1 Suct Frm RN Hdr A) __ • 1CA-15A (CA Pump 1A Suct Frm RN Isol) __ • 1CA-85B (CA Pump #1 Suct Frm RN Hdr B) __ • 1CA-18B (CA Pump 1B Suct Frm RN Isol) __ • 1RN-310B (RN Hdr B To CA Pmp Suct Isol).
c. Verify proper CA pump status as follows:	
__ 1) Power to both motor driven CA pumps - AVAILABLE.	1) Perform the following: __ • **IF** 1ETA **OR** 1ETB de-energized, **THEN** restore power to affected essential bus. **REFER TO** AP/1/A/5500/007 (Loss of Normal Power). __ • **IF** essential bus energized, **THEN** dispatch operator to determine cause of breaker failure.

Op Test No.:	301	Scenario #	3	Event #	6,7,8	Page	66 of 121

Event Description: CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 5 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. (Continued)	
__ 2) 1AD-5, F/3 "CAPT MECH OS TRIP" - DARK.	2) Perform the following: __ a) Dispatch operator to reset CAPT trip and throttle valve. __ b) **IF AT ANY TIME** CAPT trip and throttle valve reset prior to reaching feed and bleed criteria, **THEN** perform Step 7. __ c) **GO TO** Step 7.d.
__ 3) "CAPT TRIP T/V CTRL" - OPEN.	3) Perform the following: __ a) OPEN valve. __ b) **IF** valve will not open, **THEN** dispatch operator to open CAPT trip and throttle valve.
4) Verify the following valves - OPEN: __ • 1SA-2 (S/G 1B SM To CAPT) __ • 1SA-5 (S/G 1C SM To CAPT).	__ 4) Place CA Pump #1 to "ON".
__ d. Ensure all CA isolation valves - OPEN.	
__ e. Verify all CA flow control valves - OPEN.	e. Perform the following: __ 1) **IF** valve(s) closed as required by Step 37, **THEN GO TO** Step 7.f. __ 2) OPEN affected valve(s).
__ f. Start all available CA pumps.	

Op Test No.:	301	Scenario #	3	Event #	6,7,8	Page	67 of 121
Event Description:	CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed						

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 6 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. (Continued)	
__ g. Verify total CA flow - GREATER THAN 450 GPM.	g. Perform the following:
	N/A 1) **IF** only one motor driven CA pump on, **AND** its discharge path cannot be aligned to associated S/Gs, **THEN** evaluate aligning flow to other S/Gs through motor driven CA train A/B cross-tie alignment. **REFER TO** Enclosure 3 (Motor Driven CA Pump Train A/B Cross-Tie Alignment).
	N/A 2) **IF** any CA pump on, **AND** Step 37 has been implemented, **THEN GO TO** Enclosure 7 (S/G CA Flow Restoration).
	N/A 3) **IF** any feed flow to at least one S/G verified, **THEN** perform the following:
	__ a) Maintain flow to restore N/R level in at least one S/G to greater than 11% (29% ACC).
	b) **IF AT ANY TIME** N/R level in at least one S/G trends up to greater than 11% (29% ACC) prior to reaching feed and bleed initiation criteria, **THEN** perform the following:
	(1) **IF** NC System **OR** S/G depressurization in progress to feed S/G(s) from CM, **THEN** stabilize the following:
	__ • NC pressure
	__ • S/G pressure.
	__ (2) **RETURN TO** procedure and step in effect.
	(RNO continued on next page)

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 7 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. (Continued)	
	__ c) Dispatch operator to verify proper CA valve alignment. **REFER TO** Enclosure 2 (Local CA Flowpath Restoration).
	__ d) **IF AT ANY TIME** CA flow restored greater than 450 GPM prior to meeting feed and bleed initiation criteria, **THEN** perform Step 7.
	4) **IF** no CA flow indicated, **THEN** perform the following:
	__ a) **IF** no CA pump can be started, **THEN** dispatch operator and maintenance to CA pumps to attempt to restore one CA pump to service. **REFER TO** EM/1/A/5200/007 (Troubleshooting Cause For CA Pump(s) Failing to Start).
	__ b) Dispatch operator to verify proper CA valve alignment. **REFER TO** Enclosure 2 (Local CA Flowpath Restoration).
	__ c) **IF AT ANY TIME** CA flow restored prior to meeting feed and bleed initiation criteria, **THEN** perform Step 7.
	__ 5) **GO TO** Step 8.

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 8 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. (Continued)	
__ h. Verify feed and bleed - PREVIOUSLY ESTABLISHED (Steps 22 through 26 completed).	h. Perform the following: 1) **IF** NC System **OR** S/G depressurization in progress to feed S/G(s) from CM, **THEN** stabilize the following: __ • NC pressure __ • S/G pressure. __ 2) **RETURN TO** procedure and step in effect.
__ i. **GO TO** Step 39.	
8. **Verify Condenser Steam Dump as follows:**	
a. Verify condenser available as follows: __ • "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT __ • Any MSIV - OPEN.	__ a. **GO TO** Step 9.
__ b. Verify steam dumps in - T-AVG MODE.	__ b. **GO TO** Step 9.
c. Place steam dumps in pressure mode as follows: __ 1) Place steam dumps in - PRESSURE MODE. __ 2) Ensure "STM DUMP CTRL" - SET AT 1090 PSIG STEAM HEADER PRESSURE.	
__ 9. **Stop all NC pumps.**	

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 9 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **Verify CM System in service as follows:** __ • Hotwell pump(s) - ON __ • Condensate Booster pump(s) - ON.	**Perform the following:** __ a. Place CM System in service. **REFER TO** OP/1/A/6250/001 (Condensate and Feedwater System). __ b. **IF** CM System cannot be placed in service, **THEN** observe Note prior to Step 19 and **GO TO** Step 19.
11. **Reset Feedwater Isolation as follows:**	
a. Verify the following annunciators - DARK: __ • 1AD-8, D/7 "INNER DOGHOUSE TRAIN A LEVEL HI" __ • 1AD-8, E/7 "INNER DOGHOUSE TRAIN B LEVEL HI" __ • 1AD-8, D/8 "OUTER DOGHOUSE TRAIN A LEVEL HI" __ • 1AD-8, E/8 "OUTER DOGHOUSE TRAIN B LEVEL HI".	__ a. **IF** doghouse level greater than or equal to 11 inches, **THEN** notify IAE to bypass Feedwater Isolation due to Hi-Hi doghouse level. **REFER TO** EM/1/A/5200/008 (Bypassing Feedwater Isolation Due to Hi-Hi Doghouse Level).
__ b. Verify S/I - HAS PREVIOUSLY ACTUATED.	b. Perform the following: __ 1) Reset Feedwater Isolation. N/A 2) **IF** Feedwater Isolation will not reset, **THEN** perform the following: __ a) Notify IAE to bypass Feedwater Isolation. **REFER TO** EM/1/A/5200/009 (Bypassing Feedwater Isolation). __ b) **WHEN** IAE has bypassed Feedwater Isolation signal, **THEN** ensure Feedwater Isolation reset. __ 3) **GO TO** Step 11.f.

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 10 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. (Continued)	
__ c. Notify IAE to bypass Feedwater Isolation. **REFER TO** EM/1/A/5200/009 (Bypassing Feedwater Isolation).	
__ d. **WHEN** IAE has bypassed Feedwater Isolation signal, **THEN** ensure Feedwater Isolation reset.	
e. Ensure S/I - RESET:	
__ 1) ECCS.	__ 1) Locally reset ECCS. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 4 (ECCS Master Reset).
__ 2) D/G load sequencers.	2) 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).
__ 3) **IF AT ANY TIME** B/O occurs, **THEN** restart S/I equipment previously on.	
__ f. **IF AT ANY TIME** subsequent Feedwater Isolation occurs, **THEN RETURN TO** Step 11.	

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Event Description: CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 11 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. **Attempt to establish CF flow to at least one S/G as follows:**	
__ a. Verify CM System - IN SERVICE.	__ a. **<u>IF</u>** CM System cannot be placed in service, **<u>THEN</u>** observe Note prior to Step 19 and **<u>GO TO</u>** Step 19.
b. Place the following valves in manual and closed: __ • All CF control valves __ • All CF bypass control valves.	
c. Ensure at least one of the following valves - OPEN: __ • 1CF-10 (1A CF Pump Disch Isol) (TB1-579, 1E-21) __ • 1CF-17 (1B CF Pump Disch Isol) (TB1-579, 1E-20).	__ c. Observe Note prior to Step 19 and **<u>GO TO</u>** Step 19.
__ d. Verify at least one CF pump - AVAILABLE TO BE STARTED.	__ d. **<u>IF</u>** both CF pumps known to be incapable of starting, **<u>THEN</u> <u>GO TO</u>** Step 14.
e. Verify following feedwater pump recirc valves - FULLY OPEN: __ • 1CF-6 (CF Pump 1A Recirc Ctrl) __ • 1CF-13 (CF Pump 1B Recirc Ctrl).	__ e. OPEN valve(s).

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 12 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. (Continued)	
NOTE When CFPT reset, if speed demand raised above "0" the zero speed trip (≤ 2 RPM) arms. If speed has not raised above 2 RPM within 5 seconds CFPT will trip.	
__ f. Ensure CFPT to be started - RESET.	f. Perform the following: __ 1) Continue attempts to reset a CFPT. __ 2) **WHEN** CFPT reset **AND** feed from CF desired, **THEN RETURN TO** Step 10. __ 3) **GO TO** Step 14.
__ g. OPEN 1AS-12 (AS To CFPT Isol).	
__ h. Dispatch operator to close 1SP-3 (SC To CFPT 1A & 1B) (TB1-640, 1G-24).	
__ i. Verify CFPT selected to feed S/G(s) has remained running since loss of S/G feed event occurred.	i. OPEN the following valves for CFPT to be started: • CFPT 1A: __ • 1TE-3 (CFPT A LP S/V Above Seat Drn) __ • 1TE-7 (CFPT A HP S/V Above Seat Drn). • CFPT 1B: __ • 1TE-4 (CFPT B LP S/V Above Seat Drn) __ • 1TE-8 (CFPT B HP S/V Above Seat Drn).
__ j. Place "CFPT RUNBK ON RX TRIP" in - BYPASS.	

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 13 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

12. (Continued)

k. Issue work order to restore VI supply regulators to normal for the following SP valves:

__ • 1SP-29 (1A CFPT HP Drains) (TB-597, 1D-21) (W/O 02187004)

__ • 1SP-33 (1B CFPT HP Drains) (TB-597, 1D-19) (W/O 02187006)

__ • 1SP-40 (1A & 1B CFPT HP Drains) (TB-599, 1C-32) (W/O 02187005)

__ • 1SP-99 (1A CFPT HP Drains) (TB-598, 1C-23) (W/O 02187007).

l. Dispatch operator(s) to ensure VI isolation valve associated with the following SP valves - OPEN:

__ • 1VI-1298 (VI Supply to 1SPSV0290)(TB-597,1D-21)

__ • 1VI-2066 (VI Supply to 1SPSV0330)(TB-598,1C-19)

__ • 1VI-1101 (VI Supply to 1SPSV0400)(TB-600,1C-33)

__ • 1VI-1282 (VI Supply to 1SPSV0990)(TB-598,1C-23)

__ • 1VI-1291 (VI Supply to 1SPSV1230)(TB-606,1B-22).

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 14 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. (Continued)	
m. Ensure the following switches for CFPT to be started in - AUTO:	
• CFPT 1A:	
__ • "1SP-40, 29, 99 CFPT A HP DRNS"	
__ • "1SP-37, 19 CFPT A LP DRNS".	
• CFPT 1B:	
__ • "1SP-40, 33, 123 CFPT B HP DRNS"	
__ • "1SP-37, 23 CFPT B LP DRNS".	
__ n. Slowly raise speed of CFPT to be started to maintain CF pressure 200 PSIG greater than SM pressure for S/G(s) to be fed.	n. Perform the following: __ 1) Continue attempts to raise CFPT speed. __ 2) **WHEN** CFPT speed control available **AND** feed from CF desired, **THEN RETURN TO** Step 10. __ 3) **GO TO** Step 14.

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 15 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. (Continued)	
o. CLOSE the following drain valves for CFPT started:	
• CFPT 1A:	
__ • 1TE-1 (CFPT 1A 1st Stage Drn)	
__ • 1TE-7 (CFPT A HP S/V Above Seat Drn)	
__ • 1TE-3 (CFPT A LP S/V Above Seat Drn)	
__ • 1TE-24 (CFPT A HP S/V Below Seat Drn)	
__ • 1TE-5 (CFPT A LP S/V Below Seat Drn).	
• CFPT 1B:	
__ • 1TE-2 (CFPT 1B 1st Stage Drn)	
__ • 1TE-8 (CFPT B HP S/V Above Seat Drn)	
__ • 1TE-4 (CFPT B LP S/V Above Seat Drn)	
__ • 1TE-28 (CFPT B HP S/V Below Seat Drn)	
__ • 1TE-6 (CFPT B LP S/V Below Seat Drn).	
__ p. Verify feed and bleed - PREVIOUSLY ESTABLISHED (Steps 22 through 26 completed).	__ p. **GO TO** Step 12.r.

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 16 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. (Continued)	
CAUTION **Restoring feed flow at very high flow rates may result in excessive NC System cooldown.**	
__ q. Verify all S/G W/R levels - GREATER THAN 12% (21% ACC).	__ q. Establish feed flow to S/Gs. **GO TO** Enclosure 8 (S/G CM/CF Flow Restoration).
__ r. Verify CF Isolation signal - RESET OR BYPASSED.	r. Perform the following: __ 1) **IF AT ANY TIME** it is determined CF Isolation signal cannot be reset or bypassed, **THEN** observe Note prior to Step 19 and **GO TO** Step 19. __ 2) Do not continue until CF Isolation signal reset or bypassed.
s. OPEN at least one of the following valves: __ • 1CA-149 (S/G 1A CF Byp To CA Nozzle) __ • 1CA-150 (S/G 1B CF Byp To CA Nozzle) __ • 1CA-151 (S/G 1C CF Byp To CA Nozzle) __ • 1CA-152 (S/G 1D CF Byp To CA Nozzle).	s. Perform the following: 1) OPEN at least one of the following valves: __ • 1CF-33 (S/G 1A CF Cont Isol) __ • 1CF-42 (S/G 1B CF Cont Isol) __ • 1CF-51 (S/G 1C CF Cont Isol) __ • 1CF-60 (S/G 1D CF Cont Isol). __ 2) **IF** flow path cannot be established to at least one S/G, **THEN** observe Note prior to Step 19 and **GO TO** Step 19.
__ t. THROTTLE open CF control valve or CF bypass control valve for S/G(s) to be fed.	__ t. **IF** flow path cannot be established to at least one S/G, **THEN** observe Note prior to Step 19 and **GO TO** Step 19.

Op Test No.:	301	Scenario #	3	Event #	6,7,8	Page	78 of 121
Event Description:	CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed						

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 17 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. **Verify S/G levels as follows:**	
__ a. Verify N/R level in at least one S/G - GREATER THAN 11% (29% ACC).	a. Perform the following: __ 1) **IF** feed flow indicated to at least one S/G, **THEN** maintain feed flow to restore S/G N/R level to greater than 11% (29% ACC). __ 2) **IF** feed flow not indicated, **THEN** **GO TO** Step 14.
__ b. Verify feed and bleed - PREVIOUSLY ESTABLISHED (Steps 22 through 26 completed).	__ b. **RETURN TO** procedure and step in effect.
__ c. **GO TO** Step 39.	
14. **Depressurize NC System to less than 1905 PSIG and perform blocks as follows:**	
__ a. Verify "P-11 PZR S/I BLOCK PERMISSIVE" status light (1SI-18) - DARK.	a. Perform the following: 1) Depress "BLOCK" pushbuttons for the following signals: __ • ECCS steam pressure __ • ECCS Pzr pressure. 2) Verify the following status lights (1SI-13) - LIT: __ • Main Steam Isol __ • Pzr low pressure S/I. __ 3) **GO TO** Step 15.
__ b. Ensure NC System pressure maintained greater than 1845 PSIG until ECCS Pzr pressure blocked.	

Op Test No.: 301	Scenario # 3	Event # 6,7,8	Page 79 of 121				

Event Description: CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 18 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

14. (Continued)

__ c. Ensure operator prepared to perform blocks in the following step as soon as Pzr pressure goes below P-11, to avoid inadvertent S/I.

d. **WHEN** "P-11 PZR S/I BLOCK PERMISSIVE" status light (1SI-18) lit, **THEN** perform the following:

1) Depress "BLOCK" pushbuttons for the following signals:

__ • ECCS steam pressure

__ • ECCS Pzr pressure.

2) Verify the following status lights (1SI-13) - LIT:

__ • Main Steam Isol

__ • Pzr low pressure S/I.

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 19 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. (Continued)	
__ e. Verify letdown - IN SERVICE.	e. Perform the following:
	__ 1) Depressurize NC System to less than 1905 PSIG using one Pzr PORV.
	2) **IF** Pzr PORV will not operate, **THEN** 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) Depressurize using one of the following Pzr PORVs to less than 1905 PSIG:
	__ • 1NC-34A (PZR PORV)
	OR
	__ • 1NC-32B (PZR PORV).
	3) **IF** Pzr PORV available, **THEN** perform the following:
	__ a) Maintain NC pressure less than 1905 PSIG.
	__ b) Do not continue until ECCS steam pressure and main steam isolation blocks performed.
	__ c) **GO TO** Step 15.

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 20 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. (Continued)	
f. Depressurize NC System to less than 1905 PSIG using NV aux spray as follows:	__ f. Depressurize NC System to less than 1905 PSIG using one Pzr PORV.
1) Ensure the following valves - OPEN:	
__ • 1NV-312A (Chrg Line Cont Isol)	
__ • 1NV-314B (Chrg Line Cont Isol).	
2) Ensure the following valves - CLOSED:	
__ • 1NC-27 (Pzr Spray Ctrl Frm Loop A)	
__ • 1NC-29 (Pzr Spray Ctrl Frm Loop B)	
__ • 1NV-39A (NV Supply To Loop D Isol)	
__ • 1NV-32B (NV Supply To Loop A Isol).	
__ 3) Maintain charging flow less than 180 GPM.	
__ 4) THROTTLE 1NV-37A (NV Supply To Pzr Aux Spray) and charging flow as required.	

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 21 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

14. (Continued)

5) **IF AT ANY TIME** letdown lost **AND** Pzr PORV available, **THEN** perform the following:

__ a) CLOSE 1NV-37A (NV Supply To Pzr Aux Spray).

b) OPEN one of the following valves:

__ • 1NV-39A (NV Supply To Loop D Isol)

OR

__ • 1NV-32B (NV Supply To Loop A Isol).

__ c) Depressurize NC System to less than 1905 PSIG using one Pzr PORV.

__ g. Do not continue until ECCS steam pressure and main steam isolation blocks performed.

__ 15. **IF AT ANY TIME conditions degrade, THEN manual S/I actuation may be required.**

CAUTION **Failure to monitor Pzr pressure and maintain pressure below P-11 may result in an S/I, main steamline isolation and subsequent loss of feed flow. An operator must monitor Pzr pressure even after leaving this EP.**

__ 16. **Designate operator to continuously monitor and control Pzr pressure. REFER TO Enclosure 4 (Maintaining Pzr pressure below P-11).**

Note to Evaluator:

Enclosure 4 can be found as Attachment 9 in the back of this document.

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 22 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17. **Attempt to establish feed flow from CM as follows:**	
NOTE • If feed and bleed has not yet been initiated, it is preferable to depressurize two S/Gs in the next step in order to: • Leave two S/G levels above feed and bleed criteria • Minimize NC System cooldown. • If feed and bleed has been initiated, it is preferable to depressurize just one S/G in the following steps.	
__ a. Depressurize at least one S/G to less than 500 PSIG in the following steps.	
b. Verify condenser available as follows: __ • "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT __ • MSIV on S/Gs to be depressurized - OPEN.	__ b. **GO TO** Step 17.i RNO.
__ c. Place "STM DUMP CTRL" slim station in manual.	
__ d. Ensure steam dumps in pressure mode.	
__ e. **WHEN** "P-12 LO-LO TAVG" status light (1SI-18) lit, **THEN** place steam dump interlock bypass switches in "BYP INTLK".	

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 23 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17. (Continued)	
__ f. Verify feed and bleed - PREVIOUSLY ESTABLISHED (Steps 22 through 26 completed).	f. Perform the following: __ 1) CLOSE MSIV on two S/Gs **NOT** to be depressurized. __ 2) Ensure S/G PORV closed or in "AUTO" on two S/Gs **NOT** to be depressurized. __ 3) **GO TO** Step 17.i.
__ g. CLOSE MSIV on three S/Gs **NOT** to be depressurized.	
__ h. Ensure S/G PORV closed or in "AUTO" on three S/Gs **NOT** to be depressurized.	

NOTE
- 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 center of SM graphic.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ i. Dump steam to condenser at maximum rate while attempting to avoid Main Steam Isolation.	i. Perform the following: __ 1) CLOSE MSIV on S/Gs **NOT** to be depressurized. __ 2) CLOSE manual loaders on S/G PORV(s) on S/G(s) **NOT** to be depressurized.
Critical Task #3	__ 3) Dump steam from S/G(s) selected to be depressurized using S/G PORV(s) at maximum rate.

(RNO continued on next page)

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 24 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

17. (Continued)

N/A 4) **IF** PORV on S/G(s) to be depressurized can **NOT** be operated from Control Room, **THEN** perform the following:

__ a) Dispatch operator(s) to operate intact S/G(s) PORV. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 10 (Local Operation of S/G PORVs).

__ b) Obtain sound powered phone from storage box on rear wall of Control Room.

__ c) Connect sound powered phone to jack on 1MC-11.

__ d) Monitor sound powered phone for communication from the Doghouse(s).

N/A 5) **IF** no S/G PORV can be opened, **THEN** perform the following:

__ a) Evaluate REOPENING MSIVs and dump steam to condenser. **REFER TO** Enclosure 15 (Condenser Dump Operation).

__ b) Observe Note prior to Step 19 and **GO TO** Step 19.

NOTE Continuing in this step to align feed path open, while waiting for S/G(s) pressure to reach 500 PSIG, will allow S/G(s) to be fed as soon as S/G pressure goes below CF header pressure.

__ j. **WHEN** S/G pressure less than 500 PSIG, **THEN** stabilize S/G pressure less than 500 PSIG.

Event Description: CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 25 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17. (Continued)	
__ k. Verify feed and bleed - PREVIOUSLY ESTABLISHED (Steps 22 through 26 completed).	__ k. **GO TO** Step 17.m.
CAUTION **Restoring feed flow at very high flow rates may result in excessive NC System cooldown.**	
__ l. Verify all S/G W/R levels - GREATER THAN 12% (21% ACC).	__ l. Establish feed flow to S/Gs. **GO TO** Enclosure 8 (S/G CM/CF Flow Restoration).
__ m. Verify CF Isolation signal - RESET OR BYPASSED.	m. Perform the following: __ 1) **IF AT ANY TIME** it is determined CF Isolation signal cannot be reset or bypassed, **THEN** observe Note prior to Step 19 and **GO TO** Step 19. __ 2) Do not continue until CF Isolation signal reset or bypassed.
Note to Evaluator: **Only 1 of the valves in the following step are part of the critical task at this time. Only one of the S/Gs selected to be fed are critical.**	
n. OPEN CF to CA valve on S/G(s) to be fed: __ • 1CA-149 (S/G 1A CF Byp To CA Nozzle) __ • 1CA-150 (S/G 1B CF Byp To CA Nozzle) __ • 1CA-151 (S/G 1C CF Byp To CA Nozzle) __ • 1CA-152 (S/G 1D CF Byp To CA Nozzle). Critical Task # 3	n. Perform the following: 1) OPEN CF Cont Isol valve on S/G(s) to be fed: __ • 1CF-33 (S/G 1A CF Cont Isol) __ • 1CF-42 (S/G 1B CF Cont Isol) __ • 1CF-51 (S/G 1C CF Cont Isol) __ • 1CF-60 (S/G 1D CF Cont Isol). __ 2) **IF** flow path cannot be established to at least one depressurized S/G, **THEN** observe Note prior to Step 19 and **GO TO** Step 19.

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 26 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17. (Continued)	
__ o. THROTTLE open CF control valve or CF bypass control valve for S/G(s) to be fed. Critical Task # 3	__ o. **IF** flow path cannot be established to at least one depressurized S/G, **THEN** observe Note prior to Step 19 and **GO TO** Step 19.
__ p. Verify feedwater flow to depressurized S/G(s) - INDICATING FLOW.	p. Perform the following: __ 1) **IF** depressurized S/G pressure less than 500 PSIG, **THEN** observe Note prior to Step 19 and **GO TO** Step 19. __ 2) **RETURN TO** Step 17.i.
18. **Verify S/G levels as follows:**	
__ a. Verify N/R level in at least one S/G - GREATER THAN 11% (29% ACC).	a. Perform the following: __ 1) **IF** feed flow indicated to at least one S/G, **THEN** maintain feed flow to restore S/G N/R level to greater than 11% (29% ACC). N/A 2) **IF** feed flow not indicated, **THEN** observe Note prior to Step 19 and **GO TO** Step 19.
b. While performing actions in subsequent procedures, maintain the following conditions required for feed flow from CM System: __ • S/G(s) pressure - LESS THAN 500 PSIG __ • Feed flow path - OPEN __ • NC System pressure - LESS THAN 1905 PSIG.	

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Event Description:	CAPT#1 Overspeed Trip / Loss of Heat Sink / Loss of CFPT Vacuum / 1NV-37A Fails Closed						

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	PAGE NO. 27 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18. (Continued)	
__ c. Verify feed and bleed - PREVIOUSLY ESTABLISHED (Steps 22 through 26 completed)	c. Perform the following: __ 1) **IF** S/I has occurred, **THEN** **RETURN TO** procedure and step in effect. 2) **IF** S/I has not occurred, **THEN** perform the following: __ a) **IF** Pzr level **OR** Pzr pressure low due to operator controlled cooldown in this procedure, **THEN** S/I actuation requirements based on Pzr level or NC pressure do not apply in subsequent procedures unless conditions degrade. b) Control charging as follows: __ • Maintain charging flow less than 180 GPM __ • Restore Pzr level to greater than 11%. __ c) **RETURN TO** procedure and step in effect.
__ d. **GO TO** Step 39.	

Note to Evaluator:

At this time all critical tasks and the 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.

Attachment List

Scenario 3

ATTACHMENT 1 -	Crew Critical Task Summary
ATTACHMENT 2 -	Shift Turnover Information
ATTACHMENT 3 -	AP/1/A/5500/007 Enclosure 1 (Foldout Page)
ATTACHMENT 4 -	EP/1/A/5000/E-0 Enclosure 1 (Foldout Page)
ATTACHMENT 5 -	EP/1/A/5000/ES-0.1 Enclosure 1 (Foldout Page)
ATTACHMENT 6 -	EP/1/A/5000/ES-0.1 Enclosure 2 (NC Temperature Control)
ATTACHMENT 7 -	EP/1/A/5000/FR-H.1 Enclosure 1 (Foldout Page)
ATTACHMENT 8 -	EP/1/A/5000/FR-H.1 Enclosure 9 (S/G BB and NM Valve Checklist)
ATTACHMENT 9	EP/1/A/5000/FR-H.1 Enclosure 4 (Maintaining Pzr pressure below P-11)
ATTACHMENT 10 -	Scenario Specific Technical Specifications

ATTACHMENT 1

CREW CRITICAL TASK SUMMARY			
SAT	**UNSAT**	**CT #**	**CRITICAL TASK**
		1	Control Charging flow to prevent a Reactor Trip on Pressurizer High Level of 92%.
		2	Close Pressurizer PORV prior to a manual or automatic reactor trip on Pressurizer low pressure.
		3	Establish feedwater flow to at least one S/G prior to meeting bleed and feed criteria (<24% W/R level in 3 out of 4 S/Gs).

Comments:

ATTACHMENT 2

SHIFT TURNOVER INFORMATION

Unit 1 Status

Power Level	Power History	NCS Boron	Xenon
100 %	BOL	1366 PPM	per OAC

Controlling Procedure

- OP/1/A/6100/003 (Controlling Procedure for Unit Operation), Enclosure 4.3 (Operation Between 85 and 100%). The steps through step 3.2.5 are complete.

Other Information Needed to Assume the Shift

- Unit 1 is at 100% power at the BOL. Unit 2 is at 100% power. 1B CA Pump is removed from service for PMs. 1B CA Pump has been inoperable for 3 hours and is expected to be returned to service in 6 hours. Tech Spec 3.7.5 Condition B is in effect. Direction for the crew is to initiate a downpower to ~85% in preparation for performing the Turbine Control Valve Movement PT.

AOs Available

Eight AOs are available as listed on the status board

METEOROLOGICAL CONDITIONS

- Upper wind direction = 125 degrees, speed = 3 mph
- Lower wind direction = 127 degrees, speed = 4.5 mph
- Forecast calls for clear skies over the next 24 hours.

CNS AP/1/A/5500/007	LOSS OF NORMAL POWER Enclosure 1 - Page 1 of 3 **Foldout Page**	PAGE NO. 84 of 280 Revision 85

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 NC pump seals resulting in NC System inventory loss.**

IF AT ANY TIME KC **AND** NV seal cooling for any NC pump 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 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. **Containment Air Release Criterion:**

- **IF AT ANY TIME** containment pressure greater than or equal to .25 PSIG, **THEN** perform the following:

__ • Perform normal VQ release. **REFER TO** OP/1/A/6450/017 (Containment Air Release and Addition System)

OR

__ • **IF** VQ fans cannot be started, **THEN REFER TO** Enclosure 13 (VQ Release Without Fans).

__ 3. **IF Containment entry required, THEN coordinate with TSC to defeat 1EMF-17 input to containment evacuation alarm per AM/0/B/5100/009 (Defeating 1EMF-17 or 2EMF-2 Containment Evacuation Alarm Circuit(s)).**

ATTACHMENT 3

CNS AP/1/A/5500/007	LOSS OF NORMAL POWER Enclosure 1 - Page 2 of 3 **Foldout Page**	PAGE NO. 85 of 280 Revision 85

4. **NC Pump Trip Criteria:**

IF any of the following NC pump trip criteria met:

__ • #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 perform the following:

__ a. Ensure steam dumps - IN PRESSURE MODE.

__ b. Ensure "STM DUMP CTRL" - SET AT 1090 PSIG STEAM HEADER PRESSURE.

__ c. Ensure Reactor - TRIPPED.

d. **WHEN** reactor power less than 5%, **THEN** perform the following:

__ 1) Trip all NC pumps.

__ 2) Ensure normal spray valve associated with tripped NC pump(s) - IN MANUAL **AND** CLOSED.

__ e. Secure any dilutions in progress.

f. **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).

ATTACHMENT 3

CNS AP/1/A/5500/007	LOSS OF NORMAL POWER Enclosure 1 - Page 3 of 3 **Foldout Page**	PAGE NO. 86 of 280 Revision 85

CAUTION **This step should be a high priority if LOCA or other event is anticipated to deplete the FWST.**

NOTE FWST level transmitter heat tracing is **NOT** available in LOOP events.

5. **IF Unit 1 LOOP event in progress and freezing weather exists, THEN perform the following:**

__ • Notify Control Room team FWST level instruments have lost heat tracing and may be inaccurate until external heating established.

• Notify TSC to evaluate the following to provide supplemental freeze protection:

__ • Portable heaters

__ • Additional insulation

NOTE Temporary heat trace equipment is available in the FLEX Dome behind rack "J" in box labeled "Heat Trace".

__ • Portable generators/temporay heat trace.

ATTACHMENT 4

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 1 of 3 **Foldout Page**	PAGE NO. 34 of 49 Revision 46

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
     - Reactor power - LESS THAN 5%.

2. **Open Phase Criteria:**

   - **IF** operating NV **AND** KC pumps automatically trip, **THEN** perform the following:

     a. Start the following pumps on opposite train:
        - NV pump
        - KC pumps
        - RN pump.

     b. **IF** pumps do not start, **OR** trip after starting, **THEN** restart pumps on previously operating train.

     c. **IF** all KC pumps off, **THEN** ensure all NC pumps - OFF.

     d. **IF** Unit 2 4160V bus energized by Unit 1 busline, **THEN** immediately notify Unit 2 to perform same actions on Unit 2.

3. **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).

4. **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.

ATTACHMENT 4

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 2 of 3 **Foldout Page**	PAGE NO. 35 of 49 Revision 46

NOTE CA flow control valves fail open on CA auto start. Isolating flow with the motor operated isolation valve will not require re-isolation on subsequent CA auto starts.

5. **Ruptured S/G CA Isolation Criteria:**

- **IF** both the following conditions met, **THEN** stop CA flow to affected S/G(s):
  - Level going up in uncontrolled manner or radiation level in that S/G abnormal
  - N/R level - GREATER THAN 11% (29% ACC).

NOTE CA flow control valves fail open on CA auto start. Isolating flow with the motor operated isolation valve will not require re-isolation on subsequent CA auto starts.

6. **Faulted S/G CA isolation Criteria:**

- **IF** all the following conditions met, **THEN** stop CA flow to affected S/G:
  - S/G pressure trends down in 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).

ATTACHMENT 4

CNS EP/1/A/5000/E-0	REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 3 of 3 **Foldout Page**	PAGE NO. 36 of 49 Revision 46

7. **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.

8. **IF AT ANY TIME KC cooling to operating KF pump(s) 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

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE Enclosure 1 - Page 1 of 1 **Foldout Page**	PAGE NO. 27 of 41 Revision 48

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. **Open Phase Criteria:**

   - **IF** operating NV **AND** KC pumps automatically trip, **THEN** perform the following:

     a. Start the following pumps on opposite train:

        - NV pump
        - KC pumps
        - RN pump.

     b. **IF** pumps do not start, **OR** trip after starting, **THEN** restart pumps on previously operating train.

     c. **IF** all KC pumps off, **THEN** ensure all NC pumps - OFF.

     d. **IF** Unit 2 4160V bus energized by Unit 1 busline, **THEN** immediately notify Unit 2 to perform same actions on Unit 2.

3. **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 6

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE Enclosure 2 - Page 1 of 6 **NC Temperature Control**	PAGE NO. 28 of 41 Revision 48

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. Place steam dumps in pressure mode as follows: __ 1) Place steam dumps in pressure mode using "STEAM DUMP SELECT" switch __ 2) Ensure "STM DUMP CTRL" - SET AT 1090 PSIG STEAM HEADER PRESSURE. __ 3) Ensure steam dumps control to maintain steam header pressure - 1090 PSIG. __ d. **GO TO** Step 4.
__ 2. **Use NC T-Avg to determine NC temperature as required in subsequent steps.**	
__ 3. **IF AT ANY TIME 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 7.**

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE Enclosure 2 - Page 2 of 6 **NC Temperature Control**	PAGE NO. 29 of 41 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 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 TRENDING UP IN UNCONTROLLED MANNER

  OR

- __ NC temperature - GREATER THAN 557°F AND STABLE

  OR

- __ NC temperature - LESS THAN 557°F AND TRENDING DOWN IN UNCONTROLLED MANNER.

ATTACHMENT 6

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE Enclosure 2 - Page 3 of 6 **NC Temperature Control**	PAGE NO. 30 of 41 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 7. **Verify NC temperature - LESS THAN 557°F AND TRENDING DOWN.**	**Perform the following:** a. **IF** NC temperature greater than 557°F **AND** trending up, **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.

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE Enclosure 2 - Page 4 of 6 **NC Temperature Control**	PAGE NO. 31 of 41 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. **Attempt to stop NC cooldown as follows:**	
a. **IF** steam dumps open **AND** any MSIV open, **THEN** place steam dumps in pressure mode as follows:	
__ 1) Place steam dumps in pressure mode using "STEAM DUMP SELECT" switch	
__ 2) Ensure "STM DUMP CTRL" - SET AT 1090 PSIG STEAM HEADER PRESSURE.	
__ 3) Ensure steam dumps control to maintain steam header pressure - 1090 PSIG.	
__ b. Verify 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.	
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.

ATTACHMENT 6

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. (Continued)	
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).	
__ 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.

ATTACHMENT 6

CNS EP/1/A/5000/ES-0.1	REACTOR TRIP RESPONSE Enclosure 2 - Page 6 of 6 **NC Temperature Control**	PAGE NO. 33 of 41 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. **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.	

ATTACHMENT 7

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. 69 of 134 Revision 48

1. **Feed and Bleed Initiation Criteria:**
   - **IF** W/R level in at least 3 S/Gs less than 24% (36% ACC), **THEN GO TO** Section C. (Operator Actions), Step 21.
2. **IF AT ANY TIME a CA pump restored after Step 7 AND prior to meeting Feed and Bleed Initiation Criteria, THEN perform Section C. (Operator Actions), Step 7.**
3. **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).
4. **Cold Leg Recirc Switchover Criterion:**
   - **IF** FWST level lowers 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 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.

ATTACHMENT 8

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK Enclosure 9 - Page 1 of 2 **S/G BB and NM Valve Checklist**	PAGE NO. 100 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE The following valves are closed to minimize S/G inventory loss.	
1. **Verify the following valves - CLOSED:**	__ **CLOSE valve(s).**
__ • 1BB-56A (S/G 1A Bldwn Cont Isol Insd)	
__ • 1BB-148B (S/G 1A Bldwn Cont Isol Byp)	
__ • 1BB-57B (S/G 1A Bldwn Cont Isol Otsd)	
__ • 1BB-19A (S/G 1B Bldwn Cont Isol Insd)	
__ • 1BB-150B (S/G 1B Bldwn Cont Isol Byp)	
__ • 1BB-21B (S/G 1B Bldwn Cont Isol Otsd)	
__ • 1BB-60A (S/G 1C Bldwn Cont Isol Insd)	
__ • 1BB-149B (S/G 1C Bldwn Cont Isol Byp)	
__ • 1BB-61B (S/G 1C Bldwn Cont Isol Otsd)	
__ • 1BB-8A (S/G 1D Bldwn Cont Isol Insd)	
__ • 1BB-147B (S/G 1D Bldwn Cont Isol Byp)	
__ • 1BB-10B (S/G 1D Bldwn Cont Isol Otsd)	
__ • 1NM-191B (S/G 1A Smpl Hdr Cont Isol)	
__ • 1NM-201A (S/G 1B Smpl Hdr Cont Isol)	
__ • 1NM-211B (S/G 1C Smpl Hdr Cont Isol)	
__ • 1NM-221A (S/G 1D Smpl Hdr Cont Isol)	

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK Enclosure 9 - Page 2 of 2 **S/G BB and NM Valve Checklist**	PAGE NO. 101 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. (Continued) __ • 1NM-187A (S/G A UPR Shell Smpl Cont Isol) __ • 1NM-197B (S/G B UPR Shell Smpl Cont Isol) __ • 1NM-207A (S/G C UPR Shell Smpl Cont Isol) __ • 1NM-217B (S/G D UPR Shell Smpl Cont Isol) __ • 1NM-190A (S/G 1A Bldwn Smpl Cont Isol) __ • 1NM-200B (S/G 1B Bldwn Smpl Cont Isol) __ • 1NM-210A (S/G 1C Bldwn Smpl Cont Isol) __ • 1NM-220B (S/G 1D Bldwn Smpl Cont Isol).	

ATTACHMENT 9

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK Enclosure 4 - Page 1 of 3 **Maintaining Pzr pressure below P-11**	PAGE NO. 78 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE **Failure to secure NV aux spray when less than or equal to 1800 PSIG will cause excessive depressurization.**	
__ 1. **Verify 1NV-37A (NV Supply To Pzr Aux Spray) - CLOSED.**	**Perform the following:** a. **WHEN** Pzr pressure less than or equal to 1800 PSIG, **THEN** isolate NV aux spray as follows: 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 (NV Supply To Pzr Aux Spray). __ 3) Control charging at desired flow rate while maintaining charging flow less than 180 GPM. __ b. Do not continue in this enclosure until 1NV-37A closed in previous step.

ATTACHMENT 9

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2. **IF AT ANY TIME Pzr pressure approaches 1905 PSIG, THEN maintain pressure between 1905 PSIG and 1800 PSIG as follows:**

__ • **IF** normal letdown isolated, **OR** NV aux spray not effective in maintaining pressure below 1905 PSIG, **THEN** cycle Pzr PORV

OR

• **IF** normal letdown in service, **OR** all Pzr PORVs unavailable, **THEN** use NV aux spray as follows:

  • **WHEN** required to depressurize to stay less than 1905 PSIG, **THEN** initiate spray as follows:

  __ a. THROTTLE 1NV-37A (NV Supply To Pzr Aux Spray) **AND** charging flow as required to control Pzr pressure.

  b. Ensure the following valves - CLOSED:

    __ • 1NV-32B (NV Supply To Loop A Isol)

    __ • 1NV-39A (NV Supply To Loop D Isol).

  • **WHEN** Pzr pressure less than or equal to 1800 PSIG, **THEN** isolate NV aux spray as follows:

  a. Ensure one of the following valves - OPEN:

    __ • 1NV-39A (NV Supply To Loop D Isol)

    OR

    __ • 1NV-32B (NV Supply To Loop A Isol).

  __ b. CLOSE 1NV-37A (NV Supply To Pzr Aux Spray).

ATTACHMENT 9

CNS EP/1/A/5000/FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK Enclosure 4 - Page 3 of 3 **Maintaining Pzr pressure below P-11**	PAGE NO. 80 of 134 Revision 48

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. **<u>IF AT ANY TIME</u> Pzr pressure inadvertently goes above 1955 PSIG, <u>THEN</u> ensure the following performed again (to reinstate blocks):**	
__ a. Ensure another operator prepared to perform blocks in next step as soon as Pzr pressure goes below P-11, to avoid an inadvertent S/I.	
b. **<u>WHEN</u>** "P-11 PZR S/I BLOCK PERMISSIVE" status light (1SI-18) lit, **<u>THEN</u>** perform the following:	
1) Depress "BLOCK" pushbuttons for the following signals: __ • ECCS steam pressure __ • ECCS Pzr pressure.	
2) Verify the following status lights (1SI-13) - LIT: __ • Main Steam Isol __ • Pzr low pressure S/I.	
__ c. Ensure NC System pressure maintained greater than 1845 PSIG until ECCS Pzr pressure blocked.	
__ d. **<u>RETURN TO</u>** Step 2 to ensure Pzr pressure maintained below P-11.	

ATTACHMENT 10

Event #3
1NC-32B Fails Open

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.11 Pressurizer Power Operated Relief Valves (PORVs)

LCO 3.4.11 Each PORV and associated block valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

--NOTES--
Separate Condition entry is allowed for each PORV.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more PORVs inoperable and capable of being manually cycled.	A.1 Close and maintain power to associated block valve.	1 hour
B. One or two PORVs inoperable and not capable of being manually cycled.	B.1 Close associated block valves.	1 hour
	AND	
	B.2 Remove power from associated block valves.	1 hour
	AND	
	B.3 Restore PORV(s) to OPERABLE status.	72 hours

(continued)

ATTACHMENT 10

Event #3

1NC-32B Fails Open

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One block valve inoperable.	C.1 Place associated PORV in manual control. AND C.2 Restore block valve to OPERABLE status.	1 hour 72 hours
D. Required Action and associated Completion Time of Condition A, B, or C not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 4.	6 hours 12 hours
E. Three PORVs inoperable and not capable of being manually cycled.	E.1 Close associated block valves. AND E.2 Remove power from associated block valves. AND E.3 Be in MODE 3. AND E.4 Be in MODE 4.	1 hour 1 hour 6 hours 12 hours
F. More than one block valve inoperable.	F.1 Place associated PORVs in manual control. AND	1 hour (continued)

ATTACHMENT 10

Event #3
1NC-32B Fails Open

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. (continued)	F.2 Restore one block valve to OPERABLE status if three block valves are inoperable.	2 hours
	AND	
	F.3 Restore remaining block valve(s) to OPERABLE status.	72 hours
G. Required Action and associated Completion Time of Condition F not met.	G.1 Be in MODE 3.	6 hours
	AND	
	G.2 Be in MODE 4.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.11.1	-----NOTE----- Not required to be met with block valve closed in accordance with the Required Action of Condition B or E. ---------- Perform a complete cycle of each block valve.	In accordance with the Surveillance Frequency Control Program

(continued)

ATTACHMENT 10

Event #3

1NC-32B Fails Open

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.11.2	------------------------------NOTE------------------------------ Required to be performed in MODE 3 or MODE 4 when the temperature of all RCS cold legs is > 200°F. --- Perform a complete cycle of each PORV.	In accordance with the Surveillance Frequency Control Program
SR 3.4.11.3	------------------------------NOTE------------------------------ This SR is not applicable to valve NC-36B. --- Verify the nitrogen supply for each PORV is OPERABLE by: a. Manually transferring motive power from the air supply to the nitrogen supply, b. Isolating and venting the air supply, and c. Operating the PORV through one complete cycle.	In accordance with the Surveillance Frequency Control Program

ATTACHMENT 10

Event #4
Loss of 1ETA

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems—Operating

LCO 3.8.9 Train A and Train B AC, four channels of DC, DC Train A and Train B and four AC vital buses electrical power distribution subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more AC electrical power distribution subsystem(s) inoperable.	A.1 Restore AC electrical power distribution subsystem(s) to OPERABLE status.	8 hours AND 16 hours from discovery of failure to meet LCO
B. One AC vital bus inoperable.	B.1 Restore AC vital bus subsystem to OPERABLE status.	2 hours AND 16 hours from discovery of failure to meet LCO

(continued)

ATTACHMENT 10

Event #4
Loss of 1ETA

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One channel of DC electrical power distribution subsystems inoperable.	C.1 Restore channel of DC electrical power distribution subsystems to OPERABLE status.	2 hours AND 16 hours from discovery of failure to meet LCO
D. One train of DC electrical power distribution subsystems inoperable.	D.1 Restore DC electrical power distribution subsystem to OPERABLE status.	2 hours AND 16 hours from discovery of failure to meet LCO
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3. AND E.2 Be in MODE 5.	6 hours 36 hours
F. Two trains with inoperable distribution subsystems that result in a loss of safety function.	F.1 Enter LCO 3.0.3.	Immediately

ATTACHMENT 10

Event #4

Loss of 1ETA

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.9.1	Verify correct breaker alignments and voltage to required AC, DC channel, DC train, and AC vital bus electrical power distribution subsystems.	In accordance with the Surveillance Frequency Control Program

ATTACHMENT 10

Event #4
Loss of 1ETA

3.7 PLANT SYSTEMS

3.7.5 Auxiliary Feedwater (AFW) System

LCO 3.7.5 Three AFW trains shall be OPERABLE.

-----NOTE-----
Only one AFW train, which includes a motor driven pump, is required to be OPERABLE in MODE 4.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is relied upon for heat removal.

ACTIONS

-----NOTE-----
LCO 3.0.4.b is not applicable when entering MODE 1.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One steam supply to turbine driven AFW pump inoperable. <u>OR</u> -----NOTE----- Only applicable if Mode 2 has not been entered following refueling. ----- One turbine driven AFW pump inoperable in MODE 3 following refueling.	A.1 Restore affected equipment to OPERABLE status.	7 days <u>AND</u> 10 days from discovery of failure to meet the LCO
B. One AFW train inoperable in MODE 1, 2 or 3 for reasons other than Condition A.	B.1 Restore AFW train to OPERABLE status.	72 hours <u>AND</u> 10 days from discovery of failure to meet the LCO

(continued)

ATTACHMENT 10

Event #4
Loss of 1ETA

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time for Condition A or B not met. OR Two AFW trains inoperable in MODE 1, 2, or 3.	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	6 hours 12 hours
D. Three AFW trains inoperable in MODE 1, 2, or 3.	D.1 ------------NOTE------------ LCO 3.0.3 and all other LCO Required Actions requiring MODE changes are suspended until one AFW train is restored to OPERABLE status. ----------------------------------- Initiate action to restore one AFW train to OPERABLE status.	 Immediately
E. Required AFW train inoperable in MODE 4.	E.1 Initiate action to restore AFW train to OPERABLE status.	Immediately

ATTACHMENT 10

Event #4
Loss of 1ETA

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.5.1	-----NOTE----- Not applicable to automatic valves when THERMAL POWER is ≤ 10% RTP. ----- Verify each AFW manual, power operated, and automatic valve in each water flow path, and in both steam supply flow paths to the steam turbine driven pump, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.7.5.2	-----NOTE----- Not required to be performed for the turbine driven AFW pump until 24 hours after ≥ 600 psig in the steam generator. ----- Verify the developed head of each AFW pump at the flow test point is greater than or equal to the required developed head.	In accordance with the INSERVICE TESTING PROGRAM
SR 3.7.5.3	-----NOTE----- Not applicable in MODE 4 when steam generator is relied upon for heat removal. ----- Verify each AFW automatic valve that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program

(continued)

ATTACHMENT 10

Event #4
Loss of 1ETA

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.5.4	-----NOTES----- 1. Not required to be performed for the turbine driven AFW pump until 24 hours after $\geq$ 600 psig in the steam generator. 2. Not applicable in MODE 4 when steam generator is relied upon for heat removal. ---------- Verify each AFW pump starts automatically on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.7.5.5	Verify proper alignment of the required AFW flow paths by verifying flow from the condensate storage system to each steam generator.	Prior to entering MODE 2, whenever unit has been in MODE 5 or 6 for > 30 days

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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-**Pl**ant ________ **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 #141
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.

A. Purpose

This procedure provides actions to add negative reactivity to a core which is observed to be critical when expected to be shutdown.

B. Symptoms or Entry Conditions

This procedure is entered from:

a. EP/1/A/5000/E-0 (Reactor Trip or Safety Injection), when reactor trip is not verified and manual trip is not effective.

b. EP/1/A/5000/F-0 (Critical Safety Function Status Trees), (SUBCRITICALITY) on either a RED or ORANGE condition.

c. EP/1/A/5000/FR-S.2 (Response to Loss of Core Shutdown), Step 1, when I/R or W/R power trending up.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

C. Operator Actions

CAUTION **NC pumps should NOT be tripped with reactor power greater than 5% to prevent fuel damage.**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. **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** insert rods.
__ • I/R power - TRENDING DOWN.	
2. **Verify Turbine Trip:**	**Perform the following:**
✓ • All turbine stop valves - CLOSED	__ 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 the following: __ • All MSIVs __ • All MSIV bypass valves.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. **Verify CA pumps running as follows:**	
✓ a. Motor driven CA pumps - ON.	__ a. Start motor driven CA pump(s).
✓ b. 3 S/G N/R levels - GREATER THAN 11%.	__ b. Ensure CA Pump #1 - RUNNING.
4. **Initiate Emergency Boration of NC System as follows:**	
__ a. Ensure at least one NV pump - ON.	
__ b. OPEN 1NV-236B (Boric Acid To NV Pumps Suct).	
__ c. Ensure both boric acid transfer pump switches - IN THE "ON" POSITION.	
__ d. Verify emergency boration flow - GREATER THAN OR EQUAL TO 30 GPM.	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). 2) CLOSE the following valves: __ • 1NV-188A (VCT Otlt Isol) __ • 1NV-189B (VCT Otlt Isol).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. (Continued)	
e. Verify the following charging line isolation values - OPEN: __ • 1NV-312A (Chrg Line Cont Isol) __ • 1NV-314B (Chrg Line Cont Isol).	e. Perform the following: 1) 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). 2) Ensure the following valves - OPEN: __ • 1NI-9A (NV Pmp C/L Inj Isol) __ • 1NI-10B (NV Pmp C/L Inj Isol).
__ f. Verify Pzr pressure - LESS THAN 2335 PSIG.	f. Perform the following: 1) Verify the following valves - OPEN. __ • All Pzr PORVs __ • All Pzr PORV isolation valves. __ 2) **<u>IF</u>** any Pzr PORV(s) **<u>OR</u>** isolation valves closed, **<u>THEN</u>** OPEN Pzr PORV(s) and isolation valves as required to reduce Pzr pressure to less than 2135 PSIG.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. **Verify the following Monitor Light Panel Group 5 St lights on energized train - LIT:**	**Ensure the following VQ isolation valves - CLOSED:**
__ • I/2	__ • 1VQ-2A (VQ Fan Suct From Cont Isol)
__ • I/3	__ • 1VQ-3B (VQ Fan Suct From Cont Isol)
__ • I/10	__ • 1VQ-15B (Cont Air Add Cont Isol)
__ • H/11.	__ • 1VQ-16A (Cont Air Add Cont Isol).
6. **Verify S/I status as follows:**	
__ a. "SAFETY INJECTION ACTUATED" status light (1SI-13) - LIT.	a. Perform the following: __ 1) **<u>IF</u> <u>AT</u> <u>ANY</u> <u>TIME</u>** S/I signal exists **<u>OR</u>** occurs while in this procedure, **<u>THEN</u>** perform Step 6.b. __ 2) **<u>GO</u> <u>TO</u>** Step 7.
b. **<u>WHEN</u>** manpower **<u>AND</u>** time permits, **<u>THEN</u>** verify proper system alignments as follows: __ • **<u>REFER</u> <u>TO</u>** Enclosure 1 (System Verification Following S/I Actuation) __ • Notify Unit 2 operator to perform Enclosure 2 (Opposite Unit Ventilation Verification).	

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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 17 (Isolating Cold Leg Accumulators)

Task Standard: AP/1/A/5500/027 (Shutdown LOCA) Enclosure 17 (Isolating Cold Leg Accumulators) is performed and 1B & 1C Cold Leg Accumulators are isolated and 1NI-83 fully opened to vent 1A & 1D 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

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SIMULATOR OPERATOR INSTRUCTIONS:

1. **ENSURE NRC Examination Security has been established.**
2. **Reset to IC # 142.**
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-NI005F (NI54A ACCUM ISOL VLV FAIL TO POSITION)	1				
	VLV-NI014F (NI88B ACCUM ISOL VLV FAIL TO POSITION)	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:

- **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 17 (Isolating Cold Leg Accumulators).**

EXAMINER NOTE: **After reading the cue, provide the applicant with a copy of AP/1/A/5500/027 Enclosure 17.**

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-65B & 1NI-76A. Applicant also verifies the red OPEN light lit and green CLSD light dark for valves 1NI-54A & 1NI-88B and transitions to the RNO. **The critical part of this step is to close isolation valves 1NI-65B & 1NI-76A. 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. **This step is critical to prevent binding of nitrogen supply isolation valves due to high differential pressure.** COMMENTS:	**CRITICAL STEP** ___ **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. **Examiner Cue: If asked, "Key #11 has been obtained."** **This step is critical to place power on Cold Leg Accumulator Nitrogen supply isolation valves for 1A and 1D 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-50 and 1NI-84. **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 1A and 1D 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 1A and 1D CLAs. **This step is critical to vent the 1A and 1D CLAs.** **NOTE TO EVALUATOR: The time to fully vent the 1A & 1D 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 1A and 1D 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 17 (Isolating Cold Leg Accumulators).**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 1. **Dispatch operator to restore power to all CLA discharge isolation valves. <u>REFER</u> <u>TO</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 9 (Power Alignment for CLA Valves).**	
2. **Ensure S/I - RESET:**	
__ a. ECCS.	__ a. Locally reset ECCS. **<u>REFER</u> <u>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</u> <u>AT</u> <u>ANY</u> <u>TIME</u>** B/O occurs, **<u>THEN</u>** restart S/I equipment previously on.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

3. **WHEN power 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).

RESPONSE NOT OBTAINED:

a. Perform the following:

1) Ensure containment isolation signals - RESET:

   __ • Phase A

   __ • Phase B.

__ 2) Ensure 1VI-77B (VI Cont Isol) - OPEN.

3) **IF** VI pressure less than 85 PSIG, **THEN** perform the following:

   __ a) Dispatch operator to ensure proper VI compressor operation.

   __ b) Restore VI while continuing with this procedure. **REFER TO** AP/0/A/5500/022 (Loss of Instrument Air).

(RNO continued on next page)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. (Continued)	4) Vent any unisolated CLA as follows: __ a) OPEN 1NI-47A (C-Leg Accum N2 Sup Cont Isol). __ b) Place breaker 1CB-1 (behind 1MC-6) (Key #11) to - ON. 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). __ d) CLOSE 1NI-47A. __ e) OPEN 1NI-83 (C-Leg Accums N2 Vent Ctrl) to depressurize affected CLA(s). __ f) <u>**IF**</u> any unisolated CLA(s) cannot be vented, <u>**THEN**</u> consult Station Management for further actions.
__ b. Notify dispatched operator to remove power from all CLA isolation valves. <u>**REFER TO**</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 9 (Power Alignment for CLA Valves).	

JPM C

Catawba Nuclear Station
JPM C
2021 NRC Exam

EVALUATION SHEET

Task: Restore CA Flow Following Bleed and Feed

Alternate Path: Yes

Facility JPM #: NEW

Safety Function: 4S **Title:** Loss of Secondary Heat Sink

K/A EPE05 EA1.1 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 (Loss of Secondary Heat Sink) Rev 48

Task Standard: CA flow restored to 1A and/or 1B Steam Generators from the 1A CA pump with suction aligned to the RN system.

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

==

COMMENTS

____

____

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____

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____

Catawba Nuclear Station
JPM C
2021 NRC Exam

SIMULATOR OPERATOR INSTRUCTIONS:

1. ENSURE NRC Examination Security has been established.
2. Reset to IC # 143.
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-CA004A (FAILURE OF CA PUMP A TO START)	AUTO				
	MAL-CA005 (CA PUMP OVERSPEED TRIP)	MECH-ANICAL				
	MAL-CF001A (LOSS OF CFPT 1A VACUUM)	100				
	MAL-CF001B (LOSS OF CFPT 1B VACUUM)	100				
	MAL-EHC002 (TURBINE TRIP FAILURE)	BOTH				
	VLV-CA002F (CA4 CA PMP SUCT FROM UST HDR ISOL FAIL TO POSITION)	0				

Catawba Nuclear Station
JPM C
2021 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 in Mode 3 following a reactor trip due to a loss of all feedwater.**
- **Bleed and Feed has been established per EP/1/A/5000/FR-H.1.**
- **CA flow control valves have been closed per Step 37.**
- **Report from AO and Maintenance in the field that 1A CA pump is ready to be started has just been received.**

INITIATING CUES:

- **The CRS instructs you to perform Step 7 to establish CA flow from 1A CA pump.**

Examiner Note: After reading cue, provide the applicant with a copy of EP/1/A/5000/FR-H.1 Step 7.

STEP/STANDARD	SAT/UNSAT

START TIME: _______

STEP 1 7. **Attempt to establish CA flow to at least one S/G as follows:** a. Verify 1AD-8, B/1 "UST LO LEVEL" – DARK. STANDARD: Applicant determines that 1AD-8, B/1 is dark. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP 2 7.b Verify 1CA-4 (CA Pmps Suct From UST) – OPEN. STANDARD: Applicant determines that 1CA-4 is closed and transitions to the RNO. COMMENTS:	___ **SAT** ___**UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 3 7.b.RNO Perform the following: 1) OPEN 1CA-4. STANDARD: Applicant depresses the red OPEN pushbutton and verifies the red OPEN light remains dark and the green CLSD light remains lit. Applicant determines the valve will not open and continues in the RNO. **Examiner Note: This begins the alternate path of this JPM.** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 4 7.b.RNO.2) **IF** no suction source can be aligned, **THEN** OPEN the following valves: • **1RN-250A (RN Hdr A to CA Pmp Suct Isol)** • 1CA-116A (CA Pump #1 Suct Frm RN Hdr A) • **1CA-15A (CA Pump 1A Suct Frm RN Isol)** • 1CA-85B (CA Pump #1 Suct Frm RN Hdr B) • 1CA-18B (CA Pump 1B Suct Frm RN Isol) • 1RN-310B (RN Hdr B To CA Pmp Suct Isol) STANDARD: Applicant rotates switches for the listed valves clockwise to the OPEN position and verifies the red OPEN lights lit and green CLOSED lights dark. **Examiner Note: This step is critical to align a suction flowpath to the CA pumps. Only 1RN-250A and 1CA-15A are required to be opened to meet this critical step due to the 1A CA pump being the only available source for CA flow.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 5 7.c Verify proper CA pump status as follows: 1) Power to both motor driven CA pumps – AVAILABLE. STANDARD: Applicant determines that power is not available to 1B CA pump by observing the indicating lights dark and transitions to the RNO. COMMENTS:	___ SAT ___ UNSAT

STEP/STANDARD	SAT/UNSAT
STEP 6 7.c.1) Perform the following: • **IF** 1ETA **OR** 1ETB de-energized, **THEN** restore power to affected essential bus. **REFER TO** AP/1/A/5500/007 (Loss of Normal Power). • **IF** essential bus energized, **THEN** dispatch operator to determine cause of breaker failure. STANDARD: Applicant determines that power is available to 1ETB and dispatches an operator to determine cause of breaker failure. **Examiner Cue: Once contacted as an AO, "Operator dispatched to determine cause of breaker failure."** COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 7 7.c.2) 1AD-5, F/3 "CAPT MECH OS TRIP" – DARK. STANDARD: Applicant determines 1AD-5, F/3 is lit and transitions to the RNO. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 8 7.c.2) RNO Perform the following: a) Dispatch operator to reset CAPT trip and throttle valve. b) **IF AT ANY TIME** CAPT trip and throttle valve reset prior to reaching feed and bleed criteria, **THEN** perform step 7. c) GO TO Step 7.d STANDARD: Applicant determines that the CAPT T/V CTRL is closed and transitions to the RNO. **Examiner Cue: "Operator dispatched to open the trip and throttle valve."** COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 9 7.d Ensure all CA isolation valves – OPEN. STANDARD: Applicant verifies all CA isolation valve red OPEN lights lit and green CLSD lights dark. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 10 7.e Verify all CA flow control valves – OPEN. STANDARD: Applicant verifies all CA flow control valves are closed and transitions to the RNO. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 11 7.e RNO Perform the following: 1) **IF** valve(s) closed as required by Step 37, **THEN GO TO** Step 7.f. 2) OPEN affected valve(s). STANDARD: Applicant determines from cue sheet that the CA flow control valves were closed per step 37 and proceeds to Step 7.f. **Examiner Cue: If asked why the CA flow control valves are closed, reply "CA flow control valves were closed per Step 37."** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 12 7.f Start all available CA pumps. STANDARD: Applicant depresses the 1A CA pump red ON pushbutton and verifies the red ON light lit and green OFF light dark. **Examiner Note: This step is critical to provide CA flow to the 1A and/or 1B S/Gs to meet the JPM standard.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 13 7.g Verify total CA flow – GREATER THAN 450 GPM. STANDARD: Applicant determines that total CA flow is < 450 GPM and transitions to the RNO. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 14 7.g RNO Perform the following: 1) **IF** only one motor driven CA pump on, **AND** its discharge path cannot be aligned to associated S/Gs, **THEN** evaluate aligning flow to other S/Gs through motor driven CA train A/B cross-tie alignment. **REFER TO** Enclosure 3 (Motor Driven CA Pump Train A/B Cross-Tie Alignment). STANDARD: Applicant determines that this step is not applicable and continues in the RNO. **Examiner Note: A copy of Encl. 3 has been provided if the applicant asks for it.** COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 15 7.g RNO 2) **IF** any CA pump on, **AND** Step 37 has been implemented, **THEN GO TO** Enclosure 7 (S/G CA Flow Restoration). STANDARD: Applicant determines from cue sheet that Step 37 has been implemented and transitions to Enclosure 7. **Examiner Note: Provide applicant with a copy of FR-H.1 Encl. 7. The following steps are from Encl. 7.** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT

NOTE:
- It may be preferable to feed 1B or 1C S/G first, to maintain steam supply to CAPT.
- Selecting S/G with the highest level will reduce risk of thermal shock to S/G when reestablishing feed flow.
- The available feed source will also determine which S/G can be fed.

STEP/STANDARD	SAT/UNSAT
STEP 16 1. Select one S/G to be fed. STANDARD: Applicant determines that either 1A or 1B S/G will be fed since the 1A CA pump is the only source of feed at this time. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 17 2. Verify core exit T/Cs – STABLE OR TRENDING DOWN. STANDARD: Applicant determines from the OAC or plasma display that CETs are trending down. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 18 3. THROTTLE open CA flow control valve to selected S/G to establish feed flow rate less than or equal to 100 GPM. STANDARD: Applicant turns flow control knob clockwise to establish flow to either 1A or 1B S/G. **Examiner Note: This step is critical to establish CA flow to either 1A or 1B S/G.** **Examiner Cue: If asked, "Containment pressure has remained less than 3 PSIG."** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 19 4. Maintain feed flow rate less than or equal to 100 GPM until W/R S/G level greater than 12% (21% ACC). STANDARD: Applicant determines that W/R level is > 12% on both 1A and 1B S/Gs. COMMENTS:	___ **SAT** ___ **UNSAT**

CAUTION Feed flow rates should be controlled to raise S/G level and prevent excessive NC System cooldown.

STEP/STANDARD	SAT/UNSAT
STEP 20 5. **WHEN** W/R S/G level greater than 12% (21% ACC), **THEN** feed flow can be raised to desired rate. STANDARD: Applicant determines that feed flow can be raised to desired rate. COMMENTS:	___ SAT ___ UNSAT
STEP 21 6. Slowly establish flow to any intact S/G with W/R level greater than 12% (21% ACC). STANDARD: Applicant determines that W/R level is > 12% on both 1A and 1B S/Gs and establishes flow to the S/G that has not been fed to this point by rotating the flow control knob in the clockwise direction. **Examiner Cue: Once applicants determine that W/R level in the S/G being fed is rising, the JPM may be terminated by informing the applicant "Another operator will continue with FR-H.1. This JPM is complete."** COMMENTS: **END OF TASK**	___ SAT ___ UNSAT

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- **Unit 1 is in Mode 3 following a reactor trip due to a loss of all feedwater.**
- **Bleed and Feed has been established per EP/1/A/5000/FR-H.1.**
- **CA flow control valves have been closed per Step 37.**
- **Report from AO and Maintenance in the field that 1A CA pump is ready to be started has just been received.**

INITIATING CUES:

- **The CRS instructs you to perform Step 7 to establish CA flow from 1A CA pump.**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. **Verify NC System feed and bleed required as follows:**	
__ a. W/R level in at least 3 S/Gs - LESS THAN 24% (36% ACC).	a. Perform the following: __ 1) Monitor feed and bleed initiation criteria. **<u>REFER</u> <u>TO</u>** Enclosure 1 (Foldout Page). __ 2) **<u>WHEN</u>** criteria satisfied, **<u>THEN</u> <u>GO</u> <u>TO</u>** Step 21. __ 3) **<u>GO</u> <u>TO</u>** Step 6.
__ b. **<u>GO</u> <u>TO</u>** Step 21.	
__ 6. **Ensure S/G BB and NM valves closed. <u>REFER</u> <u>TO</u> Enclosure 9 (S/G BB and NM Valve Checklist).**	
7. **Attempt to establish CA flow to at least one S/G as follows:**	
__ a. Verify 1AD-8, B/1 "UST LO LEVEL" - DARK.	a. Perform the following: __ 1) **<u>REFER</u> <u>TO</u>** AP/1/A/5500/006 (Loss of S/G Feedwater). __ 2) **<u>GO</u> <u>TO</u>** Step 7.c.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. (Continued)	
__ b. Verify 1CA-4 (CA Pmps Suct From UST) - OPEN.	b. Perform the following: __ 1) OPEN 1CA-4. 2) **IF** no suction source can be aligned, **THEN** OPEN the following valves: __ • 1RN-250A (RN Hdr A To CA Pmp Suct Isol) __ • 1CA-116A (CA Pump #1 Suct Frm RN Hdr A) __ • 1CA-15A (CA Pump 1A Suct Frm RN Isol) __ • 1CA-85B (CA Pump #1 Suct Frm RN Hdr B) __ • 1CA-18B (CA Pump 1B Suct Frm RN Isol) __ • 1RN-310B (RN Hdr B To CA Pmp Suct Isol).
c. Verify proper CA pump status as follows:	
__ 1) Power to both motor driven CA pumps - AVAILABLE.	1) Perform the following: __ • **IF** 1ETA **OR** 1ETB de-energized, **THEN** restore power to affected essential bus. **REFER TO** AP/1/A/5500/007 (Loss of Normal Power). __ • **IF** essential bus energized, **THEN** dispatch operator to determine cause of breaker failure.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. (Continued)	
__ 2) 1AD-5, F/3 "CAPT MECH OS TRIP" - DARK.	2) Perform the following: __ a) Dispatch operator to reset CAPT trip and throttle valve. __ b) **IF AT ANY TIME** CAPT trip and throttle valve reset prior to reaching feed and bleed criteria, **THEN** perform Step 7. __ c) **GO TO** Step 7.d.
__ 3) "CAPT TRIP T/V CTRL" - OPEN.	3) Perform the following: __ a) OPEN valve. __ b) **IF** valve will not open, **THEN** dispatch operator to open CAPT trip and throttle valve.
4) Verify the following valves - OPEN: __ • 1SA-2 (S/G 1B SM To CAPT) __ • 1SA-5 (S/G 1C SM To CAPT).	__ 4) Place CA Pump #1 to "ON".
__ d. Ensure all CA isolation valves - OPEN.	
__ e. Verify all CA flow control valves - OPEN.	e. Perform the following: __ 1) **IF** valve(s) closed as required by Step 37, **THEN GO TO** Step 7.f. __ 2) OPEN affected valve(s).
__ f. Start all available CA pumps.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

7. (Continued)

__ g. Verify total CA flow - GREATER THAN 450 GPM.

g. Perform the following:

__ 1) **IF** only one motor driven CA pump on, **AND** its discharge path cannot be aligned to associated S/Gs, **THEN** evaluate aligning flow to other S/Gs through motor driven CA train A/B cross-tie alignment. **REFER TO** Enclosure 3 (Motor Driven CA Pump Train A/B Cross-Tie Alignment).

__ 2) **IF** any CA pump on, **AND** Step 37 has been implemented, **THEN GO TO** Enclosure 7 (S/G CA Flow Restoration).

3) **IF** any feed flow to at least one S/G verified, **THEN** perform the following:

__ a) Maintain flow to restore N/R level in at least one S/G to greater than 11% (29% ACC).

b) **IF AT ANY TIME** N/R level in at least one S/G trends up to greater than 11% (29% ACC) prior to reaching feed and bleed initiation criteria, **THEN** perform the following:

(1) **IF** NC System **OR** S/G depressurization in progress to feed S/G(s) from CM, **THEN** stabilize the following:

__ • NC pressure

__ • S/G pressure.

__ (2) **RETURN TO** procedure and step in effect.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

7. (Continued)

__ c) Dispatch operator to verify proper CA valve alignment. **REFER TO** Enclosure 2 (Local CA Flowpath Restoration).

__ d) **IF AT ANY TIME** CA flow restored greater than 450 GPM prior to meeting feed and bleed initiation criteria, **THEN** perform Step 7.

4) **IF** no CA flow indicated, **THEN** perform the following:

__ a) **IF** no CA pump can be started, **THEN** dispatch operator and maintenance to CA pumps to attempt to restore one CA pump to service. **REFER TO** EM/1/A/5200/007 (Troubleshooting Cause For CA Pump(s) Failing to Start).

__ b) Dispatch operator to verify proper CA valve alignment. **REFER TO** Enclosure 2 (Local CA Flowpath Restoration).

__ c) **IF AT ANY TIME** CA flow restored prior to meeting feed and bleed initiation criteria, **THEN** perform Step 7.

__ 5) **GO TO** Step 8.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. (Continued)	
__ h. Verify feed and bleed - PREVIOUSLY ESTABLISHED (Steps 22 through 26 completed).	h. Perform the following: 1) **IF** NC System **OR** S/G depressurization in progress to feed S/G(s) from CM, **THEN** stabilize the following: __ • NC pressure __ • S/G pressure. __ 2) **RETURN TO** procedure and step in effect.
__ i. **GO TO** Step 39.	
8. **Verify Condenser Steam Dump as follows:**	
a. Verify condenser available as follows: __ • "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT __ • Any MSIV - OPEN.	__ a. **GO TO** Step 9.
__ b. Verify steam dumps in - T-AVG MODE.	__ b. **GO TO** Step 9.
c. Place steam dumps in pressure mode as follows: __ 1) Place steam dumps in - PRESSURE MODE. __ 2) Ensure "STM DUMP CTRL" - SET AT 1090 PSIG STEAM HEADER PRESSURE.	
__ 9. **Stop all NC pumps.**	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE • It may be preferable to feed 1B or 1C S/G first, to maintain steam supply to CAPT. • Selecting S/G with highest level will reduce risk of thermal shock to S/G when reestablishing feed flow. • The available feed source will also determine which S/G can be fed.	
__ 1. **Select one S/G to be fed.**	
__ 2. **Verify core exit T/Cs - STABLE OR TRENDING DOWN.**	**Perform the following:** __ a. THROTTLE open CA flow control valve to establish flow rate required to lower core exit T/Cs temperature. __ b. **IF** core exit T/Cs continue to trend up, **THEN** THROTTLE open CA flow control valves to feed other S/Gs as needed to lower core exit T/Cs temperature. c. **IF** CA flow cannot be established to at least one S/G, **THEN** perform the following: __ 1) Dispatch operator to verify proper CA valve alignment. **REFER TO** Enclosure 2 (Local CA Flowpath Restoration). __ 2) **GO TO** Section C. (Operator Actions), Step 37. __ d. **GO TO** Step 6.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 3. **THROTTLE open CA flow control valve to selected S/G to establish feed flow rate less than or equal to 100 GPM.**	**IF CA flow cannot be established to at least one S/G, THEN perform the following:** __ a. Dispatch operator to verify proper CA valve alignment. **REFER TO** Enclosure 2 (Local CA Flowpath Restoration). __ b. **GO TO** Section C. (Operator Actions), Step 37.
__ 4. **Maintain feed flow rate less than or equal to 100 GPM until W/R S/G level greater than 12% (21% ACC).**	

CAUTION **Feed flow rates should be controlled to raise S/G level and prevent excessive NC System cooldown.**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 5. **WHEN W/R S/G level greater than 12% (21% ACC), THEN feed flow can be raised to desired rate.**	
__ 6. **Slowly establish flow to any intact S/G with W/R level greater than 12% (21% ACC).**	
7. **Verify the following:** __ • NC T-Hot associated with S/G(s) being fed - TRENDING DOWN __ • Core Exit T/Cs - TRENDING DOWN.	__ **Do not continue in this enclosure until both conditions met.**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 8. **Verify S/G(s) being fed - INTACT.**	**Perform the following:** __ a. **IF** S/G being fed faulted **OR** ruptured, **THEN** establish feedwater flow to another S/G observing previous flowrate requirements. __ b. **IF** an intact S/G not available to be fed, **THEN** establish feed flow to ruptured or faulted S/G. __ c. **WHEN** ruptured **OR** faulted S/G no longer required for heat sink, **THEN** isolate feed flow to ruptured or faulted S/G.
__ 9. **GO TO Section C. (Operator Actions), Step 39.**	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
CAUTION **Aligning single motor driven CA pump to more than two S/Gs can lead to pump runnout if control valves are opened too far or if they fail open.**	
NOTE 1A CA pump is normally aligned to 1A and 1B S/Gs. 1B CA pump is normally aligned to 1C and 1D S/Gs. Opening train A/B cross-tie will allow either motor driven CA pump to feed any S/G.	
__ 1. **Verify 1A CA pump - ON.**	__ **GO TO Step 4.**
2. **CLOSE the following CA flow control valves:** __ • 1CA-44 (CA Pump 1B Flow To S/G 1C) __ • 1CA-40 (CA Pump 1B Flow To S/G 1D).	**Perform the following:** a. Dispatch operator to close the following valves. **REFER TO** Enclosure 14 (Unit 1 Local CA Flow Control Valve Operation): __ • 1CA-44 (CA Pump 1B Flow To S/G 1C) (AB-552, CC-DD, 52-53, Rm 250) (Ladder needed) __ • 1CA-40 (CA Pump 1B Flow To S/G 1D) (AB-553, BB-49, Rm 250) (Ladder needed). __ b. Do not continue until valves in previous step - CLOSED.
__ 3. **GO TO Step 6.**	
__ 4. **Verify 1B CA pump - ON.**	__ **Exit this enclosure.**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. **CLOSE the following CA flow control valves:** __ • 1CA-60 (CA Pump 1A Flow To S/G 1A) __ • 1CA-56 (CA Pump 1A Flow To S/G 1B).	**Perform the following:** a. Dispatch operator to close the following valves. **REFER TO** Enclosure 14 (Unit 1 Local CA Flow Control Valve Operation): __ • 1CA-60 (CA Pump 1A Flow To S/G 1A) (AB-551, BB-CC, 49-50, Rm 250) (Ladder needed) __ • 1CA-56 (CA Pump 1A Flow To S/G 1B) (AB-552, DD-52, Rm 250) (Ladder needed). __ b. Do not continue until valves in previous step - CLOSED.
__ 6. **Limit motor driven CA pump flow in the following steps to less than 500 GPM.**	
7. **Dispatch operator to unlock and open the following valves while monitoring CA flow:** __ • 1CA-111 (1A & 1B CA Pump Disch X-over To S/G Isol) (AB-552, BB-50, Rm 250) __ • 1CA-112 (1A & 1B CA Pump Disch X-over To S/G Isol) (AB-552, BB-50, Rm 250).	**IF valve(s) will not open, THEN perform the following to reduce ΔP across valves:** __ a. Stop motor driven CA pump. __ b. Notify dispatched operator to open valves prior to starting pump. __ c. Start motor driven CA pump.
__ 8. **THROTTLE open CA flow control valves to desired flow rate.**	__ **Notify dispatched operator to throttle local valves as required. REFER TO Enclosure 14 (Unit 1 Local CA Flow Control Valve Operation).**

JPM D

Catawba Nuclear Station
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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-**Pl**ant ________ **P**erform __X__ **S**imulate ________

References: EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) Rev 46

Task Standard: At least one train of Phase A containment isolation initiated and either 1NV-10A or 1NV-15B manually closed and either 1WL-805A or 1WL-807B manually closed.

Validation Time: 5 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

===

COMMENTS

Catawba Nuclear Station
JPM D
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SIMULATOR OPERATOR INSTRUCTIONS:

1. ENSURE NRC Examination Security has been established.
2. Reset to IC # 144.
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 A ISOL SIGNAL TRN B)	BLOCK				
	VLV-NV009A (NV10A L/D ORIFICE 1B ISOL CNTRL FAIL AUTO ACTIONS)	ACTIVE				
	VLV-NV012A (NV15B L/D ISOL OUTSIDE CNMT VLV FAIL AUTO ACTIONS)	ACTIVE				
	VLV-WL007A (WL805A NCDT PMPS DISCH CONT ISOL IN FAIL AUTO ACTIONS)	ACTIVE				
	VLV-WL008A (WL807B NCDT PMPS DISCH CONT ISOL OUT FAIL AUTO ACTIONS)	ACTIVE				
	When applicant is ready, INSERT EVENT 1.					

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:

- **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: 1. **Monitor Enclosure 1 (Foldout Page).** STANDARD: Applicant will monitor Foldout Page actions once immediate actions are performed and verified. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP 2: 2. **Verify Reactor Trip:** • All rod bottom lights – LIT • All reactor trip and bypass breakers – OPEN • I/R power – TRENDING DOWN. STANDARD: Applicant verifies the reactor is tripped. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP 3: 3. **Verify Turbine Trip:** • All turbine stop valves – CLOSED. STANDARD: Applicant determines the turbine is tripped. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 4: 4. **Verify 1ETA and 1ETB – ENERGIZED.** STANDARD: Applicant verifies that 1ETA and 1ETB are energized by use of status lights or by verifying the indicating lights lit for KC valves on both A and B trains. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 5: 5. **Verify S/I actuated:** a. “SAFETY INJECTION ACTUATED” status light (1SI-13) – LIT. b. Both E/S load sequencer actuated status lights (1SI-14) – LIT. STANDARD: Applicant determines that safety injection has actuated. **Examiner Note: Once applicant announces that his immediate actions are complete, hand them a copy of E-0 completed through step 5 and provide the following cue: “The CRS has validated that the immediate actions are complete and directs you to continue performance of E-0, beginning at Step 6.”** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 6: 6. **Announce "Unit 1 Safety Injection".** STANDARD: Applicant uses the plant paging system to make the announcement. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 7 7. **Determine required notifications:** • **REFER TO** AD-EP-ALL-0111 (Control Room Activation of the ERO) • **REFER TO** AD-LS-ALL-0006 (Notification/Reportability Evaluation) STANDARD: Applicant acknowledges the step and continues with E-0. COMMENTS:	___ **SAT** ___**UNSAT**
STEP 8 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 9 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 10 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 letdown penetration is isolated. The letdown 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 11 9.b. Monitor Light Panel Group 5 St lights on energized train(s) – LIT. STANDARD: Applicant determines that Group 5 St lights B/1, B/12, C/1, and C/12 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 12 9.b.RNO. Align valves as necessary to ensure each penetration isolated by at least one isolation valve. STANDARD: Applicant rotates the switch for 1NV-10A counterclockwise to the CLOSE position and verifies the green closed light is lit and red open light dark. Applicant depresses the green CLOSE pushbutton for 1NV-15B and verifies the green CLSD light lit and red OPEN light dark. Applicant depresses the green CLOSE pushbutton for 1WL-805A and 1WL-807B and verifies the green CLSD light lit and red OPEN light dark on both valves. **Examiner Note: It is critical for the applicant to close 1 of the valves in each penetration (either 1NV-10A or 1NV-15B and either 1WL-805A or 1WL-807B) to ensure the 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**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
C. Operator Actions	
✓ 1. **Monitor Enclosure 1 (Foldout Page).**	
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 perform the following:
✓ • I/R power - TRENDING DOWN.	__ • 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** 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 the following valves:
	__ • All MSIVs
	__ • All MSIV bypass valves.

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).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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) **<u>IF</u>** S/I required, **<u>THEN</u>** initiate S/I. 3) **<u>IF</u>** S/I not required, **<u>THEN</u>** concurrently perform the following: • **<u>IF</u>** 1ETA **<u>OR</u>** 1ETB de-energized, **<u>THEN</u>** ensure the following pumps running on energized bus: __ • NV pump __ • KC pumps __ • RN pump. __ • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). __ • **<u>GO</u> <u>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.
__ 6. **Announce "Unit 1 Safety Injection".**	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **Determine required notifications:**	
__ • **REFER TO** AD-EP-ALL-0111 (Control Room Activation of the ERO)	
__ • **REFER TO** AD-LS-ALL-0006 (Notification/Reportability Evaluation).	
__ 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.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

10. **Verify 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.

__ b) **IF** Phase B Isolation "RESET" lights lit, **THEN** initiate Phase B Isolation.

c) Verify following monitor light panel lights on energized train(s) - 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.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

10. (Continued)

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.

__ b. **IF AT ANY TIME** containment pressure exceeds 3 PSIG while in this procedure, **THEN** perform Step 10.a.

JPM E

Catawba Nuclear Station
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EVALUATION SHEET

Task: Align the NS System for Cold Leg Recirculation

Alternate Path: Yes

Facility JPM #: NS-106

Safety Function: 5 **Title:** Containment Integrity

K/A 026 A4.01 Ability to manually operate and/or monitor in the control room: CSS controls

Rating(s): 4.5 / 4.3 **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/ES-1.3 (Transfer to Cold Leg Recirculation) Enclosure 2. Rev.031

Task Standard: Aligns NS system for Cold Leg Recirculation with suction valves from the FWST closed, spray header containment isolations open, 1B NS Pump running, and proper RN flow to the 1B NS Heat Exchanger.

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

===

COMMENTS

Catawba Nuclear Station
JPM E
2021 NRC Exam

SIMULATOR OPERATOR INSTRUCTIONS:

1. ENSURE NRC Examination Security has been established.
2. Reset to IC # 145.
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-NC013A (NC COLD LEG A LEAK)	27.5				
	VLV-NS009F (NS18A NS PMP A SUCT FROM CNMT SUMP FAIL TO POSITION)	0				

Catawba Nuclear Station
JPM E
2021 NRC Exam

READ TO APPLICANT

DIRECTION TO APPLICANT:

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INITIAL CONDITIONS:

- **A LOCA has occurred on Unit 1.**
- **EP/1/A/5000/ES-1.3, (Transfer to Cold Leg Recirculation) has been implemented.**

INITIATING CUES:

The CRS instructs you to align NS to Cold Leg Recirculation per Enclosure 2 of ES-1.3.

Examiner Note: After reading cue, provide the applicant with a copy of EP/1/A/5000/ES-1.3 Enclosure 2.

STEP/STANDARD	SAT/UNSAT

START TIME: _______

STEP 1: 1. **Verify both NS pumps - OFF.** STANDARD: Applicant verifies that 1A and 1B NS pumps are off . COMMENTS:	___ **SAT** ___ **UNSAT**

STEP 2 2. **CLOSE the following valves:** • 1NS-20A (NS Pump 1A Suct From FWST) • 1NS-3B (NS Pump 1B Suct From FWST). STANDARD: Applicant depresses the green CLOSE pushbuttons for 1NS-20A and 1NS-3B. **Examiner Note: This step is critical to ensure suction flowpath is only from the containment sump.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 3 3. **Verify containment pressure - GREATER THAN 3 PSIG** STANDARD: Applicant verifies containment pressure is greater than 3 psig on 1NSP5040, 1NSP5050, 1NSP5060 or 1NSP5070 on 1MC-11 or on the OAC or on any chart recorder containing containment pressure. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 4 4. **Verify at least one of the following annunciators - LIT:** • 1AD-20, B/3 "CONT. SUMP LEVEL >3.3 ft" OR • 1AD-21, B/3 "CONT. SUMP LEVEL >3.3 ft". STANDARD: Applicant verifies that at least 1AD-20, B/3 or 1AD-21, B/3 is lit on 1MC-7 COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 5 5. **Align NS Train 1A to containment sump as follows:** a. Verify NS Pump 1A - AVAILABLE TO RUN. STANDARD: Applicant verifies that NS Pump 1A is available to run. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 6 5. b. Verify 1NI-185A (ND Pump 1A Cont Sump Suct) - OPEN. STANDARD: Applicant verifies that 1NI-185A is open. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 7 5. c. Verify NS Pump 1B – OFF STANDARD: Applicant verifies that NS Pump 1B is off. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 8 5. d. OPEN 1NS-29A (NS Spray Hdr 1A Cont Isol). STANDARD: Applicant depresses the red OPEN pushbutton for 1NS-29A on 1MC-11. **Examiner Note: This step is critical to provide a flowpath from the pump to the containment spray rings.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 9 5. e. OPEN 1NS-32A (NS Spray Hdr 1A Cont Isol). STANDARD: Applicant depresses the red OPEN pushbutton for 1NS-32A on 1MC-11. **Examiner Note: This step is critical to provide a flowpath from the pump to the containment spray rings.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 10 5. f. Verify 1NS-20A (NS Pump 1A Suct From FWST) - CLOSED. STANDARD: Applicant verifies that 1NS-20A is closed. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 11 5. g. OPEN 1NS-18A (NS Pmp A Suct From Cont Sump). STANDARD: Applicant depresses the red OPEN pushbutton for 1NS-18A on 1MC-11. The valve will not open. No RNO step available for this step. Applicant proceeds to next step. **Examiner Note: This begins the alternate path for this JPM.** COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 12 5. h. Verify the following valves - OPEN: • 1NS-29A (NS Spray Hdr 1A Cont Isol) • 1NS-32A (NS Spray Hdr 1A Cont Isol) • 1NS-18A (NS Pmp A Suct From Cont Sump). STANDARD: Applicant verifies that 1NS-29A and 1NS-32A are open and that 1NS-18A is closed and transitions to the RNO. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 13 5.h RNO. **IF** any valve remains CLOSED or INTERMEDIATE for over 25 seconds, **THEN GO TO** Step 6. STANDARD: Applicant proceeds to Step 6 in order to place 1B NS train in service. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 14 6. **Align NS Train 1B to containment sump as follows:** a. Verify 1NI-184B (ND Pump 1B Cont Sump Suct) - OPEN. STANDARD: Applicant verifies that 1NI-184B is open. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 15 6. b. Verify NS Pump 1A – OFF STANDARD: Applicant verifies that NS Pump 1A is off. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 16 6.c OPEN 1NS-15B (NS Spray Hdr 1B Cont Isol). STANDARD: Applicant depresses the red OPEN pushbutton for 1NS-15B and verifies the red open light is lit and green CLSD light is dark. **Examiner Note: This step is critical to provide a flowpath from the pump to the containment spray rings.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 17 6.d OPEN 1NS-12B (NS Spray Hdr 1B Cont Isol). STANDARD: Applicant depresses the red OPEN pushbutton for 1NS-12B on 1MC-11 and verifies the red OPEN light lit and green CLSD light dark. **Examiner Note: This step is critical to provide a flowpath from the pump to the containment spray rings.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 18 6.e Verify 1NS-3B (NS Pump 1B Suct From FWST) - CLOSED. STANDARD: Applicant verifies green CLSD light lit and red OPEN light dark for 1NS-3B. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 19 6.f. OPEN 1NS-1B (NS Pmp B Suct From Cont Sump). STANDARD: Applicant depresses the red OPEN pushbutton and verifies the red OPEN light lit and green CLSD light dark for 1NS-1B. **Examiner Note: This step is critical to provide a suction path from the containment sump to the NS pump.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 20 6.g. Verify the following valves – OPEN: • 1NS-15B (NS Spray Hdr 1B Cont Isol) • 1NS-12B (NS Spray Hdr 1B Cont Isol) • 1NS-1B (NS Pmp B Suct From Cont Sump) STANDARD: Applicant verifies that listed valves are open. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 21 6.h. Verify containment pressure – GREATER THAN 1 PSIG. STANDARD: Applicant verifies that containment pressure is > 1 PSIG. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 22 6.i Start NS Pump 1B. STANDARD: Applicant depresses the red ON pushbutton for 1B NS pump and verifies the red ON light lit and green OFF light dark. **Examiner Note: This step is critical to initiate containment spray flow.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

CAUTION: Exceeding 4650 GPM RN flow through an NS Hx will cause damage to the Hx tubes.

STEP 23 6.j.1) Align RN to NS Hx 1B as follows: Verify at least one of the following: • All Unit 1 and Unit 2 RN pumps – ON OR • RN System – ALIGNED FOR SINGLE SUPPLY HEADER OPERATION STANDARD: Applicant verifies that all Unit 1 and Unit 2 RN pumps are on. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 24 6.j.2) OPEN 1RN-225B (NS Hx 1B Inlet Isol). STANDARD: Applicant depresses the red OPEN pushbutton for 1RN-225B and verifies the red OPEN light lit and green CLSD light dark. **Examiner Note: This step is critical to provide cooling of containment spray.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 25 6.j.3). **WHEN** 1RN-225B begins to open, **THEN** OPEN 1RN-229B (NS Hx 1B Otlt Isol) STANDARD: Applicant depresses and holds the red OPEN pushbutton for 1RN-229B and verifies the red OPEN light lit and green CLSD light dark. **Examiner Note: This step is critical to provide cooling of containment spray.** **Examiner Cue: Once cooling water has been established: "Another operator will continue this enclosure. JPM 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:

- **A LOCA has occurred on Unit 1.**
- **EP/1/A/5000/ES-1.3, (Transfer to Cold Leg Recirculation) has been implemented.**

INITIATING CUES:

The CRS instructs you to align NS to Cold Leg Recirculation per Enclosure 2 of ES-1.3.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 1. **Verify both NS pumps - OFF.**	**Perform the following:** a. **IF** all the following conditions met: __ • NS in service __ • NS suction aligned to containment sump __ • RN established to associated NS Hx, __ **THEN RETURN TO** procedure section and step in effect. __ b. Ensure both NS pumps - OFF.
2. **CLOSE the following valves:** __ • 1NS-20A (NS Pump 1A Suct From FWST) __ • 1NS-3B (NS Pump 1B Suct From FWST).	
__ 3. **Verify containment pressure - GREATER THAN 3 PSIG.**	**Perform the following:** __ a. Wait up to 20 seconds for 1NS-20A and 1NS-3B to close. __ b. OPEN 1NS-18A (NS Pmp A Suct From Cont Sump). __ c. OPEN 1NS-1B (NS Pmp B Suct From Cont Sump). __ d. **IF AT ANY TIME** containment pressure goes above 3 PSIG, **THEN** perform Enclosure 2 (Aligning NS for Recirculation). __ e. **RETURN TO** procedure section and step in effect.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. **Verify at least one of the following annunciators - LIT:** __ • 1AD-20, B/3 "CONT. SUMP LEVEL >3.3 ft" OR __ • 1AD-21, B/3 "CONT. SUMP LEVEL >3.3 ft".	**Perform the following:** __ a. **<u>WHEN</u>** at least one "CONT. SUMP LEVEL >3.3 ft" annunciator - LIT, **<u>THEN</u> <u>GO</u> <u>TO</u>** Step 5. __ b. Do not continue in this enclosure until at least one annunciator - LIT.
5. **Align NS train 1A to containment sump as follows:**	
__ a. Verify NS pump 1A - AVAILABLE TO RUN.	__ a. **<u>GO</u> <u>TO</u>** Step 6.
__ b. Verify 1NI-185A (ND Pump 1A Cont Sump Suct) - OPEN.	__ b. **<u>GO</u> <u>TO</u>** Step 6.
__ c. Verify NS pump 1B - OFF.	c. **<u>IF</u>** NS pump 1B running **<u>AND</u>** RN established to NS Hx 1B, **<u>THEN</u>** perform the following: __ 1) Ensure 1NS-20A (NS Pump 1A Suct From FWST) - CLOSED. __ 2) Ensure 1NS-18A (NS Pmp A Suct From Cont Sump) - OPEN. __ 3) **<u>GO</u> <u>TO</u>** Step 7.
__ d. OPEN 1NS-29A (NS Spray Hdr 1A Cont Isol).	__ d. **<u>GO</u> <u>TO</u>** Step 6.
__ e. OPEN 1NS-32A (NS Spray Hdr 1A Cont Isol).	__ e. **<u>GO</u> <u>TO</u>** Step 6.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. (Continued)	
__ f. Verify 1NS-20A (NS Pump 1A Suct From FWST) - CLOSED.	__ f. **IF** 1NS-20A remained OPEN or INTERMEDIATE for over 20 seconds, **THEN GO TO** Step 6.
__ g. OPEN 1NS-18A (NS Pmp A Suct From Cont Sump).	
h. Verify the following valves - OPEN: __ • 1NS-29A (NS Spray Hdr 1A Cont Isol) __ • 1NS-32A (NS Spray Hdr 1A Cont Isol) __ • 1NS-18A (NS Pmp A Suct From Cont Sump).	__ h. **IF** any valve remains CLOSED or INTERMEDIATE for over 25 seconds, **THEN GO TO** Step 6.
__ i. Verify containment pressure - GREATER THAN 1 PSIG.	i. Perform the following: 1) CLOSE the following valves: __ • 1NS-29A (NS Spray Hdr 1A Cont Isol) __ • 1NS-32A (NS Spray Hdr 1A Cont Isol). __ 2) **IF AT ANY TIME** containment pressure exceeds 1 PSIG, **THEN RETURN TO** Step 4. __ 3) **GO TO** Step 7.
__ j. Start NS pump 1A.	__ j. **GO TO** Step 6.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

5. (Continued)

CAUTION **Exceeding 4650 GPM RN flow through an NS Hx will cause damage to the Hx tubes.**

k. Align RN to NS Hx 1A as follows:

1) Verify at least one of the following:

__ • All Unit 1 and Unit 2 RN pumps - ON

OR

__ • RN System - ALIGNED FOR SINGLE SUPPLY HEADER OPERATION.

RESPONSE NOT OBTAINED:

1) Perform the following to support NS Hx cooling flow:

__ a) **IF** only one A train RN pump on, **THEN** CLOSE Unit 2 2RN-48B (RN Supply X-Over Isol).

b) **IF** only A train RN pumps on, **THEN** CLOSE one of the following Unit 2 valves:

__ • 2RN-47A (RN Supply X-Over Isol)

OR

__ • 2RN-48B (RN Supply X-Over Isol).

__ 2) OPEN 1RN-144A (NS Hx 1A Inlet Isol).

__ 3) **WHEN** 1RN-144A begins to open, **THEN** OPEN 1RN-148A (NS Hx 1A Otlt Isol).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. **Align NS train 1B to containment sump as follows:**	
__ a. Verify 1NI-184B (ND Pump 1B Cont Sump Suct) - OPEN.	__ a. **<u>GO</u> <u>TO</u>** Step 7.
__ b. Verify NS pump 1A - OFF.	b. **<u>IF</u>** NS pump 1A running **<u>AND</u>** RN established to NS Hx 1A, **<u>THEN</u>** perform the following: __ 1) Ensure 1NS-3B (NS Pump 1B Suct From FWST) - CLOSED. __ 2) Ensure 1NS-1B (NS Pmp B Suct From Cont Sump) - OPEN. __ 3) **<u>GO</u> <u>TO</u>** Step 7.
__ c. OPEN 1NS-15B (NS Spray Hdr 1B Cont Isol).	__ c. **<u>GO</u> <u>TO</u>** Step 7.
__ d. OPEN 1NS-12B (NS Spray Hdr 1B Cont Isol).	__ d. **<u>GO</u> <u>TO</u>** Step 7.
__ e. Verify 1NS-3B (NS Pump 1B Suct From FWST) - CLOSED.	__ e. **<u>IF</u>** 1NS-3B remained OPEN or INTERMEDIATE for over 20 seconds, **<u>THEN</u> <u>GO</u> <u>TO</u>** Step 7.
__ f. OPEN 1NS-1B (NS Pmp B Suct From Cont Sump).	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. (Continued)	
g. Verify the following valves - OPEN: __ • 1NS-15B (NS Spray Hdr 1B Cont Isol) __ • 1NS-12B (NS Spray Hdr 1B Cont Isol) __ • 1NS-1B (NS Pmp B Suct From Cont Sump).	__ g. **<u>IF</u>** any valve remains CLOSED or INTERMEDIATE for over 25 seconds, **<u>THEN</u> <u>GO</u> <u>TO</u>** Step 7.
__ h. Verify containment pressure - GREATER THAN 1 PSIG.	h. Perform the following: 1) CLOSE the following valves: __ • 1NS-15B (NS Spray Hdr 1B Cont Isol) __ • 1NS-12B (NS Spray Hdr 1B Cont Isol). __ 2) **<u>IF</u> <u>AT</u> <u>ANY</u> <u>TIME</u>** containment pressure exceeds 1 PSIG, **<u>THEN</u> <u>RETURN</u> <u>TO</u>** Step 4. __ 3) **<u>GO</u> <u>TO</u>** Step 7.
__ i. Start NS pump 1B.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

6. (Continued)

<u>CAUTION</u> Exceeding 4650 GPM RN flow through an NS Hx will cause damage to the Hx tubes.

j. Align RN to NS Hx 1B as follows:

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1) Verify at least one of the following: __ • All Unit 1 and Unit 2 RN pumps - ON **<u>OR</u>** __ • RN System - ALIGNED FOR SINGLE SUPPLY HEADER OPERATION.	1) Perform the following to support NS Hx cooling flow: __ a) **<u>IF</u>** only one B train RN pump on, **<u>THEN</u>** CLOSE Unit 2 2RN-47A (RN Supply X-Over Isol). b) **<u>IF</u>** only B Train RN pumps on, **<u>THEN</u>** CLOSE one of the following Unit 2 valves: __ • 2RN-48B (RN Supply X-Over Isol) OR __ • 2RN-47A (RN Supply X-Over Isol).
__ 2) OPEN 1RN-225B (NS Hx 1B Inlet Isol).	
__ 3) **<u>WHEN</u>** 1RN-225B begins to open, **<u>THEN</u>** OPEN 1RN-229B (NS Hx 1B Otlt Isol).	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. **Verify proper NS alignment as follows:**	
__ a. Verify 1NS-18A (NS Pmp A Suct From Cont Sump) - OPEN.	a. Perform the following: __ 1) **<u>IF</u>** 1NI-185A (ND Pump 1A Cont Sump Suct) open **<u>AND</u>** 1NS-20A (NS Pump 1A Suct From FWST) closed, **<u>THEN</u>** OPEN 1NS-18A. __ 2) DO **<u>NOT</u>** start 1A NS pump until aligned to containment sump.
__ b. Verify 1NS-1B (NS Pmp B Suct From Cont Sump) - OPEN.	b. Perform the following: __ 1) **<u>IF</u>** 1NI-184B (ND Pump 1B Cont Sump Suct) open **<u>AND</u>** 1NS-3B (NS Pump 1B Suct From FWST) closed, **<u>THEN</u>** OPEN 1NS-1B. __ 2) DO **<u>NOT</u>** start 1B NS pump until aligned to containment sump.
__ c. Verify NS pump 1A - ON.	c. Ensure the following valves - CLOSED: __ • 1NS-29A (NS Spray Hdr 1A Cont Isol) __ • 1NS-32A (NS Spray Hdr 1A Cont Isol).
__ d. Verify NS pump 1B - ON.	d. Ensure the following valves - CLOSED: __ • 1NS-15B (NS Spray Hdr 1B Cont Isol) __ • 1NS-12B (NS Spray Hdr 1B Cont Isol).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. **IF AT ANY TIME NS flow lost OR RN flow lost to operating NS Hx, THEN start other NS pump as follows:**	
__ a. Ensure affected NS pump - OFF.	
b. CLOSE the following valves for affected train: • A Train: __ • 1NS-29A (NS Spray Hdr 1A Cont Isol) __ • 1NS-32A (NS Spray Hdr 1A Cont Isol) __ • 1RN-148A (NS Hx 1A Otlt Isol) __ • 1RN-144A (NS Hx 1A Inlet Isol). • B Train: __ • 1NS-12B (NS Spray Hdr 1B Cont Isol) __ • 1NS-15B (NS Spray Hdr 1B Cont Isol) __ • 1RN-229B (NS Hx 1B Otlt Isol) __ • 1RN-225B (NS Hx 1B Inlet Isol).	
c. Verify both the following Unit 2 valves - OPEN: __ • 2RN-47A (RN Supply X-Over Isol) __ • 2RN-48B (RN Supply X-Over Isol).	__ c. **IF** affected valve closed to support NS Hx cooling flow, **THEN** ensure valve - RETURNED TO PREVIOUS ALIGNMENT.
__ d. **RETURN TO** Step 4 in this enclosure.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. **Verify adequate RN heat sink as follows:**	**Perform the following:**
__ • RN System - SUCTION ALIGNED TO LAKE WYLIE	a. Ensure the following valves - OPEN:
• RN essential header temperatures at one of the following locations - LESS THAN OR EQUAL TO 93°F:	__ • 1RN-3A (RN P/H Pit A Isol From SNSWP)
__ • 1MC-9	__ • 1RN-4B (RN P/H Pit B Isol From SNSWP)
OR	__ • 1RN-58B (RN Hdr B Ret To SNSWP)
__ • RO Logbook.	__ • 1RN-63A (RN Hdr A Ret To SNSWP)
	__ • 1RN-846A (D/G 1A Hx Ret To SNSWP)
	__ • 1RN-848B (D/G 1B Hx Ret To SNSWP)
	__ • 2RN-846A (D/G 2A Hx Ret To SNSWP)
	__ • 2RN-848B (D/G 2B Hx Ret To SNSWP).
	(RNO continued on next page)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9. (Continued)	
	b. Ensure the following valves - CLOSED: __ • 1RN-1A (RN P/H Pit A Isol From Lake) __ • 1RN-2B (RN P/H Pit A Isol From Lake) __ • 1RN-5A (RN P/H Pit B Isol From Lake) __ • 1RN-6B (RN P/H Pit B Isol From Lake) __ • 1RN-53B (Station RN Disch Hdr X-Over) __ • 1RN-54A (Station RN Disch Hdr X-Over) __ • 1RN-57A (Station RN Disch To RL Sys) __ • 1RN-843B (Station RN Disch To RL Sys) __ • 1RN-847A (D/G 1A Hx Ret To Lake) __ • 1RN-849B (D/G 1B Hx Ret To Lake) __ • 2RN-847A (D/G 2A Hx Ret To Lake) __ • 2RN-849B (D/G 2B Hx Ret To Lake).
__ 10. **Verify any NS pump - ON.**	__ **Exit this enclosure.**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 11. **Notify Control Room Supervisor this enclosure shall remain in effect until current or subsequent procedures provide alternate guidance.**	
12. **IF AT ANY TIME containment pressure less than 1 PSIG, THEN perform the following:**	
__ a. Ensure NS pump - OFF.	
b. CLOSE the following valves for affected train: • A Train: __ • 1NS-29A (NS Spray Hdr 1A Cont Isol) __ • 1NS-32A (NS Spray Hdr 1A Cont Isol) __ • 1RN-148A (NS Hx 1A Otlt Isol) __ • 1RN-144A (NS Hx 1A Inlet Isol). • B Train: __ • 1NS-12B (NS Spray Hdr 1B Cont Isol) __ • 1NS-15B (NS Spray Hdr 1B Cont Isol) __ • 1RN-229B (NS Hx 1B Otlt Isol) __ • 1RN-225B (NS Hx 1B Inlet Isol).	
c. Verify both the following Unit 2 valves - OPEN: __ • 2RN-47A (RN Supply X-Over Isol) __ • 2RN-48B (RN Supply X-Over Isol).	__ c. **IF** affected valve closed to support NS Hx cooling flow, **THEN** ensure valve - RETURNED TO PREVIOUS ALIGNMENT.
__ d. **IF AT ANY TIME** containment pressure exceeds 3 PSIG, **THEN RETURN TO** Step 4 in this enclosure.	

JPM F

Catawba Nuclear Station
JPM F
2021 NRC Exam

EVALUATION SHEET

Task: Manually align Essential power to 1FTB from 1ETB per AP/1/A/5500/007 Case 1 Step 10

Alternate Path: No

Facility JPM #: EP-018

Safety Function: 6 **Title:** A.C. Electrical Distribution

K/A 062A4.01 Ability to manually operate and/or monitor in the control room: All breakers (including available switchyard)

Rating(s): 3.3 / 3.1 **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/5500/007 Case I

Task Standard: Applicant manually energizes 1FTB from 1ETB.

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
2021 NRC Exam

SIMULATOR OPERATOR INSTRUCTIONS:

1. ENSURE NRC Examination Security has been established.
2. Reset to IC # 146.
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
	LOA-EP095 (600VLXH BKR LXH-4B)	OPEN				1
	LOA-EP095 (600V LC LXH BKR LXH-4B)	CLOSE				2
	MAL-EQB001B (D/G 1B LOAD SEQUENCER FAILURE)	R1				

Catawba Nuclear Station
JPM F
2021 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.**

INITIATING CUES:

- **Unit 1 has experienced a B Train blackout due to a failure of 1ATD. The 1B D/G is supplying 1ETB. The crew has implemented AP/1/A/5500/07 Case 1 (Loss of Normal Power to an Essential Train). The CRS has directed you to perform step 10.**

EXAMINER NOTE: **After reading Initiating Cue, provide the applicant with a copy of AP/1/A/5500/007 Case 1 step 10.**

Catawba Nuclear Station
JPM F
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START TIME: _______

STEP/STANDARD	SAT/UNSAT
STEP 1: 10. **Verify B/O busses are energized as follows:** a. 1AD-11, K/3 "4KV B/O BUS FTA VOLTAGE LO" - DARK. STANDARD: Applicant will verify 1AD-11, K/3 is DARK COMMENTS:	___ **SAT** ___ **UNSAT**

STEP 2 10.b 1AD-11, K/4 "4KV B/O BUS FTB VOLTAGE LO" - DARK. STANDARD: Applicant will note that 1AD-11, K/4 is LIT and will transition to the RNO column. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 3 10.b.RNO b. Perform the following: 1) Ensure breaker "FTB B/O NORM FDR FRM ATD" - OPEN. STANDARD: Applicant will verify breaker is open COMMENTS:	___ SAT ___ UNSAT
STEP 4 10.b. RNO b. 2) Dispatch operator to open 1LXH-4B (Incoming Breaker Fed From Xfmr TXH) (SB-594, U-30). STANDARD: Applicant will contact the booth and dispatch an operator to open 1LXH-4B **Booth Operator: Insert Event 1 to open 1LXH-4B.** **Examiner Note: This step is critical to prevent overloading 1FTB during realignment to ETB in the following steps.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP/STANDARD	SAT/UNSAT
STEP 5 10.b. RNO b. 3) **IF** S/I has actuated, **THEN** ensure "ECCS TRN B" reset. STANDARD: Applicant will determine that this step does not apply. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP 6 10.b RNO b. 4) Reset "D/G 1B LOAD SEQ RESET". STANDARD: Applicant will depress the "D/G 1B LOAD SEQ REST" pushbutton **Examiner Note: This step is critical to gain manual control of the breakers in subsequent steps.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 7 10.b. RNO b. 5) **WHEN** notified by dispatched operator that 1LXH-4B is open, **THEN** perform the following: a) Close breaker "FTB B/O ALT FDR FRM ETB". STANDARD: Once notified, applicant will close breaker **Booth Operator: Contact Control Room and inform operator that 1LXH-4B is open.** **Examiner Note: This step is critical to energize 1FTB from 1ETB.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 8 10.b. RNO b.5) b) Close breaker "ETB ALT FDR TO FTB". STANDARD: Applicant will close the breaker. **Examiner Note: This step is critical to energize 1FTB from 1ETB.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 9 10.b. RNO b.5) c) Notify dispatched operator to close 1LXH-4B (Incoming Breaker Fed From Xfmr 1TXH) (SB-594, U-30). STANDARD: Applicant will contact the booth and notify dispatched operator to close 1LXH-4B. **Booth Operator : Insert Event 2 to close 1LXH-4B.** **Examiner Note: This step is critical to re-energize 1LXH.** **Examiner Cue: Following breaker closure, "Another operator will continue steps of this procedure. JPM complete."** COMMENTS: **END OF TASK**	**CRITICAL STEP** ___ **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 operating at 100% power.**

INITIATING CUES:

- **Unit 1 has experienced a B Train blackout due to a failure of 1ATD. The 1B D/G is supplying 1ETB. The crew has implemented AP/1/A/5500/07 Case 1 (Loss of Normal Power to an Essential Train). The CRS has directed you to perform step 10.**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

10. **Verify B/O busses energized as follows:**

__ a. 1AD-11, K/3 "4KV B/O BUS FTA VOLTAGE LO" - DARK.

a. Perform the following:

NOTE Both ND Hx Bypass valves fail closed on loss of 1LXI (1FTA).

1) **IF** ND pump 1A operating in Residual Heat Removal Mode, **THEN** perform the following:

__ a) Place "PWR DISCON FOR 1NI173A" in "THROT".

__ b) THROTTLE 1NI-173A (ND Hdr 1A To Cold Legs C&D) to stabilize NC temperature.

2) **IF** ND pump 1B operating in Residual Heat Removal Mode, **THEN** perform the following:

__ a) Place "PWR DISCON FOR 1NI178B" in "THROT".

__ b) THROTTLE 1NI-178B (ND Hdr 1B To Cold Legs A&B) to stabilize NC temperature.

__ 3) Ensure breaker "FTA B/O NORM FDR FRM ATC" - OPEN.

__ 4) Dispatch operator to open 1LXI-4B (Incoming Breaker Fed From Xfmr 1TXI) (SB-594, U-V, 29-30).

__ 5) **IF** S/I actuated, **THEN** ensure "ECCS TRN A" reset.

__ 6) Reset "D/G 1A LOAD SEQ RESET".

(RNO continued on next page)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. (Continued)	
	7) **WHEN** notified by dispatched operator 1LXI-4B open, **THEN** perform the following: __ a) CLOSE breaker "FTA B/O ALT FDR FRM ETA". __ b) CLOSE breaker "ETA ALT FDR TO FTA". __ c) Notify dispatched operator to close 1LXI-4B (Incoming Breaker Fed From Xfmr 1TXI) (SB-594, U-V, 29-30).
__ b. 1AD-11, K/4 "4KV B/O BUS FTB VOLTAGE LO" - DARK.	b. Perform the following: __ 1) Ensure breaker "FTB B/O NORM FDR FRM ATD" - OPEN. __ 2) Dispatch operator to open 1LXH-4B (Incoming Breaker Fed From Xfmr 1TXH) (SB-594, U-30). __ 3) **IF** S/I actuated, **THEN** ensure "ECCS TRN B" reset. __ 4) Reset "D/G 1B LOAD SEQ RESET". 5) **WHEN** notified by dispatched operator 1LXH-4B open, **THEN** perform the following: __ a) CLOSE breaker "FTB B/O ALT FDR FRM ETB". __ b) CLOSE breaker "ETB ALT FDR TO FTB". __ c) Notify dispatched operator to close 1LXH-4B (Incoming Breaker Fed From Xfmr 1TXH) (SB-594, U-30).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. **Verify B/O loads in service as follows:**	
__ a. Maintain D/G load less than 5750 KW.	
b. Ensure proper B/O sequencer(s) loading as follows:	
__ • **<u>REFER</u> <u>TO</u>** Enclosure 2 (Blackout Loads)	
__ • Dispatch operator to ensure all required in plant loads energized **<u>OR</u>** on. **<u>REFER</u> <u>TO</u>** Enclosure 3 (Local Blackout Loads).	
__ c. Ensure Spent Fuel Pool cooling established. **<u>REFER</u> <u>TO</u>** AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).	
__ 12. **Verify VI pressure - GREATER THAN 85 PSIG AND STABLE.**	__ **<u>REFER</u> <u>TO</u> AP/0/A/5500/022 (Loss of Instrument Air).**

JPM G

Catawba Nuclear Station
JPM G
2021 NRC Exam
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-**Pl**ant ________ **P**erform __X__ **S**imulate __________

References: OP/0/A/6500/080 (EMF RP86A Output Modules) rev. 18, 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__

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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
JPM G
2021 NRC Exam

SIMULATOR OPERATOR INSTRUCTIONS:

1. **ENSURE NRC Examination Security has been established.**
2. **Reset to IC # 147.**
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 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 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).

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. 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:	**CRITICAL STEP** ___ 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.

EMF RP86A and RM1000 Trip Setpoint Adjustment
Information Use

1. Limits and Precautions

1.1 The EMF RP86A and RM1000 green "OPERATE" light goes dark and the failure relay de-energizes under any of the following conditions:

- The operate/calibrate switch is set to calibrate
- Loss of high voltage
- Loss of signal (0 counts in 2 minutes)
- Safety loop open
- Loss of power

1.2 If an EMF RP86A and RM1000 Trip 1 is set higher than Trip 2, the entered value will be accepted.

2. Initial Conditions

Verify a need to adjust the EMF setpoints.

3. Procedure

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.

3.1 **IF** necessary, press the clear key [CLR] to reset trip lamps.

3.2 Press the function key [FUN] to bring up the "SELECT FUNCTION" screen.

3.3 Adjust Trip 1 Setpoint as follows:

3.3.1 Press [1] for Trip 1 setting display screen.

3.3.2 Key in the desired Trip 1 setpoint.

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.

NOTE:	Once the enter key [ENT] is pressed, the change in Trip 1 alarm setpoint is active.

3.3.4 Press the enter key [ENT]. This value is now displayed under "TRIP 1" and the "ENTER" block is cleared.

3.3.5 Press the clear key [CLR] to return to the "SELECT FUNCTION" screen.

3.4 Adjust Trip 2 Setpoint as follows:

3.4.1 Press [2] for Trip 2 setting display screen.

3.4.2 Key in the desired Trip 2 setpoint.

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.

NOTE:	Once the enter key [ENT] is pressed, the changes in Trip 2 alarm setpoint is active.

3.4.4 Press the enter key [ENT]. This value is now displayed under "TRIP 2" and the "ENTER" block is cleared.

3.5 Press the clear key [CLR] twice to return to the normal display screen.

3.6 Enter the new EMF setpoints on the Control Room EMF Setpoint Log.

3.7 Sign the Control Room EMF Setpoint Log in the appropriate box.

3.8 **IF** applicable, document the RP personnel that supplied the setpoints in the Control Room EMF Setpoint Log.

3.9 A separate Operator shall perform the following:

3.9.1 Verify that the correct setpoints are entered in the Control Room EMF Setpoint Log.

3.9.2 Sign the IV BY block on the Control Room EMF Setpoint Log.

JPM H

Catawba Nuclear Station
JPM H
2021 NRC Exam

EVALUATION SHEET

Task: Place KC in Parallel Operation per OP/1/A/6400/005

Alternate Path: No

Facility JPM #: KC-085

Safety Function: 8 **Title:** Plant Service Systems

K/A 008 A4.01 Ability to manually operate and/or monitor in the control room: CCW indications and controls

Rating(s): 3.3 / 3.1 **CFR:** 41.7 / 45.5

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ___X___ In-**P**lant ________ **P**erform ___X___ **S**imulate _________

References: OP/1/A/6400/005 (Component Cooling System) Rev. 132 Enclosure 4.4 (Operation of Additional KC Pumps/Parallel Operation)

Task Standard: KC Pump 1A1 is started and 1A KC HX OTLT MODE switch is placed in "KC TEMP" position to place KC in parallel operation.

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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____

Catawba Nuclear Station
JPM H
2021 NRC Exam

SIMULATOR OPERATOR INSTRUCTIONS:

1. **ENSURE NRC Examination Security has been established.**
2. **Reset to IC # 148**
3. **Ensure 1B2 KC pump in operation**
4. **Place simulator in RUN and acknowledge any alarms.**
5. **ENSURE "Extra Operator" is present in the simulator.**
6. **Place simulator in FREEZE until Examiner cue is given.**

✓	Instructor Action	Final	Delay	Ramp	Delete In	Event

Catawba Nuclear Station
JPM H
2021 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:

1. **Unit 1 is at 100% power.**
2. **A work list item has been generated to place Unit 1 KC in parallel operation in preparation for Aux Safeguards Testing early next shift.**

INITIATING CUES:

1. **The CRS instructs you to place KC in parallel operation by performing Encl. 4.4 of OP/1/A/6400/005. You are to start 1A1 KC pump. Pre-start pump checkout has been successfully completed. Initial conditions have previously been verified and signed off. You are to begin at step 3.4.**
2. **The Cation Bed Demineralizer is NOT in service.**
3. **CV is waived for this JPM.**

Examiner Note: After reading cue, provide the applicant with a copy of OP/1/A/6400/005 Encl. 4.4.

Catawba Nuclear Station
JPM H
2021 NRC Exam

START TIME: _______

STEP/STANDARD	SAT/UNSAT
STEP 1: 3.4 **IF** placing KC train 1A in parallel operation with KC Train 1B with the trains cross connected, complete the following steps: 3.4.1 Complete the following steps to ensure the RN system has miniflow protection: 3.4.1.1 **IF** a Unit 2 KC Hx discharge valve is in the "MINIFLOW" position, perform the following: A. Ensure the associated inlet valve is open: • 2RN-287A (KC Hx 2A Inlet Isol) • 2RN-347B (KC Hx 2B Inlet Isol) B. Ensure a complete RN flow path exists from the RN pumps through the applicable Hx to the discharge. STANDARD: Applicant asks Unit 2 operator to verify which KC heat exchanger is in service and whether its respective heat exchanger inlet valve is open. Applicant determines RN system is in normal lineup and has a flowpath through 2B KC heat exchanger to the discharge by looking at the OAC graphic. **Examiner Cue: "2B KC heat exchanger is in the "MINIFLOW" position and 2RN-347B is open."** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP 2: 3.1.4.2 **IF** no Unit 2 KC Hxs are available for RN miniflow, establish miniflow per OP/0/A/6400/006 C (Nuclear Service Water System) as necessary to maintain RN flow $\geq$ 8600 GPM per operating RN pump. STANDARD: Applicant determines this step is N/A. 2B KC heat exchanger is available for miniflow. COMMENTS:	**___ SAT** **___UNSAT**

STEP 3: 3.4.2 Ensure 1RN-287A (KC Hx 1A Inlet Isol) is open. STANDARD: Applicant determines that the red OPEN light is lit and green CLSD light is dark on 1RN-287A. COMMENTS:	**___ SAT** **___ UNSAT**

STEP 4: 3.4.3 Ensure "KC HX A OTLT MODE" is in "KC TEMP". STANDARD: Applicant rotates "KC HX A OTLT MODE" switch counter clockwise to the "KC TEMP" position. **Examiner Note: This step is critical in order to maintain consistent temperature in the 1A KC train and prevent reactivity excursions due to flowrate changes (and associated letdown temperature changes) following the start of 1A1 KC Pump.** COMMENTS:	**CRITICAL STEP** **___ SAT** **___ UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 5: 3.4.4 IF letdown is in service per OP/1/A/6200/001 (Chemical and Volume Control System) perform the following: 3.4.4.1 Verify the Cation Bed Demineralizer is NOT in service per OP/1/A/6200/001 (Chemical and Volume Control System). STANDARD: Applicant requests information concerning status of the Cation Bed Demineralizer. **Examiner Cue: "The Cation Bed Demineralizer is not in service."** COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 6: 3.4.4.2 Record position of 1NV-153A (Letdn Hx Otlt 3-Way Vlv) Recorded valve position ________________ STANDARD: Applicant records position of 1NV-153A to be the AUTO/DEMIN position. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 7: 3.4.4.3 **IF** letdown flow is through the demineralizers, notify Primary Chemistry that the demineralizers will be bypassed while shifting KC pumps. Person notified ____________________ STANDARD: Applicant contacts Primary Chemistry and informs them that the demineralizers will be bypassed. **Examiner Cue: "This is Steve in Primary Chemistry. I understand that the letdown demineralizers will be bypassed while shifting KC pumps."** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 8: 3.4.4.4 IF letdown flow is through the demineralizers, notify Radiation Protection that the demineralizers will be bypassed while shifting KC Pumps. Person notified ______________________ STANDARD: Applicant contacts Radiation Protection and informs them that the demineralizers will be bypassed. **Examiner Cue: "This is Gary in Radiation Protection. I understand that the letdown demineralizers will be bypassed while shifting KC pumps."** COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 9: 3.4.4.5 Place 1NV-153A (Letdn Hx Otlt 3-Way Vlv) in the "VCT" position. STANDARD: Applicant rotates switch for 1NV-153A counter clockwise to the VCT position and verifies the white light lit and red light dark. COMMENTS:	___ **SAT** ___ **UNSAT**

CAUTION: 5700 GPM discharge header flow per operating KC Pump shall NOT be exceeded

STEP/STANDARD	SAT/UNSAT
STEP 10: 3.4.5 Start either KC Train 1A pump: • "KC PUMP A1" • OR • "KC PUMP A2" STANDARD: Per initiating cue, applicant will start 1A1 KC pump by depressing the red ON pushbutton and verifying the red ON light lit and green OFF light dark. **Examiner Note: This step is critical because on 'A' train KC pump has to be started to place KC in parallel operation per the JPM standard.** **Examiner Cue: Following pump start, "1A1 KC pump post start check is complete – Good for continued operation."** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 11: 3.4.6 **IF** KC flow requirement in the Train 1A header is > 5700 gpm, perform the following: STANDARD: Applicant determines this step is not applicable. COMMENTS:	___ **SAT** ___ **UNSAT**

NOTE: One pump running is preferred as long as flow is < 5700 gpm.

STEP/STANDARD	SAT/UNSAT

CAUTION:

- **The time two KC pumps in a train are operating with header flow less than 5700 gpm shall be minimized.**
- **Operating two KC pumps in a train with header flow less than 4850 gpm has the potential for a “strong pump” versus “weak pump” interaction, which can impact minimum flow capacity.**

STEP 12: 3.4.7 **IF** KC flow requirement in the 1A header is < 5700 gpm **AND** it is desirable to place the second Train 1A pump in service, perform the following: STANDARD: Applicant determines this step is not applicable. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 13: 3.4.8 **IF** letdown is in service per OP/1/A/6200/001 (Chemical and Volume Control System), **WHEN** KC flow and temperature have stabilized, perform the following: 3.4.8.1 **IF** 1NV-153A (Letdn Hx Otlt 3-Way Vlv) position was recorded as "DEMIN" in Step 3.7.4.2 **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. (RM) STANDARD: Applicant will rotate switch for 1NV-153A clockwise to the DEMIN position, verifying the red light lit and white light dark, and then return the switch to the AUTO position. **Examiner Cue: "Using time compression, KC flow and temperature have stabilized."** COMMENTS:	___ SAT ___ UNSAT
STEP 14: 3.4.8.1.B Verify 1NV-153A returns to "AUTO". STANDARD: Applicant verifies switch position in "AUTO". COMMENTS:	___ SAT ___ UNSAT

STEP/STANDARD	SAT/UNSAT
STEP 15: 3.4.8.2 **IF** letdown flow is through the demineralizers, notify Primary Chemistry that the demineralizers have been restored to service. Person notified ____________________ STANDARD: Applicant contacts Primary Chemistry and lets them know that the demineralizers have been returned to service. **Examiner Cue: "This is Steve with Primary Chemistry. I understand that the letdown demineralizers have been returned to service."** COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 16: 3.4.8.3 **IF** letdown flow is through the demineralizers, notify Radiation Protection that the demineralizers have been restored to service. Person notified ____________________ STANDARD: Applicant contacts Radiation Protection and lets them know that the demineralizers have been returned to service. **Examiner Cue: "This is Gary with Radiation Protection. I understand that the letdown demineralizers have been returned to 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:

1. **Unit 1 is at 100% power.**
2. **A work list item has been generated to place Unit 1 KC in parallel operation in preparation for Aux Safeguards Testing early next shift.**

INITIATING CUES:

1. **The CRS instructs you to place KC in parallel operation by performing Encl. 4.4 of OP/1/A/6400/005. You are to start 1A1 KC pump. Pre-start pump checkout has been successfully completed. Initial conditions have previously been verified and signed off. You are to begin at step 3.4.**
2. **The Cation Bed Demineralizer is NOT in service.**
3. **CV is waived for this JPM.**

1. Limits and Precautions

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

1.2 The maximum discharge header flow for each operating KC pump is 5700 gpm.

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

1.4 After manual operation, maintenance or packing adjustment of any safety related motor operated valve, it shall be cycled electrically to ensure reliable automatic operation.

1.5 KC pump minimum flow is 1100 gpm.

1.6 While running just one KC Pump, making KC flow adjustments in a gradual manner will minimize total KC System flow fluctuations. (PIP 96-1894)

1.7 The time two KC pumps in a train are operating with header flow less than 5700 gpm shall be minimized.

1.8 Operating two KC pumps in a train with header flow less than 4850 gpm has the potential for a "strong pump" versus "weak pump" interaction, which can impact minimum flow capacity.

2. Initial Conditions

AA 2.1 Verify one train of KC is operating per Enclosure 4.1 (System Startup).

AA 2.2 Notify Radwaste of the intent to change the current KC system pump lineup.

AA 2.3 **IF** in Mode 1 or 2, ensure R3 reactivity management controls established per AD-OP-ALL-0203 (Reactivity Management). (R.M.)

3. Procedure

NOTE:	Steps 3.1 through 3.9 are independent of each other and may be performed in any order.

N/A 3.1 **IF** an operating KC Train has a single pump in operation with the idle pump in that train available **AND** it is desired to start the additional pump in the train, **THEN** perform one of the following:

_____ 3.1.1 **IF** KC flow requirements on the train are > 5700 gpm, perform the following:

_____ 3.1.1.1 Ensure the appropriate miniflow valve is closed:

_____ _____ • 1KC-C37A (Train A Miniflow Isol)

OR

_____ _____ • 1KC-C40B (Train B Miniflow Isol)

3.1.1.2 Start the idle pump in the train:

_____ • "KC PUMP A1"

OR

_____ • "KC PUMP A2"

OR

_____ • "KC PUMP B1"

OR

_____ • "KC PUMP B2"

NOTE:	One pump running is preferred as long as flow is < 5700 gpm.

CAUTION:

- The time two KC pumps in a train are operating with header flow less than 5700 gpm shall be minimized.
- Operating two KC pumps in a train with header flow less than 4850 gpm has the potential for a "strong pump" versus "weak pump" interaction, which can impact minimum flow capacity.

_____ 3.1.2 **IF** KC flow requirement in the train is < 5700 gpm **AND** it is desired to start the additional pump in the train, perform the following:

3.1.2.1 Start the idle pump in the train:

_____ • "KC PUMP A1"
OR
_____ • "KC PUMP A2"

OR

_____ • "KC PUMP B1"
OR
_____ • "KC PUMP B2"

_____ 3.1.2.2 Ensure minimum flow requirements are met.

NOTE: One pump running is preferred as long as flow is < 5700 gpm.

N/A 3.2 **IF** both KC pumps in an operating train are running **AND** flow requirement in that operating train is < 5700 gpm, perform the following:

_____ 3.2.1 **IF** required, throttle KC flow to the inservice KF heat exchanger as necessary to prevent KC pump runout:

- _____ 1KC-149 (KF Hx 1A Cool Wtr Otlt)
- _____ 1KC-156 (KF Hx 1B Cool Wtr Otlt)

_____ 3.2.2 **IF AT ANY TIME** KC Train flow approaches 5700 gpm while performing the next step, ensure the appropriate miniflow valve is closed:

- _____ _____ 1KC-C37A (Train A Miniflow Isol)
  OR
- _____ _____ 1KC-C40B (Train B Miniflow Isol)

3.2.3 Stop one of the operating pumps:

- _____ "KC PUMP A1"
  OR
- _____ "KC PUMP A2"
  OR
- _____ "KC PUMP B1"
  OR
- _____ "KC PUMP B2"

3.2.4 Perform the following for the KF cooling loops that are in service:

_____ 3.2.4.1 **IF** 1A KF Cooling Loop is in service, adjust 1KC-149 (KF Hx 1A Cool Wtr Otlt) flow controller on 1MC11 to 3000 gpm or as necessary to maintain Spent Fuel Pool temperature < 125°F.

_____ 3.2.4.2 **IF** 1B KF Cooling Loop is in service, adjust 1KC-156 (KF Hx 1B Cool Wtr Otlt) flow controller on 1MC11 to 3000 gpm or as necessary to maintain Spent Fuel Pool temperature < 125°F.

AA 3.3 **IF** additional KC flow is needed **AND** both pumps in the operating loop are running **OR** KC is in single pump operation with the idle pump in the operating train **NOT** available, place KC in parallel operation per Step 3.4, 3.5, 3.7 or 3.8 as applicable.

_____ 3.4 **IF** placing KC Train 1A in parallel operation with KC Train 1B with the trains cross-connected, complete the following steps:

NOTE: RN System minimum flow protection is normally established using an idle KC train.

3.4.1 Complete the following steps to ensure the RN System has miniflow protection:

_____ 3.4.1.1 **IF** a Unit 2 KC Hx discharge valve is in the "MINIFLOW" position, perform the following:

A. Ensure the associated inlet valve is open:

_____ _____ • 2RN-287A (KC Hx 2A Inlet Isol)

_____ _____ • 2RN-347B (KC Hx 2B Inlet Isol)

_____ B. Ensure a complete RN flow path exists from the RN Pumps through the applicable Hx to the discharge.

_____ 3.4.1.2 **IF** no Unit 2 KC Hxs are available for RN miniflow, establish miniflow per OP/0/A/6400/006 C (Nuclear Service Water System) as necessary to maintain RN flow ≥ 8600 gpm per operating RN Pump.

_____ _____ 3.4.2 Ensure 1RN-287A (KC Hx 1A Inlet Isol) is open.

_____ 3.4.3 Ensure "KC HX 1A OTLT MODE" is in "KC TEMP".

_____ 3.4.4 **IF** letdown is in service per OP/1/A/6200/001 (Chemical and Volume Control System) perform the following: (R.M.)

_____ 3.4.4.1 Verify the Cation Bed Demineralizer is **NOT** in service per OP/1/A/6200/001 (Chemical and Volume Control System).

_____ 3.4.4.2 Record position of 1NV-153A (Letdn Hx Otlt 3-Way Vlv).
Recorded valve position_________________

_____ 3.4.4.3 **IF** letdown flow is through the demineralizers, notify Primary Chemistry that the demineralizers will be bypassed while shifting KC Pumps.
Person notified ______________________________

_____ 3.4.4.4 **IF** letdown flow is through the demineralizers, notify Radiation Protection that the demineralizers will be bypassed while shifting KC Pumps.
Person notified ______________________________

_____ 3.4.4.5 Place 1NV-153A (Letdn Hx Otlt 3-Way Vlv) in the "VCT" position.

CAUTION: 5700 gpm discharge header flow per each operating KC pump shall **NOT** be exceeded.

3.4.5 Start either KC Train 1A pump:

- _____ "KC PUMP A1"
  OR
- _____ "KC PUMP A2"

_____ 3.4.6 **IF** KC flow requirement in the Train 1A header is > 5700 gpm, perform the following:

_____ _____ 3.4.6.1 Ensure 1KC-C37A (Train A Miniflow Isol) is closed.

3.4.6.2 Start the remaining KC Train 1A pump:

- _____ "KC PUMP A1"
  OR
- _____ "KC PUMP A2"

NOTE: One pump running is preferred as long as flow is < 5700 gpm.

CAUTION:
- The time two KC pumps in a train are operating with header flow less than 5700 gpm shall be minimized.
- Operating two KC pumps in a train with header flow less than 4850 gpm has the potential for a "strong pump" versus "weak pump" interaction, which can impact minimum flow capacity.

_____ 3.4.7 **IF** KC flow requirement in the Train 1A header is < 5700 gpm **AND** it is desired to place the second Train 1A pump in service, perform the following:

3.4.7.1 Start the remaining KC Train 1A pump:

- _____ "KC PUMP A1"
  OR
- _____ "KC PUMP A2"

_____ 3.4.7.2 Ensure minimum flow requirements are met.

_____ 3.4.8 **<u>IF</u>** letdown is in service per OP/1/A/6200/001 (Chemical and Volume Control System), **<u>WHEN</u>** KC flow and temperature have stabilized perform the following: (R.M.)

_____ 3.4.8.1 **<u>IF</u>** 1NV-153A (Letdn Hx Otlt 3-Way Vlv) position was recorded as "DEMIN" in Step 3.4.4.2 **<u>AND</u>** 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".

_____ 3.4.8.2 **<u>IF</u>** letdown flow is through the demineralizers, notify Primary Chemistry that the demineralizers have been restored to service. Person notified ____________________________

_____ 3.4.8.3 **<u>IF</u>** letdown flow is through the demineralizers, notify Radiation Protection that the demineralizers have been restored to service. Person notified ___________________________

NOTE:	At this point, KC Train 1A and 1B are in parallel service.

_____ 3.4.9 **<u>IF</u>** RN miniflow was established per Step 3.4.1.2, **<u>WHEN</u>** no longer needed, secure unneeded flow paths.

_____ 3.4.10 **<u>IF</u>** Train 1A is to be secured, leaving Train 1B in service as per Enclosure 4.1 (System Startup), go to Step 3.6.

_____ 3.5 **<u>IF</u>** placing KC Train 1A in parallel operation with KC Train 1B with the trains **<u>NOT</u>** cross-connected, complete the following steps:

NOTE:	RN System minimum flow protection is normally established using an idle KC train.

3.5.1 Complete the following steps to ensure the RN System has miniflow protection:

_____ 3.5.1.1 **<u>IF</u>** a Unit 2 KC Hx discharge valve is in the "MINIFLOW" position, perform the following:

A. Ensure the associated inlet valve is open:

_____ _____ • 2RN-287A (KC Hx 2A Inlet Isol)

_____ _____ • 2RN-347B (KC Hx 2B Inlet Isol)

_____ B. Ensure a complete RN flow path exists from the RN Pumps through the applicable Hx to the discharge.

_____ 3.5.1.2 **IF** no Unit 2 KC Hxs are available for RN miniflow, establish miniflow per OP/0/A/6400/006 C (Nuclear Service Water System) as necessary to maintain RN flow ≥ 8600 gpm per operating RN Pump.

_____ _____ 3.5.2 Ensure 1RN-287A (KC Hx 1A Inlet Isol) is open.

_____ 3.5.3 Ensure "KC HX 1A OTLT MODE" is in "KC TEMP".

_____ _____ 3.5.4 Ensure 1KC-56A (KC To ND Hx 1A Sup Isol) is closed.

CAUTION: 5700 gpm discharge header flow per each operating KC pump shall **NOT** be exceeded.

3.5.5 Start either KC Train 1A pump:

_____ • "KC PUMP A1"
OR
_____ • "KC PUMP A2"

_____ _____ 3.5.6 Ensure 1KC-C37A (Train A Miniflow Isol) opens.

_____ 3.5.7 **<u>IF</u>** KC flow requirement in the Train 1A header is > 5700 gpm, perform the following:

_____ _____ 3.5.7.1 Ensure 1KC-C37A (Train A Miniflow Isol) is closed.

_____ 3.5.7.2 **<u>IF</u>** Train 1A header flow is > 5700 gpm, start the remaining KC Train 1A pump:

_____ • "KC PUMP A1"
OR
_____ • "KC PUMP A2"

NOTE:	One pump running is preferred as long as flow is < 5700 gpm.

CAUTION:	• The time two KC pumps in a train are operating with header flow less than 5700 gpm shall be minimized. • Operating two KC pumps in a train with header flow less than 4850 gpm has the potential for a "strong pump" versus "weak pump" interaction, which can impact minimum flow capacity.

_____ 3.5.8 **<u>IF</u>** KC flow requirement in the Train 1A header is < 5700 gpm **<u>AND</u>** it is desired to place the second Train 1A pump in service, perform the following:

3.5.8.1 Start the remaining KC Train 1A pump:

_____ • "KC PUMP A1"
OR
_____ • "KC PUMP A2"

_____ 3.5.8.2 Ensure minimum flow requirements are met.

_____ 3.5.9 **<u>IF</u>** RN miniflow was established per Step 3.5.1.2, **<u>WHEN</u>** no longer needed, secure unneeded flow paths.

NOTE:	At this point, KC Train 1A and 1B are in parallel service with KC Train 1A isolated from the Aux and Rx Bldg Non-Ess Headers.

_____ 3.6 **IF** Train 1A is to be secured, leaving Train 1B in service as per Enclosure 4.1 (System Startup), complete the following steps:

_____ 3.6.1 Notify Radwaste of the intent to change the current KC system pump lineup.

_____ 3.6.2 **IF** KC Trains 1A and 1B are **NOT** cross-connected, ensure that any component required to support unit operation is **NOT** being cooled by KC Train 1A.

_____ 3.6.3 **IF** letdown is in service per OP/1/A/6200/001 (Chemical and Volume Control System), perform the following: (R.M.)

_____ 3.6.3.1 Verify the Cation Bed Demineralizer is **NOT** in service per OP/1/A/6200/001 (Chemical and Volume Control System).

_____ 3.6.3.2 Record position of 1NV-153A (Letdn Hx Otlt 3-Way Vlv).
Recorded valve position _______________

_____ 3.6.3.3 **IF** letdown flow is through the demineralizers, notify Primary Chemistry that the demineralizers will be bypassed while shifting KC Trains.
Person notified ____________________________

_____ 3.6.3.4 **IF** letdown flow is through the demineralizers, notify Radiation Protection that the demineralizers will be bypassed while shifting KC Trains.
Person notified ____________________________

_____ 3.6.3.5 Place 1NV-153A (Letdn Hx Otlt 3-Way Vlv) in the "VCT" position.

3.6.4 Adjust the following flow controllers on 1MC11 to zero gpm flow:

- _____ 1KC-149 (KF Hx 1A Cool Wtr Otlt)
- _____ 1KC-156 (KF Hx 1B Cool Wtr Otlt)

3.6.5 Stop all KC Train 1A pumps:

- _____ "KC PUMP A1"
- _____ "KC PUMP A2"

_____ 3.6.6 Place "KC HX 1A OTLT MODE" in "MINIFLOW".

3.6.7 Perform the following for the KF cooling loops that are in service:

_____ 3.6.7.1 **IF** 1A KF Cooling Loop is in service, adjust 1KC-149 (KF Hx 1A Cool Wtr Otlt) flow controller on 1MC11 to 3000 gpm or as necessary to maintain Spent Fuel Pool temperature < 125°F.

_____ 3.6.7.2 **IF** 1B KF Cooling Loop is in service, adjust 1KC-156 (KF Hx 1B Cool Wtr Otlt) flow controller on 1MC11 to 3000 gpm or as necessary to maintain Spent Fuel Pool temperature < 125°F.

_____ _____ 3.6.8 **IF AT ANY TIME** KC Train 1B flow approaches 5700 gpm while performing the next step, ensure 1KC-C40B (Train B Miniflow Isol) is closed.

NOTE:	One pump running is preferred as long as flow is < 5700 gpm.

_____ 3.6.9 **IF** KC flow requirements are < 5700 gpm **AND** both KC Train 1B pumps are running, stop either KC Train 1B pump:

_____ • "KC PUMP B1"
OR
_____ • "KC PUMP B2"

NOTE:	At this point, KC Train 1B is in service as per Enclosure 4.1 (System Startup).

_____ 3.6.10 **IF** RN flow has been established through components other than the Unit 2 KC Hx's for RN miniflow, secure unneeded flow paths.

_____ 3.6.11 **IF** letdown is in service per OP/1/A/6200/001 (Chemical and Volume Control System), **WHEN** KC flow and temperature have stabilized, perform the following: (R.M.)

_____ 3.6.11.1 **IF** 1NV-153A (Letdn Hx Otlt 3-Way Vlv) position was recorded as "DEMIN" in Step 3.6.3.2 **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".

_____ 3.6.11.2 **IF** letdown flow is through the demineralizers, notify Primary Chemistry that the demineralizers have been restored to service.
Person notified ______________________________

_____ 3.6.11.3 **IF** letdown flow is through the demineralizers, notify Radiation Protection that the demineralizers have been restored to service.
Person notified ______________________________

_____ 3.7 **IF** placing KC Train 1B in parallel operation with KC Train 1A with the trains cross-connected, complete the following steps:

NOTE:	RN System minimum flow protection is normally established using an idle KC train.

3.7.1 Complete the following steps to ensure the RN System has miniflow protection:

_____ 3.7.1.1 **IF** a Unit 2 KC Hx discharge valve is in the "MINIFLOW" position, perform the following:

A. Ensure the associated inlet valve is open:

_____ _____ • 2RN-287A (KC Hx 2A Inlet Isol)

_____ _____ • 2RN-347B (KC Hx 2B Inlet Isol)

_____ B. Ensure a complete RN flow path exists from the RN Pumps through the applicable Hx to the discharge.

_____ 3.7.1.2 **IF** no Unit 2 KC Hxs are available for RN miniflow, establish miniflow per OP/0/A/6400/006 C (Nuclear Service Water System) as necessary to maintain RN flow $\geq$ 8600 gpm per operating RN Pump.

_____ _____ 3.7.2 Ensure 1RN-347B (KC Hx 1B Inlet Isol) is open.

_____ 3.7.3 Ensure "KC HX 1B OTLT MODE" is in "KC TEMP".

_____ 3.7.4 **IF** letdown is in service per OP/1/A/6200/001 (Chemical and Volume Control System) perform the following: (R.M.)

_____ 3.7.4.1 Verify the Cation Bed Demineralizer is **NOT** in service per OP/1/A/6200/001 (Chemical and Volume Control System).

_____ 3.7.4.2 Record position of 1NV-153A (Letdn Hx Otlt 3-Way Vlv).
Recorded valve position_________________

_____ 3.7.4.3 **IF** letdown flow is through the demineralizers, notify Primary Chemistry that the demineralizers will be bypassed while shifting KC Pumps.
Person notified ______________________________

_____ 3.7.4.4 **IF** letdown flow is through the demineralizers, notify Radiation Protection that the demineralizers will be bypassed while shifting KC Pumps.
Person notified ______________________________

_____ 3.7.4.5 Place 1NV-153A (Letdn Hx Otlt 3-Way Vlv) in the "VCT" position.

CAUTION: 5700 gpm discharge header flow per operating KC Pump shall **NOT** be exceeded.

3.7.5 Start either KC Train 1B pump:

_____ • "KC PUMP B1"
OR
_____ • "KC PUMP B2"

_____ 3.7.6 **IF** KC flow requirement in the Train 1B header is > 5700 gpm, perform the following:

_____ _____ 3.7.6.1 Ensure 1KC-C40B (Train B Miniflow Isol) is closed.

3.7.6.2 Start the remaining KC Train 1B pump:

_____ • "KC PUMP B1"
OR
_____ • "KC PUMP B2"

NOTE: One pump running is preferred as long as flow is < 5700 gpm.

CAUTION:
- The time two KC pumps in a train are operating with header flow less than 5700 gpm shall be minimized.
- Operating two KC pumps in a train with header flow less than 4850 gpm has the potential for a "strong pump" versus "weak pump" interaction, which can impact minimum flow capacity.

_____ 3.7.7 **<u>IF</u>** KC flow requirement in the Train 1B header is < 5700 gpm **<u>AND</u>** it is desired to place the second Train 1B pump in service, perform the following:

3.7.7.1 Start the remaining KC Train 1B pump:

_____ • "KC PUMP B1"
OR
_____ • "KC PUMP B2"

_____ 3.7.7.2 Ensure minimum flow requirements are met.

_____ 3.7.8 **<u>IF</u>** letdown is in service per OP/1/A/6200/001 (Chemical and Volume Control System), **<u>WHEN</u>** KC flow and temperature have stabilized perform the following: (R.M.)

_____ 3.7.8.1 **<u>IF</u>** 1NV-153A (Letdn Hx Otlt 3-Way Vlv) position was recorded as "DEMIN" in Step 3.7.4.2 **<u>AND</u>** 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".

_____ 3.7.8.2 **<u>IF</u>** letdown flow is through the demineralizers, notify Primary Chemistry that the demineralizers have been restored to service.
Person notified ____________________________

_____ 3.7.8.3 **<u>IF</u>** letdown flow is through the demineralizers, notify Radiation Protection that the demineralizers have been restored to service.
Person notified ___________________________

NOTE:	At this point, KC Train 1A and 1B are in parallel service.

_____ 3.7.9 **IF** RN miniflow was established per Step 3.7.1.2, **WHEN** no longer needed, secure unneeded flow paths.

_____ 3.7.10 **IF** Train 1B is to be secured, leaving Train 1A in service as per Enclosure 4.1 (System Startup), go to Step 3.9.

_____ 3.8 **IF** placing KC Train 1B in parallel operation with KC Train 1A with the trains **NOT** cross-connected, complete the following steps:

NOTE:	RN System minimum flow protection is normally established using an idle KC train.

3.8.1 Complete the following steps to ensure the RN System has miniflow protection:

_____ 3.8.1.1 **IF** a Unit 2 KC Hx discharge valve is in the "MINIFLOW" position, perform the following:

A. Ensure the associated inlet valve is open:

_____ _____ • 2RN-287A (KC Hx 2A Inlet Isol)

_____ _____ • 2RN-347B (KC Hx 2B Inlet Isol)

_____ B. Ensure a complete RN flow path exists from the RN Pumps through the applicable Hx to the discharge.

_____ 3.8.1.2 **IF** no Unit 2 KC Hxs are available for RN miniflow, establish miniflow per OP/0/A/6400/006 C (Nuclear Service Water System) as necessary to maintain RN flow ≥ 8600 gpm per operating RN Pump.

_____ _____ 3.8.2 Ensure 1RN-347B (KC Hx 1B Inlet Isol) is open.

_____ 3.8.3 Ensure "KC HX 1B OTLT MODE" is in "KC TEMP".

_____ _____ 3.8.4 Ensure 1KC-81B (KC To ND Hx 1B Sup Isol) is closed.

CAUTION:	5700 gpm discharge header flow per operating KC Pump shall **NOT** be exceeded.

3.8.5 Start either KC Train 1B pump:

_____ • "KC PUMP B1"
OR
_____ • "KC PUMP B2"

_____ _____ 3.8.6 Ensure 1KC-C40B (Train B Miniflow Isol) opens

_____ 3.8.7 **IF** KC flow requirement in the Train 1B header is > 5700 gpm, perform the following:

_____ _____ 3.8.7.1 Ensure 1KC-C40B (Train B Miniflow Isol) is closed.

_____ 3.8.7.2 **IF** Train 1B header flow is > 5700 gpm, start the remaining KC Train 1B pump:

- _____ "KC PUMP B1"
  OR
- _____ "KC PUMP B2"

NOTE: One pump running is preferred as long as flow is < 5700 gpm.

CAUTION:

- The time two KC pumps in a train are operating with header flow less than 5700 gpm shall be minimized.
- Operating two KC pumps in a train with header flow less than 4850 gpm has the potential for a "strong pump" versus "weak pump" interaction, which can impact minimum flow capacity.

_____ 3.8.8 **IF** KC flow requirement in the Train 1B header is < 5700 gpm **AND** it is desired to place the second Train 1B Pump in service, perform the following:

3.8.8.1 Start the remaining KC Train 1B pump:

- _____ "KC PUMP B1"
  OR
- _____ "KC PUMP B2"

_____ 3.8.8.2 Ensure minimum flow requirements are met.

_____ 3.8.9 **IF** RN miniflow was established per Step 3.8.1.2, **WHEN** no longer needed, secure unneeded flow paths.

NOTE: At this point, KC Train 1A and 1B are in parallel service with KC Train 1B isolated from the Aux and Rx Bldg Non-Ess Headers.

_____ 3.9 **IF** Train 1B is to be secured, leaving Train 1A in service as per Enclosure 4.1 (System Startup), complete the following steps.

_____ 3.9.1 Notify Radwaste of the intent to change the current KC system pump lineup.

_____ 3.9.2 **IF** KC Trains 1A and 1B are **NOT** cross-connected, ensure that any component required to support unit operation is **NOT** being cooled by KC Train 1B.

_____ 3.9.3 **IF** letdown is in service per OP/1/A/6200/001 (Chemical and Volume Control System) perform the following: (R.M.)

_____ 3.9.3.1 Verify the Cation Bed Demineralizer is **NOT** in service per OP/1/A/6200/001 (Chemical and Volume Control System).

_____ 3.9.3.2 Record position of 1NV-153A (Letdn Hx Otlt 3-Way Vlv).
Recorded valve position_________________

_____ 3.9.3.3 **IF** letdown flow is through the demineralizers, notify Primary Chemistry that the demineralizers will be bypassed while shifting KC Pumps.
Person notified ______________________________

_____ 3.9.3.4 **IF** letdown flow is through the demineralizers, notify Radiation Protection that the demineralizers will be bypassed while shifting KC Pumps.
Person notified ______________________________

_____ 3.9.3.5 Place 1NV-153A (Letdn Hx Otlt 3-Way Vlv) in the "VCT" position.

3.9.4 Adjust the following flow controllers on 1MC11 to zero gpm flow:

_____ • 1KC-149 (KF Hx 1A Cool Wtr Otlt)

_____ • 1KC-156 (KF Hx 1B Cool Wtr Otlt)

3.9.5 Stop all KC Train 1B pumps:

_____ • "KC PUMP B1"

_____ • "KC PUMP B2"

_____ 3.9.6 Place "KC HX 1B OTLT MODE" in "MINIFLOW".

3.9.7 Perform the following for the KF cooling loops that are in service:

_____ 3.9.7.1 **IF** 1A KF Cooling Loop is in service, adjust 1KC-149 (KF Hx 1A Cool Wtr Otlt) flow controller on 1MC11 to 3000 gpm or as necessary to maintain Spent Fuel Pool temperature < 125°F.

_____ 3.9.7.2 **IF** 1B KF Cooling Loop is in service, adjust 1KC-156 (KF Hx 1B Cool Wtr Otlt) flow controller on 1MC11 to 3000 gpm or as necessary to maintain Spent Fuel Pool temperature < 125°F.

_____ _____ 3.9.8 **IF** KC Train 1A flow approaches 5700 gpm while performing the next step, ensure 1KC-C37A (Train A Miniflow Isol) is closed.

NOTE:	One pump running is preferred as long as flow is < 5700 gpm.

_____ 3.9.9 **IF** KC flow requirements are < 5700 gpm **AND** both KC Train 1A pumps are running, stop either KC Train 1A pump:

_____ • "KC PUMP A1"
OR
_____ • "KC PUMP A2"

NOTE:	At this point, KC Train 1A is in service as per Enclosure 4.1 (System Startup).

_____ 3.9.10 **IF** RN flow has been established through components other than the Unit 2 KC Hx's for RN miniflow, secure unneeded flow paths.

_____ 3.9.11 **IF** letdown is in service per OP/1/A/6200/001 (Chemical and Volume Control System), **WHEN** KC flow and temperature have stabilized perform the following: (R.M.)

_____ 3.9.11.1 **IF** 1NV-153A (Letdn Hx Otlt 3-Way Vlv) position was recorded as "DEMIN" in Step 3.9.3.2 **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".

_____ 3.9.11.2 **IF** letdown flow is through the demineralizers, notify Primary Chemistry that the demineralizers have been restored to service. Person notified ____________________________

_____ 3.9.11.3 **IF** letdown flow is through the demineralizers, notify Radiation Protection that the demineralizers have been restored to service. Person notified ___________________________

3.10 File this enclosure in the designated storage cabinet.

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EVALUATION SHEET

Task: Local ESPS Alignment to 1ETA through 1ATC

Alternate Path: No

Facility JPM #: NEW

Safety Function: 6 **Title:** Loss of Offsite and Onsite Power (Station Blackout)

K/A EPE 055 EA2.03 Ability to determine or interpret the following as they apply to a Station Blackout: Actions necessary to restore power.

Rating(s): 3.9 / 4.7 **CFR:** 43.5 / 45.13

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ In-**P**lant ___X___ **P**erform ___X___ **S**imulate _________

References: EP/2/A/5000/ECA-0.0 (Loss of All AC Power) Encl. 52 (Local ESPS Alignment to 2ETB through 2ATD)

Task Standard: Both ESPS D/Gs started with ESPS Switchgear supply breaker to Unit 1 and Unit 2 6.9Kv switchgear and 2TD-12 closed.

Validation Time: 10 minutes **Time Critical:** Yes _____ No ___X___

==

Applicant:
NAME_______________________ Docket #_____________ Time Start: ___________
Time Finish: ___________

Performance Time ______

Performance Rating:

SAT ____ UNSAT ____

Examiner: ______________________________ ______________________________/________
NAME SIGNATURE DATE

==

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:

- **Unit 2 is in Mode 3 following a Loss of All AC power**
- **EP/2/A/5000/ECA-0.0 has been entered**
- **Neither of the Emergency D/Gs could be started**
- **Management has determined that power will be restored to 2ETB from ESPS through 2ATD**

INITIATING CUES:

- **ECA-0.0 Enclosure 52 (Local ESPS Alignment to 2ETB through 2ATD) has been entered and Steps 1 & 2 are complete. The Control Room Supervisor has instructed you to perform ECA-0.0 Enclosure 52 beginning at step 3.**

Examiner Note: Provide applicant with a copy of EP/2/A/5000/ECA-0.0, Enclosure 52.

START TIME _________

STEP/STANDARD	SAT/UNSAT
STEP 1: 3. Perform the following on 0ELCP0091 (ESPS Diesel Generator Emergency Control Panel): a. Ensure the following breakers – OPEN: • “ESPS SWGR SUPPLY BKR TO U1 & U2 6.9 KV SWGR” • “1TA-13 SWGR INCOMING FDR FROM ESPS SWGR” • “1TB-2 SWGR INCOMING FDR FROM ESPS SWGR” • “2TC-13 SWGR INCOMING FDR FROM ESPS SWGR” • “2TD-12 SWGR INCOMING FDR FROM ESPS SWGR” **Examiner Cue: As applicant describes verifying breaker status for ESPS SWGR SUPPLY BKR and 2TD-12, “green light is lit.” For 1TA-13, 1TB-2, and 2TC-13, “Breaker green flag is shown.”** STANDARD: Applicant verifies the green OPEN lights lit and red CLOSE lights dark or breaker green flag showing for the listed breakers. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 2: 3.b Verify the following lights – LIT: • "D/G #1 READY TO START" • "D/G #2 READY TO START" **Examiner Cue: As applicant describes verifying the lights lit, "Light is lit."** STANDARD: Applicant verifies both D/G ready to start lights lit. COMMENTS:	___ SAT ___UNSAT

STEP 3: 3.c Start ESPS DGs by depressing the following pushbuttons: • "D/G #1 START" pushbutton • "D/G #2 START" pushbutton **Examiner Cue: As applicant describes depressing the D/G start pushbuttons, "Button has been depressed and D/G red running lights lit."** STANDARD: Applicant describes depressing the D/G start pushbuttons. **Examiner Note: This step is critical to allow power restoration to 2ETB from ESPS.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

NOTE

- Up to two minutes may elapse from pressing the "START" pushbuttons to "READY TO LOAD" indicating lights illuminate.
- While "TROUBLE" light may momentarily illuminate during start up.

STEP/STANDARD	SAT/UNSAT
STEP 4: 3.d Verify the following lights: • "D/G # 1 RUNNING" red light – LIT • "D/G # 2 RUNNING" red light – LIT • "ESPS GENERATOR #1 OUTPUT BREAKER" red light – LIT • "ESPS GENERATOR #2 OUTPUT BREAKER" red light – LIT • "D/G #1 READY TO LOAD" amber light – LIT • "D/G #2 READY TO LOAD" amber light – LIT **Examiner Cue: As applicant describes verifying each light, "Light is LIT."** STANDARD: Applicant describes verifying the listed lights lit. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP 5: 4. Contact Control Room for the following: a. Verify the following switches in "OFF" • "HTWL PUMP 2C" • "CM BSTR PUMP 2C". b. Verify 2ETB load shed – COMPLETE. c. Verify 2ETB aligned to ATD. **Examiner Cue: Once applicant contacts the control room, "2C hotwell and condensate booster pump switches are in the "OFF" position, 2ETB load shed is complete, and 2ETB is aligned to ATD."** STANDARD: Applicant contacts the control room for the required information. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP 6: 5. CLOSE "ESPS SWGR SUPPLY BKR to U1 & U2 6.9 KV SWGR". **Examiner Cue: As applicant describes rotating pistol grip for the listed breaker to the CLOSE position, "Pistol grip rotated clockwise to the CLOSE position and red light is lit and green light is dark."** STANDARD: Applicant describes rotating the pistol grip for breaker clockwise to the CLOSE position. **Examiner Note: This step is critical to allow power restoration to 2ETB from ESPS.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP 7: 6. CLOSE "2TD-12 SWGR INCOMING FDR FROM ESPS SWGR". **Examiner Cue: As applicant describes rotating pistol grip for the listed breaker, "Pistol grip rotated clockwise to the CLOSE position and red light is lit and green light is dark."** STANDARD: Applicant describes rotating the pistol grip for breaker clockwise to the CLOSE position. **Examiner Note: This step is critical to allow power restoration to 2ETB from ESPS.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP 8: 7. **WHEN** 2ATD aligned to 2ETB, **THEN** notify Control Room to close "4KV XFMR 2ATD FDR" on 1MC-11. **Examiner Cue: As applicant describes contacting the control room, "4KV XFMR 2ATD FDR has been closed. Another operator will continue with the procedure. This JPM is complete."** STANDARD: Applicant describes contacting the control room to close the appropriate breaker. 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 2 is in Mode 3 following a Loss of All AC power**
- **EP/2/A/5000/ECA-0.0 has been entered**
- **Neither of the Emergency D/Gs could be started**
- **Management has determined that power will be restored to 2ETB from ESPS through 2ATD**

INITIATING CUES:

- **ECA-0.0 Enclosure 52 (Local ESPS Alignment to 2ETB through 2ATD) has been entered and Steps 1 & 2 are complete. The Control Room Supervisor has instructed you to perform ECA-0.0 Enclosure 52 beginning at step 3.**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE Steps 1 and 2 can be performed in any order or concurrently.

✓ 1. **Ensure 2GTB (Incoming Feeder From Xfmr 2ATD) (TB-568, 2F-17) - OPEN.**

2. **Align 2TD as follows:**

NOTE Steps 2.a through 2.e may be performed in any order or concurrently.

a. Verify the following 2TD lockout relays reset:

- ✓ 86T/2TD (2TD-04 cubicle)
- ✓ 86BNA/2TD05 (2TD-05 cubicle)
- ✓ 86NA1/2TD05 (2TD-05 cubicle)
- ✓ 86BS/2TD07 (2TD-07 cubicle)
- ✓ 86S/2TD07 (2TD-07 cubicle)
- ✓ 86BNB/2TD09 (2TD-09 cubicle)
- ✓ 86NB1/2TD09 (2TD-09 cubicle)
- ✓ 86NA2/2SCPD (2SCPD panel)
- ✓ 86NB2/2SCPD (2SCPD panel).

RESPONSE NOT OBTAINED:

a. Perform the following:

__ 1) Notify Control Room Supervisor.

NOTE It is acceptable to continue in this enclosure if discrepancies are expected to be resolved.

__ 2) Do not continue attempts to energize 2TD until all lockouts evaluated and cleared.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. (Continued)	
b. Verify the following breakers - RACKED OUT:	b. Rack out affected breaker(s) as follows:
✓ • 2TD-05 (Normal B Incoming Feeder From XFMR 2T1B)	__ 1) Open sliding door in compartment door.
✓ • 2TD-09 (Normal A Incoming Feeder From Xfmr 2T1A)	__ 2) Verify breaker "OPEN" per mechanical "OPEN-CLOSE" flag.
✓ • 2TD-10 (2D RC Pump Motor).	__ 3) Engage racking tool.
	__ 4) Push racking unlocking lever left and rotate racking crank counterclockwise ¼ turn.
	__ 5) Release racking unlocking lever.
	__ 6) Continue cranking counterclockwise until unlocking lever snaps back and racking mechanism automatically stops in "TEST".
	__ 7) Push racking unlocking lever to left and rotate racking crank counterclockwise ¼ turn.
	__ 8) Release racking unlocking lever.
	__ 9) Continue cranking counterclockwise until unlocking lever snaps back and racking mechanism automatically stops in "DISCONNECT".
	__ 10) Remove racking tool.
	__ 11) Close sliding door in compartment door.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. (Continued)	
✓ c. Verify 2TD-04 (6900/4160 VAC XFMR 2ATD) - RACKED IN.	c. Rack in breaker as follows:
	__ 1) Verify breaker "OPEN" per mechanical "OPEN-CLOSE" flag.
	__ 2) Ensure closing springs toggle switch in "ON" position.
	__ 3) Verify breaker in "DISCONNECT".
	__ 4) Ensure compartment doors closed.
	__ 5) Open sliding door in compartment door.
	__ 6) Engage racking tool.
	__ 7) Push racking unlocking lever to left and rotate racking crank clockwise ¼ turn.
	__ 8) Release racking unlocking lever.
	__ 9) Continue cranking clockwise until unlocking lever snaps back and racking mechanism automatically stops in "TEST".
	__ 10) Push rotating unlocking lever to left and rotate racking crank clockwise ¼ turn.
	__ 11) Release racking unlocking lever.
	__ 12) Continue cranking clockwise until unlocking lever snaps back and racking mechanism automatically stops in "CONNECT".
	__ 13) Remove racking tool.
	__ 14) Close sliding door in compartment door.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2. (Continued)

CAUTION **The 6.9 KV bus must be de-energized while racking the breaker from "TEST" to "CONNECT".**

✓ d. Verify 2TD-12 (2TD SWGR INCOMING FDR FROM ESPS SWGR) - RACKED IN.

d. Rack in 2TD-12 (2TD SWGR INCOMING FDR FROM ESPS SWGR) as follows:

__ 1) Open sliding door in compartment door.

__ 2) Verify breaker "OPEN" per mechanical "OPEN-CLOSE" flag.

__ 3) Verify breaker in "DISCONNECT".

__ 4) Engage racking tool.

__ 5) Push racking unlocking lever to left and rotate racking crank clockwise ¼ turn.

__ 6) Release racking unlocking lever.

__ 7) Continue cranking clockwise until unlocking lever snaps back and racking mechanism automatically stops in "TEST".

__ 8) Push rotating unlocking lever to left and rotate racking crank clockwise ¼ turn.

__ 9) Release racking unlocking lever.

__ 10) Continue cranking clockwise until unlocking lever snaps back and racking mechanism automatically stops in "CONNECT".

__ 11) Remove racking tool.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2. (Continued)

__ 12) Close sliding door in compartment door.

NOTE If the "7 KV BUS 2TD MODE SEL" switch is in "AUTO", the breaker will auto close when taken to "CONNECT".

✓ e. Verify 2TD-07 (7KV Bus 2TD Tie Bkr) - RACKED IN.

e. Perform the following:

1) Rack in 2TD-07 (7KV Bus 2TD Tie Bkr) as follows:

__ a) Verify breaker "OPEN" per mechanical "OPEN-CLOSE" flag.

__ b) Ensure power control toggle switch in "ON" position.

__ c) Verify breaker in "DISCONNECT".

__ d) Ensure compartment doors closed.

__ e) Open sliding door in compartment door.

__ f) Engage racking tool.

__ g) Push racking unlocking lever to left and rotate racking crank clockwise ¼ turn.

__ h) Release racking unlocking lever.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2. (Continued)

__ i) Continue cranking clockwise until unlocking lever snaps back and racking mechanism automatically stops in "TEST".

__ j) Push rotating unlocking lever to left and rotate racking crank clockwise ¼ turn.

__ k) Release racking unlocking lever.

__ l) Continue cranking clockwise until unlocking lever snaps back and racking mechanism automatically stops in "CONNECT".

__ m) Remove racking tool.

__ n) Close sliding door in compartment door.

__ 2) Notify Control Room to place "7 KV BUS 2TD MODE SEL" switch in "AUTO" to close 2TD-07.

3) **IF** 2TD-07 cannot be closed in Control Room, **THEN** perform the following:

__ a) Obtain breaker manual pull cord from break glass station located near breaker racking tool storage location.

__ b) Attach pull cord to "CLOSE" lever at bottom of breaker.

__ c) Do not stand in front of breaker cubicle.

__ d) Pull cord to close breaker.

__ e) Notify Control Room of status of 2TD-07.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2. (Continued)

   f. Ensure the following breakers - OPEN:

   ✓ • 2TD-03 (6900 VAC Switchgear RCP2D Feeder)

   ✓ • 2TD-04 (6900/4160 VAC XFMR 2ATD)

   ✓ • 2TD-06 (6900/600 VAC Xfrmr 2TXD)

   ✓ • 2TD-08 (2C2 Heater Drain Tank Pump Motor)

   ✓ • 2TD-11 (2C Condensate Booster Pump Motor)

   ✓ • 2TD-13 (2C Hotwell Pump Motor)

   ✓ • 2TD-12 (2TD SWGR Incoming FDR From ESPS SWGR)

   ✓ • 2TD-14 (6900/600 VAC Xfrmr 2STXD)

   ✓ • 2TD-15 (6900/600 VAC Xfmr 2TXF).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. **Perform the following on 0ELCP0091 (ESPS Diesel Generator Emergency Control Panel) (SERV-594, U-31):**	
a. Ensure the following breakers - OPEN:	
__ • "ESPS SWGR SUPPLY BKR TO U1 & U2 6.9 KV SWGR"	
__ • "1TA-13 SWGR INCOMING FDR FROM ESPS SWGR"	
__ • "1TB-2 SWGR INCOMING FDR FROM ESPS SWGR"	
__ • "2TC-13 SWGR INCOMING FDR FROM ESPS SWGR"	
__ • "2TD-12 SWGR INCOMING FDR FROM ESPS SWGR".	
	<u>**NOTE**</u> ESPS cannot be started from the ESPS Diesel Generator Emergency Control Panel if the ESPS Mode select switch is in the test position.
b. Verify the following white lights - LIT:	b. Perform the following:
__ • "DG #1 READY TO START"	__ 1) Ensure 0EQSCA3003CSMODE (ESPS SWGR MODE SELECT SWITCH) on 0EQSCA3003 (ESPS SWGR CONTROL PANEL) set to "EMERGENCY" mode (YRD/E-594, 44-X, 56-Y, Bldg 77163).
__ • "DG #2 READY TO START".	__ 2) <u>**IF**</u> DG start lights <u>**NOT**</u> lit, <u>**THEN**</u> notify Control Room.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

3. (Continued)

c. Start ESPS DGs by depressing the following pushbuttons:

__ • "DG #1 START" pushbutton

__ • "DG #2 START" pushbutton.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

3. (Continued)

NOTE
- Up to two minutes may elapse from pressing the "START" pushbuttons to "READY TO LOAD" indicating lights illuminate.
- White "TROUBLE" light may momentarily illuminate during start up.

d. Verify the following lights:

__ • "D/G # 1 RUNNING" red light - LIT

__ • "D/G # 2 RUNNING" red light - LIT

__ • "ESPS GENERATOR #1 OUTPUT BREAKER" red light - LIT

__ • "ESPS GENERATOR #2 OUTPUT BREAKER" red light - LIT

__ • "DG #1 READY TO LOAD" amber light - LIT

__ • "DG #2 READY TO LOAD" amber light - LIT.

d. Perform the following:

1) **IF** both "DG #1 READY TO LOAD" and "DG #2 READY TO LOAD" lights dark, **THEN** perform the following:

__ a) Notify Control Room Supervisor that 2ETB cannot be energized by ESPS.

__ b) **GO TO** Step 13 to secure ESPS.

2) **IF** either "DG #1 READY TO LOAD" **OR** "DG #2 READY TO LOAD" lights lit, **THEN** perform the following:

__ a) Notify Control Room Supervisor to **REFER TO** Enclosure 55 (ESPS Operation With One D/G) to evaluate if 2ETB should be energized with one ESPS D/G.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. (Continued)	b) Perform one of the following based on Control Room Supervisor evaluation: __ • **<u>IF</u>** Control Room Supervisor determines ESPS should be used with one D/G, **<u>THEN</u> <u>GO</u> <u>TO</u>** Step 4. **<u>OR</u>** __ • **<u>IF</u>** Control Room Supervisor determines ESPS should **<u>NOT</u>** be used, **<u>THEN</u> <u>GO</u> <u>TO</u>** Step 13 to secure ESPS.
4. **Contact Control Room for the following:** a. Verify the following switches in "OFF": __ • "HTWL PUMP 2C" __ • "CM BSTR PUMP 2C". __ b. Verify 2ETB load shed - COMPLETE. __ c. Verify 2ETB aligned to 2ATD.	
__ 5. **CLOSE "ESPS SWGR SUPPLY BKR to U1 & U2 6.9 KV SWGR".**	
__ 6. **CLOSE "2TD-12 SWGR INCOMING FDR FROM ESPS SWGR".**	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 7. **WHEN 2ATD aligned to 2ETB, THEN notify Control Room to close "4KV XFMR 2ATD FDR" on 2MC-11.**

IF "4KV XFMR 2ATD FDR" cannot be closed in Control Room, THEN CLOSE 2TD-04 (6900/4160 VAC XFMR 2ATD) as follows:

__ a. Obtain breaker manual pull cord from break glass station located near breaker racking tool storage location.

__ b. Attach pull cord to "CLOSE" lever at bottom of breaker.

__ c. Do not stand in front of breaker cubicle.

__ d. Pull cord to close breaker.

__ e. Notify Control Room of status of 2TD-04.

8. **IF notified by Control Room to close 2ETB-03 (Normal Incoming Feeder From Xfmr 2ATD), THEN perform the following:**

__ a. Obtain breaker manual pull cord from break glass station located near breaker racking tool storage location.

__ b. Attach pull cord to "CLOSE" lever at bottom of breaker.

__ c. Do not stand in front of breaker cubicle.

__ d. Pull cord to close breaker.

__ e. Notify Control Room of status of 2ETB-03.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

9. **<u>WHEN</u> notified by Control Room, <u>THEN</u> CLOSE the following load center normal incoming breakers from 2ETB:**

   __ • 2ELXB-4B (Normal Incoming Breaker Fed From Xfmr 2ETXB) (AB-560, AA-67, Rm 362)

   __ • 2ELXD-4B (Normal Incoming Breaker Fed from Xfmr 2ETXD) (AB-560, AA-68, Rm 362).

10. **<u>WHEN</u> time allows, <u>THEN</u> tag the following breakers:**

    __ • 2TD-05 (Normal B Incoming Feeder From XFMR 2T1B)

    __ • 2TD-09 (Normal A Incoming Feeder From Xfmr 2T1A)

    __ • 2TD-10 (2D RC Pump Motor).

__ 11. **Notify Control Room personnel of status.**

__ 12. **Exit this enclosure.**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

13. **Secure ESPS as follows:**

a. Perform the following on 0ELCP0091 (ESPS Diesel Generator Emergency Control Panel) (SERV-594, U-31):

NOTE
- The stop button must be depressed even if ESPS D/G is off to remove the run permissive.
- D/G engine goes into a cool down cycle for approximately five minutes after stop buttons are depressed. The D/G ready to load light will go dark immediately, but the running light will remain lit for 5 minutes.

1) Stop ESPS D/Gs by depressing the following pushbuttons:

__ • "DG #1 STOP" pushbutton

__ • "DG #2 STOP" pushbutton.

__ 2) Ensure "ESPS SWGR SUPPLY BKR to U1 & U2 6.9 KV SWGR" - OPEN.

__ 3) Ensure "2TD-12 SWGR INCOMING FDR FROM ESPS SWGR" - OPEN.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

13. (Continued)

CAUTION **The 6.9 KV bus must be de-energized while racking the breaker from "CONNECT" to "TEST".**

b. Rack out 2TD-12 (2TD SWGR Incoming Fdr From ESPS SWGR) as follows:

__ 1) Open sliding door in compartment door.

__ 2) Verify breaker "OPEN" per mechanical "OPEN-CLOSE" flag.

__ 3) Engage racking tool.

__ 4) Push racking unlocking lever to left and rotate racking crank counterclockwise ¼ turn.

__ 5) Release racking unlocking lever.

__ 6) Continue cranking counterclockwise until unlocking lever snaps back and racking mechanism automatically stops in "TEST".

__ 7) Push racking unlocking lever to left and rotate racking crank counterclockwise ¼ turn.

__ 8) Release racking unlocking lever.

__ 9) Continue cranking counterclockwise until unlocking lever snaps back and racking mechanism automatically stops in "DISCONNECT".

__ 10) Remove racking tool.

__ 11) Close sliding door in compartment door.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

13. (Continued)

c. Rack in the following breakers per Step 13.d:

__ 1) 2TD-05 (Normal B Incoming Feeder From XFMR 2T1B)

__ 2) 2TD-09 (Normal A Incoming Feeder From Xfmr 2T1A)

__ 3) 2TD-10 (2D RC Pump Motor).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

13. (Continued)

d. Rack in each breaker as follows:

__ 1) Verify breaker "OPEN" per mechanical "OPEN-CLOSE" flag.

__ 2) Ensure closing springs toggle switch in "ON" position.

__ 3) Verify breaker in "DISCONNECT".

__ 4) Ensure compartment doors closed.

__ 5) Open sliding door in compartment door.

__ 6) Engage racking tool.

__ 7) Push racking unlocking lever to left and rotate racking crank clockwise ¼ turn.

__ 8) Release racking unlocking lever.

__ 9) Continue cranking clockwise until unlocking lever snaps back and racking mechanism automatically stops in "TEST".

__ 10) Push rotating unlocking lever to left and rotate racking crank clockwise ¼ turn.

__ 11) Release racking unlocking lever.

__ 12) Continue cranking clockwise until unlocking lever snaps back and racking mechanism automatically stops in "CONNECT".

__ 13) Remove racking tool.

__ 14) Close sliding door in compartment door.

__ e. Notify Control Room personnel of status.

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EVALUATION SHEET

Task: Place 1B Hydrogen Recombiner in Service

Alternate Path: No

Facility JPM #: VX-025

Safety Function: 5 **Title:** Hydrogen Recombiner and Purge Control System

K/A 028 A2.01 Malfunctions or operations on the HRPS; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations: Hydrogen Recombiner power setting, determined by using plant data book

Rating(s): 3.4 / 3.6 **CFR:** 41.5 / 43.5 / 45.3 / 45.13

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ In-**P**lant __X__ **P**erform ________ **S**imulate __X__

References: OP/1/A/6450/010 (Containment Hydrogen Control Systems) rev. 44, Enclosure 4.10 (Operation of the Hydrogen Recombiners Following a LOCA)
Unit 1 Revised Data Book, Figure 10

Task Standard: Hydrogen Recombiner 1B in service with Power Adjust “POT” set to approximately 58 KW (Acceptable Range of 57- 59 KW) per Figure 10 of the Unit 1 Revised Data Book.

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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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 LOCA has occurred on Unit 1.**

INITIATING CUES:

- **The CRS instructs you to place Hydrogen Recombiner 1B in service at the required power per OP/1/A/6450/010 (Containment Hydrogen Control Systems), Enclosure 4.10 (Operation of the Hydrogen Recombiners Following a LOCA), steps 3.1 through 3.3.14.**
- **All initial conditions are complete.**
- **Containment pressure is 4.3 psig.**
- **Containment hydrogen concentration is 5% as indicated on 1MC-7.**
- **Hydrogen Recombiner 1A is tagged for maintenance.**

Examiner Note: After reading cue, provide the applicant with a copy of OP/1/A/6450/010 rev. 44, Enclosure 4.10 signed off through step 2.2 and a copy of Unit 1 Revised Data Book Figure 10.

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STEP/STANDARD	SAT/UNSAT

START TIME: _______

STEP 1 3.1 Ensure the H2 Skimmer Fans running per Enclosure 4.13 (Emergency Manual Operation of the H2 Skimmer Fans) **Examiner Cue**: **"Hydrogen Skimmer Fans 1A & 1B are running per Enclosure 4.13."** STANDARD: Applicant acknowledges cue and signs off the step. COMMENTS:	___ **SAT** ___ **UNSAT**

CAUTION: Hydrogen Recombiners are NOT operated with hydrogen concentration ≥ 6% without TSC approval.

NOTE:
1. If desired to place both Hydrogen Recombiners in service, Steps 3.2 and 3.3 may be performed in conjunction.
2. If desired to place both Hydrogen Recombiners in service, use additional Enclosure 4.11 (Hydrogen Recombiner Heater Temperature Log).
3. Placing Hydrogen Recombiner 1A in service is preferred for ALARA consideration.

STEP 2 3.2 **IF** placing Hydrogen Recombiner 1A in service, perform the following at 1ELCP0139 (1A Hydrogen Recombiner Control Panel) (AB-577, DD-52, Rm 494): STANDARD: Applicant determines that per the cue sheet, Hydrogen Recombiner 1A is tagged out for maintenance, and that this step is N/A. COMMENTS:	___ **SAT** ___**UNSAT**

STEP/STANDARD	**SAT/UNSAT**
STEP 3 3.3 **IF** placing Hydrogen Recombiner 1B in service, perform the following at 1ELCP0140 (1B Hydrogen Recombiner Control Panel) (AB-560, DD-52, Rm 370): 3.3.1 Ensure the "POWER OUT SWITCH" is in the "OFF" position. STANDARD: Applicant locates the Power Out Switch and ensures it is in the OFF position. **Examiner Cue: "The "POWER OUT SWITCH" is in the "OFF" position."** COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 4 3.3.2 Ensure the "POWER ADJUST" potentiometer is set to zero (000). STANDARD: Applicant verifies the "POWER ADJUST" potentiometer is set to 000. **Examiner Cue: "The "POWER ADJUST" pot is set to zero (000)."** COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 5 3.3.3 **IF** the "POWER IN AVAILABLE" light is DARK, ensure 1EMXL-F07C (1B Electric Hydrogen Recombiner Power Supply Panel) (AB-560, BB-47) is in the "ON" position. **Examiner Cue**: **"The "POWER IN AVAILABLE" light is lit."** STANDARD: Applicant determines that with the POWER IN AVAILABLE light being lit, this step is N/A. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 6 3.3.4 Place the "POWER OUT SWITCH" in the "ON" position. **Examiner Cue: After applicant describes placing the POWER OUT SWITCH up to the ON position, "The POWER OUT SWITCH is in the "ON" position."** STANDARD: Applicant places the POWER OUT SWITCH up to the ON position. **Examiner Note: This step is critical to place the hydrogen recombiner in service.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 7 3.3.5 Verify that the red indicating light is lit. **Examiner Cue: After finding the indicating light on the switch plate inform the applicant - "The RED light on the switch plate is lit."** STANDARD: Applicant finds the red indicating light on the switch plate and verifies that it is lit. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 8 3.3.6 Slowly turn the "POWER ADJUST" potentiometer clockwise until 5 KW is indicated on the "POWER OUT" meter. **Examiner Cue: After explaining operation of the potentiometer in the clockwise direction, inform applicant – "The POWER OUT meter rises to 5 KW".** STANDARD: Applicant describes turning the potentiometer clockwise to increase the POWER OUTPUT meter reading to 5 KW. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 9 3.3.7 Maintain a 5 KW output for 10 minutes. **Examiner Cue**: **"Using time compression, 10 minutes has elapsed."** STANDARD: Applicant describes maintaining this power output for 10 minutes. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 10 3.3.8 Slowly advance the "POWER ADJUST" setting until an output of 10 KW is obtained on the "POWER OUT" meter. **Examiner Cue**: **After explaining the operation of the potentiometer in the clockwise direction inform applicant - "The POWER OUT meter rises to 10 KW."** STANDARD: Applicant describes turning the potentiometer clockwise to increase the POWER OUTPUT meter reading to 10 KW. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 11 3.3.9 Maintain a 10 KW output for 10 minutes. **Examiner Cue**: **"Using time compression, 10 minutes has elapsed."** STANDARD: Applicant describes maintaining this power output for 10 minutes. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 12 3.3.10 Advance the "POWER ADJUST" setting until an output of 20 KW is obtained on the "POWER OUT" meter. **Examiner Cue**: **After explaining the operation of the potentiometer in the clockwise direction inform applicant - "The POWER OUT meter rises to 20 KW."** STANDARD: Applicant describes turning the potentiometer clockwise to increase the POWER OUTPUT meter reading to 20 KW. COMMENTS:	___ **SAT** ___ **UNSAT**
STEP 13 3.3.11 Maintain a 20 KW output for 5 minutes. **Examiner Cue**: **"Using time compression, 5 minutes has elapsed."** STANDARD: Applicant describes maintaining this power output for 5 minutes. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 14 3.3.12 Determine Hydrogen Recombiner 1B power setting as follows: 3.3.12.1 Determine KW value from Figure 10 of the Unit 1 Revised Data Book. **Examiner Note: The applicant will use the copy of Unit 1 Revised Data Book Figure 10 provided with the initiating cue.** STANDARD: Applicant determines that the KW value from Figure 10 is 54 KW (Acceptable Range is 53 – 55 KW). **Examiner Note: This step is critical in determining the proper power setting for the given containment conditions.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 15 3.3.12.2 H_2 concentration (1MC-7) ________ % STANDARD: Applicant determines from cue sheet that hydrogen concentration is 5%. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 16 3.3.12.3 **IF** H_2 concentration is > 3.5%, add 4 KW to calculation. STANDARD: Applicant determines that H2 concentration is > 3.5% and adds 4 KW to the calculation. **Examiner Note: This step is critical in determining the proper power setting for the given containment conditions.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 17 3.3.12.4 Calculate KW as follows: 54 (Step 3.3.12.1) + 4 (Step 3.3.12.3 or N/A) = 58 KW STANDARD: Applicant calculates the required power setting to be 58 KW (Acceptable Range is 57 – 59 KW). **Examiner Note: This step is critical in determining the proper power setting for the given containment conditions.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP/STANDARD	**SAT/UNSAT**
STEP 18 3.3.13 Advance the "POWER ADJUST" setting until the "POWER OUT" meter indicates the value calculated in 3.3.12.4. Adjust "POWER ADJUST" as necessary to maintain this output. **Examiner Cue: After explaining the operation of the potentiometer in the clockwise direction inform applicant - "The POWER OUT meter rises to 58 KW."** STANDARD: Applicant describes turning the potentiometer clockwise to increase the POWER OUTPUT meter reading to 58 KW (Acceptable Range is 57 – 59 KW). **Examiner Note: This step is critical to set the necessary power output setting for the given containment conditions.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**
STEP 19 3.3.14 Notify the NCO that Hydrogen Recombiner 1B is now in service. Person notified ____________________ STANDARD: Applicant calls the control room and notifies them that 1B Hydrogen Recombiner is in service. **Examiner Cue: "Unit 1 Control Room, this is Greg." Repeat any additional information given.** COMMENTS: **END OF TASK**	___ **SAT** ___ **UNSAT**

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)
May 2015 NRC Initial License Exam
JPM I

INITIAL CONDITIONS:

- **A LOCA has occurred on Unit 1.**

INITIATING CUES:

- **The CRS instructs you to place Hydrogen Recombiner 1B in service at the required power per OP/1/A/6450/010 (Containment Hydrogen Control Systems), Enclosure 4.10 (Operation of the Hydrogen Recombiners Following a LOCA), steps 3.1 through 3.3.14.**
- **All initial conditions are complete.**
- **Containment pressure is 4.3 psig.**
- **Containment hydrogen concentration is 5% as indicated on 1MC-7.**
- **Hydrogen Recombiner 1A is tagged for maintenance.**

Operation of the Hydrogen Recombiners Following a LOCA

1. Limits and Precautions

1.1 Hydrogen concentrations greater than 3.5% are combustible.

1.2 The maximum electric hydrogen recombiners heater temperature is 1400°F.

1.3 Hydrogen Recombiners and Hydrogen Ignitors are **NOT** operated with hydrogen concentration ≥ 6% without TSC approval.

2. Initial Conditions

AA 2.1 Verify operation of the Hydrogen Recombiner is required per appropriate emergency procedures.

AA 2.2 Request RP coverage due to increasing radiation levels at Hydrogen Recombiner panels during a LOCA.
Person notified Gary Johnson

3. Procedure

_____ 3.1 Ensure the H_2 Skimmer Fans running per Enclosure 4.13 (Emergency Manual Operation of the H_2 Skimmer Fans).

CAUTION: Hydrogen Recombiners are **NOT** operated with hydrogen concentration ≥ 6% without TSC approval.

NOTE:
1. If desired to place both Hydrogen Recombiners in service, Steps 3.2 and 3.3 may be performed in conjunction.
2. If desired to place both Hydrogen Recombiners in service, use additional Enclosure 4.11 (Hydrogen Recombiner Heater Temperature Log).
3. Placing Hydrogen Recombiner 1A in service is preferred for ALARA consideration.

_____ 3.2 **IF** placing Hydrogen Recombiner 1A in service, perform the following at 1ELCP0139 (1A Hydrogen Recombiner Control Panel) (AB-577, DD-52, Rm 494):

☐ 3.2.1 Ensure the "POWER OUT SWITCH" is in the "OFF" position.

☐ 3.2.2 Ensure the "POWER ADJUST" potentiometer is set to zero (000).

_____ _____ 3.2.3 **IF** the "POWER IN AVAILABLE" light is DARK, ensure 1EMXK-F07C (1A Electric Hydrogen Recombiner Power Supply Panel) (AB-577, BB-47) is in the "ON" position:

☐ 3.2.4 Place the "POWER OUT SWITCH" in the "ON" position

☐ 3.2.5 Verify that the red indicating light is lit.

☐ 3.2.6 Slowly turn the "POWER ADJUST" potentiometer clockwise until 5 KW is indicated on the "POWER OUT" meter.

☐ 3.2.7 Maintain a 5 KW output for 10 minutes.

☐ 3.2.8 Slowly advance the "POWER ADJUST" setting until an output of 10 KW is obtained on the "POWER OUT" meter.

☐ 3.2.9 Maintain a 10 KW output for 10 minutes.

☐ 3.2.10 Advance the "POWER ADJUST" setting until an output of 20 KW is obtained on the "POWER OUT" meter.

☐ 3.2.11 Maintain a 20 KW output for 5 minutes.

3.2.12 Determine Hydrogen Recombiner 1A power setting as follows:

_____ 3.2.12.1 Determine KW value from Figure 10 of the Unit One Revised Data Book. ______ KW VALUE

_____ 3.2.12.2 H_2 concentration (1MC7) ________%

_____ 3.2.12.3 **IF** H_2 concentration is > 3.5%, add 4KW to calculation.

_____ 3.2.12.4 Calculate KW as follows:

_________ + __________ = ______ KW

Step 3.2.12.1 Step 3.2.12.3 or N/A

_____ 3.2.13 Advance the "POWER ADJUST" setting until the "POWER OUT" meter indicates the value calculated in 3.2.12.4. Adjust "POWER ADJUST" as necessary to maintain this output.

_____ 3.2.14 Notify NCO that Hydrogen Recombiner 1A is now in service.
Person notified ____________________________________

Operation of the Hydrogen Recombiners Following a LOCA

CAUTION: The maximum electric hydrogen recombiner heater temperature is 1400°F.

NOTE:

1. Temperature stabilization may take up to 5 hours. The heater temperatures are considered stabilized when the channels are within 60°F of each other and the average temperature is ≥ 1225°F. (CNM-1399.36-0010)
2. Hydrogen Recombiner Heater 1A Temperature is monitored from 1VXCR5000 (Train A Hydrogen Recombiner Heater Temperature Recorder) located on 1ELCP0299 (AB-577, DD-52, Rm 494).
3. 1VXCR5000 is a touch screen video monitor. Touching the screen while in screen saver mode will display the main menu. The thermocouple temperatures will be displayed when the "Digital" icon is selected. The "Return" icon on the lower left of the screen returns to the main menu.

☐ 3.2.15 Record hourly the Hydrogen Recombiner 1A Heater Temperature for each of the three thermocouples on Enclosure 4.11 (Hydrogen Recombiner Heater Temperature Log) until stabilized.

☐ 3.2.16 **WHEN** the Hydrogen Recombiner Heater 1A Temperature has stabilized per Enclosure 4.11 (Hydrogen Recombiner Heater Temperature Log), perform the following:

_____ 3.2.16.1 **IF** the thermocouples are inaccurate, proceed to Step 3.2.17.

☐ 3.2.16.2 Adjust "POWER ADJUST" potentiometer as necessary to maintain recombination temperature of 1225-1400°F as read on 1VXCR5000 (Train A Hydrogen Recombiner Heater Temperature Recorder).

☐ 3.2.16.3 Verify the "POWER OUT" meter indicates ≥ the value calculated in Step 3.2.12.4

3.2.17 Every 24 hours, measure containment hydrogen concentration **AND** adjust recombiner power for the duration of recombiner operation as follows:

_____ 3.2.17.1 Determine KW value from Figure 10 of the Unit One Revised Data Book. ______ KW VALUE

_____ 3.2.17.2 H_2 concentration (1MC7) ________%

_____ 3.2.17.3 **IF** H_2 concentration has increased by .5% **OR** is > 3.5%, add 4KW to calculation.

_____ 3.2.17.4 Calculate KW as follows:

_________ + __________ = ______ KW
Step 3.2.17.1 Step 3.2.17.3 or N/A

_____ 3.2.17.5 Advance the "POWER ADJUST" setting until the "POWER OUT" meter indicates the value calculated in 3.2.17.4. Adjust "POWER ADJUST" as necessary to maintain this output.

☐ 3.2.17.6 Monitor Hydrogen Recombiner Heater Temperature per Steps 3.2.15 and 3.2.16 to prevent temperature from exceeding 1400°F.

_____ 3.3 **IF** placing Hydrogen Recombiner 1B in service, perform the following at 1ELCP0140 1B Hydrogen Recombiner Control Panel) (AB-560, DD-52, Rm 370):

☐ 3.3.1 Ensure the "POWER OUT SWITCH" is in the "OFF" position.

☐ 3.3.2 Ensure the "POWER ADJUST" potentiometer is set to zero (000).

_____ _____ 3.3.3 **IF** the "POWER IN AVAILABLE" light is DARK, ensure 1EMXL-F07C (1B Electric Hydrogen Recombiner Power Supply Panel) (AB-560, BB-47) is in the "ON" position:

☐ 3.3.4 Place the "POWER OUT SWITCH" in the "ON" position.

☐ 3.3.5 Verify that the red indicating light is lit.

☐ 3.3.6 Slowly turn the "POWER ADJUST" potentiometer clockwise until 5 KW is indicated on the "POWER OUT" meter.

☐ 3.3.7 Maintain a 5 KW output for 10 minutes.

☐ 3.3.8 Slowly advance the "POWER ADJUST" setting until an output of 10 KW is obtained on the "POWER OUT" meter.

☐ 3.3.9 Maintain a 10 KW output for 10 minutes.

☐ 3.3.10 Advance the "POWER ADJUST" setting until an output of 20 KW is obtained on the "POWER OUT" meter.

☐ 3.3.11 Maintain a 20 KW output for 5 minutes.

3.3.12 Determine Hydrogen Recombiner 1B power setting as follows:

_____ 3.3.12.1 Determine KW value from Figure 10 of the Unit One Revised Data Book.

_____ 3.3.12.2 H_2 concentration (1MC7) ________%

_____ 3.3.12.3 **IF** H_2 concentration is > 3.5%, add 4KW to calculation.

_____ 3.3.12.4 Calculate KW as follows:

_________ + ___________ = ______ KW

Step 3.3.12.1 Step 3.3.12.3 or N/A

_____ 3.3.13 Advance the "POWER ADJUST" setting until the "POWER OUT" meter indicates the value calculated in 3.3.12.4. Adjust "POWER ADJUST" as necessary to maintain this output.

_____ 3.3.14 Notify NCO that Hydrogen Recombiner 1B is now in service.
Person notified ____________________________________

CAUTION: The maximum electric hydrogen recombiner heater temperature is 1400°F.

NOTE:
1. Temperature stabilization may take up to 5 hours. The heater temperatures are considered stabilized when the channels are within 60°F of each other and the average temperature is ≥ 1225°F. (CNM-1399.36-0010)
2. Hydrogen Recombiner Heater 1B Temperature is monitored from 1VXCR5500 (Train B Hydrogen Recombiner Heater Temperature Recorder) located on 1ELCP0300 (AB-560, DD-52, Rm 370).
3. 1VXCR5500 is a touch screen video monitor. Touching the screen while in screen saver mode will display the main menu. The thermocouple temperatures will be displayed when the "Digital" icon is selected. The "Return" icon on the lower left of the screen returns to the main menu.

☐ 3.3.15 Record hourly the Hydrogen Recombiner Heater 1B Temperature for each of the three thermocouples on Enclosure 4.11 (Hydrogen Recombiner Heater Temperature Log), until stabilized.

☐ 3.3.16 **WHEN** the Hydrogen Recombiner Heater 1B Temperature has stabilized per Enclosure 4.11 (Hydrogen Recombiner Heater Temperature Log), perform the following:

_____ 3.3.16.1 **IF** the thermocouples are inaccurate, proceed to Step 3.3.17.

☐ 3.3.16.2 Adjust "POWER ADJUST" potentiometer as necessary to maintain recombination temperature of 1225-1400°F as read on1VXCR5500 (Train B Hydrogen Recombiner Heater Temperature Recorder).

☐ 3.3.16.3 Verify the "POWER OUT" meter indicates $\geq$ the value calculated in Step 3.3.12.4.

3.3.17 Every 24 hours, measure containment hydrogen concentration **AND** adjust recombiner power for the duration of recombiner operation as follows:

_____ 3.3.17.1 Determine KW value from Figure 10 of the Unit One Revised Data Book. ______ KW VALUE

_____ 3.3.17.2 H_2 concentration (1MC7) ________%

_____ 3.3.17.3 **IF** H_2 concentration has increased by .5% **OR** is > 3.5%, add 4KW to calculation.

_____ 3.3.17.4 Calculate KW as follows:

_________ + ___________ = ______ KW

Step 3.3.17.1 Step 3.3.17.3 or N/A

_____ 3.3.17.5 Advance the "POWER ADJUST" setting until the "POWER OUT" meter indicates the value calculated in 3.3.17.4. Adjust "POWER ADJUST" as necessary to maintain this output.

☐ 3.3.17.6 Monitor Hydrogen Recombiner Heater Temperature per Steps 3.3.15 and 3.3.16 to prevent temperature from exceeding 1400°F.

_____ 3.4 **IF** operation of Hydrogen Recombiner 1A is no longer required, perform the following on panel 1ELCP0139 (1A Hydrogen Recombiner Power Control Panel):

_____ 3.4.1 Turn the "POWER ADJUST" potentiometer on the control panel to zero (000).

_____ 3.4.2 Place the "POWER OUT SWITCH" on the control panel in the "OFF" position.

_____ 3.5 **IF** operation of Hydrogen Recombiner 1B is no longer required, perform the following on panel 1ELCP0140 (1B Hydrogen Recombiner Power Control Panel):

_____ 3.5.1 Turn the "POWER ADJUST" potentiometer on the control panel to zero (000).

_____ 3.5.2 Place the "POWER OUT SWITCH" on the control panel in the "OFF" position.

3.6 Do **NOT** file a copy of this enclosure in the designated storage cabinet.

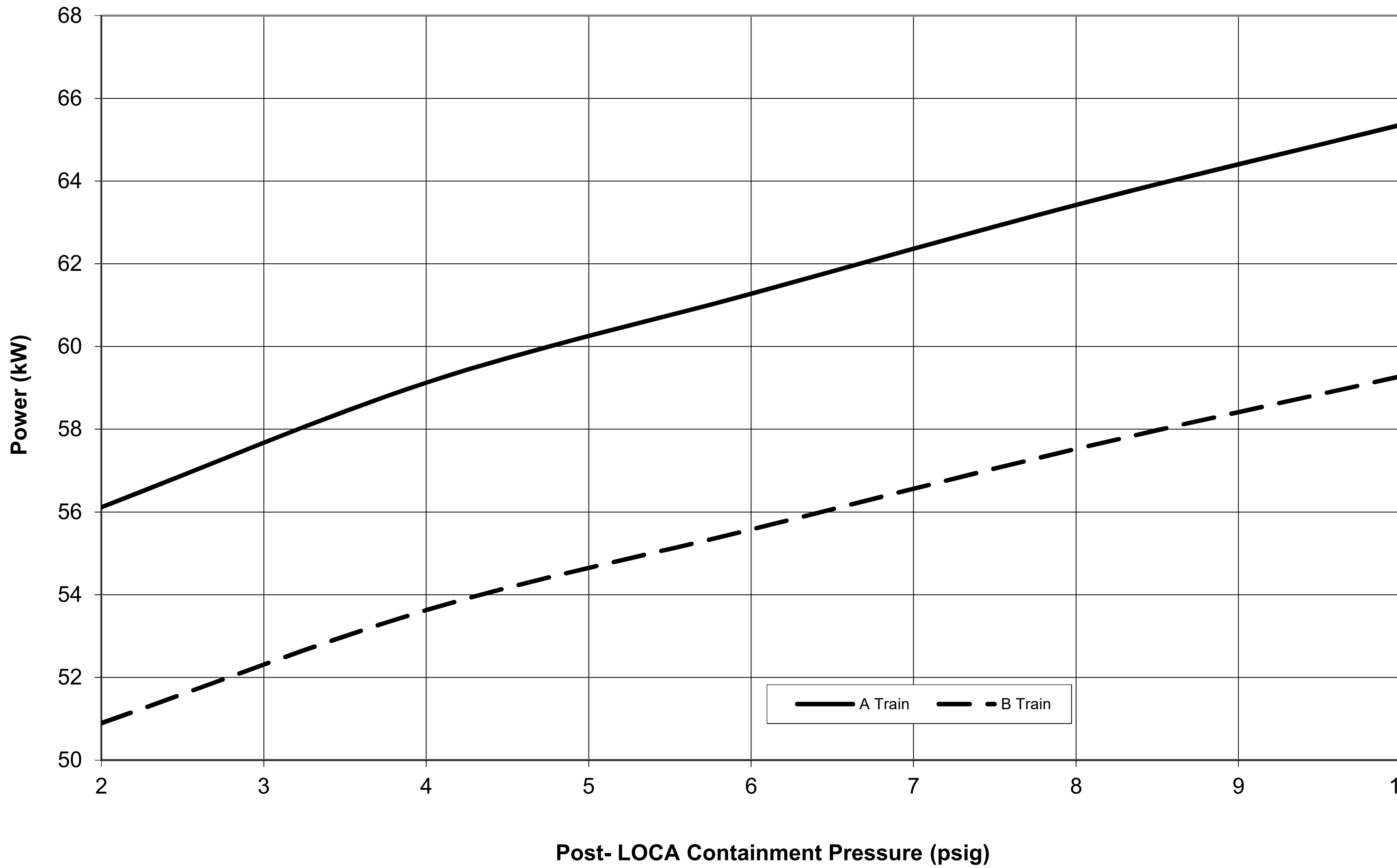

Figure 10 - Unit 1 Hydrogen Recombiners Post-LOCA Power Consumption

JPM K

Catawba Nuclear Station
JPM K
2021 NRC Exam

EVALUATION SHEET

Task: Break Condenser Vacuum Locally

Alternate Path: No

Facility JPM #: CA-084

Safety Function: 4S **Title:** Main Turbine Generator (MT/G) System

K/A 045 A1.06 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MT/G system controls including: Expected response of secondary plant parameters following T/G trip

Rating(s): 3.3 / 3.7 **CFR:** 41.5 / 45.5

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ In-**P**lant __X__ **P**erform __X__ **S**imulate ________

References: AP/1/A/5500/006 (Loss of S/G Feedwater) Rev 45 Enclosure 3

Task Standard: Enclosure 3 has been completed with the first vacuum breaker opened within 10 minutes.

Validation Time: 8 minutes **Time Critical:** Yes __X__ No ______

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Applicant:
NAME________________________ Docket #______________

Time Start: ____________
Time Finish: ____________

Time Critical (<10 minutes)
Time Start: ___________
Time Finish: ___________

Performance Rating:

SAT ____ UNSAT ____

Performance Time ______

Examiner: ________________________________ ________________________________/_________
NAME SIGNATURE DATE

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COMMENTS

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Catawba Nuclear Station
JPM K
2021 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 in Mode 3 following a reactor trip.**

INITIATING CUES:

- **The Control Room Supervisor instructs you to perform AP/1/A/5500/006 (Loss of S/G Feedwater) Enclosure 3 (Local Actions to Break Condenser Vacuum).**

This JPM is TIME CRITICAL; time begins when you acknowledge the task.

EXAMINER NOTE: **Provide applicant with a copy of AP/1/A/5500/006, Enclosure 3.**

Catawba Nuclear Station
JPM K
2021 NRC Exam

Critical Time Start: Record Time that applicant acknowledges the task _________.

STEP/STANDARD	SAT/UNSAT
CAUTION **High air flow rates will exist when vacuum breakers are first opened. Stay clear of pipe end.**	**CRITICAL STEP**
STEP 1: 1 **Break condenser vacuum by opening the following valves:** • 1CM-368 (2A Main Cond Shell Vacuum Bkr) (TB1-600,1F- 26) (Ladder needed) • 1CM-369 (2B Main Cond Shell Vacuum Bkr) (TB1-603, 1F- 24) (Ladder needed) • 1CM-370 (2C Main Cond Shell Vacuum Bkr) (TB1-605, 1F-22) (Ladder needed). **Examiner Note:** **The critical end time is when the applicant describes opening the first valve. Due to the height of the valves, no fall protection will be required.** **Examiner Cue:** **When applicant describes engaging lever and rotating handwheel counter clockwise to open the following valve then: "A large volume of airflow is heard."** **Examiner Note:** **This step is critical in order to open correct valves for breaking vacuum.** **Critical Time End: _______________** STANDARD: Applicant will describe opening the valves: 1CM-368, 1CM-369, 1CM-370. COMMENTS:	___ SAT ___ UNSAT

STEP/STANDARD	SAT/UNSAT
STEP 2 2 **Secure steam to CSAEs as follows:** a. Close the following valves: • 1SA-22 (Main Steam To CSAE) (TB1-594, 1M-32) • 1SA-27 (Aux Steam To CSAE) (TB-594, 1M-27). STANDARD: Applicant will describe closing 1SA-22 and 1SA-27. **Examiner Cue:** **As applicant properly describes closing the valves give cue as appropriate, "Valve turns until resistance is felt."** **Examiner Note:** **This step is critical, because if it is not performed, the CSAEs will continue to pull vacuum** COMMENTS:	**CRITICAL STEP** **___ SAT** **___UNSAT**

STEP 3 b. **WHEN** time and manpower permit, **THEN** complete the shutdown of the CSAEs. **REFER TO** OP/1/B/6300/006 (Main Vacuum). STANDARD: Applicant will read the step **Examiner Cue:** **The Control Room Supervisor has instructed another operator to complete the shutdown of the CSAEs.** COMMENTS:	**___ SAT** **___ UNSAT**

STEP/STANDARD	SAT/UNSAT
STEP 4 3. **WHEN requested by Control Room Supervisor, THEN verify condenser vacuum broken as follows:** a. Inspect each vacuum breaker for absence of air flow into condenser. b. Notify Control Room Supervisor of results. STANDARD: Applicant will inspect each vacuum breaker for the absence of air flow into the condenser and will report to the Control Room Supervisor. **Examiner Cue:** **After each inspection, "No air flow into condenser."** COMMENTS:	___ **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 3 following a reactor trip.**

INITIATING CUES:

- **The Control Room Supervisor instructs you to perform AP/1/A/5500/006 (Loss of S/G Feedwater) Enclosure 3 (Local Actions to Break Condenser Vacuum).**

This JPM is TIME CRITICAL; time begins when you acknowledge the task.

CAUTION **High air flow rates will exist when vacuum breakers are first opened. Stay clear of pipe end.**

1. **Break condenser vacuum by opening the following valves:**

   __ • 1CM-368 (1A Main Cond Shell Vacuum Bkr) (TB1-600,1F-26) (Ladder needed)

   __ • 1CM-369 (1B Main Cond Shell Vacuum Bkr) (TB1-603, 1F-24) (Ladder needed)

   __ • 1CM-370 (1C Main Cond Shell Vacuum Bkr) (TB1-605, 1F-22) (Ladder needed).

2. **Secure steam to CSAEs as follows:**

   a. CLOSE the following valves:

      __ • 1SA-22 (Main Steam To CSAE) (TB1-594, 1M-32)

      __ • 1SA-27 (Aux Steam To CSAE) (TB-594, 1M-27).

   __ b. **WHEN** time and manpower permit, **THEN** complete the shutdown of CSAEs. **REFER TO** OP/1/B/6300/006 (Main Vacuum).

3. **WHEN requested by Control Room Supervisor, THEN verify condenser vacuum broken as follows:**

   __ a. Inspect each vacuum breaker for absence of air flow into condenser.

   __ b. Notify Control Room Supervisor of results.

JPM A.1-1R

RO

Catawba Nuclear Station
Admin. JPM A.1-1R
September 2021 NRC Exam

EVALUATION SHEET

Task: Calculate Reactor Vessel Head Venting Time

Alternate Path: N/A

Facility JPM #: New

Safety Function: N/A

K/A G 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: EP/1/A/5000/FR-I.3 Response to Voids in Reactor Vessel, Enclosure 2 (rev 19) and images of control room gauges needed to perform head vent calculation.

Task Standard: Reactor vessel head maximum allowable vent time calculated as follows: Value "A" calculated to be 9434 – 9698; Value "B" calculated to be 7075 – 12123: Value "C" determined to be 2750 – 3250; Maximum allowable vent time "T" is calculated to be 2.1 - 4.4 minutes.

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.1-1R
September 2021 NRC Exam

SIMULATOR OPERATOR INSTRUCTIONS:

1. **ENSURE NRC Examination Security has been established.**
2. **Insert the following malfunctions:**

✓	Instructor Action	Final	Delay	Ramp	Delete In	Event
	XMT-VV010 (TVV_5090 LOWER CNT AIR TEMP A MTR)	145				
	XMT-VV011 (TVV_5110 LOWER CNT AIR TEMP B MTR)	145				
	XMT-VV014 (TVV_5170 LOWER CNT AIR TEMP C MTR)	145				
	XMT-VV015 (TVV_5190 LOWER CNT AIR TEMP D MTR)	145				
	XMT-VX003 (XMI_5320 CNT TRN A H2 ANAL MTR)	2				
	XMT-VX004 (XMI_5330 CNT TRN B H2 ANAL MTR)	2				
	XMT-CNT009 (PNS_5090 CNT PRESS MTR (PI-937))	3.5				
	XMT-CNT008 (PNS_5060 CNT PRESS MTR (PI-936))	3.5				
	XMT-CNT007 (PNS_5050 CNT PRESS MTR (PI-935))	3.5				
	XMT-CNT006 (PNS_5040 CNT PRESS MTR (PI-934))	3.5				
	XMT-CNT011 (PNS_5380 CNT TRN B PRESS MTR)	3.5				
	XMT-CNT010 (PNS_5370 CNT TRN A PRESS MTR)	3.5				
	IND-NC023 (PNC_5120 LOOP B HOT LEG W/R PRESS MTR (PI-405))	900				
	IND-NC024 (PNC_5140 LOOP C HOT LEG W/R PRESS MTR (PI-403))	900				

3. **Take digital photographs of the gauges listed above or provide control board mimics from the instructor station.**

NOTE TO EVALUATOR: These have been provided as part of the JPM package for each applicant.

Catawba Nuclear Station
Admin. JPM A.1-1R
September 2021 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:

- **A LOCA is in progress on Unit 1**

INITIATING CUES:

- **The CRS directs you to calculate and record the maximum reactor vessel head venting time per EP/1/A/5000/FR-I.3 (Response to Voids in Reactor Vessel) Enclosure 2 (Allowable Hydrogen Venting Time)**

EXAMINER NOTE: Each applicant should receive a copy of FR-I.3 Enclosure 2 as well as 4 pictures of control room gauges for:

- **H2 Analyzers**
- **Containment Pressure**
- **Lower Containment Air Temperatures**
- **Loop B and C Hot Leg W/R Pressure**

START TIME: _______

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STEP 1: Step 1

Calculate A where $A = 9500 \times \frac{(P + 14.7)}{14.7} \times \frac{492}{(T+460)}$

Where: P = Containment pressure (PSIG)
T = Lower Containment temperature (°F)

STANDARD:

Calculate A:

Determine containment pressure as 3.4 psig to 3.6 psig.

Determine Lower Containment Temperature as 140°F - 150°F.

Using 3.4, 140 $A = 9500 \times \frac{(3.4 + 14.7)}{14.7} \times \frac{492}{(140+460)}$ = **9591.7**

Using 3.4, 150 $A = 9500 \times \frac{(3.4 + 14.7)}{14.7} \times \frac{492}{(150+460)}$ = **9434.5**

Using 3.6, 140 $A = 9500 \times \frac{(3.6 + 14.7)}{14.7} \times \frac{492}{(140+460)}$ = **9697.7**

Using 3.6, 150 $A = 9500 \times \frac{(3.6 + 14.7)}{14.7} \times \frac{492}{(150+460)}$ = **9538.7**

NOTE TO EXAMINER: Acceptable band for value of A is 9434 – 9698.

This step is critical to properly perform this task and to meet the JPM standard to calculate the maximum head vent time for the containment conditions given.

COMMENTS:

</td><td>

CRITICAL STEP

___ **SAT**

___ **UNSAT**

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STEP 2: Step 2

Calculate B where B = (3 - H) X A

Where H = Containment Hydrogen Concentration (%)

STANDARD:

Determine H2 concentration as between 1.75% and 2.25%.

Using bounding values of A (9434 to 9698):

B = (3 – 1.75) X 9434 = **11792.5**

B = (3 – 1.75) X 9698 = **12122.5**

B = (3 – 2.25) X 9434 = **7075.5**

B = (3 – 2.25) X 9698 = **7273.5**

NOTE TO EXAMINER: Acceptable range for value of B is 7075 – 12123.

This step is critical to properly perform this task and to meet the JPM standard to calculate the maximum head vent time for the containment conditions given.

COMMENTS:

</td><td>

CRITICAL STEP

___ SAT

___UNSAT

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STEP 3: Step 3 **Determine C from the curve for the current NC system pressure.** STANDARD: Determines NC pressure from pictures as **875** psig to **925** psig. Determines C (hydrogen flow rate) as between **2,750** – **3,250** SCFM. **This step is critical to properly perform this task and to meet the JPM standard to calculate the maximum head vent time for the conditions given.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

<table>
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STEP 4 Enclosure 5 Step 4

Calculate T:

T= B / C = Venting time in minutes

STANDARD:

Using bounding values for B and C:

T = 7075 / 2750 = 2.57 minutes

T = 7075 / 3250 = 2.18 minutes

T = 12123 / 2750 = 4.40 minutes

T = 12123 / 3250 = 3.73 minutes

NOTE TO EXAMINER: Maximum allowable venting time acceptable band is 2.1 – 4.4 minutes (2 minutes 6 seconds to 4 minutes 24 seconds).

This step is critical to properly perform this task and to meet the JPM standard to calculate the maximum head vent time for the containment conditions given.

COMMENTS:

END OF TASK
</td>
<td>
CRITICAL STEP

___ SAT

___ UNSAT
</td></tr>
</table>

STOP TIME ________

APPLICANT CUE SHEET

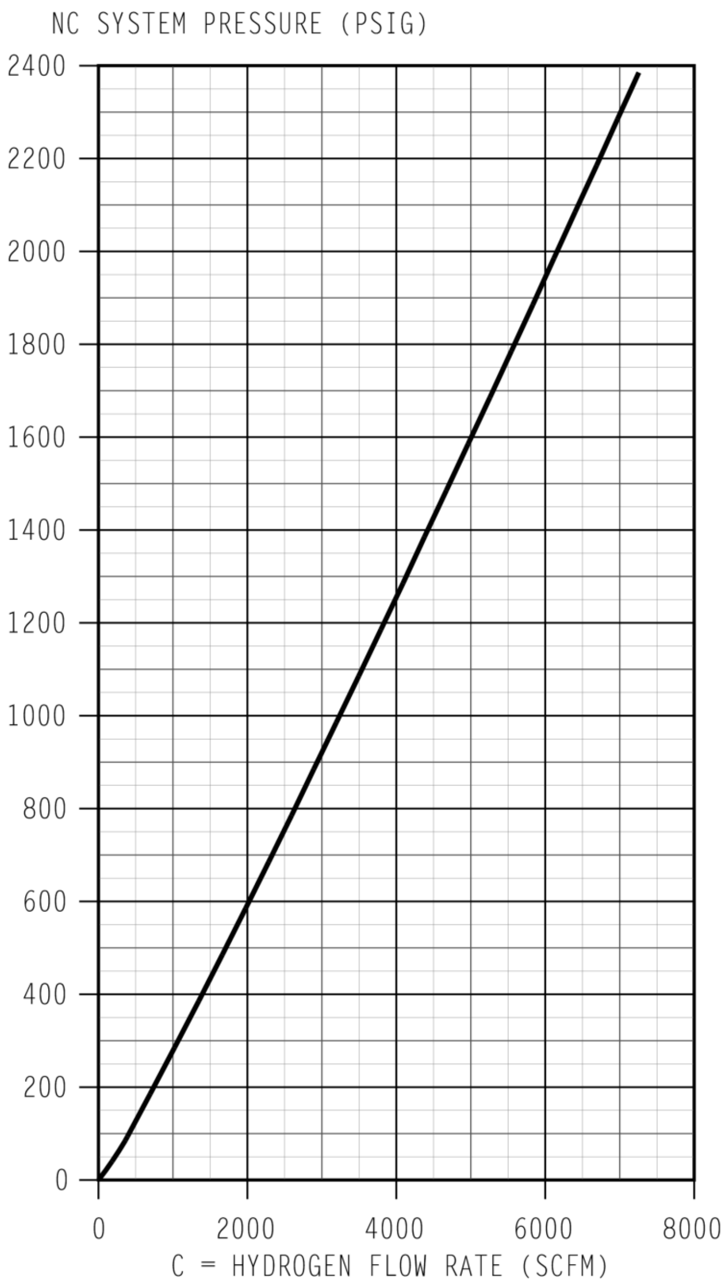
(RETURN TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- **A LOCA is in progress on Unit 1**

INITIATING CUES:

- **The CRS directs you to calculate and record the maximum reactor vessel head venting time per EP/1/A/5000/FR-I.3 (Response to Voids in Reactor Vessel) Enclosure 2 (Allowable Hydrogen Venting Time)**



CALCULATION OF MAXIMUM ALLOWABLE VENTING TIME

STEP 1: Calculate A

$$A = 9{,}500 \times \frac{(P + 14.7)}{14.7} \times \frac{492}{(T + 460)}$$

where: P = Containment pressure (PSIG)
T = Lower containment temperature (deg F)

STEP 2: Calculate B

B = (3 - H) x A

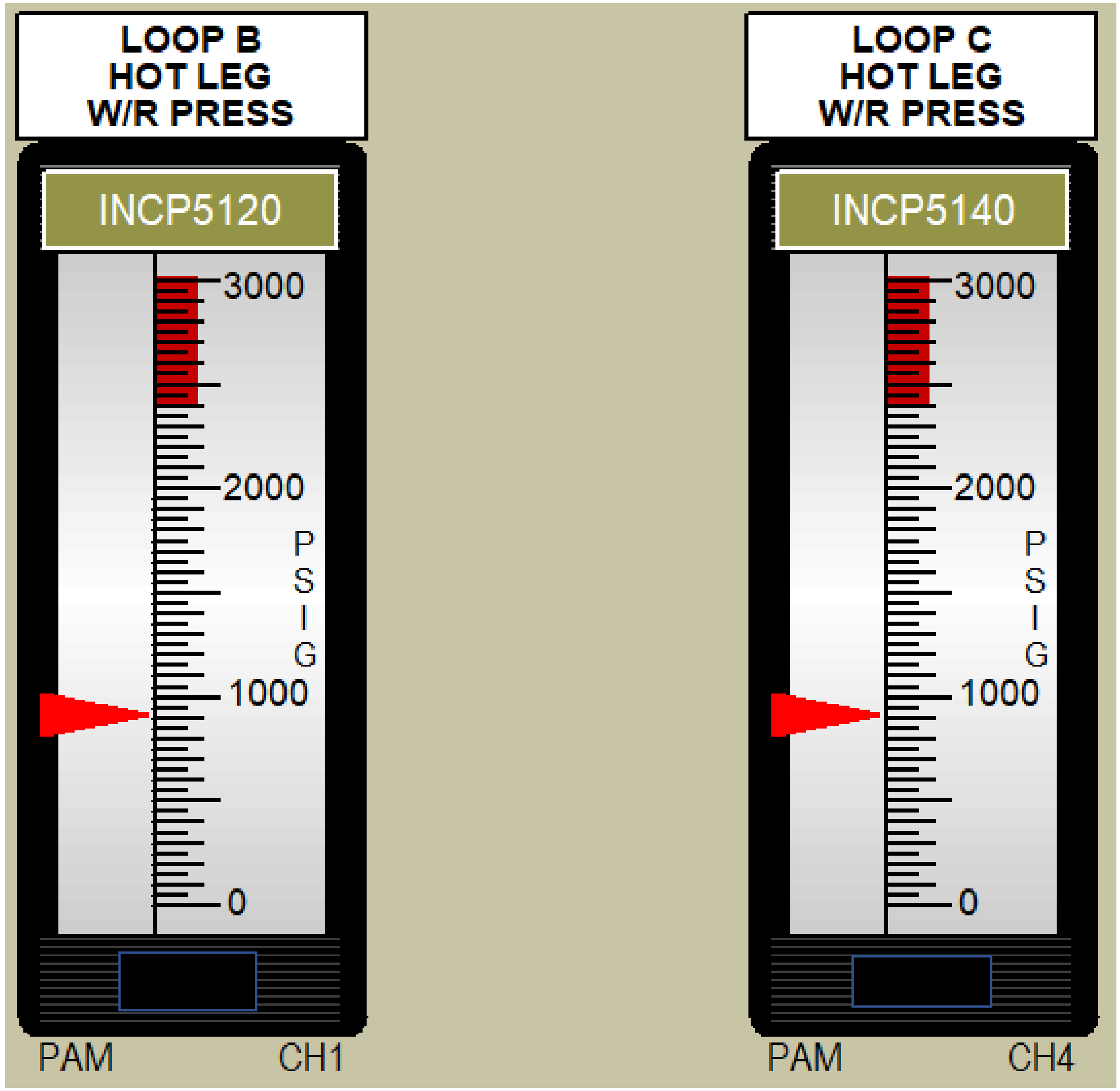
where: H = Containment hydrogen concentration (%)

STEP 3: Determine C from the curve for the current NC system pressure.

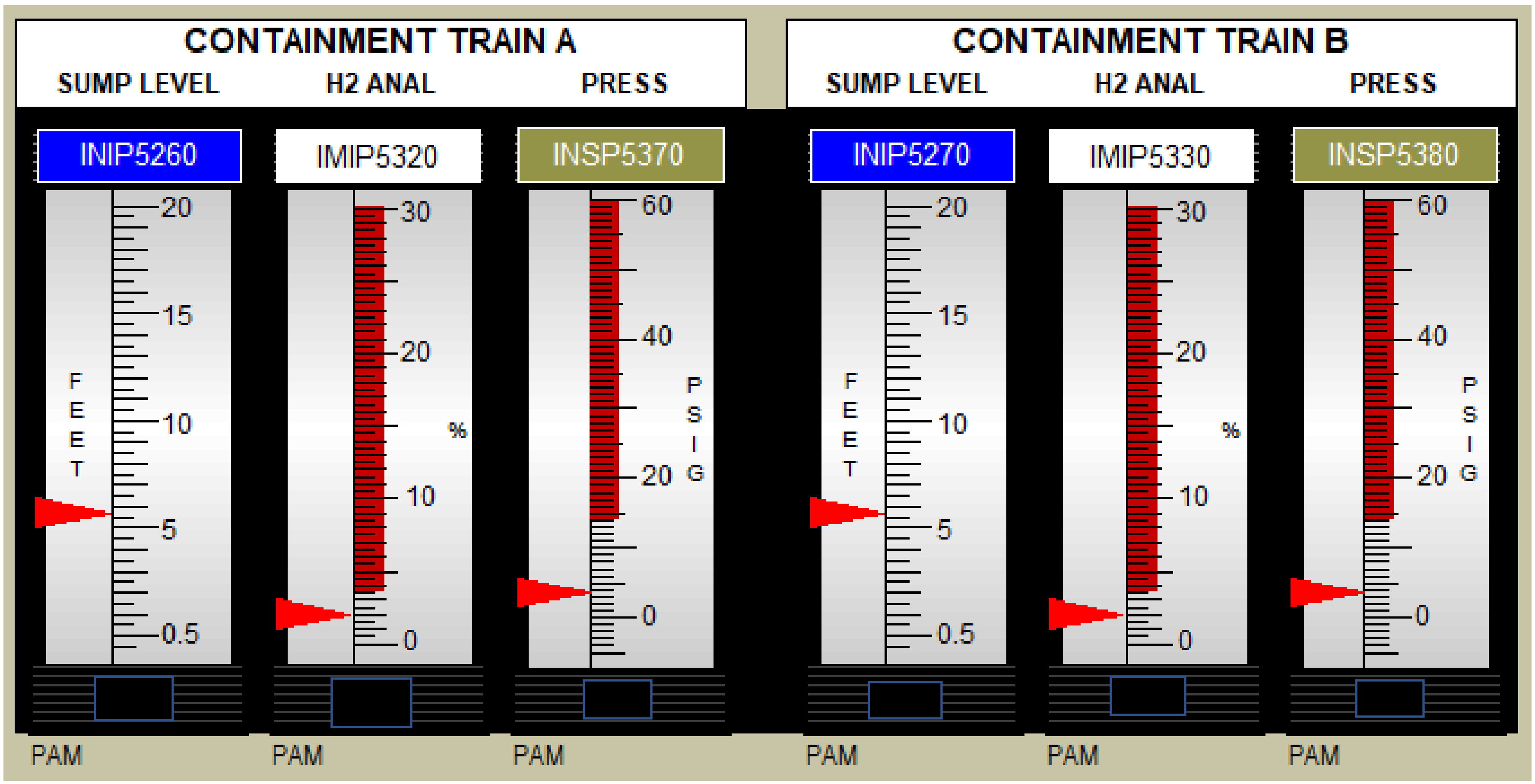
STEP 4: Calculate T

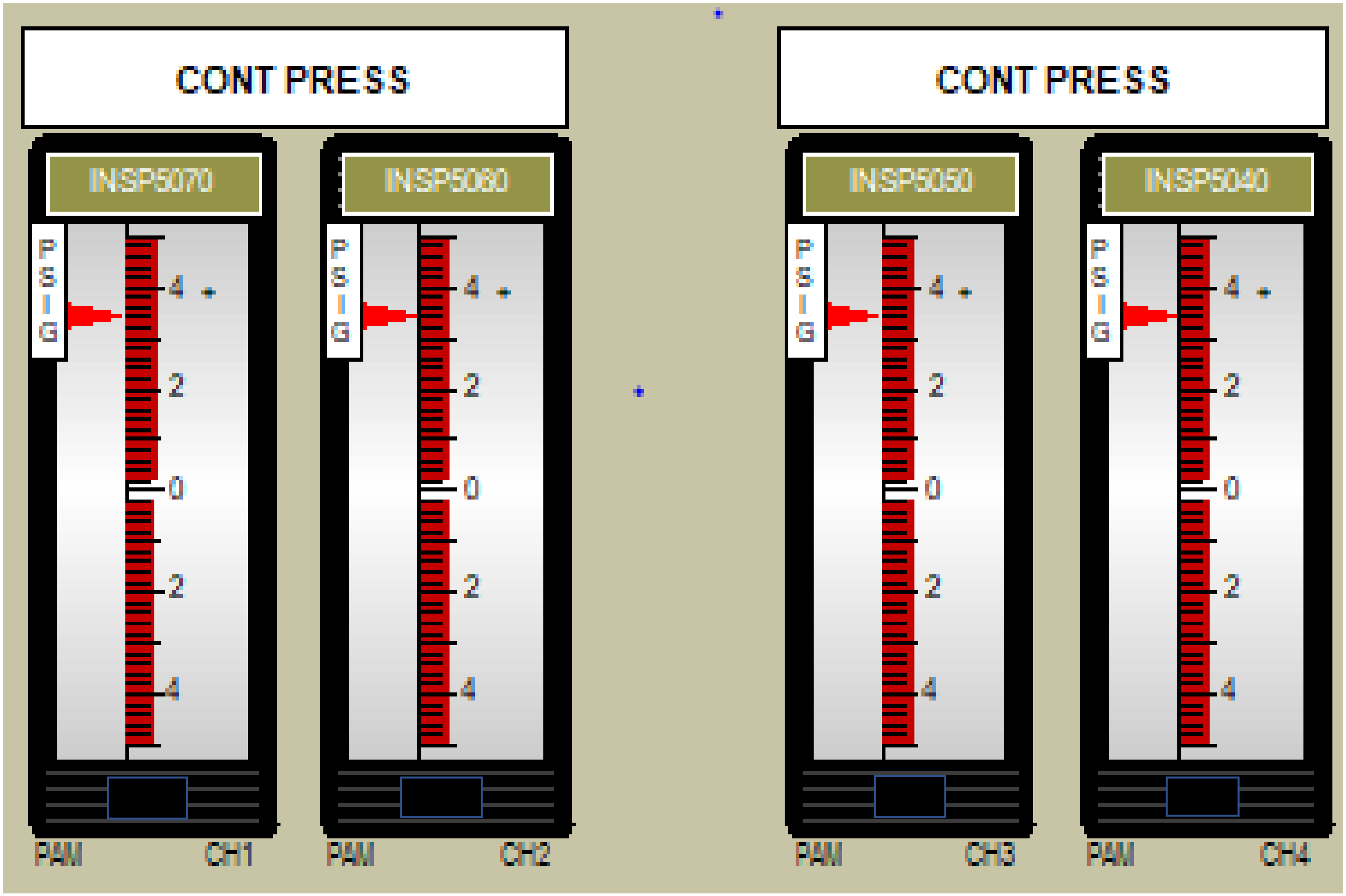
T = B/C = Venting time in minutes

NC pressure ______ PSIG. Maximum allowable venting time ______ minutes.

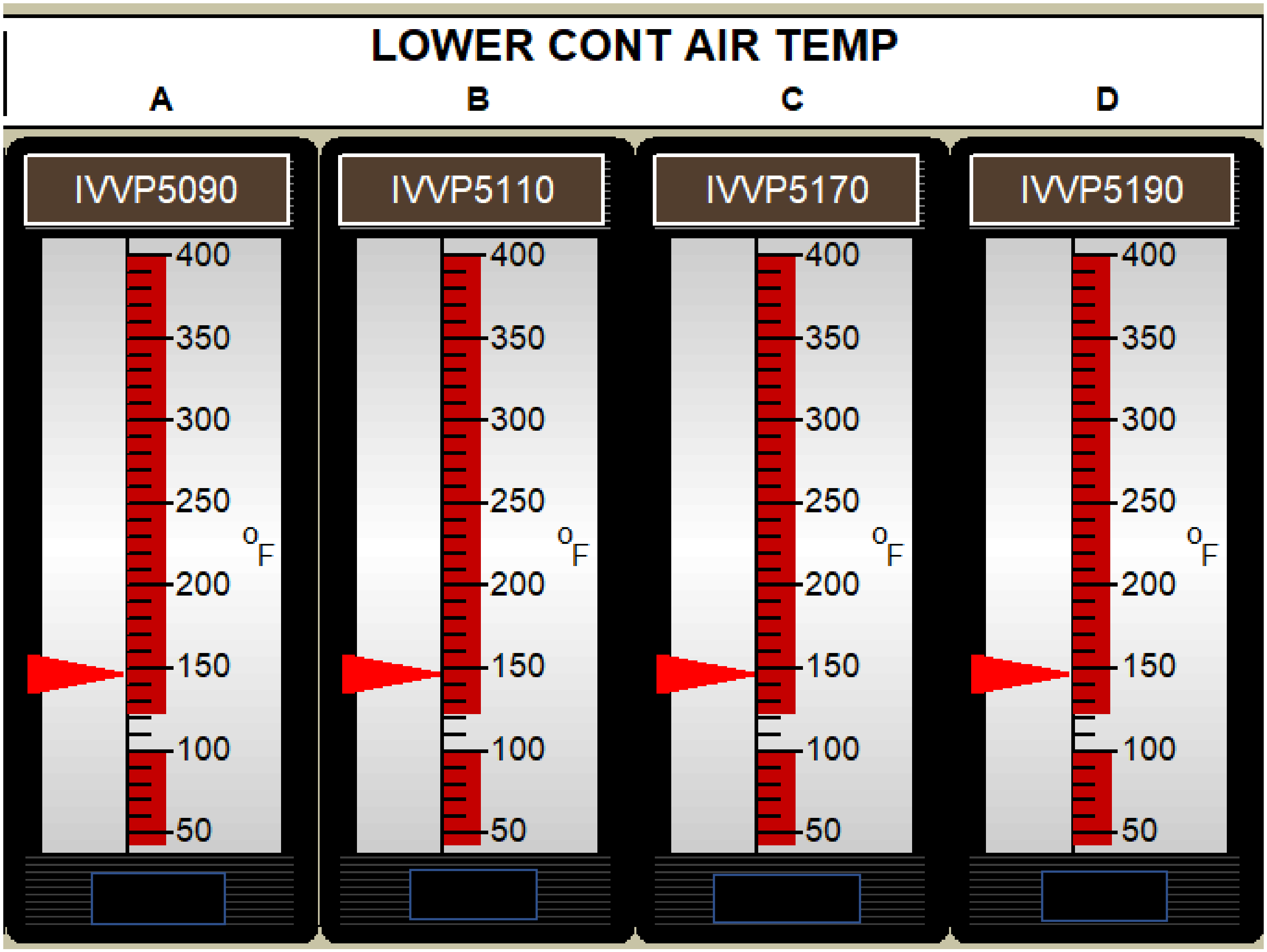


LOOP B
HOT LEG
W/R PRESS
INCP5120
3000
2000
P
S
I
G
1000
0
PAM
CH1
LOOP C
HOT LEG
W/R PRESS
INCP5140
3000
2000
P
S
I
G
1000
0
PAM
CH4


CONTAINMENT TRAIN A
SUMP LEVEL
H2 ANAL
PRESS
INIP5260
IMIP5320
INSP5370
FEET
%
PSIG
PAM
PAM
PAM
CONTAINMENT TRAIN B
SUMP LEVEL
H2 ANAL
PRESS
INIP5270
IMIP5330
INSP5380
FEET
%
PSIG
PAM
PAM
PAM



CONT PRESS
CONT PRESS
INSP5070
INSP5060
INSP5050
INSP5040
PSIG
4
2
0
2
4
PAM
CH1
CH2
CH3
CH4



LOWER CONT AIR TEMP
A
B
C
D
IVVP5090
IVVP5110
IVVP5170
IVVP5190
400
350
300
250
200
150
100
50
°F

JPM A.1-2R

RO

Catawba Nuclear Station
Admin. JPM A.1-2R
September 2021 NRC Exam

EVALUATION SHEET

Task: Determine Rod Insertion Limit Boration

Alternate Path: N/A

Facility JPM #: New

Safety Function: N/A

K/A 2.1.43 Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc.

Importance: 4.1 / 4.3 **CFR:** 41.10 / 43.6 / 45.6

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ Classroom X Perform X Simulate ________

References: AP/1/A/5500/003 (Load Rejection) Rev 47 Enclosure 3 (Rod Insertion Limit Boration)
Unit 1 ROD Book

Task Standard: Applicant determines the Rod Insertion Limit to be between 39-42 steps withdrawn on Control Bank D, Calculated values for R = 796 – 823 PCM, P = 1084 PCM, A = 261 – 288 PCM, Differential Boron Worth = -6.47 PCM/PPM, C = 40.34 – 44.51 PPM, D = 940 – 945 PPM, and calculates the required amount of boric acid to add to the NC system to restore rods to 10 steps above RIL is 411 - 515 gallons.

Validation Time: 10 minutes **Time Critical:** Yes _____ No X

Applicant:
NAME______________________________ Docket #________________ Time Start: ___________
Time Finish: ___________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ________________________________ ________________________________/_________
NAME SIGNATURE DATE

==

COMMENTS

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____

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____

____

Catawba Nuclear Station
Admin. JPM A.1-2R
September 2021 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 has experienced a runback from 85% RTP following a Zone A Lockout
- Current reactor power is 48% RTP
- Unit 1 is at 250 EFPD
- Annunciator 1AD-2, B/9 (CONTROL ROD BANK LO-LO LIMIT) is LIT
- Control Bank D rods are currently 20 steps withdrawn
- Current NC System Boron concentration is 900 ppm

INITIATING CUES:

- The CRS has directed you to borate the NC system as necessary to maintain control rods above the insertion limit per AP/1/A/5500/003 (Load Rejection) Enclosure 3 (Rod Insertion Limit Boration) step 2.
- You are to determine the amount of Boric Acid required to restore control rods to **10 STEPS ABOVE** the required rod insertion limit and record below.

Boric Acid addition required: ___________________ gallons

EXAMINER NOTE:
After reading cue, provide applicant with a copy of AP/1/A/5500/003 Enclosure 3 and the ROD book for Unit 1

START TIME: _______

STEP / STANDARD	SAT / UNSAT
STEP 1: 2.a **IF** initial reactor power was 100%, **THEN** borate NC System as required to restore control rods above insertion limits. **REFER TO** Unit 1 R.O.D. book, section 4.8 (Reactivity Data Sheet). STANDARD: Applicant determines that initial reactor power was 85% per the initiating cue and that this step is not applicable. COMMENTS:	___ SAT ___ UNSAT

STEP 2: 2.b **IF** initial reactor power was less than 100% **OR** Unit 1 R.O.D. book, section 4.8 (Reactivity Data Sheet) is **NOT** available, **THEN** perform the following as required to restore control rods above the insertion limits: **NOTE** OAC point C1P1448 (Low Bank Insertion Limit Margin) and R.O.D. Book (Section 2.2) provide rod insertion limit indication. 1) Determine control rod insertion limit. ________	**CRITICAL STEP**
STANDARD: Applicant determines that the rod insertion limit for 48% power is approximately 40 steps withdrawn on Control Bank D (Acceptable Range 39-42 steps). **This step is critical in order to properly determine the correct amount of boric acid to add to restore control rods to above the insertion limit.** COMMENTS:	___ SAT ___ UNSAT

STEP 3: 2.b.2) Calculate "A" (reactivity difference between required rod position and current rod position). **REFER TO** Unit 1 R.O.D. book section 5.6.3. R = Required rod position IRW ______ PCM P = Current rod position IRW _______ PCM (R – P = A _________ PCM).	**CRITICAL STEP**
STANDARD: Applicant determines R for 50 steps withdrawn (40 steps RIL + 10 steps = 50 steps) is 805 PCM (Acceptable Range is 796 PCM – 823 PCM). Applicant determines P for 20 steps withdrawn is 1084 PCM. Applicant then calculates A to be 279 PCM (Acceptable Range is 261 PCM – 288 PCM). **This step is critical in order to properly determine the correct amount of boric acid to add to restore control rods to above the insertion limit.** COMMENTS:	___ SAT ___ UNSAT

STEP 4: 2.b.3) Determine "B" (differential boron worth). **REFER TO** Unit 1 R.O.D. book section 5.5 _________ PCM/PPM. STANDARD: Applicant determines from ROD book section 5.5 that differential boron worth for 250 EFPD is -6.47 PCM/PPM. **This step is critical in order to properly determine the correct amount of boric acid to add to restore control rods to above the insertion limit.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 5: 2.b.4) Calculate "C" (difference in reactivity) as follows: A / B = C ________ PPM. STANDARD: Applicant calculates C to be 43.12 PPM (279 PCM / 6.47 PCM/PPM = 42.97 PPM). (Acceptable Range is 40.34 PPM – 44.51 PPM) **This step is critical in order to properly determine the correct amount of boric acid to add to restore control rods to above the insertion limit.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 6: 2.b.5) Calculate "D" (required boron concentration) as follows: E = Current Boron Concentration _______ PPM. E + C = D ________ PPM STANDARD: Applicant calculates D to be 943 PPM. (900 + 43 = 943 PPM) (Acceptable Range is 940 PPM – 945 PPM) **This step is critical in order to properly determine the correct amount of boric acid to add to restore control rods to above the insertion limit.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 7: 2.b.6) Determine required boric acid needed to raise NC System boron concentration to value "D" calculated in Step 2.b.5. **REFER TO** Unit 1 R.O.D. book table 4.1 or REACT Boration/Dilution module. ________. STANDARD: Applicant determines that 442 gallons of boric acid are needed to raise NC system boron concentration from 900 PPM to 943 PPM. (Acceptable range is 411 – 515 gallons). **This step is critical in order to properly determine the correct amount of boric acid to add to restore control rods to above the insertion limit.** 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 has experienced a runback from 85% RTP following a Zone A Lockout
- Current reactor power is 48% RTP
- Unit 1 is at 250 EFPD
- Annunciator 1AD-2, B/9 (CONTROL ROD BANK LO-LO LIMIT) is LIT
- Control Bank D rods are currently 20 steps withdrawn
- Current NC System Boron concentration is 900 ppm

INITIATING CUES:

- The CRS has directed you to borate the NC system as necessary to maintain control rods above the insertion limit per AP/1/A/5500/003 (Load Rejection) Enclosure 3 (Rod Insertion Limit Boration) step 2.
- You are to determine the amount of Boric Acid required to restore control rods to **10 STEPS ABOVE** the required rod insertion limit and record below.

Boric Acid addition required: ___________________ gallons

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.

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

   a. Stop any dilutions in progress.

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

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

2. **Perform one of the following to restore control rods above insertion limits:**

   a. **IF** initial reactor power was 100%, **THEN** borate NC System as required to restore control rods above insertion limits. **REFER TO** Unit 1 R.O.D. book, section 4.8 (Reactivity Data Sheet).

2. (Continued)

b. **IF** initial reactor power was less than 100% **OR** Unit 1 R.O.D. book, section 4.8 (Reactivity Data Sheet) is **NOT** available, **THEN** perform the following as required to restore control rods above insertion limits:

NOTE OAC point C1P1448 (Low Bank Insertion Limit Margin) and R.O.D Book (Section 2.2) provide rod insertion limit indication.

1) Determine control rod insertion limit. ________.

2) Calculate "A" (reactivity difference between required rod position and current rod position). **REFER TO** Unit 1 R.O.D. book section 5.6.3.

R = Required rod position IRW _________ PCM

P = Current rod position IRW _________ PCM

(R - P = A __________ PCM).

3) Determine "B" (differential boron worth). **REFER TO** Unit 1 R.O.D. book section 5.5 ______________ PCM/PPM.

4) Calculate "C" (difference in reactivity) as follows:

A / B = C ______________ PPM.

5) Calculate "D" (required boron concentration) as follows:

E = Current Boron concentration _________ PPM.

E + C = D__________ PPM.

6) Determine required boric acid needed to raise NC System boron concentration to value "D" calculated in Step 2.b.5. **REFER TO** Unit 1 R.O.D. book table 4.1 or REACT Boration/Dilution module. ___________.

NOTE
- The boric acid added to the NC System should be added in several increments within the first hour of the runback.
- Due to the post transient Xenon build-in rate, the total boric acid value calculated in Step 2.b.6, may not need to be added to restore control rods above insertion limits.

7) Borate NC System as required to restore control rods above insertion limits.

JPM A.2R

RO

Catawba Nuclear Station
Admin. JPM A.2R
September 2021 NRC Exam

EVALUATION SHEET

Task: Determine NC Subcooling on a loss of OAC

Alternate Path: N/A

Facility JPM #: CCM-003

Safety Function: N/A

K/A G 2.2.12 Knowledge of surveillance procedures.

Importance: 3.7 / 4.1 **CFR:** 41.10 / 45.13

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ Classroom __X__ Perform __X__ Simulate _________

References: PT/1/A/4600/009 (Loss of Operator Aid Computer), Unit 1 Revised Databook Figures 57 & 58

Task Standard: Determines Tsat is 465°F – 480°F, average of the 5 highest CETs is hottest at 452°F, and Subcooling is 13°F – 28°F and fills out Enclosure 13.8 (Subcooling Data Sheet) per the key. Determines the Acceptance Criteria is NOT met.

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.2R
September 2021 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 in Mode 3 and has experienced a loss of OAC**
- **PT/1/A/4600/009 (Loss of Operator Aid Computer) is in progress**
- **Both trains of the plasma display monitor are inoperable**

INITIATING CUES:

- **The CRS directs you to complete Enclosure 13.8 (Subcooling Data Sheet) to determine the °F Subcooled and if this subcooling margin meets the acceptance criteria.**

	T cold	T hot	T ave	D/T
Loop A	445	448	447	3
Loop B	446	450	448	4
Loop C	442	444	443	2
Loop D	443	446	445	3

5 Highest Core Exit T/C	454	450	453	451	452

	Chan 1	Chan 2	Chan 3	Chan 4	W/R B	W/R C
Pressure	1700	1700	1700	1700	600	620

EXAMINER NOTE: Each applicant should receive a copy of PT/1/A/4600/009 Enclosure 13.8 and a copy of the Unit 1 Revised Data Book.

START TIME: _______

STEP 1: Record lowest indicated system pressure. STANDARD: Applicant determines that 600 psig is the lowest pressure and records this value on the table in Enclosure 13.8. COMMENTS:	___ **SAT** ___ **UNSAT**

STEP 2: T-Sat – Using NC pressure, determine saturation temperature from the Unit 1 Revised Data Book Figure 57 or Figure 58. STANDARD: Applicant determines T-Sat is 465°F-480°F and records this value on the table in Enclosure 13.8. **This step is critical in determining the actual amount of subcooling on Unit 1 to meet the JPM standard.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP 3: Highest NC Temp – Determine the highest NC Temp:
 	
• In Modes 1 and 2, use Loop Thot
• In Modes 3-6:
  o Compare the average of the 5 highest reading operable core exit T/Cs to Loop Thot.
  OR
  o Use the operating train(s) of ND inlet temperature, Loop Thot and/or the operable core exit T/Cs.
 	
STANDARD:
 	
Applicant determines that the average of the 5 highest core exit T/Cs is the hottest and calculates it to be 452°F and records this value on the table in Enclosure 13.8.
 	
This step is critical in determining the actual amount of subcooling on Unit 1 to meet the JPM standard.
 	
COMMENTS:
	CRITICAL STEP
	
	___ **SAT**
	
	___ **UNSAT**

STEP 4 °F Subcooled – Calculate by subtracting "HIGHEST NC TEMP" from "T-Sat". STANDARD: Applicant calculates °F Subcooled to be 13°F-28°F and records this value on the table in Enclosure 13.8. **This step is critical in determining the actual amount of subcooling on Unit 1 to meet the JPM standard.** COMMENTS:	**CRITICAL STEP** ___ **SAT** ___ **UNSAT**

STEP 5 Determine if the acceptance criteria is met. STANDARD: Applicant determines that °F Subcooled is < the required of 30°F while shutdown and therefore the acceptance criteria is NOT met. **This step is critical in determining that the amount of subcooling present does not meet acceptance criteria for the current mode.** COMMENTS: **END OF TASK**	**CRITICAL STEP** **___ SAT** **___ UNSAT**

STOP TIME ________

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- **Unit 1 is in Mode 3 and has experienced a loss of OAC**
- **PT/1/A/4600/009 (Loss of Operator Aid Computer) is in progress**
- **Both trains of the plasma display monitor are inoperable**

INITIATING CUES:

- **The CRS directs you to complete Enclosure 13.8 (Subcooling Data Sheet) to determine the °F Subcooled and if this subcooling margin meets the acceptance criteria.**

	T cold	T hot	T ave	D/T
Loop A	445	448	447	3
Loop B	446	450	448	4
Loop C	442	444	443	2
Loop D	443	446	445	3

5 Highest Core Exit T/C	454	450	453	451	452

	Chan 1	Chan 2	Chan 3	Chan 4	W/R B	W/R C
Pressure	1700	1700	1700	1700	600	620

°F Subcooled: ___________

Acceptance Criteria met (Yes/No): ___________

CALCULATION SHEET FOR NC SYSTEM DEGREES SUBCOOLED

Date/Time	NC Press	T-SAT	Highest NC Temp	°F Subcooled	Initials

ACCEPTANCE CRITERIA:

Subcool limit is 10°F while at power.
30°F while shutdown.

INFORMATION:

NC Pressure - Record lowest indicated system pressure.

T-SAT - Using NC pressure, determine saturation temperature from the Unit One Revised Data Book Figure 57 or Figure 58.

Highest NC Temp - Determine the highest NC Temp:

- In Modes 1 and 2, use Loop T_{HOT}.
- In Modes 3-6:
  - Compare the average of the 5 highest reading operable core exit T/Cs to Loop T_{HOT}. (This is the preferred method)
    OR
  - Use the operating train(s) of ND inlet temperature, Loop T_{HOT} and/or the operable core exit T/Cs.

°F Subcooled - Calculate by subtracting "HIGHEST NC TEMP" from "T-SAT".

JPM A.3R

RO

Catawba Nuclear Station
Admin. JPM A.3R
September 2021 NRC Exam

EVALUATION SHEET

Task: Determine Radiation Protection Requirements for an activity

Alternate Path: N/A

Facility JPM #: 2019 NRC Exam Admin JPM A.3R

Safety Function: N/A

K/A G 2.3.14 Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.

Importance: 3.4 / 3.8 **CFR:** 41.12 / 43.4 / 45.10

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ Classroom __X__ Perform __X__ Simulate ________

References: Radiation Work Permit # 5021 Task 1, Room 105 (ND Pump 1A) Survey Map

Task Standard: Correctly determine that total dose received for the job is 13 mR and maximum additional time allowed at Low Exposure Waiting Area is 42 minutes prior to exceeding 80% of RWP dose limits.

Validation Time: 10 minutes **Time Critical:** Yes _____ No __X__

Applicant:
NAME____________________________ Docket #_______________ Time Start: __________
Time Finish: __________

Performance Rating: Performance Time _____

SAT ____ UNSAT ____

Examiner: ______________________________ ______________________________/________
NAME SIGNATURE DATE

COMMENTS

Catawba Nuclear Station
Admin. JPM A.3R
September 2021 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 has entered AP/1/A/5500/019 (Loss of Residual Heat Removal)**
- **The CRS has dispatched an AO to 1A ND pump room to vent the 1A ND pump casing when directed.**
- **The AO has staged himself to minimize dose while waiting.**
- **The following is the timeline for the venting evolution:**

0730 – AO enters 1A ND Pump Room.
0800 – AO is directed to vent using 1ND-88 (1A ND Pump Seal Water Hx Inlet Vent).
0812 – Venting is complete. AO returns to the LEWA to await further instruction.

INITIATING CUES:

Based on the above time line, RWP # 5021, and Survey Maps provided and discounting any dose received during transit:

1. State the amount of dose that has been received thus far.

Amount of dose received - ________________ mR

2. Following completion of venting activity, calculate how much longer the AO can remain in the room until required to exit (based on exceeding 80% of RWP allowable dose).

Allowable time in room following venting activity – ___________ .

EXAMINER NOTE: Each applicant should receive a copy of RWP # 5021 (Task 1) and the Room Survey for rooms 105 and 110.

START TIME: _______

STEP / STANDARD	SAT / UNSAT
STEP 1 Determine dose received for the venting evolution: AO is to stage themselves at the Low Exposure Waiting Area (LEWA) where they wait for 30 minutes (.5 hours) LEWA dose: **10 mR/hr X .5 hr = 5 mR** Venting time is 12 minutes (.2 hours) Area dose: **40 mR/hr X .2 hr = 8 mR** Total amount of dose received = **5 mR + 8 mR = 13 mR** STANDARD: Applicant determines the total amount of dose received for the evolution to be 13 mR. **This step is critical to meet the task requirements and standard for this JPM to determine the total amount of dose received.** COMMENTS:	**CRITICAL STEP** **___ SAT** **___ UNSAT**

STEP / STANDARD	SAT / UNSAT
STEP 2 Determine allowable time in room following venting activity. The RWP limits total exposure to 25 mR **25 mR x 80% = 20 mR total allowable dose** **20 mR – 13 mR (dose following venting) = 7 mR (remaining)** **7 mR ÷ 10 mR/hr = 0.7 hr (42 minutes)**	**CRITICAL STEP**
STANDARD: Applicant determines they can remain in the room another 42 minutes, or until 0854. **This step is critical to meet the task requirements and standard for this JPM to determine the latest time that venting could complete without exceeding RWP dose requirements.** 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 has entered AP/1/A/5500/019 (Loss of Residual Heat Removal)**
- **The CRS has dispatched an AO to 1A ND pump room to vent the 1A ND pump casing when directed.**
- **The AO has staged himself to minimize dose while waiting.**
- **The following is the timeline for the venting evolution:**

  0730 – AO enters 1A ND Pump Room.
  0800 – AO is directed to vent using 1ND-88 (1A ND Pump Seal Water Hx Inlet Vent).
  0812 – Venting is complete. AO returns to the LEWA to await further instruction.

INITIATING CUES:

Based on the above time line, RWP # 5021, and Survey Maps provided and discounting any dose received during transit:

1. State the amount of dose that has been received thus far.

Amount of dose received - ________________ mR

2. Following completion of venting activity, calculate how much longer the AO can remain in the room until required to exit (based on exceeding 80% of RWP allowable dose).

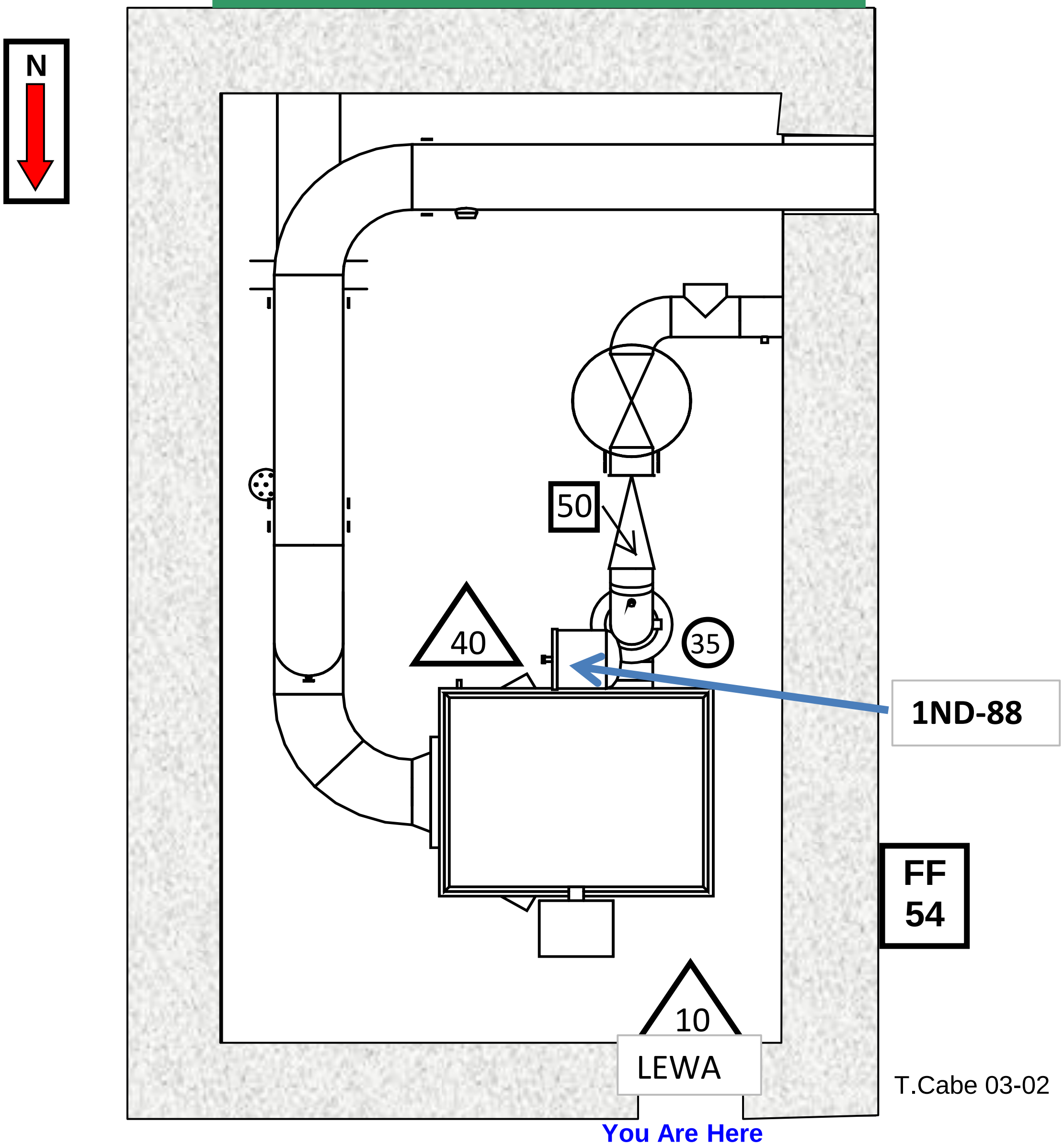
Allowable time in room following venting activity – ___________ .

CATAWBA NUCLEAR STATION
MONTHLY ROUTINE SURVEY SHEET

PERFORMED BY: ______________________ / ______________ DATE/TIME: ______________ / ________
(print name) **(initials)**

Instrument/#(s) ______________________ βγ Counter/#: ____________ Reviewed By: ________
(initials)

Room 105 ND Pump 1A



HIGHEST GA*: ____________ **HIGHEST CONTACT*:** ____________ **HIGHEST dpm/100cm^2:** ________ K βγ
HIGHEST MASSLINN CCPM: ________

*** Radiation readings in mRem/hr unless otherwise noted.**

LEGEND: **LEWA** = LOW EXPOSURE WAITING AREA **HS** = HOT SPOT --x----x----x-- = RCZ BOUNDARY

= DIRECT FRISK = GENERAL AREA > = CONTACT = SMEAR **(dpm/100cm^2)** = MASSLINN

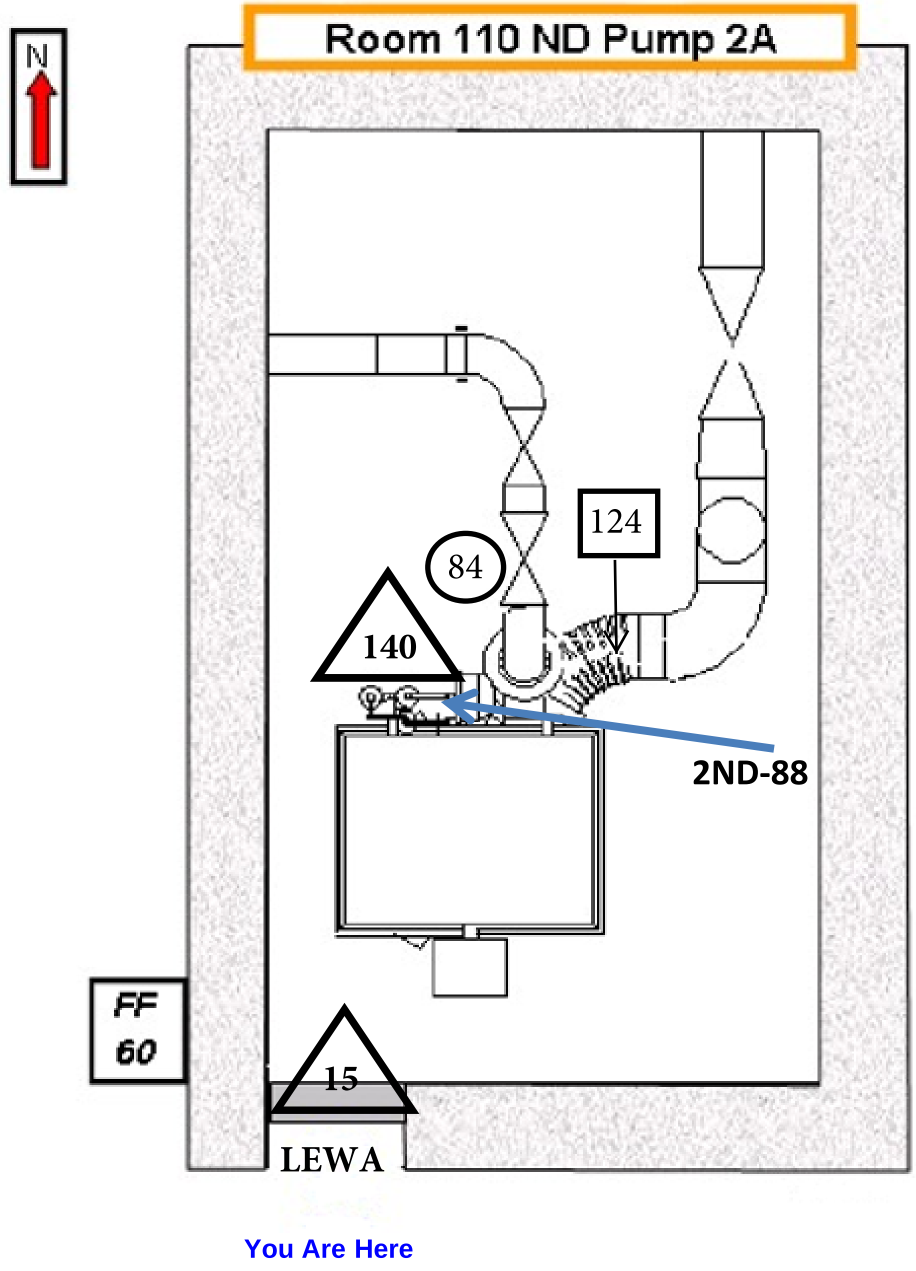
Comments: ____

RWP#15

CATAWBA NUCLEAR STATION
MONTHLY ROUTINE SURVEY SHEET

PERFORMED BY: ______________________ / __________ DATE/TIME: ______________ / ________
(print name) (initials)

Instrument/#(s) ______________________ βγ Counter/#: __________ Reviewed By: __________
itials)



HIGHEST GA*: __________ **HIGHEST CONTACT*:** __________ **HIGHEST dpm/100cm^2:** __________ K βγ

HIGHEST MASSLINN CCPM: __________

*** Radiation readings in mRem/hr unless otherwise noted.**

LEGEND: **LEWA** = LOW EXPOSURE WAITING AREA **HS** = HOT SPOT --x----x----x-- = RCZ BOUNDARY

= DIRECT FRISK = GENERAL = CONTACT = SMEAR (dpm/100cm^2) = MASSLINN

Comments: ______________________________________

RWP#15

INFORMATION USE ONLY

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INFORMATION USE ONLY

AUX BUILDING ENTRY INTO PENTRATION ROOMS HEAT EXCHANGER ROOMS AND PUMP ROOMS TO PERFORM VENTING ON ECCS SYSTEMS **RWP # 5021** **Rev: 11**

Task # 1

AUX BUILDING ENTRY INTO PENTRATION ROOMS, HEAT EXCHANGER ROOMS AND PUMP ROOMS TO PERFORM VENTING ON ECCS SYSTEMS

ED Alarm Set Points:

Dose Alarm: 25 mrem

Dose Rate Alarm: 50 mrem/hr

RWP Requirements

Dress Category/Work Description

- Dress Category "F" 1. Complete protection of skin and clothing is NOT required. 2. Radioactive material is handled and/or transported AND the potential for loose surface contamination >1000 dpm/100cm2 exists AND durability of surgical gloves is sufficient.
- E Dress Category "G" Entry into dry contaminated areas <25,000 dpm/100cm2 with NO climbing or physical / strenuous work. NO brushing, grinding, lapping, etc. is allowed.
- Dress Category "H" Entry into dry contaminated areas <25,000 dpm/100cm2 with NO climbing or physical / strenuous work. NO brushing, grinding, lapping, etc. is allowed.
- Dress Category "I" Work in dry contaminated areas <50,000 dpm/100cm2 with a risk of puncturing or tearing gloves or beta dose concerns to the hands. Work may involve brushing, grinding, lapping, etc. (1) (3) (4)
- Dress Category "N" Wet work, hot particle controls are required or work in highly contaminated areas. Work may involve brushing, grinding, lapping, etc. (1)
- Dress Category "Z" Special dress. See Additional Instructions.
- Modesty garments, top & bottom, are required under protective clothing where personal outer clothing is not worn
- (1) Cloth coverall are acceptable for use when allowed by RP. Gloves and booties must be secured (e.g. taped, elastic cuff) when wearing cloth coveralls
- (2) IF double SOP is not used when wearing double PCs, remove the outer layers at the source
- (3) Skull caps may be substituted for a hood when approved by RP and NO hands on work is to be performed.
- (4) For activities requiring crawling, kneeling, etc., review need for additional barrier to prevent contamination events, e.g., additional protective clothing, knee pads, use of floor covering, etc.

Protective Clothing

- F - Lab coat, glove liners, rubber gloves OR surgical gloves, booties and shoe covers
- G - Hood, coveralls, glove liners and rubber gloves, booties, and shoe covers over personal clothing (NO modesty clothing required).
- H - Hood, coveralls, glove liners and rubber gloves, booties and shoe covers, NO personal outer clothing.
- I - Hood, coveralls, glove liners, 2 pair rubber gloves, booties and shoe covers, no personal outer clothing.
- N - Hood, coveralls, water resistant/water proof suit, glove liners, 2 pair rubber gloves, booties, 2 pair shoe covers, no personal outer clothing.
- Z - Special dress

Contamination Control

- Wipe down AND bag all tools and equipment prior to removal from a contaminated area as directed by RP
- Utilize facial protection (e.g. face shield, hood sock, power visor) as directed by RP
- Install catch containments OR drain rigs to prevent spills if draining components
- If installing a drain rig, use hose clamps to secure hose OR tubing connections
- If installing a drain rig, secure hose OR tubing to floor drain
- Wear disposable (plastic) booties inside of orex booties for work in wet conditions
- Change outer rubber gloves often when handling highly contaminated material as directed by RP

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INFORMATION USE ONLY

AUX BUILDING ENTRY INTO PENTRATION ROOMS HEAT EXCHANGER ROOMS AND PUMP ROOMS TO PERFORM VENTING ON ECCS SYSTEMS **RWP # 5021** **Rev: 11**

Task # 1

AUX BUILDING ENTRY INTO PENTRATION ROOMS, HEAT EXCHANGER ROOMS AND PUMP ROOMS TO PERFORM VENTING ON ECCS SYSTEMS

ED Alarm Set Points:

Dose Alarm: 25 mrem **Dose Rate Alarm: 50 mrem/hr**

RWP Requirements

- Use surgical gloves in lieu of rubber gloves for the manipulation of small or specialty items as directed by RP

RP Job Coverage

- Start of Job, Intermittent or No Coverage In Radiation Areas or Less
- RP Coverage Required To Transport Material > 5 mrem/hr at 30 cm
- Pre-job briefing required
- Continuous RP Coverage for aggressive work in Alpha Level III areas or Alpha Level II areas with beta-gamma to alpha ratios less than 3000:1 or where conditions could change

Dosimetry Requirements

- Monitor ED periodically while inside the RCA/RCZ (once or twice per hour in low dose rate areas). Monitor more frequently in higher dose rate areas, for example every 10 to 15 minutes.
- If dress requirements prevent the monitoring of ED, and RP is not remotely monitoring (via teledose & communications), place ED external to the outmost layer of protective clothing for monitoring

Respiratory Protection

- If weighted DAC-Hours are expected to result in greater than or equal to 4 DAC-Hours per person, perform a TEDE/ALARA evaluation
- Full Face Particulate (Additional Hood Required) IF warranted by TEDE ALARA Evaluation OR directed by RP
- Personal (lapel) air samplers required for Alpha Level III areas or Alpha Level II areas with beta-gamma to alpha ratios of less than 3000:1

RP Hold Points

- Breaching Contaminated System
- RP Survey Required Prior to Handling Debris or Foreign Material
- RP survey required after removal of items from contaminated systems. Decon may be necessary (as directed by RP)
- Notify RP prior to reaching OR entry into the overhead (8 feet and above)
- Accumulated Dose Higher than Expected
- Notify RP Prior to Start of Work
- A change in Alpha Level (AL I to AL II or AL III; AL II to AL III) requires additional planning for alpha considerations

Stop Work Criteria

- Dose Alarm
- Unexpected dose rate alarm
- Airborne conditions higher than expected
- Actual dose rates are higher than the expected levels written on this RWP task
- Actual contamination levels are higher than the expected levels written on this RWP task

INFORMATION USE ONLY

Catawba Nuclear Station
Radiation Work Permit

INFORMATION USE ONLY

AUX BUILDING ENTRY INTO PENTRATION ROOMS HEAT EXCHANGER ROOMS AND PUMP ROOMS TO PERFORM VENTING ON ECCS SYSTEMS

RWP # 5021

Rev: 11

Task # 1

AUX BUILDING ENTRY INTO PENTRATION ROOMS, HEAT EXCHANGER ROOMS AND PUMP ROOMS TO PERFORM VENTING ON ECCS SYSTEMS

ED Alarm Set Points:

Dose Alarm: 25 mrem

Dose Rate Alarm: 50 mrem/hr

RWP Requirements

- Unexpected wet conditions
- Work scope changes
- If monitoring of the ED indicates that the dose alarm set point will be exceeded prior to completing the job, leave the area and contact RP. Do not wait to receive an alarm before exiting the area
- Failure of OR sweat soaked protective clothing

Expected Radiological Conditions

Expected radiological conditions:
General Area Dose Rates: <0.1 mrem/hr - 50 mrem/hr
High Contact Dose Rates: <0.1 mrem/hr - 1000 mrem/hr

Contamination Levels: < 1000 dpm/100cm2- 100,000 dpm/100cm2

Additional Instructions

Electronic Dosimeter rate alarms are established based on general area dose rates. If personnel are positioned in close proximity to primary piping and equipment they may anticipate receiving a dose rate alarm.

Z Dress - Orex Coveralls only. This is for use in clean areas only due to potential for contamination from wearing a fall harness.

JPM A.1-1S

SRO

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Sept 2021 NRC Exam

EVALUATION SHEET

Task: Calculate Boric Acid and Water Addition to FWST and determine Tech Spec actions.

Alternate Path: N/A

Facility JPM #: 2017 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
==

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:

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:

Per OP/1/A/6200/014 (Refueling Water System) Enclosure 4.4, steps 3.1 - 3.4, determine the quantity of Boric Acid and RMWST Water required for 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 <u>SLC and TS</u> LCO entries (if any) will be required at 1000 and 1100.**

1000: ____

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1100: ____

<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.

___ SAT

___ UNSAT

COMMENTS:

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.

___ SAT

___ UNSAT

COMMENTS:

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.

___ SAT

___ UNSAT

COMMENTS:

CRITICAL STEP

STEP 7: 3.3.5 Solve for the desired makeup water boron concentration, Cf.

$$C_f = \frac{C_{FW} V_{FW} - C_i V_i}{V_f} \qquad C_f = \_\_\_\_\_\_\_\_\_\_\_$$

STANDARD:

Applicant calculates desired concentration of makeup water to be 737.1 ppmB

$C_f = (2720 \times 377646) - (2740 \times 373875) / 3771 = 737.1$ ppmB

(737-738 ppmB acceptable)

Examiner Note: This step is critical to ensure accurate result for final calculation.

___ SAT

___ UNSAT

COMMENTS:

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 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**
<u>1000: SLC 16-9.12 Condition D</u> / <u>LCO 3.5.4, Condition B</u> 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. **<u>1100: SLC 16-9.12 Condition D</u> / <u>LCO 3.5.4, Conditions B & C</u>** 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:

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 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. **Per OP/1/A/6200/014 (Refueling Water System) Enclosure 4.4, steps 3.1 - 3.4, determine the quantity of Boric Acid and RMWST Water required for 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: ____

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REFERENCE HANDOUT

ONLINE DATABOOK CALCULATOR: XY

FILENAME : REFUEL_T.XYP
TITLE : FW Refueling Water Storage Tank
SUB TITLE : Source: CNC-1223.21-00-0004

	VALUES MINIMUM	MAXIMUM
X:Level (%)	0.00000	100.000
Y:Volume (GALLONS)	15584.6	392732.

ENTER ONE VARIABLE AND PRESS CALCULATE

X VALUE	Y VALUE
95.0	373875.

CALCULATE CLEAR CANCEL

ONLINE DATABOOK CALCULATOR: XY

FILENAME : REFUEL_T.XYP
TITLE : FW Refueling Water Storage Tank
SUB TITLE : Source: CNC-1223.21-00-0004

	VALUES MINIMUM	MAXIMUM
X:Level (%)	0.00000	100.000
Y:Volume (GALLONS)	15584.6	392732.

ENTER ONE VARIABLE AND PRESS CALCULATE

X VALUE	Y VALUE
96.0	377646.

CALCULATE CLEAR CANCEL

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 Ensure Reactivity Management controls for an R3 evolution are established per AD-OP-ALL-0203 (Reactivity Management).

_____ 2.2 Verify FWST operation per <u>one</u> of the following:

☐ Normal operation per Enclosure 4.1 (FWST Normal Operation)
OR
☐ Purification per Enclosure 4.5 (FWST Purification)
OR
☐ Recirculation per Enclosure 4.6 (FWST Recirculation)

_____ 2.3 Verify boron concentration control systems are available per OP/1/A/6150/009 (Boron Concentration Control).

_____ 2.4 <u>**IF**</u> 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.

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 ___________________________________

_____________ 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}:

_____________ 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 _______ = V_i.

3.3.2 Final volume of FWST after makeup _______ = V_{FW}.

3.3.3 Compute the total gallons of makeup water to be added to the FWST _________ = V_f.

$V_f = V_{FW} - V_i$

3.3.4 Initial boron concentration of water in the FWST ______ = C_i.

3.3.5 Solve for the desired makeup water boron concentration, C_f.

$$C_f = \frac{C_{FW} V_{FW} - C_i V_i}{V_f} \qquad C_f = \_\_\_\_\_\_\_\_\_$$

_____ _____ 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.

3.4.2 Boron concentration of water in RMWST __________ = C_2.

3.4.3 Total gallons of makeup water to be added to FWST ________ = 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.

$$V_1 = \frac{V_f (C_f - C_2)}{C_1 - C_2} \qquad V_1 = \_\_\_\_\_\_\_\_\_$$

_____ 3.4.5 **<u>IF</u>** 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).

$V_2 = V_f - V_1$ V_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'd 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 **<u>IF</u>** final BAT volume will be less than COLR requirements, perform <u>one</u> 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 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)

3.8 Set the following blender flow controllers to achieve the desired boron concentration and volume:

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

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

3.9 Ensure the selector switches for the following valves are in "AUTO":

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

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

3.10 Set the following counters to achieve the desired boron concentration and volume:

_____ • BORIC ACID

_____ • TOTAL MAKEUP

_____ _____ 3.11 Verify 1NI-96B (C-Leg Accum Chk Vlv Tst Isol) is closed.

_____ 3.12 Verify 1NB-5 (Unit 1 VCT To NB Evap Feed Demin Isol) (1ELCC0024) (AB-560, MM-52) is closed.

_____ 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 **IF** the FWST is in recirculation alignment per one of the following enclosures:

☐ Enclosure 4.6 (FWST Recirculation)

OR

☐ Enclosure 4.5 (FWST Purification)

<u>THEN</u> perform the following:

_____ 3.15.1 Secure the "FW PUMP".

Record FW Pump stop time. ____________

3.15.2 Start the FW recirc pump secured in Enclosure 4.5 (FWST Purification) **<u>OR</u>** Enclosure 4.6 (FWST Recirculation).

_____ • FW Recirc Pump 1A

_____ • FW Recirc Pump 1B

_____ 3.16 Place "NC MAKEUP MODE SELECT" switch in the "MANUAL" position.

3.17 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"

3.18 Ensure the Reactor Makeup Water Pump **<u>NOT</u>** selected to "AUTO" in Step 3.17 is in "OFF":

_____ • "RX M/U WTR PUMP 1A"
OR
_____ • "RX M/U WTR PUMP 1B"

3.19 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"

_____ 3.20 **<u>IF</u>** a Boric Acid Transfer Pump was **<u>NOT</u>** selected to "AUTO" in Step 3.19, ensure it is in "OFF":

_____ • "B/A XFER PUMP 1A"
OR
_____ • "B/A XFER PUMP 1B"

_____ 3.21 **IF** Unit 1 is in Mode 1, 2, 3 or 4, perform the following:

_____ 3.21.1 Step 3.21.2 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 ___________________________________

_____ 3.21.2 **IF AT ANY TIME** while FWST makeup is in progress a Safety Injection occurs on Unit 1, terminate the makeup by performing the following:

_____ 3.21.2.1 Turn the "NC MAKEUP CONTROL" switch to the "STOP" position.

3.21.2.2 Ensure the following:

- _____ Selected Reactor Makeup Water Pump stops.
- _____ 1NV-238A (B/A To Blender Ctrl Vlv) closes.
- _____ 1NV-242A (RMWST To B/A Blender Ctrl) closes.

_____ 3.22 Energize makeup control circuit by turning the "NC MAKEUP CONTROL" switch to the "START" position.

3.23 Ensure the following:

- _____ Selected Reactor Makeup Water Pump starts.
- _____ Selected Boric Acid Transfer Pump starts.
- _____ 1NV-238A (B/A To Blender Ctrl Vlv) positions to produce desired boric acid flow.
- _____ 1NV-242A (RMWST To B/A Blender Ctrl) positions to produce desired total makeup flow.

_____ 3.24 **WHEN** makeup is complete, turn the "NC MAKEUP CONTROL" switch to the "STOP" position.

3.25 Ensure the following:

_____ • Selected Reactor Makeup Water Pump stops.

_____ • Selected Boric Acid Transfer Pump stops.

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

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

3.26 Flush the flowpath for one minute as follows:

3.26.1 Place both Boric Acid Transfer Pumps in "OFF".

_____ • "B/A XFER PUMP 1A"

_____ • "B/A XFER PUMP 1B"

_____ 3.26.2 Place the selector switch for 1NV-238A (B/A To Blender Ctrl Vlv) in the "CLOSED" position.

_____ 3.26.3 Place the selector switch for 1NV-242A (RMWST To B/A Blender Ctrl) in the "OPEN" position.

_____ 3.26.4 Turn the "NC MAKEUP CONTROL" switch to the "START" position.

3.26.5 Ensure the following:

_____ • Selected Reactor Makeup Water Pump starts.

_____ • Total makeup flow indicates flow.

_____ 3.26.6 **WHEN** flushing is completed, turn the "NC MAKEUP CONTROL" switch to the "STOP" position.

3.26.7 Ensure the following:

_____ • Selected Reactor Makeup Water Pump stops.

_____ • Total makeup flow indicates no flow.

3.27 Place the selector switches for the following valves in "AUTO":

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

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

3.28 Close the following values:

_____ • 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)

_____ 3.29 Open 1NV-187 (Boric Acid Blender Outlet To VCT Outlet Isol) (AB-583, KK-50, Rm 419).

3.30 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"

_____ 3.31 **<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"

_____ 3.32 **<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"

_____ 3.33 **<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"

3.34 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)

_____ 3.35 Align for makeup to the VCT per OP/1/A/6150/009 (Boron Concentration Control).

_____ 3.36 **IF** Step 3.15 was performed,
THEN perform the following:

_____ 3.36.1 Secure the FW recirc pump started in Step 3.15.2.

_____ 3.36.2 Start the "FW PUMP".

Record FW Pump start time. ____________

NOTE:	FWST sample is required within 24 hours of completion of makeup.

_____ 3.37 **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.

_____ 3.37.1 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.

_____ 3.37.2 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).

_____ 3.37.3 **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. • IF Step 3.36 was performed, Step 3.38.1 may be N/A'd.

_____ 3.38 **IF** FWST was **NOT** recirculated with the NS pump, perform the following:

_____ 3.38.1 Place the FWST in recirculation per one of the following:

- _____ Enclosure 4.6 (FWST Recirculation).
  OR
- _____ Enclosure 4.5 (FWST Purification).

_____ 3.38.2 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).

3.39 Do **NOT** file this enclosure.

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 Ensure Reactivity Management controls for an R3 evolution are established per AD-OP-ALL-0203 (Reactivity Management).

_____ 2.2 Verify FWST operation per <u>one</u> of the following:

☐ Normal operation per Enclosure 4.1 (FWST Normal Operation)
OR
☐ Purification per Enclosure 4.5 (FWST Purification)
OR
☐ Recirculation per Enclosure 4.6 (FWST Recirculation)

_____ 2.3 Verify boron concentration control systems are available per OP/1/A/6150/009 (Boron Concentration Control).

_____ 2.4 **<u>IF</u>** 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.

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 ______Steph Jackson________

_____X_____ 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.

$$C_f = \frac{C_{FW} V_{FW} - C_i V_i}{V_f} \qquad C_f = \frac{(2,720)(377,646)-(2,740)(373,875)}{3771}$$

=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.

$$V_1 = \frac{V_f (C_f - C_2)}{C_1 - C_2} \qquad V_1 = \frac{\mathbf{3771(737.1-4)}}{\mathbf{(7500-4)}} \mathbf{= 368.8}$$

_____ 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).

$V_2 = V_f - V_1$ V_2 = **3402.2** gal.

3771-368.8

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'd 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 **<u>IF</u>** final BAT volume will be less than COLR requirements, perform <u>one</u> of the following:

_____ • Place BAT #2 in service for Unit 1 per OP/1/A/6150/009 (Boron Concentration Control).
OR

_____ • Declare BAT #1 non-functional per the following:
SRO

- 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 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)

3.8 Set the following blender flow controllers to achieve the desired boron concentration and volume:

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

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

3.9 Ensure the selector switches for the following valves are in "AUTO":

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

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

3.10 Set the following counters to achieve the desired boron concentration and volume:

_____ • BORIC ACID

_____ • TOTAL MAKEUP

_____ _____ 3.11 Verify 1NI-96B (C-Leg Accum Chk Vlv Tst Isol) is closed.

_____ 3.12 Verify 1NB-5 (Unit 1 VCT To NB Evap Feed Demin Isol) (1ELCC0024) (AB-560, MM-52) is closed.

_____ 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 **<u>IF</u>** the FWST is in recirculation alignment per <u>one</u> of the following enclosures:

☐ Enclosure 4.6 (FWST Recirculation)

<u>OR</u>

☐ Enclosure 4.5 (FWST Purification)

THEN perform the following:

_____ 3.15.1 Secure the "FW PUMP".

Record FW Pump stop time. ____________

3.15.2 Start the FW recirc pump secured in Enclosure 4.5 (FWST Purification) **OR** Enclosure 4.6 (FWST Recirculation).

_____ • FW Recirc Pump 1A

_____ • FW Recirc Pump 1B

_____ 3.16 Place "NC MAKEUP MODE SELECT" switch in the "MANUAL" position.

3.17 Ensure one of the following Reactor Makeup Water Pumps is in "AUTO":

_____ • "RX M/U WTR PUMP 1A"
OR
_____ • "RX M/U WTR PUMP 1B"

3.18 Ensure the Reactor Makeup Water Pump **NOT** selected to "AUTO" in Step 3.17 is in "OFF":

_____ • "RX M/U WTR PUMP 1A"
OR
_____ • "RX M/U WTR PUMP 1B"

3.19 Ensure at least one of the following Boric Acid Transfer Pumps is in "AUTO":

_____ • "B/A XFER PUMP 1A"
AND/OR
_____ • "B/A XFER PUMP 1B"

_____ 3.20 **IF** a Boric Acid Transfer Pump was **NOT** selected to "AUTO" in Step 3.19, ensure it is in "OFF":

_____ • "B/A XFER PUMP 1A"
OR
_____ • "B/A XFER PUMP 1B"

_____ 3.21 **<u>IF</u>** Unit 1 is in Mode 1, 2, 3 or 4, perform the following:

_____ 3.21.1 Step 3.21.2 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 ___________________________________

_____ 3.21.2 **<u>IF AT ANY TIME</u>** while FWST makeup is in progress a Safety Injection occurs on Unit 1, terminate the makeup by performing the following:

_____ 3.21.2.1 Turn the "NC MAKEUP CONTROL" switch to the "STOP" position.

3.21.2.2 Ensure the following:

- _____ Selected Reactor Makeup Water Pump stops.
- _____ 1NV-238A (B/A To Blender Ctrl Vlv) closes.
- _____ 1NV-242A (RMWST To B/A Blender Ctrl) closes.

_____ 3.22 Energize makeup control circuit by turning the "NC MAKEUP CONTROL" switch to the "START" position.

3.23 Ensure the following:

- _____ Selected Reactor Makeup Water Pump starts.
- _____ Selected Boric Acid Transfer Pump starts.
- _____ 1NV-238A (B/A To Blender Ctrl Vlv) positions to produce desired boric acid flow.
- _____ 1NV-242A (RMWST To B/A Blender Ctrl) positions to produce desired total makeup flow.

_____ 3.24 **<u>WHEN</u>** makeup is complete, turn the "NC MAKEUP CONTROL" switch to the "STOP" position.

3.25 Ensure the following:

_____ • Selected Reactor Makeup Water Pump stops.

_____ • Selected Boric Acid Transfer Pump stops.

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

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

3.26 Flush the flowpath for one minute as follows:

3.26.1 Place both Boric Acid Transfer Pumps in "OFF".

_____ • "B/A XFER PUMP 1A"

_____ • "B/A XFER PUMP 1B"

_____ 3.26.2 Place the selector switch for 1NV-238A (B/A To Blender Ctrl Vlv) in the "CLOSED" position.

_____ 3.26.3 Place the selector switch for 1NV-242A (RMWST To B/A Blender Ctrl) in the "OPEN" position.

_____ 3.26.4 Turn the "NC MAKEUP CONTROL" switch to the "START" position.

3.26.5 Ensure the following:

_____ • Selected Reactor Makeup Water Pump starts.

_____ • Total makeup flow indicates flow.

_____ 3.26.6 **WHEN** flushing is completed, turn the "NC MAKEUP CONTROL" switch to the "STOP" position.

3.26.7 Ensure the following:

_____ • Selected Reactor Makeup Water Pump stops.

_____ • Total makeup flow indicates no flow.

3.27 Place the selector switches for the following valves in "AUTO":

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

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

3.28 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)

_____ 3.29 Open 1NV-187 (Boric Acid Blender Outlet To VCT Outlet Isol) (AB-583, KK-50, Rm 419).

3.30 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"

_____ 3.31 **<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"

_____ 3.32 **<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"

_____ 3.33 **<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"

3.34 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)

_____ 3.35 Align for makeup to the VCT per OP/1/A/6150/009 (Boron Concentration Control).

_____ 3.36 **IF** Step 3.15 was performed,
THEN perform the following:

_____ 3.36.1 Secure the FW recirc pump started in Step 3.15.2.

_____ 3.36.2 Start the "FW PUMP".

Record FW Pump start time. ____________

NOTE:	FWST sample is required within 24 hours of completion of makeup.

_____ 3.37 **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.

_____ 3.37.1 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.

_____ 3.37.2 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).

_____ 3.37.3 **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. • IF Step 3.36 was performed, Step 3.38.1 may be N/A'd.

_____ 3.38 **IF** FWST was **NOT** recirculated with the NS pump, perform the following:

_____ 3.38.1 Place the FWST in recirculation per one of the following:

_____ • Enclosure 4.6 (FWST Recirculation).
OR
_____ • Enclosure 4.5 (FWST Purification).

_____ 3.38.2 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).

3.39 Do **NOT** file this enclosure.

JPM A.1-2S

SRO

Catawba Nuclear Station
Admin. JPM A.1-2S
Sept 2021 NRC Exam

EVALUATION SHEET

Task: Determine License Status

Alternate Path: N/A

Facility JPM #: NS07-001

Safety Function: N/A

K/A 2.1.4 Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical records, "no-solo" operation, maintenance of active license status.

Importance: 3.3 / 3.8 CFR: 41.10 / 43.2

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ Classroom __X__ Perform __X__ Simulate _________

References: AD-OP-ALL-0107 Maintenance of RO and SRO Licenses

Task Standard: Applicant determines that RP Jones is eligible to work the CRS position on July 1, 2021, while Mike Starnes and Will Fowler are NOT eligible as actively licensed SROs for this shift.

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

===

COMMENTS

____

____

____

____

____

____

Catawba Nuclear Station
Admin. JPM A.1-2S
Sept 2021 NRC Exam

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 evaluating the work histories of three Licensed Senior Reactor Operators.
- All three have off-shift assignments at the plant, are current in License Operator Requalification Training, and have had a medical examination in the past 2 years.
- All three operators have worked ONLY the shifts listed for the second quarter of 2021.
- Active/Inactive status and time on shift since April 1, 2021 is as follows for each of the Senior Reactor Operators: (Work History Table Provided)
- Unit Power History
    - Unit 1 has remained in **MODE 1** since 04/01/21
    - Unit 2 entered a refueling outage on 05/04/21 and was in **NO MODE** from 05/15/21 – 05/22/21.

INITIATING CUES:

- Determine if each of the Senior Reactor Operators is eligible to work the CRS position on the 0700 - 1900 shift on July 1, 2021.
- Record your answer below (yes or no). If no, explain why.

Mike Starnes:____

Will Fowler:____

RP Jones:____

EXAMINER NOTE:

After reading cue, provide applicant with a copy of AD-OP-ALL-0107 and the Work History Table provided with this JPM.

Catawba Nuclear Station
Admin. JPM A.1-2S
Sept 2021 NRC Exam

START TIME: _________

STEP 1: Determine the Active/Inactive status of Mike Starnes's SRO License: STANDARD: From the cue, the applicant reviews the requirements of AD-OP-ALL-0107 and determines that this license is INACTIVE • 04/02/21, 04/03/21, 05/05/21, & 05/06/21 watches met 4 of the 5 required. • 05/21/21 watch did not count because the applicable unit was not in a required mode. • 04/04/21 & 06/17/21 watches were not in required position. **Examiner Note: This step is critical because determining that Mike Starnes is NOT eligible to work, at the CRS position, on July 1, 2021 is necessary to complete the assigned task.** COMMENTS:	**CRITICAL STEP** Sat __ Unsat __

STEP 2: Determine the Active/Inactive status of Will Fowler's SRO License:	**CRITICAL STEP**
STANDARD: From the cue, the applicant reviews the requirements of AD-OP-ALL-0107 and determines that this license is INACTIVE • 04/01/21, 04/03/21, 04/05/21, & 04/14/21 watches met 4 of the 5 required. • 04/02/21 watch did not count because it did not constitute a full 12 hour shift. • 05/02/21 watch was not in required position. **Examiner Note: This step is critical because determining that Will Fowler is NOT eligible to work, at the CRS position, on July 1, 2021 is necessary to complete the assigned task.** COMMENTS:	Sat __ Unsat __

STEP 3: Determine the Active/Inactive status of RP Jones SRO License:	**CRITICAL STEP**
STANDARD: • From the cue, the applicant reviews the requirements of AD-OP-ALL-0107 and determines that this license is ACTIVE. Although 5 complete watches were not completed within the required positions and unit modes, the five 12 hour proficiency watches are not required to be performed in a quarter where reactivation is accomplished. **Examiner Note: This step is critical because determining that RP Jones is eligible to work, at the CRS position, on July 1, 2021 is necessary to complete the assigned task.** COMMENTS:	Sat __ Unsat __

END 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 evaluating the work histories of three Licensed Senior Reactor Operators.
- All three have off-shift assignments at the plant, are current in License Operator Requalification Training, and have had a medical examination in the past 2 years.
- All three operators have worked ONLY the shifts listed for the second quarter of 2021.
- Active/Inactive status and time on shift since April 1, 2021 is as follows for each of the Senior Reactor Operators: (Work History Table Provided)
- Unit Power History
    - Unit 1 has remained in **MODE 1** since 04/01/21
    - Unit 2 entered a refueling outage on 05/04/21 and was in **NO MODE** from 05/15/21 – 05/22/21.

INITIATING CUES:

- Determine if each of the Senior Reactor Operators is eligible to work the CRS position on the 0700 - 1900 shift on July 1, 2021.
- Record your answer below (yes or no). If no, explain why.

Mike Starnes:____

Will Fowler:____

RP Jones:____

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

Mike Starnes	**License was active on April 1, 2021.**	
	04/02/21	Worked 0700-1900 shift as CRS.
	04/03/21	Worked 0700-1900 shift as Unit 1 OATC.
	04/04/21	Worked 0700-1900 shift as Unit 1 Supervisor
	05/05/21	Worked 0700-1900 shift as Unit 2 BOP.
	05/06/21	Worked 0700-1900 shift as Unit 2 OATC.
	05/21/21	Worked 1900-0700 shift as Unit 2 BOP.
	06/17/21	Worked 1900-0700 shift as STA.
Will Fowler	**License was active on April 1, 2021.**	
	04/01/21	Worked 0700-1900 shift as CRS.
	04/02/21	Worked 0700-1500 shift as CRS.
	04/03/21	Worked 0700-1900 shift as CRS.
	04/05/21	Worked 0700-1900 shift as CRS.
	04/14/21	Worked 1900-0700 shift as SM.
	05/02/21	Worked 0700-1900 shift as Unit 1 Supervisor
RP Jones	**License was inactive on April 1, 2021.**	
	04/05/21 thru 04/09/21 worked 40 hours under the direction of the CRS and completed all requirements for license reactivation.	
	04/12/21	Worked 0700-1900 shift as Unit 2 BOP.
	04/13/21	Worked 0700-1900 shift as Unit 1 BOP.
	05/16/21	Worked 0700-1900 shift as Unit 2 OATC.
	05/18/21	Worked 1900-0700 shift as Unit 1 BOP.
	05/20/21	Worked 1900-0700 shift as Unit 1 OATC.

Information Use

NUCLEAR OPERATING FLEET

ADMINISTRATIVE PROCEDURE

AD-OP-ALL-0107

MAINTENANCE OF RO AND SRO LICENSES

REVISION 3

Effective Dates:

07/01/2020	07/01/2020	07/01/2020	07/01/2020	07/01/2020
Brunswick	Catawba	Harris (HNP)	McGuire	Oconee
07/01/2020	07/01/2020			
Robinson	NGO			

REVISION SUMMARY
PRR 02321909 **DESCRIPTION**
• Section 3.0.3, sub-bullet: Added guidance for using licensee as an interchangeable term for Licensed Operator. • Section 4.4.1: Revised to incorporate participation in the requalification program. • Section 4.5 and Section 5.7.2: Revised 'Supervisor' to 'Superintendent'. • Section 5.2: Added section and associated guidance for Maintaining Required License Obligations (PRR 02280803 and PRR 02312224). • Section 5.3.1.a: Added guidance for Licensed Operators who will not attend training in accordance with AD-TQ-ALL-0068 (PRR 02280803). • Section 5.5.7 and sub-steps: Deleted guidance for maintaining a Shift Manager proficiency. • Attachment 1, Step 6.a: Updated CNS and MNS NLMS codes (PRR 02300605 and PRR 02315136). • Attachment 2, Step 6.a: Revised Requalification Training Supervisor to Operations Training Superintendent. • Attachment 2, Step 8: Revised to incorporate 'NLMS', and revised RP Staff Representative to Licensed Operator (PRR 02320845). • Attachment 2, Step 12: Revised Ops Training Manager to Ops Training Superintendent (PRR 02270855). • Attachment 2, Step 15.a: Updated CNS and MNS NLMS codes (PRR 02300605 and PRR 02315136). • Attachment 2, Table 8: Revised to delete WGDT room, revised 'AFP Hx to SFP Hx', and revised 'all levels' to 'level 1 and 2'. •

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(continued)

1.0 PURPOSE

1. This procedure provides guidance for maintaining and reactivating NRC Senior Reactor Operator (SRO), Reactor Operator (RO), and Limited Senior Reactor Operator (LSRO) licenses pursuant to 10 CFR Part 55, Operators' Licenses.

2.0 SCOPE

1. This procedure provides the following instructions:
   - Processing NRC license applications
   - Maintaining required licensed requalification training status
   - Maintaining required Licensed Operator medical status
   - Maintaining required on-shift experience for Licensed Operators
   - Certification of a new or inactive license
   - Removing a Licensed Operator from duty for other than medical or requalification training status
   - Activating an SRO license for fuel handling/core alterations only
2. This procedure applies to NRC licensed personnel at all operating Duke Energy nuclear sites.

3.0 DEFINITIONS

1. **Active Licensed Operator Position(s):** Positions that meet the NRC definition of "actively performing the duties of a Reactor Operator or Senior Reactor Operator". The following are required to be filled by individuals with active licenses, and are the only positions that can be credited for maintaining required on shift experience for Licensed Operator(s).
   - Shift Manager (SRO)
   - Control Room Supervisor (SRO)
   - Operator at the Controls (RO)
   - Balance of Plant Operator (RO)
2. **Duke Energy Medical Information (DEMI):** Database used by Duke Energy Occupational Health (OH) to store employee medical data.

3.0 DEFINITIONS (continued)

3. **Licensed Operator(s):** An individual who has obtained a license issued by the Nuclear Regulatory Commission to perform the function of a Reactor Operator or Senior Reactor Operator as defined in 10 CFR 55.

    - Licensed Operator(s) are an interchangeable term to 'licensee' in 10 CFR 55 and in this procedure.

4. **Licensed Operator Qualification Report (LOQR):** A report used to track specific RO and SRO license attribute status.

5. **Limited Senior Reactor Operator (LSRO):** A SRO limited to fuel handling/core alteration activities only. LSROs are not required to maintain proficiency between refueling outages.

6. **Medical Conditions of Concern:** A new or change in medical condition (physical or mental), illness, or injury that might affect the physical or mental ability of a Licensed Operator to perform required licensed duties.

7. **No Solo:** Operator license restriction that requires another qualified person to be present when the restricted operator is operating or directing the operation of the controls, during all modes of operation including emergency conditions.

8. **Qualified Occupational Health (OH) Personnel:** Physicians and nurses employed or contracted by Duke Energy

4.0 RESPONSIBILITIES

4.1 Operations Management

1. Ensures the status and capability of Licensed Operators to perform licensed duties.

4.2 Assistant Operations Manager - Shift (AOM-Shift) or Designee

1. Ensures Licensed Operators filling Active Licensed Operator Position(s) have the opportunity to perform a minimum of five 12-hour shifts per calendar quarter.

2. Certifies Licensed Operators who are ready to resume the responsibilities of an on-shift Licensed Operator position.

4.3 Shift Managers (SMs)

1. Ensures all Licensed Operators standing watch hold an active license for that position.

2. Communicates operator license status changes to the organizations identified in this procedure.

4.4 Licensed Operators

1. Understands and fulfills NRC license obligations, including participation in the operator requalification program, issued under 10 CFR 55.

2. Understands status in regards to fulfilling Licensed Operator duties.

3. Ensures immediate supervisor and qualified Occupational Health personnel are made aware of any changes in:

   - Prescription medication use
   - Changes in medical status

4.5 Superintendent Nuclear Operations Training

1. Notifies the on duty SM when a Licensed Operator fails to meet the requirements of the requalification program.

2. Ensures Licensed Operators who fail to meet the requirements of the requalification program are disqualified from Nuclear Learning Management System (NLMS) activities per AD-TQ-ALL-0660, Use and Administration of the Nuclear Learning Management System (NLMS). {7.1.1}

4.6 Regulatory Affairs

1. Generates and submits all regulatory required correspondence per 10 CFR 55 in accordance with the requirements of AD-LS-ALL-0002, Regulatory Correspondence.

2. Coordinates with Occupational Health personnel on reportability determination per 10 CFR 55.23.

3. Coordinates with Operations Management on reportability determination per 10 CFR 50.74(a)(b).

4.7 Corporate Medical Director (CMD)

1. Establishes and oversees the medical components of the OH program.

4.8 Examining Physician (SEP)

1. Reviews test results, performs medical examinations, and performs consultations for nuclear plant sites.

4.9 Qualified Occupational Health Personnel

1. Performs evaluations on Licensed Operator(s) when informed of changes to their medical status.

2. Provides evaluations to Operations Management concerning the ability of Licensed Operators to perform duties while taking prescription or non-prescription medications.

3. Performs biennial medical examinations per ANSI/ANS 3.4/1983.

4. Provides written documentation to Regulatory Affairs for submittal to the NRC as required by ANSI/ANS 3.4/1983.

5.0 INSTRUCTIONS

5.1 Processing NRC License Applications

1. Refer to AD-TQ-ALL-0610, NRC License Application Process, for guidance associated with initial and renewal license applications, waiver requests, and associated NRC correspondence.

2. Expiration of Operator NRC licenses is governed by 10 CFR 55.55, Expiration, which states the following:

   - Each Operator License and Senior Operator License expires six years after the date of issuance, upon termination of employment with the facility licensee, or upon determination by the facility licensee that the licensed individual no longer needs to maintain a license.

   - If a licensee files an application for renewal or an upgrade of an existing license on Form NRC-398 at least 30 days before the expiration of the existing license, it does not expire until disposition of the application for renewal or for an upgraded license has been finally determined by the Commission. Filing by mail will be deemed to be complete at the time the application is deposited in the mail.

5.2 Maintaining Required License Obligations

NOTE

The obligations in this procedure are paraphrased requirements in 10 CFR 55.

1. All Licensed Operators shall meet the following requirements:

   - Neither the license nor any right under the license may be assigned or otherwise transferred.

   - The license is limited to the facility for which it is issued.

   - The license is limited to those controls of the facility specified in the license.

   - The license is subject to, and the licensee shall observe, all applicable rules, regulations, and orders of the Nuclear Regulatory Commission.

   - Maintain on-shift operating experience (i.e., active license) in accordance with Section 5.5.

     ◊ If on-shift operating experience is not maintained, then prior to resumption of functions authorized by the license, refer to Section 5.6 to regain an active license.

5.2 Maintaining Required License Obligations (continued)

- The licensee shall notify the Nuclear Regulatory Commission within 30 days about a conviction for a felony.
- The licensee shall complete a requalification program as described by §55.59.
  - ◊ Compliance of 55.99 is verified by Section 5.3.
- The licensee shall have a biennial medical examination.
  - ◊ Medical requirements shall be maintained in accordance with Section 5.4.
- The licensee shall be Fit-for-Duty and shall **NOT** perform activities authorized by the license while under the influence of alcohol or any prescription, over-the-counter, or illegal substance that could adversely affect the licensees ability to safely and competently perform licensed duties.
  - ◊ The consumption, sale, or use of alcohol or illegal substances is prohibited in the protected area.
- The licensee shall participate in the drug and alcohol testing program established pursuant to 10 CFR Part 26.
- The licensee shall comply with any other conditions that the Commission may impose to protect health or to minimize damage to life or property.

2. If any of the following conditions exist for a Licensed Operator, then terminate the license by processing Attachment 4, Notification Of Change In Operator Status {7.1.2}:

   - Licensed Operator transfers to a new position in which maintaining the license is **NOT** desired.
   - Licensed Operator transfers to a different company.
   - Licensed Operator is no longer employed by the company.

5.3 Maintaining Required Licensed Requalification Training Status

1. All Licensed Operators must comply with the requirements of the AD-TQ-ALL-0068, Licensed Operator Continuing Training Program.

   a. If a Licensed Operator is reassigned to a position that does NOT require a license AND will NOT attend training in accordance with AD-TQ-ALL-0068, Licensed Operator Continuing Training Program, then process Attachment 4, Notification Of Change In Operator Status {7.1.2}, to terminate the Licensed Operator's license.

   b. If a Licensed Operator has failed to meet Licensed Operator qualification requirements, then Operations Training shall disqualify the Licensed Operator from licensed duties in accordance with AD-TQ-ALL-0660, Use and Administration of the Nuclear Learning Management System (NLMS).

5.4 Medical Reporting Requirements

5.4.1 General

1. The reporting requirements for medical changes contained in this procedure apply to all Active and Inactive Licensed Operators

2. Licensed Operators are required to meet the medical requirements contained in ADMP-SAF-HSF-00091, Occupational Health Programs.

3. The OH Department will initiate notifications for changes in a medical condition that affects the ability of Licensed Operator to perform operator licensed duties in accordance with Attachment 3, Change In Medical Condition Affecting License Status

4. Licensed Operators are required to complete a biennial physical examination per ANSI/ANS 3.4/1983 conducted by the Duke Energy OH facility and the SEP.

   a. The expiration date is two years to the end of the month from the examining physician's medical clearance date.

5. Prior to assuming Licensed Operator duties, Licensed Operators are required to report any physical or mental condition that might impair their ability to perform licensed duties to the License Operator's supervisor and to OH personnel.

   a. Refer to Attachment 5, Common Medical Status Changes/Conditions of Licensed Operators, for examples of changes in medical conditions.

5.4.1 General (continued)

6. If a change in physical or mental condition is discovered, the Licensed Operator is required to share the following information with OH personnel:

   - Specific details of the condition
   - Medications
   - Lab results
   - Treatments
   - Prognosis

7. Notification of a change in physical or mental condition shall be made as soon as the individual has knowledge of the change in condition.

   a. Details of the medical condition are not required to be shared with supervision, just the existence of the condition and how it impacts the ability to perform licensed duties.

   b. Licensed duties shall not be performed until OH personnel have determined that the Licensed Operator is able to perform licensed duties.

8. If a Licensed Operator receives a new prescription, then the Licensed Operator reports the medications to supervision and OH personnel.

   a. If receiving a new prescription, then the Licensed Operator shall ask the prescribing physician if the medication may affect job performance and whether it can be taken while working.

   b. Licensed duties shall not be performed until the Licensed Operator has:

      - Informed Occupational Health personnel
      - Informed the Licensed Operators supervisor
      - OH personnel determines new prescription has no impact on performing licensed duties.

9. Non-prescription medication is not required to be reported to the OH personnel except if side-effects occur (e.g., drowsiness, fatigue, dizziness).

   a. Immediately notify OH personnel if side-effects occur upon taking a non-prescription medication.

5.4.1 General (continued)

10. Supervision shall promptly report any medical condition that results in a restriction being placed on a Licensed Operator by a physician to OH personnel.

11. If a supervisor suspects that a medical condition may have some effect on work (e.g., broken fingers, splints, use of crutches, conditions impacting mobility), then the supervisor shall notify OH personnel even if no restrictions have been placed by a physician.

    a. Most minor illnesses (e.g., flu, virus, infection) are not required to be reported to OH personnel.

    b. OH personnel will initially evaluate the condition presented to them by supervision and notify the CMD or SEP as appropriate.

    c. If required, then the SEP will evaluate and document the condition with a recommendation whether the medical condition should be reported to the NRC.

12. If a change in license restrictions is indicated by a medical condition, then within 30 days, notify the NRC by completing NRC Form 396, Certification of Medical Examination by Facility Licensee.

5.4.2 Medical Examination Process

NOTE
These instructions apply to initial, license renewal, and periodic medical evaluations.

1. The Licensed Operator's supervisor or designee performs the following:

    a. Complete ADMF-SAF-HSF-00004, Facility Operator's Report Form, and ADMF-SAF-HSF-00017, Supervisor's - To Support Nuclear Occupational Medical Evaluations and Surveillances.

        (1) To locate ADMF-SAF-HSF-00004 and ADMF-SAF-HSF-00017, perform the following:

            (a) Go to the DAE and search under the Shortcuts tab for "FileNet P8 Fusion".

            (b) Open FileNet P8 Fusion and select "Enterprise Fusion"

            (c) Under the search fields, select "Document Number" and type in the desired procedure to view.

5.4.2 Medical Examination Process (continued)

b. Submits the completed Facility Operator's Report Form and the Supervisor's Statement forms to OH.

c. Promptly forwards ADMF-SAF-HSF-00013, Occupational Medical History Form, and ADMF-SAF-HSF-00009, Audiological History and Examination Form, to the Licensed Operator or applicant.

2. Licensed Operator or applicant performs the following:

a. Promptly responds to Duke Energy Medical Information (DEMI) notification emails.

b. Promptly completes the Occupational Medical History Form and returns it to OH.

(1) The medical examination consists of testing by the OH nurse and a medical examination performed by the physician.

(2) These are normally scheduled at least 24 hours apart to allow for the return of lab results.

(3) Contact OH to schedule the medical testing and examination.

3. OH performs the following:

a. Receives and reviews the Facility Operator's Report Form and the Supervisor's Statement for each Licensed Operator or applicant.

b. Schedules medical testing and examinations.

c. Performs medical testing and records the data.

d. Provides medical testing and examination data, the Facility Operator's Report Form, and if applicable, a NRC Form 396 to the SEP.

e. Initiates performance of Attachment 3, Change In Medical Condition Affecting License Status.

f. Completes the NRC Form 396 for permanent medical status changes.

g. Ensures a validation of the medical documents and OH database is performed by another member of OH.

h. Incorporates additional medical information provided by the SEP on the completed NRC Form 396 and forwards it to Regulatory Affairs.

i. Documents medical change in Licensed Operator's medical record.

5.4.2 Medical Examination Process (continued)

j. Files the original completed forms, and any associated medical documents in the Licensed Operator's medical record.

4. SEP performs the following:

a. Schedules physician examination component of the medical examination and completes the appropriate documentation.

NOTE

The discovery date on Attachment 3, Change In Medical Condition Affecting License Status is the date used for calculation of the NRC qualification expiration or for calculation of the 30-day NRC notification requirement for permanent medical changes.

b. If there are changes in the Licensed Operator's temporary or permanent medical status, then:

(1) Informs the Licensed Operator at the time of the medical examination.

(2) Notifies OH.

c. If a permanent medical status change is identified, then a required letter with additional medical information shall be prepared by the SEP with assistance from the OH staff to support the NRC Form 396 submittal.

(1) This information is transmitted to Regulatory Affairs in a sealed envelope marked as CONFIDENTIAL.

(2) Regulatory Affairs may open the sealed envelop to validate the information contained in the letter matches the information provided by the physician.

d. Submits completed medical examination documentation to OH Health.

5. Regulatory Affairs performs the following:

a. Ensures the NRC Form 396 is properly completed.

5.4.2 Medical Examination Process (continued)

b. If a permanent medical change was identified, then:

- Obtains Licensed Operator's signature
- Obtains Site VPs signatures
- Submits NRC Form 396 within 30 days of the medical status discovery date
  - ◊ A letter with additional medical information may be prepared by the SEP to support the NRC Form 396 submittal. This information will be provided to the NRC in accordance with 10 CFR 2.390.

c. Forwards a copy of the submitted NRC Form 396 to:

- Site Training
- Occupational Health
- Affected Licensed Operator
- Licensed Operator's Supervisor

5.4.3 Medical Status Changes

NOTE
These instructions apply to medical status changes identified independently of the routine or periodic medical examinations for Licensed Operators.

1. If any change occurs in a Licensed Operator's medical condition, then the operator performs the following:

   a. Refers to Attachment 5, Common Medical Status Changes/Conditions of Licensed Operators.

   b. Prior to performing licensed duties, notifies supervision and OH.

      (1) If the operator is unable to notify OH of the change in medical condition, then Operations Management will notify OH.

5.4.3 Medical Status Changes (continued)

2. OH performs the following upon notification of a potential medical condition change by a Licensed Operator or supervisor:

   a. Obtains specific medical information and documentation pertinent to the medical condition change from the Licensed Operator.

   b. Notifies SEP or CMD of the medical information obtained and follows the physician's instruction.

   c. Notifies the Licensed Operator of the review with the SEP or CMD:

      (1) If the physician needs to examine the Licensed Operator, then schedules an appointment with the physician.

      (2) If the physician does not need to examine the Licensed Operator, then notifies the Licensed Operator of the physician's opinion.

      (3) Documents all actions taken in the Licensed Operator's medical record.

3. SEP or CMD performs the following:

   a. Determines the extent of the evaluation needed to make a decision regarding a potential medical condition change.

      (1) May require contact between the Licensed Operator or the Licensed Operator's personal medical doctor.

   b. If a clinical assessment is not required, then:

      (1) Advises OH.

      (2) Notifies OH personnel of the decision and provide supporting documentation.

   c. If a clinical assessment is required, then determines the Licensed Operator's condition based on available medical records, results of the personal medical doctor's clinical assessment, and any special testing.

      (1) Notifies OH personnel of the decision and provides supporting documentation.

5.4.3 Medical Status Changes (continued)

d. If license restrictions are indicated or determined, then notify OH.

(1) If a temporary medical status change is identified, then additional clinical assessment at a future date will be warranted to determine if or when temporary restrictions may be removed.

(2) If a permanent medical status change is identified, then a required letter with additional medical information shall be prepared by the SEP with assistance from the Occupational Health staff to support the NRC Form 396 submittal.

(a) This information is transmitted to Regulatory Affairs in a sealed envelope marked as CONFIDENTIAL.

(b) Regulatory Affairs may open the sealed envelop to validate the information contained in the letter matches the information provided by the physician.

(3) If OH identifies a permanent medical status change that is not compatible with maintaining a RO or SRO license, then notify the Operations Manager (or designee) and contact Site HR for Medical Accommodations Program consideration.

4. Occupational Health performs the following upon notification of a medical status change by the SEP or CMD:

a. Initiate performance of Attachment 3, Change In Medical Condition Affecting License Status.

b. Completes the NRC Form 396 for permanent medical status changes.

c. Ensures a validation of the medical documents and OH database is performed by another member of OH.

d. Incorporates additional medical information provided by the SEP on the completed NRC Form 396 and forwards it to Regulatory Affairs.

e. Documents medical change in Licensed Operator's medical record.

f. Files the original completed forms, and any associated medical documents in the Licensed Operator's medical record.

5.4.3 Medical Status Changes (continued)

5. Regulatory Affairs performs the following:

    a. Ensures the NRC Form 396 is properly completed.

    b. If a permanent medical change was identified, then:

    - Obtains Licensed Operator's signature
    - Obtains Site VP's signatures
    - Submits NRC Form 396 within 30 days of the medical status discovery date

        ◊ A letter with additional medical information may be prepared by the SEP to support the NRC Form 396 submittal. This information will be provided to the NRC in accordance with 10 CFR 2.390.

    c. Forwards a copy of the submitted NRC Form 396 to:

    - Site Training
    - Occupational Health
    - Affected Licensed Operator
    - Licensed Operator's supervisor.

5.4.4 Medical Restrictions Follow-Up

1. OH performs the following:

    a. Monitors medical reevaluation dates for Licensed Operators with temporary medical restrictions.

    b. Schedules follow-up testing and examinations.

2. SEP performs the following:

    a. Performs the follow-up examinations and tests as necessary.

    b. Completes clinical documentation and submits documentation to OH.

5.4.4 Medical Restrictions Follow-Up (continued)

3. OH performs the following:

   a. Obtains the clinical documents from the SEP and reviews for completeness and accuracy.

   b. If the SEP reports that the temporary medical restriction is no longer valid, then the following actions are taken:

      (1) Initiates performance of Attachment 3, Change In Medical Condition Affecting License Status

      (2) Incorporates additional medical information provided by the SEP on the completed NRC Form 396 and forwards it to Regulatory Affairs.

      (3) Documents medical change in Licensed Operator's medical record.

      (4) Files the original completed forms, and any associated medical documents in the Licensed Operator's medical record.

5.5 Maintaining Required On-Shift Experience (Proficiency) For Licensed Operators

1. Licensed Operators must comply with 10 CFR 55.53(e) to maintain an Active Licensed Operator Position. {7.1.1}

   a. Licensed Operators must perform five 12 hour shifts per calendar quarter to maintain an active license status.

   b. Time as an extra RO or SRO on an Outage Unit or as RO or SRO in the Outage Command Center CANNOT be counted as an Active Licensed Operator Position.

   c. Time during No Mode CANNOT be counted as an Active Licensed Operator Position.

2. Any Licensed Operator that fails to comply with 10 CFR 55.53(e) requirements shall immediately notify their supervisor. {7.1.1}

   a. The Licensed Operator's supervisor shall notify Operations Training to disqualify the Licensed Operator from licensed duties in accordance with AD-TQ-ALL-0660, Use and Administration of the Nuclear Learning Management System (NLMS).

5.5 Maintaining Required On-Shift Experience (Proficiency) For Licensed Operators (continued)

3. The Licensed Operator shall document performance of standing an Active Licensed Operator Position by one of the following methods:

   - Attachment 1, Operating Experience Maintenance For Active Licensed Operators
   - 'Credit for Standing Watch' eSOMS report

4. If a Licensed SRO stands all of the required proficiency watches in a SRO position, then the RO portion of the license remains active.

5. Individuals who are licensed on two (or more) similar units at a facility are not required to maintain proficiency on each of the similar units (i.e., performing required watches on a single unit will maintain the active licenses on the similar units).

6. If a Licensed SRO stands mostly RO watches, then to maintain the supervisory portion of the SRO License active, the Licensed SRO must stand at least one complete 12 hour shift per calendar quarter as either SM or CRS.

   a. Failure to complete at least one complete watch during a calendar quarter as either a SM or CRS will result in the SRO License becoming inactive.

      (1) The Operator may still stand watch as a RO until the SRO License is reactivated.

7. Two SROs may obtain active hours at the same time in dual unit Control Rooms as long as each SRO is assigned overall responsibility for a specific unit.

   a. SROs assigned to the Control Room for oversight of specific evolutions may not accrue time that can be credited toward their calendar quarter requirement.

8. Four Reactor Operators may obtain active hours at the same time in dual unit Control Rooms as long as each is assigned either the OATC or the BOP position for a specific unit.

   a. Reactor Operators assigned to the Control Room for specific evolutions may not accrue time that can be credited toward their calendar quarter requirement.

5.6 Activation of a New or Inactive License

1. Licensed Operators must ensure compliance with the terms of 10 CFR55.53(e) for activation of a new or inactive license.

2. Prior to performance of Active Licensed Operator Position duties, the Licensed Operator must complete Attachment 2, Activation of New or Inactive License.

   a. Five 12 hour proficiency watches are not required to be performed in a quarter where reactivation or initial activation is accomplished.

   b. Activation hours CANNOT be counted as part of the proficiency watch standing time for the quarter.

NOTE

The requirement detailed in the following step is not specified in 10 CFR 55, but are required by Duke Energy.

3. The AOM-Shift completes an evaluation, determining the need for any additional training in the following areas:

   - Ops Management Expectations (e.g., watch standing, communications)
   - Security
   - Radiation Protection
   - Emergency Planning
   - Operation
   - Major Plant Modifications

5.7 Removing a Licensed Operator From Duty for Other Than Medical or Requalification Training Status

1. If a Licensed Operator is removed from licensed duty due to management discretion, then the AOM-Shift ensures the SM and Operations Training is notified.

   a. Operations Training disqualifies the Licensed Operator from licensed duties in accordance with AD-TQ-ALL-0660, Use and Administration of the Nuclear Learning Management System (NLMS).

2. As necessary, the AOM-Shift and the Superintendent Nuclear Operations Training will develop any needed remediation plan.

5.7 Removing a Licensed Operator From Duty for Other Than Medical or Requalification Training Status (continued)

3. If the removal from license duty is temporary, then the condition is not required to be reported per 10 CFR 55.

4. Upon resolution of the disqualifying issue, the AOM-Shift notifies Operations Training to reinstate the Licensed Operator qualifications to perform licensed duties in accordance with AD-TQ-ALL-0660, Use and Administration of the Nuclear Learning Management System (NLMS).

5. If a Licensed Operator becomes ineligible to perform licensed duties due to lapses in non-requalification training (e.g., SCBA, Respirator Training), then the Licensed Operator informs the SM.

   a. The SM notifies Operations Training to disqualify the Licensed Operator from licensed duties in accordance with AD-TQ-ALL-0660, Use and Administration of the Nuclear Learning Management System (NLMS).

   b. Upon resolution of the disqualifying issue, the AOM-Shift notifies Operations Training to reinstate the Licensed Operator qualifications to perform licensed duties in accordance with AD-TQ-ALL-0660, Use and Administration of the Nuclear Learning Management System (NLMS).

5.8 <u>Activating an SRO License For Fuel Handling/Core Alterations Only</u>

1. Prior to an inactive Licensed Operator independently standing watch as a Fuel Handling/Core Alterations SRO, the actions contained in Attachment 6, Activation Of An SRO License For Fuel Handling/Core Alterations Only must be completed.

5.9 <u>[CNS] Licensed Operators Qualification Report (LOQR)</u>

1. The LOQR is a report updated to provide readily available operator license status.

   a. If there is a conflict between the report and the Licensed Operator's believed qualification status, then the operator shall immediately contact the on-duty SM.

5.9 [CNS] Licensed Operators Qualification Report (LOQR) (continued)

2. At a minimum, the LOQR includes:
   - Licensed Operator's name
   - License status (active or inactive)
   - License expiration date
   - NRC physical expiration date
   - Restrictions placed on an operator's license

3. The LOQR shall be printed at least weekly and be readily available to the on duty Shift Manager for review and updating. {7.1.2}

6.0 RECORDS

6.1 QA Record

1. Completed Attachment 1, Operating Experience Maintenance For Active Licensed Operators as described in the attachment.

2. Completed Attachment 2, Activation of New or Inactive License as described in the attachment.

6.2 Business Record

1. Completed Attachment 3, Change In Medical Condition Affecting License Status as described in the attachment.

2. Completed Attachment 4, Notification Of Change In Operator Status {7.1.2} as described in the attachment.

3. Completed NRC Form 396. Filed by Occupational Health with the individuals medical record.

4. Completed Attachment 6, Activation Of An SRO License For Fuel Handling/Core Alterations Only as described in the attachment.

7.0 REFERENCES

7.1 Commitments

1. ACR 92-797, Reactor Operator With An Inactive Licenses State Stood Brief Watch on BOP
2. CAPR 01898054-11, SRO Standing Watch with a Terminated License

7.2 Procedures

1. AD-DC-ALL-0002, Records Management
2. AD-HU-ALL-0004, Procedure Use and Adherence
3. AD-LS-ALL-0002, Regulatory Correspondence
4. AD-SY-ALL-0460, Managing Fatigue And Work Hour Limits
5. AD-TQ-ALL-0068, Licensed Operator Continuing Training Program
6. AD-TQ-ALL-0610, Nuclear Operator License Application Process
7. AD-TQ-ALL-0660, Use and Administration of the Nuclear Learning Management System (NLMS)

7.3 Miscellaneous Documents

1. 10CFR50.74, Notification of change in operator or senior operator status
2. 10CFR55.23, Certification
3. 10CFR55.25, Incapacitation because of disability or illness
4. 10CFR55, OPERATORS' LICENSES Subpart C—Medical Requirements and Subpart D - Applications, Part 55.31 and Part 55.33
5. 10CFR55.53, Conditions of licenses
6. ADMF-SAF-HSF-00004, Facility Operator's Report Form
7. ADMF-SAF-HSF-00009, Audiological History and Examination Form
8. ADMF-SAF-HSF-00013, Occupational Health History Form
9. ADMF-SAF-HSF-00017, Supervisor's Statement - To Support Nuclear Occupational Medical Evaluations and Surveillances
10. ADMP-SAF-HSF-00091, Occupational Health Programs

7.3 Miscellaneous Documents (continued)

11. ANSI/ANS-3.4 - 1983, Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants
12. NRC RIS 2007-29, Clarified Guidance for Licensed Operator Watch-Standing Proficiency
13. NUREG 1021, Operator Licensing Examination Standards for Power Reactors, Revision 9, Supplement 1; Section ES-605
14. NUREG 1262, Answers to Questions at Public Meetings Regarding Implementation of Title 10, Code of Federal Regulations, Part 55 on Operators' Licenses
15. Regulatory Guide 1.134, Rev. 2, Medical Evaluation of Licensed Personnel at Nuclear Power Plants
16. RNP Nuclear Condition Report 224245, Including additional information on NRC Form 396

ATTACHMENT 1
Page 1 of 2

<< Operating Experience Maintenance For Active Licensed Operators >>

1. Licensed Operator's Name ________________________ Employee Number ________________________

2. Active Licensed Operator Position

   a. Shift Manager (SRO)

   b. Control Room Supervisor (SRO)

   c. Operator at the Controls (RO)

   d. Balance of Plant Operator (RO)

3. Refer to Section 5.5 for the requirements for maintaining an active license.

   a. Refer to Attachment 1 Step 2 and document the watches stood in Table 1.

Table 1, Licensed Operator Watch Standing Log

Licensed Operator Position (a, b, c, or d)	Shift Start Date (Month/Day/Year)	Shift (day/night)

4. I hereby certify that the information set forth above is accurate and complete.

   Licensed Operator Signature ____________________________________

5. Completed copies of this attachment shall be retained in accordance with AD-DC-ALL-0002, Records Management.

6. NLMS Code:________________________________ NLMS Entry Completed

<< Operating Experience Maintenance For Active Licensed Operators >>

Name:________________________________ Date:_____________

a. NLMS Codes:

- [BNP] BN TRN LOI0006B ROO
- [CNS] RO: CNROLOQR-NCN
- [CNS] SRO: CNSRLOQR-NCN
- [HNP] HN-OPS-LOI0014H
- [MNS] MCO023
- [ONS] TT4691-N Licensed Operator - Operating Experience Maintenance
- [RNP] RN-OPS-LOC0001R-N

QA Record Retention Rule = 421734 (Life of Plant)

<< Activation of New or Inactive License >>

1. Licensed Operator's Name: ____

   Employee Number: ________________ Position: ___________ (RO/CRS/SM)

2. Prior to initiation of the activation process, the Licensed Operator ensures all requirements of AD-SY-ALL-0460, Managing Fatigue And Work Hour Limits, are met, including validating that the individual's status in EmpCenter is "Covered."

3. Date of initiation of the activation process: ____________________

   Required Completion Date: ___________________

   - The required completion date must ensure that all hours required for activation are contained in the same calendar quarter.

4. Pre-job briefing completed.

   AOM-Shift or SM: ________________________________ Date: ______________

NOTE
Attachment 2 Step 5 through Attachment 2 Step 10 can be completed in any order.

5. An evaluation has been performed and additional training needs are identified below: (Section 5.6 Step 3)

   AOM-Shift: _____________________________________ Date: ______________

   ____

   ____

   ____

   ____

6. I hereby certify that all requalification training is up-to-date (N/A for initial licenses).

   a. For SMs and SM reliefs license reactivation, this includes verification that the SM or SM relief has participated in an active simulator evaluation (ASE) or station drill as the SM within the past two years.

   Operations Training Superintendent: ________________ Date: ______________

<< Activation of New or Inactive License >>

7. I hereby certify that medical qualifications are current.

   Occupational Health Representative: ___________________ Date: ____________

8. Verify that respirator/SCBA qualifications are current in NLMS.

   Licensed Operator: __________________________________ Date ____________

NOTE

Only one individual is allowed to parallel an active Licensed Operator at a time.

9. Licensed Operator being activated will:

   a. Perform 40 hours in an Active Licensed Operator Position to which the individual will be assigned under the direction of an active Licensed RO or SRO.

      (1) Must include participation in an ongoing and off going turnover, and a shift briefing.

      (2) Up to eight hours of the 40 activation hours may be spent completing the plant familiarization tour.

      (3) All 40 activation hours are required to be completed in the same calendar quarter.

   b. At the beginning of each shift, create a logbook entry stating the watch is being assumed under instruction.

   c. At the end of each shift, obtain an active SRO or RO signature certifying that the Licensed Operator being activated worked under the signatures direction.

   d. Upon completion of under instruction watch, complete Table 2, Licensed Operator Under Instruction Logbook

<< Activation of New or Inactive License >>

e. Complete a plant familiarization tour during the 40 hours or reactivation hours under the direction of an active Licensed SRO. Multiple personnel activating a license may participate in the same plant familiarization tour. The plant familiarization tour shall include the following:

- Up to 8 hours of reactivation time (total 40 hours) should be spent touring the plant.
- Contaminated areas or high radiation areas are not required to be accessed.
- All major equipment in tour areas shall be discussed.
- Plant familiarization tour shall include a review of all AO shift turnover procedures.
- Discuss an plant modification recently installed.
- Document the plant familiarization tour of the site specific areas using the site specific lists at the end of this attachment.
- Attach a copy of the security door printouts for both the licensed individual reactivating and the active Licensed SRO associated with the plant familiarization tour.

Table 2, Licensed Operator Under Instruction Logbook

Date	# of Hours	Under the Direction of	
		Printed Name	**Signature**
	Oncoming shift turnover		
	Off going shift turnover		

<< Activation of New or Inactive License >>

10. I hereby certify that the plant familiarization tour and 40 hours of activation time in Step 9 are complete and were completed within the same calendar quarter.

    Licensed Operator: ______________________________ Date: ______________

    SM (on duty): ___________________________________ Date: ______________

11. I hereby certify that the Training identified in Attachment 2 Step 5 is complete.

    SM (in charge): _________________________________ Date: ______________

12. All licensing requirements met.

    Ops Training Superintendent: _____________________ Date: ______________

13. I hereby certify the Licensed Operator's qualifications and status as current and valid and the required shift functions have been performed and authorize resumption of functions defined by Technical Specifications as follows:

    - Licensed Operator's qualifications are current
    - Licensed Operator's shift functions have been performed
    - Plant tour is complete

    AOM-Shift: ____________________________________ Date: ______________

14. The individual attempting to activate a license notifies the on-duty SM to:

    a. Notify Operations Training to reinstate the Licensed Operator qualifications to perform licensed duties in accordance with AD-OP-ALL-0660, Use and Administration of the Nuclear Learning Management System (NLMS).

    b. [CNS] Update LOQR active/inactive license status

    AOM-Shift/designee OR SM/designee: ______________ Date: ______________

<< Activation of New or Inactive License >>

15. NLMS Code:________________________________ NLMS Entry Completed

Name:_____________________________________ Date:_____________

a. NLMS Codes:

- [BNP] BN TRN LOI0006B ROO
- [CNS] RO: CNROLOQR-N
- [CNS] SRO: CNSRLOQR-N
- [HNP] HN-OPS-LOI0014H
- [MNS] MCO023
- [ONS] TT4691-N Licensed Operator - Operating Experience Maintenance
- [RNP] RN-OPS-LOC0001R-N

16. The following is retained in accordance with AD-DC-ALL-0002, Records Management.

- Completed copies of this attachment.
- Applicable site completed Plant Familiarization Tour table.
  - ◊ Any Plant Familiarization Tour table not used to complete this attachment can be discarded.
- Copies of the security logs for the time spent on shift for the individual attempting to activate a license and the operator responsible for oversight of the individual attempting to activate a license.
- Copies of the security records for all areas entered during the required plant familiarization tour for the operator attempting to activate a license and the operators conducting the tour.
- Copies of Operations narrative log while standing watch under instruction.

<< Activation of New or Inactive License >>

Table 3, Brunswick Reactivation Plant Familiarization Tour

Date	Area	Active Licensed SRO		Elapsed Time
		Printed Name	Signature	
	Unit 1 Reactor Building			
	Unit 2 Reactor Building			
	Turbine Building			
	DG 4 Day Tanks			
	DG Building			
	CB HVAC			
	Cable Spread			
	Service Water Building			
	Intake Structure			
	AOG			
	Radwaste			
	Transformer Yard			
	MWT - FP Area			
	Security CAS			
	Review of AO Turnover Sheets			
			Total Hours	________

<< Activation of New or Inactive License >>

Table 4, Catawba Reactivation Plant Familiarization Tour

Date	Area	Active Licensed SRO		Elapsed Time
		Printed Name	Signature	
	Aux Bldg Elevation 594			
	Aux Bldg Elevation 577			
	Aux Bldg Elevation 560			
	Aux Bldg Elevation 543			
	Aux Bldg Elevation 522			
	Unit 1 ETA/ETB Rooms			
	Unit 2 ETA/ETB Rooms			
	Unit 1 Cable Spreading Rm			
	Unit 2 Cable Spreading Rm			
	Unit 1 Spent Fuel Building			
	Unit 2 Spent Fuel Building			
	Unit 1 Vital Battery Area			
	Unit 2 Vital Battery Area			
	Unit 1 CA Pump Room			
	Unit 2 CA Pump Room			
	Unit 1 D/G Rooms			
	Unit 2 D/G Rooms			
	Unit 1 Turbine Operating Deck			
	Unit 2 Turbine Operating Deck			
	Unit 1 Turbine Mezz Level			
	Unit 2 Turbine Mezz Level			
	Unit 1 Turbine Basement			
	Unit 2 Turbine Basement			
	SSF			
	Unit 1 Exterior Doghouse			
	Unit 2 Exterior Doghouse			
	Unit 1 Interior Doghouse			
	Unit 2 Interior Doghouse			
	Review of AO Turnover Sheets			
			Total Hours	________

QA Record Retention Rule = 421734 (Life of Plant)

<< Activation of New or Inactive License >>

Table 5, Harris Reactivation Plant Familiarization Tour

Date	Area	Active Licensed SRO		Elapsed Time
		Printed Name	Signature	
	RAB (all levels)			
	Turbine Building			
	Diesel Generator Building			
	Waste Processing Building			
	Water Treatment Facility			
	Fuel Handling Building			
	Diesel Fuel Oil Storage Building			
	ESW Structure			
	ESW Screening Structure			
	Review of AO Turnover Sheets			
			Total Hours	____________

<< Activation of New or Inactive License >>

Table 6, McGuire Reactivation Plant Familiarization Tour

Date	Area	Active Licensed SRO		Elapsed Time
		Printed Name	Signature	
	Aux Bldg Elevation 767			
	Aux Bldg Elevation 750			
	Aux Bldg Elevation 733			
	Aux Bldg Elevation 716			
	Aux Bldg Elevation 695			
	Unit 1 ETA/ETB Rooms			
	Unit 2 ETA/ETB Rooms			
	Unit 1 Cable Spreading Rm			
	Unit 2 Cable Spreading Rm			
	Unit 1 Spent Fuel Building			
	Unit 2 Spent Fuel Building			
	Vital Battery Area			
	Unit 1 CA Pump Room			
	Unit 2 CA Pump Room			
	Unit 1 D/G Rooms			
	Unit 2 D/G Rooms			
	Unit 1 Turbine Operating Deck			
	Unit 2 Turbine Operating Deck			
	Unit 1 Turbine Mezz Level			
	Unit 2 Turbine Mezz Level			
	Unit 1 Turbine Basement			
	Unit 2 Turbine Basement			
	SSF			
	Unit 1 Exterior Doghouse			
	Unit 2 Exterior Doghouse			
	Unit 1 Interior Doghouse			
	Unit 2 Interior Doghouse			
	Review of AO Turnover Sheets			
			Total Hours	____________

QA Record Retention Rule = 421734 (Life of Plant)

<< Activation of New or Inactive License >>

Table 7, Oconee Reactivation Plant Familiarization Tour

Date	**Area**	**Active Licensed SRO**		**Elapsed Time**
		Printed Name	Signature	
	CT-4 Blockhouse			
	SSF			
	Turbine Building			
	Auxiliary Building			
	Unit 1 Equipment Room			
	Unit 1 Cable Room			
	Unit 2 Equipment Room			
	Unit 2 Cable Room			
	Unit 3 Equipment Room			
	Unit 3 Cable Room			
	Unit 1 Control Battery Room			
	Unit 2 Control Battery Room			
	Unit 3 Control Battery Room			
	Unit 1 and 2 Spent Fuel Building			
	Unit 3 Spent Fuel Building			
	Keowee Hydro			
	Review of AO Turnover Sheets			
			Total Hours	____________

<< Activation of New or Inactive License >>

Table 8, Robinson Reactivation Plant Familiarization Tour

- Plant tours shall include entry and visual surveillance of each room in the Turbine Building and RCA that is not specifically excluded below or in writing by the SM.
- Areas excluded from the plant familiarization tour:
  - ◊ Containment Vessel
  - ◊ RHR Pit
  - ◊ Office buildings that are not part of the watchstanders normal tour

Date	Area	Active Licensed SRO		Elapsed Time
		Printed Name	Signature	
	CR HVAC			
	4kV Room			
	E1/E2, Battery, Cable Spread Rooms			
	Building 469 - 1st and 2nd floor			
	AFW Pump Room			
	Turbine Building (all levels)			
	Security Building (CAS)			
	SFP Area			
	SFP Hx and Bit Room			
	Auxiliary Building (level 1 and 2)			
	Security Pap Diesel			
	Intake			
	Review of AO Turnover Sheets			
			Total Hours	____________

ATTACHMENT 3
Page 1 of 4

<< Change In Medical Condition Affecting License Status >>

Operator's Name:________________ Employee Number:__________ Date:_________

NOTE

- This form is to be completed when any change in medical condition affects the employee’s ability to perform licensed duties.
- Discovery date is the date and time the Licensed Operator has notified OH of a change in medical condition.
- AD-HU-ALL-0004, Procedure Use and Adherence, Section 5.6, provides guidance on how to appropriately placekeep when performing this attachment.

1. The following is completed by OH:

   a. Record discovery date and time: __________/ __________
   Date Time

   b. Ensure documentation is placed in Licensed Operator's medical file. (Return to work forms or Nurse's documentation).

   c. Identify status of condition (circle one): PERMANENT/TEMPORARY

   d. Notify CMD or SEP, if applicable.

      (1) CMD or SEP Name:________________________

   e. Ensure license duty eligibility is determined by qualified OH health personnel:

   _____ Ineligible

   _____ Eligible with the following temporary restrictions:

   ____

   ____

   _____ Eligible to perform licensed duties

   _____ Eligible with the following permanent restrictions

   ____

   ____

<< Change In Medical Condition Affecting License Status >>

Operator's Name:________________ Employee Number:__________ Date:_________

f. If the Licensed Operator is medically ineligible to perform licensed duties, then OH shall perform the following:

(1) Enter the Licensed Operator medical status change in the Duke Employee Medical Information (DEMI) system.

(a) If DEMI CANNOT be updated by the end of a shift after a Licensed Operator has been determined ineligible to perform licensed duty, then contact the on-duty SM to disqualify the Licensed Operator from licensed duties in accordance with AD-TQ-ALL-0660, Use and Administration of the Nuclear Learning Management System (NLMS).

SM name:____________________________

(2) Verify the Licensed Operator medical status change is reflected in NLMS.

2. OH notifies the affected Licensed Operator of the following:

a. The impact this change in medical status has on license duty eligibility.

(1) If ineligible to perform licensed duties, then provide direct and verbal notification to the Licensed Operator that licensed duties shall NOT be performed.

(a) If direct and verbal notification to the Licensed Operator CANNOT be established, then provide direct and verbal notification to the AOM-Shift that the Licensed Operator shall NOT perform licensed duties.

b. Comply with restrictions and conditions anytime the Licensed Operator performs license duties.

<< Change In Medical Condition Affecting License Status >>

Operator's Name:________________ Employee Number:__________ Date:_________

c. Actions required to address the medical condition may include, but are not limited to the following:

- Additional medical evaluation and treatment
- Obtaining appropriate medications
- Obtaining proper hearing enhancement devices
- Obtaining appropriate corrective lenses, including lenses for SCBA
- Obtaining therapeutic medical device

3. OH performs the following:

a. Contacts the on-duty SM.

(1) Name:________________________________ Date:__________

b. Informs the on-duty SM of the affected Licensed Operator's change in medical status and to notify the AOM-Shift and Licensed Operator's supervisor.

c. [CNS] Informs the on-duty SM to update the LOQR.

4. If the medical condition status is determined to be permanent, then ensure a NTM is generated, documenting that a change in medical status has occurred for the affected Licensed Operator:

a. Record NTM Number:_____________

(1) Include a NTM assignment for Regulatory Affairs to complete required regulatory correspondence.

b. Transmit notification to Regulatory Affairs as follows:

(1) Send email or fax copy of this attachment.

(2) Verify information received by a member of Regulatory Affairs:

(a) Name: _______________________________________

<< Change In Medical Condition Affecting License Status >>

Operator's Name:________________ Employee Number:__________ Date:_________

c. Ensure the following:

- NRC Form 396 is completed.
- Corporate Medical Director or Site Examining Physician notification letter are completed per AD-LS-ALL-0002, Regulatory Correspondence.
- Notification letter is delivered to Regulatory Affairs.

5. OH completes the following:

a. If permanent medical restrictions are being added, then notify Regulatory Affairs to generate correspondence and notify NRC Region II within 30 days of the date the license restriction was discovered.

b. If medical restrictions are being removed, then notify Regulatory Affairs to generate correspondence and notify NRC Region II within 30 days of the date of the medical change in condition.

c. Record NTM number:________________________

6. Place completed copies of this attachment in the Licensed Operator's medical file.

ATTACHMENT 4
Page 1 of 4

<< Notification Of Change In Operator Status >> {7.1.2}

NOTE

- Review NCR 01898054 {CAPR} before making any changes to this form.

Licensed Operator (name): ______________________________ will no longer perform the duties of a Licensed Senior/Reactor Operator effective as of the License Termination Date listed below.

Employee Number: __________________________

License Termination Date: ____________________

Describe Reason: (Transfer, termination)

____

____

____

____

NOTE

The signatures below indicate that the information stated above is correct.

____________________________________ ____________________
AOM-Shift/designee Signature Date

____________________________________ ____________________
Licensed Operator Signature Date

____________________________________ ____________________
Licensed Operator's Manager Signature Date

<< Notification Of Change In Operator Status >> {7.1.2}

NOTE

The notification of change in operator status must be received by the NRC within 30 days of the effective date per 10CFR50.74.

1. AOM-Shift to ensure the following:

   a. Generate an NTM for operator license termination.

   b. Ensure NTM includes the following:

      - License Termination Date
      - Direction to assign NTM ownership to Regulatory Affairs
      - Direction for Regulatory Affairs to generate all necessary corrective actions for license termination per Attachment 4, Notification Of Change In Operator Status {7.1.2}

   c. Notify Site Operations Training Group to commence actions to deactivate the affected operator's qualifications effective on the License Termination Date.

   d. Route this form to Regulatory Affairs.

______________________________	______________	______________
AOM-Shift/designee Signature	Date	NTM Number

2. Regulatory Affairs ensure the following:

   a. Generate License Termination letter.

   b. Assemble verification package.

      (1) A copy of the termination letter shall be distributed to the following individuals for verification of accuracy prior to sending the termination letter to the NRC:

         (a) Licensed Operator

         (b) Licensed Operator's manager

         (c) AOM-Shift

         (d) Operations Manager

<< Notification Of Change In Operator Status >> {7.1.2}

c. Create assignments within the associated license termination NTM as follows:

(1) For each NTM assignment:

- Enable the CAS Lock Due Date function with site Regulatory Affairs group as Due Date Owner.
- Due dates shall not exceed the License Termination Date except as provided.

(2) Create NTM assignments as follows:

- [CNS] Operations to update LOQR to disqualify the Licensed Operator
- Occupational Health staff to update operators file/record that license is terminated.
- Emergency Planning to update operator's EP file/record that license is terminated.
- Operations Training Group to deactivate the operator's qualifications on the License Termination Date (not earlier nor later than License Termination Date).
- Operations Training Group to file completed copy of Attachment 4, Notification Of Change In Operator Status {7.1.2} in operator's training file with Due Date not to exceed two weeks after License Termination Date.
- Other actions and assignments as desired

d. Ensure change in license status is reported to the Nuclear Regulatory Commission per 10CFR 50.74.

e. Route this form to AOM-Shift or deliver to on-duty SM/designee.

______________________________ ______________________

Regulatory Affairs Signature Date

<< Notification Of Change In Operator Status >> {7.1.2}

3. AOM-Shift or on-duty SM ensure the following:

- [CNS] Update LOQR
- Route this form to the Site Occupational Health staff.

AOM-Shift or SM Signature ____________________ Date ____________________

4. Occupational Health staff ensure the following:

- Update operator's records.
- Route this form to Emergency Planning

Occupational Health personnel signature ____________________ Date ____________________

5. Emergency Planning ensure the following:

- Update Emergency Planning Records.
- Route form to site Operations Training Group.

Emergency Planning Staff Signature ____________________ Date ____________________

6. Site Operations Training Group ensure the following:

- Deactivate the affected operator's qualifications as of the effective date of the license termination.
- Completed copies of this attachment shall be retained in accordance with AD-DC-ALL-0002, Records Management.

Operations Training Signature ____________________ Date ____________________

<< Common Medical Status Changes/Conditions of Licensed Operators >>

NOTE

- Complete details associated with Licensed Operator Medical Examinations is located in ADMP-SAF-HSF-00091, Occupational Health Programs.

1.0 COMMON MEDICAL CONDITIONS REQUIRING OCCUPATIONAL HEALTH AND SUPERVISION NOTIFICATION

- The inability to properly fit or effectively use personal protective equipment (PPE)
- Impairment of the sense of smell
- Loss of the capacity for clear speech
- Hearing becomes impaired
- Vision changes (e.g., visual acuity, peripheral vision, color vision or depth perception)
- Respiratory capacity becomes impaired
- Impairment of the operator's cardiovascular system (e.g., hypertension, myocardial infarction, coronary stent and coronary bypass)
- Development of any type of hernia
- Impairment of muscular-skeletal range of motion or power
- Inability of the skin to tolerate PPE or decontamination procedures
- Changes to the endocrine or metabolic systems, such as diabetes and thyroid disorders, such that the ability to change schedules is affected, or the individual could become incapacitated if meals are delayed
- Impairment of the ability to form blood such as anemia, leukemia, lymphoma and multiple sclerosis
- Impairment of lymphatic function
- Impairment neurological function
- Development of mental, emotional, or behavioral disorders

<< Common Medical Status Changes/Conditions of Licensed Operators >>

1.0 COMMON MEDICAL CONDITIONS REQUIRING OCCUPATIONAL HEALTH AND SUPERVISION NOTIFICATION (continued)

- Abnormal laboratory results
- Chronic fatigue
- Diagnosis of any cancer, including skin cancer
- Diagnosis of sleep apnea
- Use of therapeutic device such as CPAP
- Returning from hospitalizations due to heart attack and major surgery
- Elective surgery that may change or improve an individual's medical condition (e.g., lasik).

2.0 COMMON CHANGES IN MEDICAL STATUS – (NORMALLY REPORTED TO NRC)

- Hypertension/Blood Pressure medication
- Diabetes Mellitus
- Vision change - near/distant
- Myocardial infarction or coronary stents
- Syncopal episode
- Seizure
- Sleep Apnea
- Anxiety
- Depression
- Impaired Hearing Acuity, Hearing Aid
- All cancers including skin cancers
- Drug or alcohol issues

<< Common Medical Status Changes/Conditions of Licensed Operators >>

2.0 COMMON CHANGES IN MEDICAL STATUS – (NORMALLY REPORTED TO NRC) (continued)

- Thyroid medication
- Glaucoma
- Impaired Tactile Discrimination
- Chemotherapy
- Pulmonary Embolus or Deep Vein Thrombosis
- Attention Deficit Hyperactivity Disorder (ADHD)
- Multiple Myeloma
- Repair of leg aneurysm
- Sarcoidosis
- Hip or knee replacement (Reported as for information only, unless a permanent restriction is needed)
- Cholesterol medication (Reported as for information only)
- Sleep medications (Reported as for information only)
- Olfactory Deficit
- EpiPen
- Rheumatoid Arthritis
- Asthma (Frequent severe attacks within previous 2 years or need for prolonged or continued use of medication)

<< Common Medical Status Changes/Conditions of Licensed Operators >>

3.0 COMMON MEDICAL CONDITIONS REQUIRING NO SOLO OPERATION

- Insulin requiring diabetes mellitus
- Myocardial infarction
- Coronary stents (No Solo after initial stent insertion, case by case determination)
- Unexplained syncopal episodes
- Kidney transplant
- Narcolepsy
- Olfactory deficit
- Migraine Headache associated with syncope or potential incapacitation
- Treatment with Coumadin (warfarin) (case by case determination)

4.0 MEDICAL CONDITIONS REQUIRING RESTRICTIONS OF LICENSED OPERATORS

- Hypertension requiring medication
- Corrective lens
- Hearing Aid
- Sleep Apnea with CPAP treatment (Therapeutic Medical Device) must have documentation from personal physician stating compliance with machine.
- Myocardial Infarction (No Solo)
- Diabetes Mellitus requiring medication (Use of insulin is No Solo)
- Insulin Pump (Therapeutic Medical Device)
- Glaucoma requiring medication
- Unexplained syncopal episode (No Solo)
- Chemotherapy (Restriction or No Solo)
- Treatment with Coumadin (warfarin) (No Solo)

<< Common Medical Status Changes/Conditions of Licensed Operators >>

4.0 MEDICAL CONDITIONS REQUIRING RESTRICTIONS OF LICENSED OPERATORS (continued)

- Pulmonary Embolus or Deep Vein Thrombosis (case by case determination)
- Olfactory Deficit (No Solo)
- Seizure Disorder (Restriction or No Solo)
- Kidney Transplant (No Solo)
- Migraine Headache associated with syncope or potential incapacitation (No Solo)
- Impaired Tactile Discrimination (No Solo)
- Attention Deficit Disorder treatment with medication
- EpiPen (Case by case determination based on if the operator is at risk for a severe allergic reaction and carries it at all times)

ATTACHMENT 6
Page 1 of 2

<< Activation Of An SRO License For Fuel Handling/Core Alterations Only >>

Operator's Name: __________________ Employee Number: ___________ Date: ___________

1. Verify refueling training is up-to-date and completed successfully for the Refueling SRO/Reactor Building SRO position(s).

   ________________________________ ______________________
   AOM-Shift/designee Date

2. Verify the medical qualification is current for the assigned position(s).

   ________________________________ ______________________
   AOM-Shift/designee Date

3. Record the completion of at least one 12-hour (continuous time period) shift of parallel refueling operation, equipment familiarization, tours, procedure preparation for beginning of fuel movement and shift turnovers required for the assignment/return to active license duties for refueling only in the Refueling SRO/positions. During the 12-hour shift, the inactive SRO shall perform the duties related to fuel handling in parallel with an SRO assigned to the Refueling SRO position that holds an active license. No more than 6 hours can be credited for activities conducted prior to the actual start of fuel movement.

   Date of 12-hour shift Active SRO (initials)

   _____________________ ______

   _____________________ ______

4. I certify the above individual for assignment/return to active Refueling SRO duties for outage _________________ (e.g., 2CR22).

   ________________________________ ______________________
   SM Date

5. AOM-Shift files and retains this form for the duration of the core alteration for which the license was activated.

   ________________________________ ______________________
   AOM-Shift/designee Date

<< Activation Of An SRO License For Fuel Handling/Core Alterations Only >>

6. Completed copies of this attachment shall be retained in accordance with AD-DC-ALL-0002, Records Management.

_______________________________	_______________________
AOM-Shift/designee	Date

JPM A.2S

SRO

Catawba Nuclear Station
Admin. JPM A.2S
Sept 2021 NRC Exam

EVALUATION SHEET

Task: Use Flow Diagrams and Electrical Prints to Determine Work Isolation Boundary

Alternate Path: N/A

Facility JPM #: New

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 diagram of the CA system (CN 2592-01), 4.16 KV bus one line electrical drawings

Task Standard: Mechanical and electrical isolation boundary determined for work on 2A CA pump 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

==

COMMENTS

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Catawba Nuclear Station
Admin. JPM A.2S
Sept 2021 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 2A Auxiliary Feedwater (CA) Pump has been shutdown in accordance with OP/2/A/6250/002 (Auxliary Feedwater System) and is to be tagged out for pump casing disassembly and impeller replacement.**

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 2A Auxiliary Feedwater (CA) Pump, 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 CA flow diagrams (CN 2592-01), and 4.16 KV Switchgear one line diagrams (CN 2702-2.01, CN 2702-2.02).

STEP / STANDARD	SAT / UNSAT

START TIME: _______

STEP 1: Determine clearance boundary for the 2A CA Pump boundary. STANDARD: Applicant identifies clearance boundary per table on the next page. Note that only one vent valve or one drain valve plus drain valve 2CA-103 is needed to meet the critical step. **Examiner Note: This step is critical to be able to correctly isolate the 2A Auxiliary Feedwater (CA) Pump for pump casing disassembly and impeller replacement.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP / STANDARD	SAT / UNSAT

Component	Position
2ETA13	Racked Out
2CA-29	Closed
2CA-87	Closed
2CA-25	Closed
2CA-154 (Drain, Can be used)	Open
2CA-103 (Common Drain, Must be used)	Open
2CA-153 (Drain, Can be used)	Open
2CA-101 (Drain, Can be used)	Open
2CA-83 (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 2A Auxiliary Feedwater (CA) Pump has been shutdown in accordance with OP/2/A/6250/002 (Auxiliary Feedwater System) and is to be tagged out for pump casing disassembly and impeller replacement.**

INITIATING CUES:

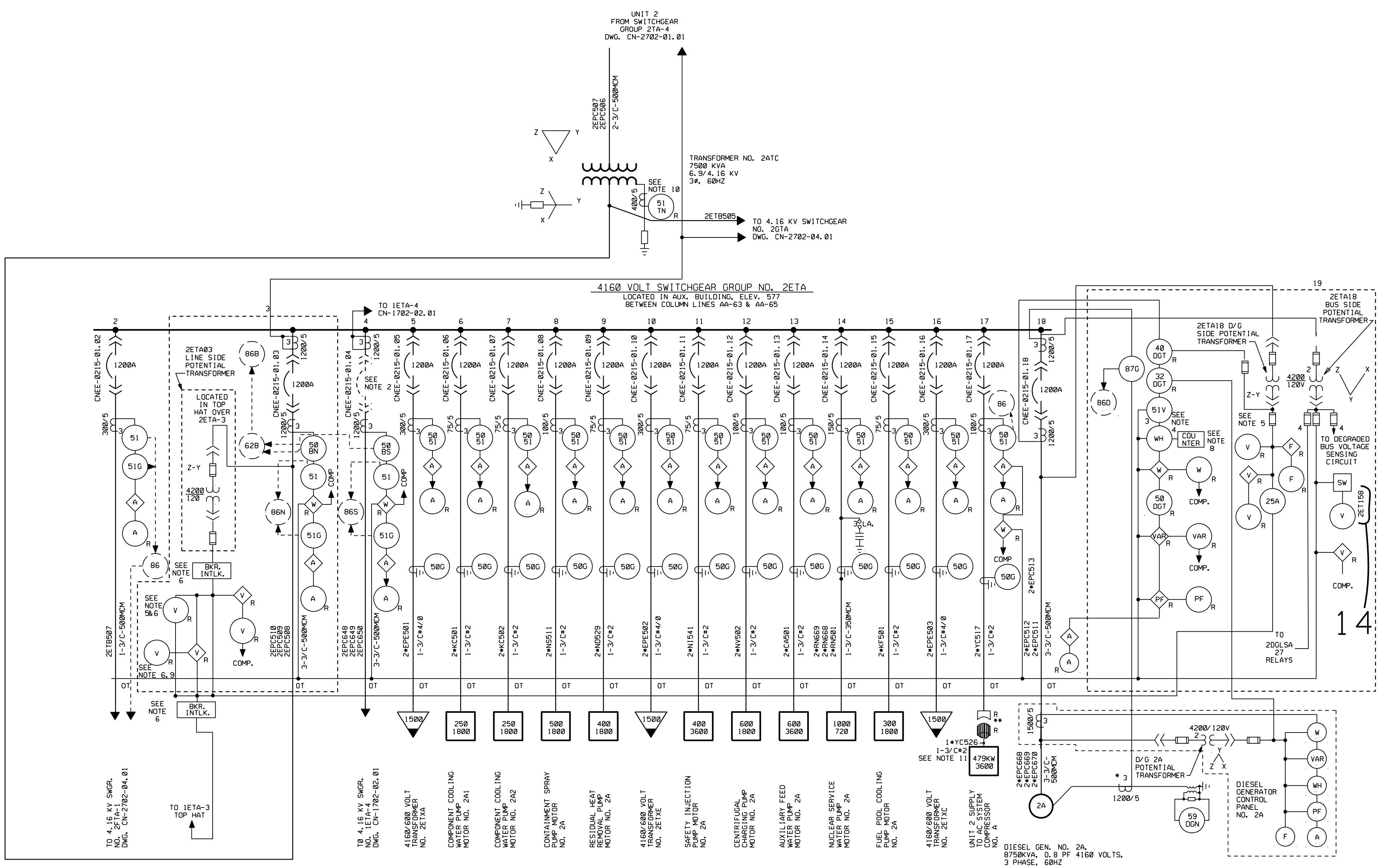
- **The SM has directed you to use the provided materials to determine the required boundary for isolation for this work.**
- **You are to use the valves closest to the work being performed for isolation to minimize drain and fill time.**
- **Identify components, including the required position, for creation of a Clearance for 2A Auxiliary Feedwater (CA) Pump, 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



NOTES:

1. CABLES ARE SIZED ON THE BASIS OF 5KV, 90C, 90 MILS OF EPR, INTERLOCKED ARMOR SHIELDED, 3 CONDUCTOR COPPER POWER CABLES WITH 0.7 DERATING FACTOR.
2. A BREAKER MAY BE FURNISHED IN 2ETA-4. A KIRK KEY INTERLOCK SCHEME IS PROVIDED WHICH PREVENTS A BREAKER BEING INSERTED ON THE BUS IN 2ETA-4. IF A BREAKER IS INSERTED ON THE BUS IN 2ETA-3,AND VICE-VERSA. THE SCHEME ALSO PREVENTS A BREAKER BEING INSERTED ON THE BUS IN 2ETA-4, IF A BREAKER IS INSERTED ON THE BUS IN 1ETA-4, AND VICE-VERSA. THIS SCHEME PREVENTS, TIEING TWO SOURCES TOGETHER AND TIEING TWO BUSES TO THE, SAME, SOURCE. THE BREAKER IN 2ETA-4 SHOULD BE KEPT IN THE DISCONNECT POSITION WHEN NOT BEING USED.
3. ALL WATT, VAR & VOLT TRANSDUCERS ARE REMOTE. ALL CURRENT TRANSDUCERS ARE LOCAL.
4. 51V RELAYS AND WATTHOUR METER SHOWN IN 2ETA-19 ARE LOCATED IN 2ETA-18.
5. DIRECT READING REMOTE VOLTMETER IS LOCATED IN DIESEL GENERATOR CONTROL PANEL.
6. THE POTENTIAL TRANSFORMER INPUT TO THESE VOLTMETERS ARE INTERLOCKED WITH THE INCOMING BREAKER LOCATION SUCH THAT, IF THE BREAKER IS IN UNIT 3, THE VOLTMETERS WILL REGISTER UNIT 3 INCOMING VOLTAGE, AND IF IN UNIT 4, THE VOLTMETERS WILL REGISTER UNIT 4 INCOMING VOLTAGE.
7. IF A FUTURE VERTICAL IS REQUIRED, IT WILL BE PLACED ADJACENT TO VERTICAL 19 AND THE SWITCHGEAR BUS WILL HAVE TO BE EXTENDED THROUGH VERTICAL 19.
8. DURANT COUNTER CONNECTED THROUGH COMP. CABINET ISOL. COUNTER LOCATED IN 1MC9.
9. REMOTE VOLTMETER LOCATED ON 2MC8.
10. THE 400/5 CURRENT TRANSFORMER WILL BE PLACED IN THE LOW VOLTAGE TERMINAL CHAMBER OF 2ATC AND THE 51TN RELAY IN THE 6.9KV SWGR. CUB. 2TA4
11. ELASTIMOLD CONNECTORS LOCATED IN 1TBOX0345(CN-1751-12.01).

ABBREVIATIONS:

OT - RUN POWER CABLE OUT TOP OF SWITCHGEAR.
R - REMOTE
* - FURNISHED BY DIESEL GENERATOR VENDOR
** - ELASTIMOLD CONNECTORS FURNISHED BY DUKE.
2DGLSA - UNIT 2 DIESEL GENERATOR LOAD SEQUENCER TRAIN A

TRAIN A - QA CONDITION 1

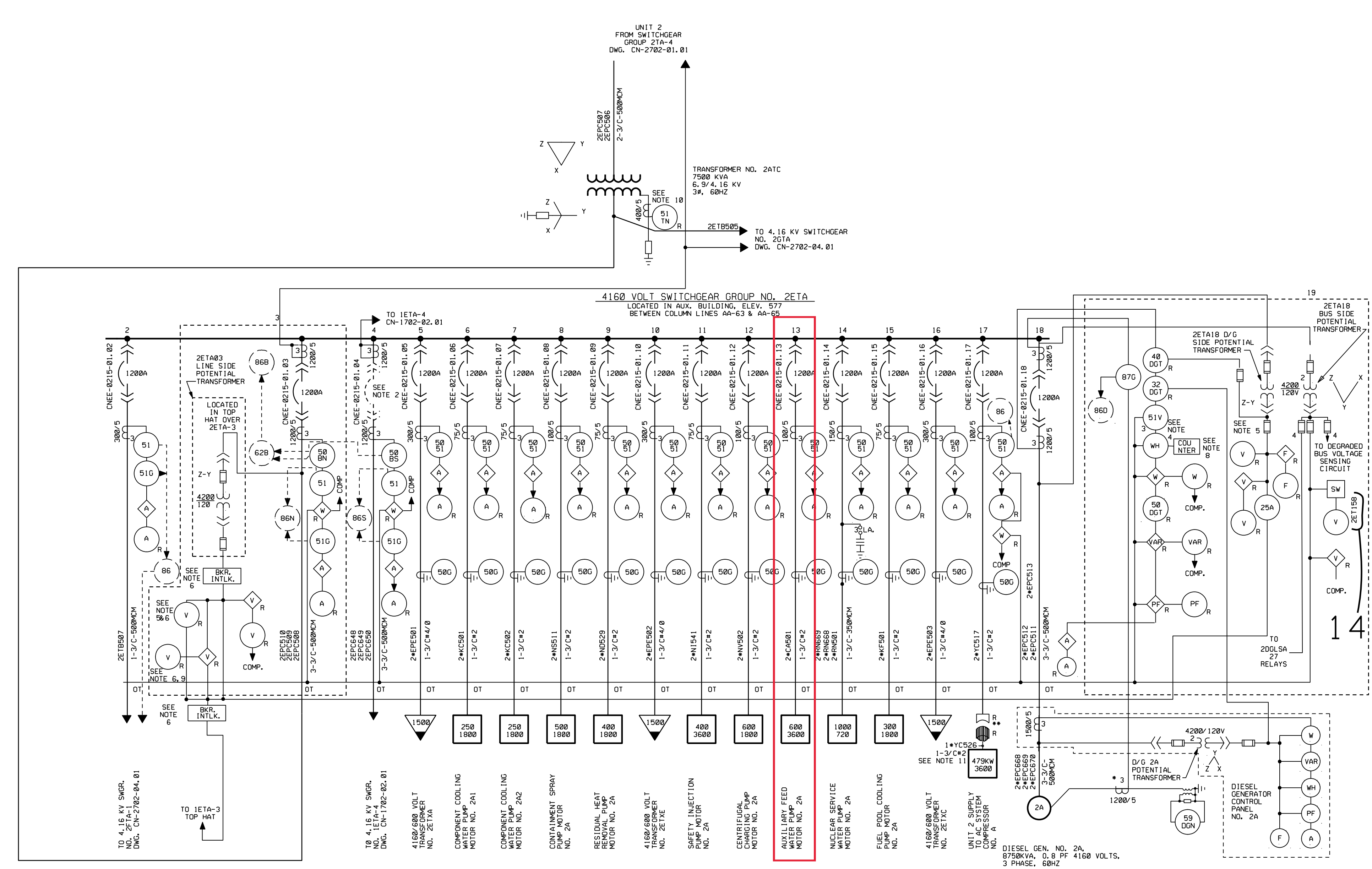
NO.	REVISIONS
14	REVISED PER EC 411851

DUKE ENERGY
CATAWBA NUCLEAR STATION UNIT 2

ONE LINE DIAGRAM
4160 VOLT ESSENTIAL AUXILIARY
POWER SYSTEM (EPC)
4160V SWITCHGEAR NO. 2ETA

SCALE N/A | DWG. NO. CN -2702-02.01 | REV. 14

ERN: CN000TW7



TRAIN A - QA CONDITION 1

NOTES:

1. CABLES ARE SIZED ON THE BASIS OF 5KV, 90C, 90 MILS OF EPR, INTERLOCKED ARMOR SHIELDED, 3 CONDUCTOR COPPER POWER CABLES WITH 0.7 DERATING FACTOR.
2. A BREAKER MAY BE FURNISHED IN 2ETA-4. A KIRK KEY INTERLOCK SCHEME IS PROVIDED WHICH PREVENTS A BREAKER BEING INSERTED ON THE BUS IN 2ETA-4. IF A BREAKER IS INSERTED ON THE BUS IN 2ETA-3, AND VICE-VERSA. THE SCHEME ALSO PREVENTS A BREAKER BEING INSERTED ON THE BUS IN 2ETA-4. IF A BREAKER IS INSERTED ON THE BUS IN 1ETA-4, AND VICE-VERSA. THIS SCHEME PREVENTS, TIEING TWO SOURCES TOGETHER AND TIEING TWO BUSES TO THE, SAME, SOURCE. THE BREAKER IN 2ETA-4 SHOULD BE KEPT IN THE DISCONNECT POSITION WHEN NOT BEING USED.
3. ALL WATT, VAR & VOLT TRANSDUCERS ARE REMOTE. ALL CURRENT TRANSDUCERS ARE LOCAL.
4. 51V RELAYS AND WATTHOUR METER SHOWN IN 2ETA-19 ARE LOCATED IN 2ETA-18.
5. DIRECT READING REMOTE VOLTMETER IS LOCATED IN DIESEL GENERATOR CONTROL PANEL.
6. THE POTENTIAL TRANSFORMER INPUT TO THESE VOLTMETERS ARE INTERLOCKED WITH THE INCOMING BREAKER LOCATION SUCH THAT, IF THE BREAKER IS IN UNIT 3, THE VOLTMETERS WILL REGISTER UNIT 3 INCOMING VOLTAGE, AND IF IN UNIT 4, THE VOLTMETERS WILL REGISTER UNIT 4 INCOMING VOLTAGE.
7. IF A FUTURE VERTICAL IS REQUIRED, IT WILL BE PLACED ADJACENT TO VERTICAL 19 AND THE SWITCHGEAR BUS WILL HAVE TO BE EXTENDED THROUGH VERTICAL 19.
8. DURANT COUNTER CONNECTED THROUGH COMP. CABINET ISOL. COUNTER LOCATED IN 1MC9.
9. REMOTE VOLTMETER LOCATED ON 2MC8.
10. THE 400/5 CURRENT TRANSFORMER WILL BE PLACED IN THE LOW VOLTAGE TERMINAL CHAMBER OF 2ATC AND THE 51TN RELAY IN THE 6.9KV SWGR. CUB. 2TA4
11. ELASTIMOLD CONNECTORS LOCATED IN ITBOX0345(CN-1751-12.01).

ABBREVIATIONS:

OT - RUN POWER CABLE OUT TOP OF SWITCHGEAR.
R - REMOTE
* - FURNISHED BY DIESEL GENERATOR VENDOR
** - ELASTIMOLD CONNECTORS FURNISHED BY DUKE.
2DGLSA - UNIT 2 DIESEL GENERATOR LOAD SEQUENCER TRAIN A

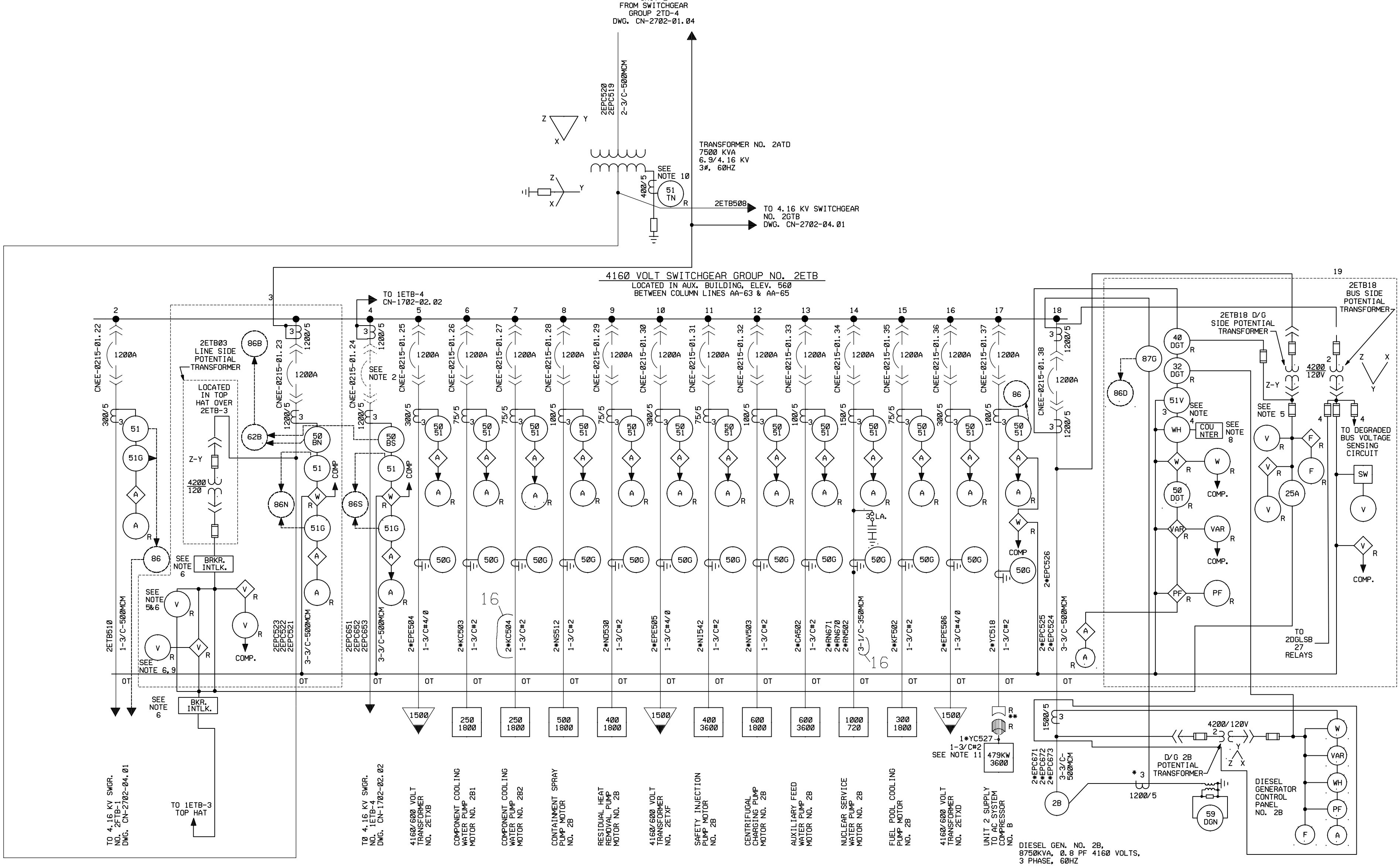
NO.	REVISIONS
14	REVISED PER EC 411851

DUKE ENERGY
CATAWBA NUCLEAR STATION UNIT 2

ONE LINE DIAGRAM
4160 VOLT ESSENTIAL AUXILIARY
POWER SYSTEM (EPC)
4160V SWITCHGEAR NO. 2ETA

SCALE N/A | DWG. NO. CN -2702-02.01 | REV. 14

ERN: CN000TW7



NOTES:

1. CABLES ARE SIZED ON THE BASIS OF 5KV, 90C, 90 MILS OF EPR, INTERLOCKED ARMOR SHIELDED, 3 CONDUCTOR COPPER POWER CABLES WITH 0.7 DERATING FACTOR.
2. A BREAKER MAY BE FURNISHED IN 2ETB-4. A KIRK KEY INTERLOCK SCHEME IS PROVIDED WHICH PREVENTS A BREAKER BEING INSERTED ON THE BUS IN 2ETB-4, IF A BREAKER IS INSERTED ON THE BUS IN 2ETB-3 AND VICE-VERSA. THE SCHEME ALSO PREVENTS A BREAKER BEING INSERTED ON THE BUS IN 2ETB-4, IF A BREAKER IS INSERTED ON THE BUS IN 1ETB-4 AND VICE-VERSA. THIS SCHEME PREVENTS TIEING TWO SOURCES TOGETHER AND TIEING TWO BUSES TO THE SAME SOURCE. THE BREAKER IN 2ETB-4 SHOULD BE KEPT IN THE DISCONNECT POSITION WHEN NOT BEING USED.
3. ALL WATT, VAR & VOLT TRANSDUCERS ARE REMOTE. ALL CURRENT TRANSDUCERS ARE LOCAL.
4. 51V RELAYS AND WATTHOUR METER SHOWN IN 2ETB-19 ARE LOCATED IN 2ETB-18.
5. DIRECT READING REMOTE VOLTMETER IS LOCATED IN DIESEL GENERATOR CONTROL PANEL.
6. THE POTENTIAL TRANSFORMER INPUT TO THESE INSTRUMENTS ARE INTERLOCKED WITH THE INCOMING BREAKER LOCATION SUCH THAT, IF THE BREAKER IS IN UNIT 3, THE VOLTMETERS WILL REGISTER UNIT 3 INCOMING VOLTAGE, AND IF IN UNIT 4, THE VOLTMETERS WILL REGISTER UNIT 4 INCOMING VOLTAGE.
7. IF A FUTURE VERTICAL IS REQUIRED, IT WILL BE PLACED ADJACENT TO VERTICAL 19 AND THE SWITCHGEAR BUS WILL HAVE TO BE EXTENDED THROUGH VERTICAL 19.
8. DURANT COUNTER CONNECTED THROUGH COMP. CABINET ISOL. COUNTER LOCATED IN 1MC9.
9. REMOTE VOLTMETER LOCATED ON 2MC8.
10. THE 400/5 CURRENT TRANSFORMER WILL BE PLACED IN THE LOW VOLTAGE TERMINAL CHAMBER OF 2ATD AND THE 51TN RELAY IN THE 6.9KV SWGR. CUB. 2TD4
11. ELASTIMOLD CONNECTORS LOCATED IN 1TBOX0346 (CN-1751-12.01).

ABBREVIATIONS:

OT - RUN POWER CABLE OUT TOP OF SWITCHGEAR.
R - REMOTE
* - FURNISHED BY DIESEL GENERATOR VENDOR
** - ELASTIMOLD CONNECTORS IN 1TBOX0346 FURNISHED BY DUKE.
2DGLSB - UNIT 2 DIESEL GENERATOR LOAD SEQUENCER TRAIN B

TRAIN B - Q.A. CONDITION 1

DUKE ENERGY
CATAWBA NUCLEAR STATION UNIT 2

ONE LINE DIAGRAM
4160 VOLT ESSENTIAL AUXILIARY POWER SYSTEM (EPC)
4160V SWITCHGEAR NO. 2ETB

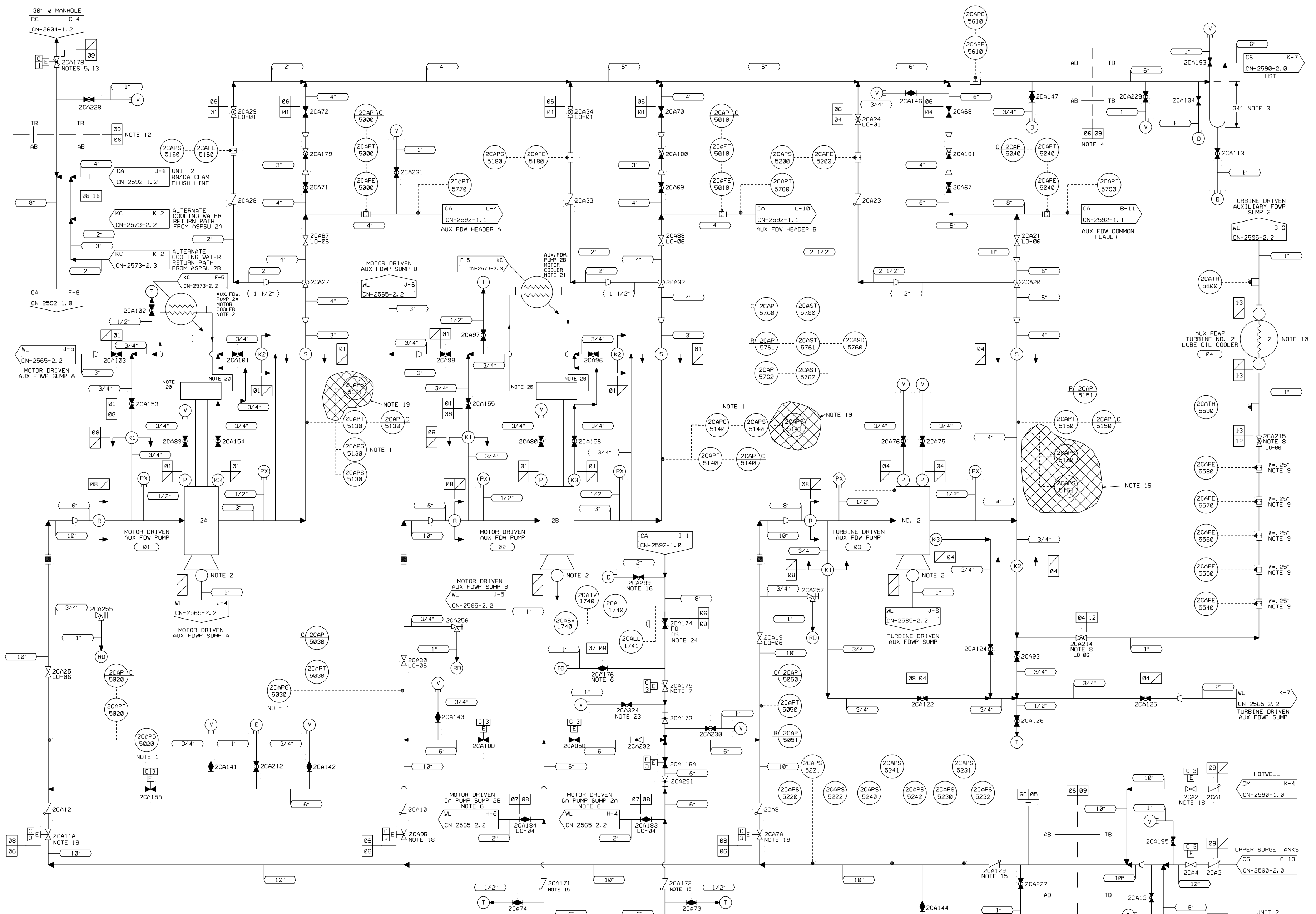
NO.	REVISIONS	DRN	DATE	CHKD	DATE	APPR	DATE
16	REV PER C-09-04497, EXEMPT CODE G.5	NSW	8-19-10	TLC	8-20-10	GNK	8-23-10
ORIG.	ORIGINAL DRAWING RETIRED	NSW	8-19-10				

INSPECTED: CIVIL WAIVED — ELEC. -W- — MECH. WAIVED

DESIGNER HERRINGTON DATE 8-15-77 INSP. WAIVED DATE 8-15-77
DRAWN RA RAMSEY DATE 7-29-77 INSP. WAIVED DATE 8-15-77
CHECKED HW BOOZER DATE 8-15-77 APPR. CE KNEEBURG DATE 8-17-77

DWG. NO. CN-2702-02.02 REV. 16

ERN:CN000TW8



NOTES:

1. LOCATE PRESSURE INDICATORS TO BE VISIBLE FROM TOP OF PUMP PIT
2. BASE DRAIN
3. TOP OF SEAL LOOP MUST BE 34 FT BELOW UST DOME CONNECTION
4. CLASS F PIPE FROM LAST SUPPORT IN TRENCH BEFORE AUX BLDG PENETRATION
5. LOCATE VALVE 2CA178 AT CONNECTION TO RC SYSTEM. PIPE IN TB TO BE EMBEDDED IN TB BASEMENT FLOOR, VALVE AND RC SYSTEM CONNECTION TO BE PROTECTED BY CONCRETE ENCLOSURE.
6. TEST DRAIN USED FOR FUNCTIONAL TEST OF CHECK VALVE. DISCHARGE TO BE VISIBLE TO VERIFY FLOW
7. POWERED FROM SSF 220/125VDC SYSTEM.
8. KEROTEST VALVES ARE UNACCEPTABLE FOR THIS APPLICATION
9. 2CAFE 5540, 5550, 5560, 5570, 5580 CONSIST OF MACHINED SOCKET WELD PIPE COUPLINGS INSTALLED IN SERIES WITH APPROXIMATELY 8" - 10" SPACING.
10. LUBE OIL (SHELL SIDE) OF HEAT EXCHANGER IS CONNECTED WITH AUX FDW PUMP TURBINE LUBE OIL SYSTEM WHICH IS NOT SHOWN ON ANY FLOW DIAGRAM. CONSULT AUX FDW TURBINE INSTRUCTION MANUAL FOR DETAILS.
11.
12. PIPING IS CLASS F IN TURBINE BLDG. TRENCH.
13. POWERED FROM SSF AC NORMAL AUXILIARY POWER SYSTEM.
14. NO PIPING SHOWN ON THIS FLOW DIAGRAM REQUIRES INSULATION.
15. CHECK VALVE INTERNALS REMOVED.
16. PURPOSE OF THIS VALVE, TO BE LOCATED OUTSIDE CA TURBINE CONTROL PANEL ROOM, IS TO BACKFILL RC/CA LINE WITH RC CHEMISTRY WATER AFTER CLAM FLUSH.
17. FUTURE CONNECTION FOR NSM CN-20525/00
18. MOTOR OPERATOR BREAKER TO BE DISCONNECTED WITH VALVE FULLY OPEN.
19. ABANDONED IN PLACE PER NSM CN-21371/00.
20. VENDOR SUPPLIED PIPING. PROCESS FLUID IS NOT IN THESE LINES.
21. COOLERS SHOW FOR INFORMATION ONLY. REFERENCE KC SYSTEM FLOW DIAGRAMS FOR SPECIFIC INFORMATION.
22. 2CA6 IS CLOSED WITH MOTOR OPERATOR POWER REMOVED (BKR 2MXW F05B OPEN) PER EC 106582 TO PREVENT POSSIBLE VORTEXING IN THE CACST. 2CA6 CAN BE OPEN IN MODES 3 AND 4 DURING PERIODS OF LOW DECAY HEAT (DEFINED AS AFTER REFUELING) WITH BOTH CACSTS ALIGNED AT FULL VOLUME TO THE OUTAGE UNIT (REF. EC 411218). 32
23. 2CA324 SUPPORTS FILLING BETWEEN 2CA174 AND 2CA173 WITH CONDENSATE GRADE WATER. (REF. EC 110084)
24. 2CA174 WILL NOT FAIL OPEN (FOR AT LEAST 60 MINUTES) ON A VI SYSTEM FAILURE UPSTREAM OF 2CACK1740 WHEN 2CASV1740 IS ENERGIZED (REF. CN-2499-CA.16-00 AND EC 110084).

DESIGN PARAMETERS

LINE LISTING	PIPE SPEC	PRESSURE	TEMPERATURE	CLASS	MATERIAL
01	2500.3	1800 PSIA	160°F	C	CS
04	2500.3	2000 PSIA	160°F	C	CS
06	150.4	165 PSIA	160°F	F	CS
07	150.4	50 PSIA	160°F	G	CS
08	150.3	165 PSIA	160°F	C	CS
09	150.4	165 PSIA	160°F	G	CS
12	2501.3	2000 PSIA	160°F	C	SS
13	151.3	165 PSIA	160°F	C	SS
16	151.4	165 PSIA	160°F	F	SS

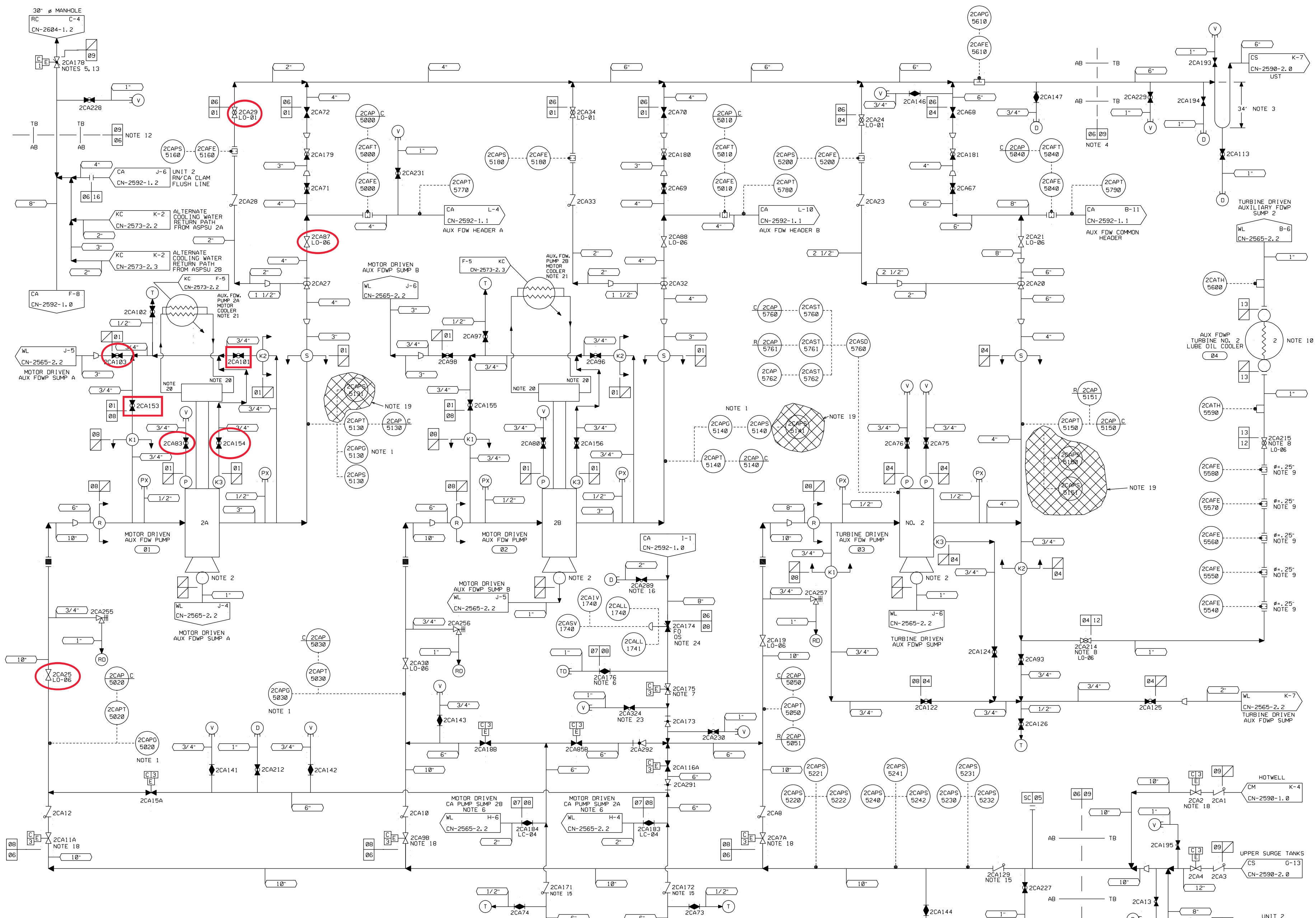
QA CONDITION 4
QA CONDITION 1

DUKE ENERGY
CATAWBA NUCLEAR STATION UNIT 2
FLOW DIAGRAM OF AUXILIARY FEEDWATER SYSTEM (CA)

NO.	REVISIONS
32	REV PER EC 411218

SCALE N/A DWG. NO. CN-2592-01.00 REV. 32

ERN: CN000THN



NOTES:

1. LOCATE PRESSURE INDICATORS TO BE VISIBLE FROM TOP OF PUMP PIT
2. BASE DRAIN
3. TOP OF SEAL LOOP MUST BE 34 FT BELOW UST DOME CONNECTION
4. CLASS F PIPE FROM LAST SUPPORT IN TRENCH BEFORE AUX BLDG PENETRATION
5. LOCATE VALVE 2CA178 AT CONNECTION TO RC SYSTEM. PIPE IN TB TO BE EMBEDDED IN TB BASEMENT FLOOR, VALVE AND RC SYSTEM CONNECTION TO BE PROTECTED BY CONCRETE ENCLOSURE.
6. TEST DRAIN USED FOR FUNCTIONAL TEST OF CHECK VALVE. DISCHARGE TO BE VISIBLE TO VERIFY FLOW
7. POWERED FROM SSF 220/125VDC SYSTEM.
8. KEROTEST VALVES ARE UNACCEPTABLE FOR THIS APPLICATION
9. 2CAFE 5540, 5550, 5560, 5570, 5580 CONSIST OF MACHINED SOCKET WELD PIPE COUPLINGS INSTALLED IN SERIES WITH APPROXIMATELY 8" - 10" SPACING.
10. LUBE OIL (SHELL SIDE) OF HEAT EXCHANGER IS CONNECTED WITH AUX FDW PUMP TURBINE LUBE OIL SYSTEM WHICH IS NOT SHOWN ON ANY FLOW DIAGRAM. CONSULT AUX FDW TURBINE INSTRUCTION MANUAL FOR DETAILS.
11.
12. PIPING IS CLASS F IN TURBINE BLDG. TRENCH.
13. POWERED FROM SSF AC NORMAL AUXILIARY POWER SYSTEM.
14. NO PIPING SHOWN ON THIS FLOW DIAGRAM REQUIRES INSULATION.
15. CHECK VALVE INTERNALS REMOVED.
16. PURPOSE OF THIS VALVE, TO BE LOCATED OUTSIDE CA TURBINE CONTROL PANEL ROOM, IS TO BACKFILL RC/CA LINE WITH RC CHEMISTRY WATER AFTER CLAM FLUSH.
17. FUTURE CONNECTION FOR NSM CN-20525/00
18. MOTOR OPERATOR BREAKER TO BE DISCONNECTED WITH VALVE FULLY OPEN.
19. ABANDONED IN PLACE PER NSM CN-21371/00.
20. VENDOR SUPPLIED PIPING. PROCESS FLUID IS NOT IN THESE LINES.
21. COOLERS SHOW FOR INFORMATION ONLY. REFERENCE KC SYSTEM FLOW DIAGRAMS FOR SPECIFIC INFORMATION.
22. 2CA6 IS CLOSED WITH MOTOR OPERATOR POWER REMOVED (BKR 2MXW F05B OPEN) PER EC 106582 TO PREVENT POSSIBLE VORTEXING IN THE CACST. 2CA6 CAN BE OPEN IN MODES 3 AND 4 DURING PERIODS OF LOW DECAY HEAT (DEFINED AS AFTER REFUELING) WITH BOTH CACSTS ALIGNED AT FULL VOLUME TO THE OUTAGE UNIT (REF. EC 411218).
23. 2CA324 SUPPORTS FILLING BETWEEN 2CA174 AND 2CA173 WITH CONDENSATE GRADE WATER. (REF. EC 110084)
24. 2CA174 WILL NOT FAIL OPEN (FOR AT LEAST 60 MINUTES) ON A VI SYSTEM FAILURE UPSTREAM OF 2CACK1740 WHEN 2CASV1740 IS ENERGIZED (REF. CN-2499-CA.16-00 AND EC 110084).

32

DESIGN PARAMETERS

LINE LISTING	PIPE SPEC	PRESSURE	TEMPERATURE	CLASS	MATERIAL
01	2500.3	1800 PSIA	160°F	C	CS
04	2500.3	2000 PSIA	160°F	C	CS
06	150.4	165 PSIA	160°F	F	CS
07	150.4	50 PSIA	160°F	G	CS
08	150.3	165 PSIA	160°F	C	CS
09	150.4	165 PSIA	160°F	G	CS
12	2501.3	2000 PSIA	160°F	C	SS
13	151.3	165 PSIA	160°F	C	SS
16	151.4	165 PSIA	160°F	F	SS

ABANDONED COMPONENTS RELATED

QA CONDITION 4
QA CONDITION 1

DUKE ENERGY
CATAWBA NUCLEAR STATION UNIT 2
FLOW DIAGRAM OF
AUXILIARY FEEDWATER SYSTEM
(CA)

NO.	REVISIONS
32	REV PER EC 411218

SCALE N/A DWG. NO. CN-2592-01.00 REV. 32

ERN: CN000THN

JPM A.3S

SRO

Catawba Nuclear Station
Admin. JPM A.3S
Sept 2021 NRC Exam

EVALUATION SHEET

Task: Review Liquid Waste Release

Alternate Path: N/A

Facility JPM #: WL-002

Safety Function: N/A

K/A G 2.3.6 Ability to approve release permits

Importance: 2.0 / 3.8 **CFR:** 41.10 / 45.12 / 45.13

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator ______ Classroom __X__ Perform __X__ Simulate ______

References: OP/0/B/6500/113 (Operations Liquid Waste Release), Enclosure 4.1 (Liquid Waste Release from a Monitor Tank)

Task Standard: The operator will determine that the LWR (Package # 2021056) should not be released due to all of the following: incorrect EMF-49 Trip 2 setpoint, incorrect RL Flow Interlock setpoint, and incorrect 1WL-124 flowrate setpoint.

Validation Time: 20 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.3S
Sept 2021 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% power.
- There are currently no liquid waste releases in progress.
- The following equipment is in service:
  - 1A & 1B RC Pumps
  - 0RLP5080 (RL Discharge Total Flow) is operable and indicating 46,400 gpm through A & B RL Discharge Headers
  - 1B RN Pump in normal alignment
  - LWR Integrator (0WLP6160) is operable
- LWR #2021056 has been delivered to the Control Room and was approved by the previous shift's CRS.
  - OP/0/B/6500/113 (Operations Liquid Waste Release), Enclosure 4.1 (Liquid Waste Release from a Monitor Tank) is in progress and has been completed through step 3.14
- The Unit 1 BOP has notified you (per step 3.15) that the LWR is ready to be released.

INITIATING CUE:

Review LWR #2021056 to determine if the release should be initiated. If applicable, list **all** issues that would prevent release initiation.

Initiate Release **YES** **NO**
circle one

Reason(s) (if any)

____

____

____

Catawba Nuclear Station
Admin. JPM A.3S
Sept 2021 NRC Exam

EXAMINER NOTE:

After reading cue, provide applicant with a copy of OP/0/B/6500/113, Enclosure 4.1, completed through step 3.14 and Student Handout (LWR #2021056).

START TIME: _________

Examiner Note: The operator may review steps performed in Enclosure 4.1. Applicable procedure direction begins at step 3.4. STEP 1: 3.4 CRS performs the following concerning the LWR Permit Report: ☐ Verifies LWR Permit Report refers to correct EMF. ☐ Verifies EMF setpoints correct. ☐ Signs and dates the LWR Permit Report authorizing the release. STANDARD: Operator reviews the LWR permit report and determines that the correct EMF is listed, EMF setpoints are correct, and that the authorization was properly completed. COMMENTS:	Sat __ Unsat __

STEP 2: 3.5 **IF** EMF-49 is functional, perform the following: 3.5.1 Verify EMF-49 (Low Range) is functional per SLC 16.11-2, Table 16.11-2-1 using OP/0/A/6500/080 (EMF Output Modules). 3.5.2 Sign off the "EMF Source Checked & Operable" blank on the LWR Permit Report. STANDARD: Operator reviews the LWR Permit Report and determines that EMF-49 has been source checked and signed off. COMMENTS:	Sat __ Unsat __

STEP 3: 3.5.3 Set EMF-49 (Low Range) trip setpoints to the values listed in "SETPOINT DATA" section on the LWR Permit Report using OP/0/A/6500/080 (EMF Output Modules). 3.5.4 Sign off the "EMF49L Setpoints Set (Low Range)" blank on the LWR Permit Report. STANDARD: Operator reviews the LWR Permit Report and determines that the EMF-49 Trip 2 setpoint has not been set to the value listed. The operator will then determine that the release should not be initiated and list EMF-49 setpoint as one reason why. **Examiner Note: This step is critical to determine that this release should not be initiated.** COMMENTS:	**CRITICAL STEP** Sat __ Unsat __

NOTE: The person performing Steps 3.5.5 and 3.5.6 shall **NOT** be the same as in Step 3.5.4. STEP 4: 3.5.5 Verify the EMF-49 (Low Range) trip setpoints are set as specified in "SETPOINT DATA" section on the LWR Permit Report using OP/0/A/6500/080 (EMF Output Modules). 3.5.6 Sign off the "(I.V.) Independent Verification" blank on the LWR Permit Report. STANDARD: Operator notes that EMF-49 Trip 2 setpoint has not been properly verified and moves on. COMMENTS:	Sat __ Unsat __

NOTE: Monitoring for highest count rate during release using a digital EMF chart recorder does **NOT** require an initial setup. STEP 5: 3.5.7 **IF** using the OAC to obtain the highest count rate during release, monitor OAC point C1E0263 (EMF49L Waste Liquid Discharge). STANDARD: Operator notes this step for future use and moves on. COMMENTS:	Sat __ Unsat __

STEP 6: 3.6 **IF** EMF-49 is nonfunctional, perform the following: STANDARD: Operator determines that this step is not applicable. COMMENTS:	Sat __ Unsat __

STEP 7: 3.7 Complete the following steps on the LWR Permit Report documenting the RN and RL Systems status: 3.7.1 Ensure at least the number of RN and RL pumps assigned to the LWR (listed on page 2 of LWR Permit) are operating. 3.7.2 Sign off the "Ensure number of RN Pumps Operating is at least #.##" blank on the LWR Permit Report where #.## is the number of RN Pumps listed on page 2 of LWR Permit.	Sat __ Unsat __

3.7.3 Sign off the "Ensure number of RL Pumps Operating is at least #.##" blank on the LWR Permit Report where #.## is the number of RL Pumps listed on page 2 of LWR Permit. STANDARD: Operator determines that the proper number of RN and RL pumps are operating and properly documented. COMMENTS:	

STEP 8: 3.8 **IF** 0RLP5080 (RL Discharge Total Flow) is operable, perform the following: 3.8.1 Enter the RL flow rate on the LWR Permit Report as read on 0RLP5080 (RL Discharge Total Flow) (located on 1MC9). 3.8.2 Sign off the "RL Flowrate _______ gpm" blank on the LWR Permit Report. STANDARD: Operator determines that RL flowrate is properly recorded. COMMENTS:	Sat __ Unsat __

<table>
<tr><td>

NOTE: If RL flow drops below this setpoint, it will automatically close 1WL-124 (Waste Monit Tnk Pmps Disch) and terminate the release.

STEP 9:

3.8.3 Set the flow interlock on 0RLP5080 (RL Discharge Total Flow) to the value specified in the "SPECIAL INSTRUCTIONS FOR RELEASE" section of the LWR Permit Report.

3.8.4 Record the RL Flow interlock setpoint on the LWR Permit Report.

3.8.5 Circle the RL header or headers used for this release.

3.8.6 Sign off the "RL Flow Interlock Set @ _______ gpm for Appropriate Headers (A and/or B)" blank on the LWR Permit Report

STANDARD:

Operator determines the RL Flow Interlock has been set for the incorrect value. The operator will determine that this is an additional reason for which the release should not be initiated.

Examiner Note: This step is critical to determine that this release should not be initiated.

COMMENTS:

</td><td>

CRITICAL STEP

Sat __

Unsat __

</td></tr>
</table>

STEP 10: 3.9 **IF** 0RLP5080 (RL Discharge Total Flow) is inoperable, perform the following: STANDARD: Operator determines that this step is not applicable. COMMENTS:	Sat __ Unsat __

STEP 11: 3.10 **IF** the LWR Integrator (Liquid Rad Waste Disch, 0WLP6160) is operable, perform the following: 3.10.1 Reset the LWR Integrator (located on 1MC11). 3.10.2 Sign off the "Reset LWR Integrator" blank on the LWR Permit Report. STANDARD: Operator determines the LWR Integrator has been reset. COMMENTS:	Sat __ Unsat __

STEP 12: 3.11 **IF** the LWR Integrator (Liquid Rad Waste Disch, 0WLP6160) is inoperable, perform the following: STANDARD: Operator determines that this step is not applicable. COMMENTS:	Sat __ Unsat __

STEP 13: 3.12 Set 1WL-124 (Waste Monit Tnk Pmps Disch) (located on 1MC11) to the "Recommended Release Rate (gpm)" specified on the LWR Permit Report. 3.13 Enter the "Recommended Release Rate (gpm)" specified on the LWR Permit Report.	**CRITICAL STEP**
STANDARD: Operator determines the 1WL-124 has NOT been set to the recommended release rate. The operator will determine that this is an additional reason for which the release should not be initiated. **Examiner Note: This step is critical to determine that this release should not be initiated.** COMMENTS:	Sat __ Unsat __

END 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% power.
- There are currently no liquid waste releases in progress.
- The following equipment is in service:
  - 1A & 1B RC Pumps
  - 0RLP5080 (RL Discharge Total Flow) is operable and indicating 46,400 gpm through A & B RL Discharge Headers
  - 1B RN Pump in normal alignment
  - LWR Integrator (0WLP6160) is operable
- LWR #2021056 has been delivered to the Control Room and was approved by the previous shift's CRS.
  - OP/0/B/6500/113 (Operations Liquid Waste Release), Enclosure 4.1 (Liquid Waste Release form a Monitor Tank) is in progress and has been completed through step 3.14
- The Unit 1 BOP has notified you (per step 3.15) that the LWR is ready to be released.

INITIATING CUE:

Review LWR #2021056 to determine if the release should be initiated. If applicable, list **all** issues that would prevent release initiation.

Initiate Release **YES** **NO**
circle one

Reason(s) (if any)

____

____

____

Duke Energy Catawba Nuclear Station **Operations Liquid Waste Release** **Continuous Use**	Procedure No. OP/**0**/B/6500/113 Revision No. 010 Electronic Reference No. CP0095WS

Operations Liquid Waste Release

1. Purpose

To aid the operator in the correct methods of performing steps in Radwaste procedure OP/0/B/6500/015 (Discharging a Monitor Tank to the Environment) and Radiation Protection procedure HP/0/B/1004/004 (Radioactive Liquid Waste Release). Also to aid the operator as to limits and results expected while these procedures are being performed.

2. Limits and Precautions

2.1 Ensure that RN is discharging through at least one RL header.

2.2 Ensure that RN is **NOT** discharging to SNSWP.

2.3 If the pre-set radiation levels are exceeded on EMF-49 or the dilution flow rate drops below the setpoint for 0RLP5080 (RL Discharge Total Flow), 1WL-124 (Waste Monit Tnk Pmps Disch) will trip closed.

2.4 Releases that are interrupted by EMF-49 "HI-RAD" trips may be initiated up to a maximum of three times, including original initiation, without re-sampling per HP/0/B/1004/004 (Radioactive Liquid Waste Release).

2.5 Turbine Building Sump releases are secured if the pre-set levels are exceeded on 1/2EMF-31.

3. Procedure

Refer to Section 4 (Enclosures)

4. Enclosures

4.1 Liquid Waste Release from a Monitor Tank

4.2 Discharging a Contaminated Turbine Building Sump to Holdup Pond

1. Limits and Precautions

1.1 Ensure that RN is discharging through at least one RL header.

1.2 Ensure that RN is **NOT** discharging to SNSWP.

1.3 If the pre-set radiation levels are exceeded on EMF-49 or the dilution flow rate drops below the setpoint for 0RLP5080 (RL Discharge Total Flow), 1WL-124 (Waste Monit Tnk Pmps Disch) will trip closed.

1.4 Releases that are interrupted by EMF-49 "HI-RAD" trips may be initiated up to a maximum of three times, including original initiation, without re-sampling per HP/0/B/1004/004 (Radioactive Liquid Waste Release).

2. Initial Conditions

CC___ 2.1 Verify Radwaste has initiated OP/0/B/6500/015 (Discharging a Monitor Tank to the Environment).

CC___ 2.2 Verify LWR (Liquid Waste Release) Permit Report has been delivered to the CRS.

3. Procedure

_____ 3.1 **IF AT ANY TIME** within 60 seconds after initiating the release with EMF-49 functional, 1RAD-1, F/4 "EMF-49 LIQUID WASTE DISCH LOSS OF FLOW" alarm **CANNOT** be cleared, the release shall be secured and EMF-49 declared nonfunctional.

_____ 3.2 **IF AT ANY TIME** during a release, a Site Assembly occurs, secure release and have Radwaste ensure the following valves are locked closed:

- 1WL-949 (RMT Outlet To Waste Monitor Tank Disch Radiation Monitor EMF-49)
- 1WL-113 (Waste Monitor Tank A Pump Disch To Radiation Monitor 1EMF-49)
- 1WL-187 (Waste Monitor Tank B Pump Disch To Radiation Monitor)

_____ 3.3 **<u>IF AT ANY TIME</u>** during this release the OAC is out of service, initiate a 15 minute increased surveillance per OMP 2-31 (Control Room Instrumentation Status) to verify:

☐ 3.3.1 The following RN valves remain OPEN:

- 1RN-57A (Station RN Disch To RL Sys)
- 1RN-843B (Station RN Disch To RL Sys)
- 1RN-54A (Station RN Disch Hdr X-Over)
- 1RN-53B (Station RN Discharge Hdr X-Over)
- 1RN-1A (RN P/H Pit A Isol From Lake)
- 1RN-2B (RN P/H Pit A Isol From Lake)
- 1RN-5A (RN P/H Pit B Isol From Lake)
- 1RN-6B (RN P/H Pit B Isol From Lake)

☐ 3.3.2 The following valves remain CLOSED:

- 1RN-3A (RN P/H Pit A Isol From SNSWP)
- 1RN-4B (RN P/H Pit B Isol From SNSWP)
- 1RN-63A (RN Hdr A Return To SNSWP)
- 1RN-58B (RN Hdr B Return To SNSWP)

_____ 3.3.3 **<u>IF</u>** any of the above RN Valve(s) are found out of position, secure the release immediately.

NOTE:
1. The following steps are to be completed, the information is to be entered and the appropriate steps (designated by "0") signed off on the LWR Permit Report.
2. Verifying EMF setpoints correct requires:
   - Verification that Trip 1 is higher than background
   - Verification that Trip 2 is higher than Trip 1
3. Steps 3.4 - 3.16 provide instructions for completing the "COMPLETE PRIOR TO RELEASE" section of the LWR Permit Report.

BB___ (CRS) 3.4 CRS performs the following concerning the LWR Permit Report:

☒ Verifies LWR Permit Report refers to correct EMF.

☒ Verifies EMF setpoints correct.

☒ Signs and dates the LWR Permit Report authorizing the release.

CC 3.5 **IF** EMF-49 is functional, perform the following:

CC 3.5.1 Verify EMF-49 (Low Range) is functional per SLC 16.11-2, Table 16.11-2-1 using OP/0/A/6500/080 (EMF Output Modules).

CC 3.5.2 Sign off the "EMF Source Checked & Operable" blank on the LWR Permit Report.

CC 3.5.3 Set EMF-49 (Low Range) trip setpoints to the values listed in "SETPOINT DATA" section on the LWR Permit Report using OP/0/A/6500/080 (EMF Output Modules).

CC 3.5.4 Sign off the "EMF49L Setpoints Set (Low Range)" blank on the LWR Permit Report.

NOTE:	The person performing Steps 3.5.5 and 3.5.6 shall **NOT** be the same as in Step 3.5.4.

DD 3.5.5 Verify the EMF-49 (Low Range) trip setpoints are set as specified in "SETPOINT DATA" section on the LWR Permit Report using OP/0/A/6500/080 (EMF Output Modules).

DD 3.5.6 Sign off the "(I.V.) Independent Verification" blank on the LWR Permit Report.

NOTE:	Monitoring for highest count rate during release using a digital EMF chart recorder does **NOT** require an initial setup.

CC 3.5.7 **IF** using the OAC to obtain the highest count rate during release, monitor OAC point C1E0263 (EMF49L Waste Liquid Discharge).

N/A CC 3.6 **IF** EMF-49 is nonfunctional, perform the following:

_____ 3.6.1 Notify Radiation Protection to take action per HP/0/B/1004/004 (Radioactive Liquid Waste Release).
Person notified ____

_____ 3.6.2 N/A the following steps on the LWR Permit Report:

- "EMF Source Checked"
- "EMF49L Setpoints Set (Low Range)"
- "(I.V.) Independent Verification"

3.7 Complete the following steps on the LWR Permit Report documenting the RN and RL Systems status:

CC 3.7.1 Ensure at least the number of RN and RL pumps assigned to the LWR (listed on page 2 of LWR Permit) are operating.

CC 3.7.2 Sign off the "Ensure number of RN Pumps Operating is at least #.##" blank on the LWR Permit Report where #.## is the number of RN Pumps listed on page 2 of LWR Permit.

CC 3.7.3 Sign off the "Ensure number of RL Pumps Operating is at least #.##" blank on the LWR Permit Report where #.## is the number of RL Pumps listed on page 2 of LWR Permit.

CC 3.8 **IF** 0RLP5080 (RL Discharge Total Flow) is operable, perform the following:

CC 3.8.1 Enter the RL flow rate on the LWR Permit Report as read on 0RLP5080 (RL Discharge Total Flow) (located on 1MC9).

CC 3.8.2 Sign off the "RL Flowrate _______ gpm" blank on the LWR Permit Report.

NOTE:	If RL flow drops below this setpoint, it will automatically close 1WL-124 (Waste Monit Tnk Pmps Disch) and terminate the release.

CC 3.8.3 Set the flow interlock on 0RLP5080 (RL Discharge Total Flow) to the value specified in the "SPECIAL INSTRUCTIONS FOR RELEASE" section of the LWR Permit Report.

CC 3.8.4 Record the RL Flow interlock setpoint on the LWR Permit Report.

CC 3.8.5 Circle the RL header or headers used for this release.

CC 3.8.6 Sign off the "RL Flow Interlock Set @ _______ gpm for Appropriate Headers (A and/or B)" blank on the LWR Permit Report.

N/A CC 3.9 **IF** 0RLP5080 (RL Discharge Total Flow) is inoperable, perform the following:

_____ 3.9.1 Estimate the flow rate every 4 hours per PT/0/A/4250/011 (RL Temperature and Discharge Flow Determination).

_____ 3.9.2 Record estimated flow rate on the LWR Permit Report and attach copies of all enclosures used to the LWR Permit Report.

_____ 3.9.3 Sign off the "RL Flowrate _______ gpm" blank on the LWR Permit Report.

CAUTION:	Setting the RL flow interlock at "0" overrides the interlock on 1WL-124 (Waste Monit Tnk Pmps Disch). RL flow rate shall be closely monitored and the release stopped if the flow drops below the RL Flow interlock Setting specified on the "SPECIAL INSTRUCTIONS FOR RELEASE" Section of the LWR Permit Report.

_____ 3.9.4 Set the RL flow interlock on "0".

_____ 3.9.5 Record the RL Flow interlock setpoint on the LWR Permit Report.

_____ 3.9.6 Note on the LWR Permit Report that the RL Flow interlock is inoperable.

_____ 3.9.7 Circle the RL header or headers used for this release.

_____ 3.9.8 Sign the "RL Flow Interlock Set @ _______ gpm for Appropriate Headers (A and/or B)" blank on the LWR Permit Report.

CC 3.10 **IF** the LWR Integrator (Liquid Rad Waste Disch, 0WLP6160) is operable, perform the following:

CC 3.10.1 Reset the LWR Integrator (located on 1MC11).

CC 3.10.2 Sign off the "Reset LWR Integrator" blank on the LWR Permit Report.

N/A CC 3.11 **IF** the LWR Integrator (Liquid Rad Waste Disch, 0WLP6160) is inoperable, perform the following:

_____ 3.11.1 Notify Radwaste that Alternate Flow Instruments, Data and Data Sheets per OP/0/B/6500/015 (Discharging a Monitor Tank to the Environment) must be used to determine volume released.
Person notified ____

_____ 3.11.2 N/A the "Reset LWR Integrator" blank on the LWR Permit Report.

CC 3.12 Set 1WL-124 (Waste Monit Tnk Pmps Disch) (located on 1MC11) to the "Recommended Release Rate (gpm)" specified on the LWR Permit Report.

CC 3.13 Enter the "Recommended Release Rate (gpm)" specified on the LWR Permit Report.

CC 3.14 Sign off the "1WL124 Flow Set @ _____ gpm" blank on the LWR Permit Report.

_____ 3.15 Notify the CRS that LWR is ready to be released.

_____ 3.16 **<u>IF AT ANY TIME</u>** an automatic closure on low RL flow **<u>OR</u>** high radiation level occurs, complete the following to reopen 1WL-124 (Waste Monit Tnk Pmps Disch):

_____ 3.16.1 Reset 1WL-124 (Waste Monit Tnk Pmps Disch) to "0".

_____ 3.16.2 Set 1WL-124 (Waste Monit Tnk Pmps Disch) (located on 1MC11) to the "Recommended Release Rate (gpm)" specified on the LWR Permit Report.

NOTE:	The Liquid Waste Release is now ready to be initiated per OP/0/B/6500/015 (Discharging a Monitor Tank to the Environment). Subsequent steps in this procedure are to be completed after the release is terminated.

_____ 3.17 Close 1WL-124 (Waste Monit Tnk Pmps Disch).

NOTE:	The LWR integrator reading shall be recorded prior to flushing.

_____ 3.18 **<u>IF</u>** the LWR Integrator (Liquid Rad Waste Disch, 0WLP6160) is operable, perform the following:

_____ 3.18.1 Record the volume released on the LWR Permit Report.
Volume released = Integrator reading X 10.

_____ 3.18.2 Sign off the "Volume Released ______ gal" blank on the LWR Permit Report.

_____ 3.18.3 Reset the LWR Integrator.

_____ 3.18.4 Sign off the "Reset LWR Integrator" blank on the LWR Permit Report.

_____ 3.19 **<u>IF</u>** the LWR Integrator (Liquid Rad Waste Disch, 0WLP6160) is inoperable, perform the following:

_____ 3.19.1 Record the volume released as calculated from Alternate Flow Instruments, Data and Data Sheets per OP/0/B/6500/015 (Discharging a Monitor Tank to the Environment).

_____ 3.19.2 Sign off the "Volume Released ________ gal" blank on the LWR Permit Report.

_____ 3.19.3 N/A the "Reset LWR Integrator" blank on the LWR Permit Report.

_____ 3.20 **IF** EMF-49 was functional during the release, perform the following:

_____ 3.20.1 Record the EMF reading after flushing on the LWR Permit Report.

_____ 3.20.2 Sign off the "EMF Reading after Flush ________ cpm" blank on the LWR Permit Report.

3.20.3 Reset the EMF-49 (low range) setpoints as follows:

3.20.3.1 Calculate EMF-49 setpoints as follows:

_____ A. Record the un-rounded setpoint values:

- Trip 2 = 3 x (EMF Reading after Flush) = ________
- Trip 1 = Trip 2 x .70 = ________

NOTE:	The EMF setpoints are rounded to 3 significant digits (using standard mathematical rounding) before entry on EMF. For example 2342 cpm = 2.34E+03 and 1635 cpm = 1.64E+03.

_____ B. Round the setpoints calculated in Step 3.20.3.1A to 3 significant digits in scientific notation:

- Trip 2 = _______ cpm
- Trip 1 = _______ cpm

_____ 3.20.3.2 Set EMF-49 (low range) Trip 1 and Trip 2 setpoints to the values determined in Step 3.20.3.1B per OP/0/A/6500/080 (EMF Output Modules).

_____ 3.20.3.3 Enter Trip 1 and Trip 2 setpoints on the LWR Permit Report.

_____ 3.20.4 Sign off the "Reset EMF49L Setpoints
EMF Reading (cpm) after Flush"
____________ cpm X 3 = _________ (Trip2)
Trip 2 X .70 = ___________(Trip 1)" blank on the LWR Permit Report.

3.20.5 Record the highest EMF-49 reading during the release on the LWR Permit Report from one of the following:

☐ 3.20.5.1 Highest reading from OAC point C1E0263.

OR

3.20.5.2 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.

_____ 3.20.6 Sign off the "Highest EMF Reading During Release:_______ cpm" blank on the LWR Permit Report.

NOTE:	The person performing Step 3.20.7 shall **NOT** be the same individual who originally performed the associated actions in Steps 3.20.3.1 and 3.20.3.2.

_____ 3.20.7 Independently verify trip setpoints are reset as described in Steps 3.20.3.1 and 3.20.3.2 using OP/0/A/6500/080 (EMF Output Modules).
IV

_____ 3.21 **IF** EMF-49 was nonfunctional during the release, N/A the following steps on the LWR Permit Report:

- "EMF Reading after Flush _______ cpm"
- "Reset EMF49L Setpoints
  EMF Reading (cpm) after Flush
  ____________ cpm X 3 = _________ (trip 2)
  Trip 2 X .70 = ___________(trip 1)"
- "Highest EMF Reading During Release:_______ cpm"

_____ 3.22 Set the RL flow interlock to "0".

_____ 3.23 Sign off the "RL Flow Interlock Set @ ZERO (0)".

_____ 3.24 Verify all blanks on the LWR Permit Report are properly filled out and signed or N/A'd as appropriate.

_____ 3.25 Sign and date the "COMPLETION OF RELEASE ACKNOWLEDGED:" "OPS SRO" blank on the LWR Permit Report.
SRO

_____ 3.26 Place the completed LWR Permit Report in the completed release box.

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

LIQUID WASTE RELEASE PERMIT REPORT

LWR Number: 2021056

```
=== RL/RN PUMP DATA ==================================================
RL pumps assigned to release................................... 1.00
RN pumps assigned to release................................... 1.00
Minimum RL flow interlock setpoint for radionuclides (gpm)..... 2.76E+04

=== RECOMMENDED RELEASE RATE =========================================
Allowable release rate (gpm)................................... 3.73E+02
Recommended release rate (gpm)................................. 1.00E+02
Release rate margin (%)........................................ 272.74

=== SETPOINT DATA ====================================================
EMF49L  in Service .............................................    Yes
EMF49L  Background (cpm)....................................... 3.91E+02

Cs-137 Equivalence (uCi/ml).................................... 2.11E-06
Expected CPM................................................... 1.13E+03
50 % of Expected CPM........................................... 5.64E+02
Trip 1 setpoint (cpm).......................................... 2.43E+04
Trip 2 setpoint (cpm).......................................... 3.24E+04

=== SPECIAL INSTRUCTIONS FOR RELEASE =================================
* RL flow interlock must be greater than or equal to 2.76E+04 gpm *
0 EMF 49 FUNCTIONAL
```

Performed by: [signature] Date: Today

Verified by: [signature] Date: Today

LWR Number: 2021056
Release ID: 2 Waste Monitor Tank "B"
Release Mode: 2 Batch

CRS AUTHORIZING RELEASE Control Room Supervisor DATE/TIME Today / 0500

COMPLETE PRIOR TO RELEASE:

(O) CC EMF49L Source Checked & Operable

(O) CC EMF49L Setpoints Set (Low Range)
TRIP 1 2.43 e4 cpm TRIP 2 2.43 e6 cpm

(O) DD (I.V.) Independent Verification

(O) CC Ensure number of RL Pumps Operating is at least 1.00

(O) CC Ensure number of RN Pumps Operating is at least 1.00

(O) CC RL Flowrate 46,400 gpm

(O) CC RL Flowrate Interlock set @ 2.760 gpm For Appropriate Headers (A, B, or A&B)

(O) CC Reset LWR Integrator

(O) CC 1WL124 Flowrate set @ 1000 gpm

(O)_____Date/Time Release Started
______/______

(O)_____0WLP6160 channel check

______/______
(OPS Contact)

(O)_____Date/Time Release Secured
______/______

(O)_____Date/Time First Restart
______/______

(O)_____Date/Time Second Restart
______/______

COMPLETE FOLLOWING RELEASE:

(O)_____Date/Time First Trip
______/______

(O)_____Date/Time Second Trip
______/______

(O)_____Date/Time Release Secured
______/______

(O)_____Tank Level ______%

(O)_____Flush per Procedure

(O)_____Flush secured

(O)_____EMF Reading after Flush:
______cpm

(O)_____Volume Released ______gal

(O)_____Reset LWR Integrator

(O)_____Reset EMF49L Setpoints

EMF Reading (cpm)After Flush:

______cpm X 3 =______cpm (Trip2)

Trip 2 X 0.7 =______cpm (Trip1)

(O)_____Highest EMF Reading During Release:______cpm

(O)_____RL Flowrate Interlock Set @ Zero (0)

COMPLETION OF RELEASE ACKNOWLEDGED:

CRS ____________ DATE/TIME______/______

RP SHIFT REVIEW____________ DATE/TIME______/______

Ensure all signoffs are legible. Print name where indicated on next page.

JPM A.4S

SRO

Catawba Nuclear Station
Admin. JPM A.4S
Sept 2021 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: AD-EP-ALL-0101 (Emergency Classification)
CSD-EP-CNS-0101-02 (EAL Wallcharts)
AD-EP-ALL-0304 (State and County Notifications)

Task Standard: Using AD-EP-ALL-0101 (Emergency Classification) CSD-EP-CNS-0101-02 (EAL Wallcharts), applicant classifies the event as an Alert (SA1.1) in $\leq$ 15 minutes, and then completes the Emergency Notification Form in $\leq$ 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.4S
Sept 2021 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 seismic event has been felt within the protected area.**
- **The following events have occurred:**
    - **Annunciator 1AD-4, B/8 OBE EXCEEDED is received in the control room.**
    - **A Loss of Offsite Power (LOOP) occurs on Unit 2.**
    - **2B D/G fails to start.**
    - **The rounds AO reports the 1A NI (Safety Injection) Pump discharge piping is cracked with water leaking out at 125 drops per minute.**

INITIATING CUES:

- **You are the Emergency Coordinator.**
- **Classify this event per AD-EP-ALL-0101 (Emergency Classification).**
- **Emergency Coordinator Judgment is NOT to be used when making this classification.**
- **Fill out the Emergency Notification Form per AD-EP-ALL-0304 (State and County Notifications).**
- **This JPM is time critical.**

EXAMINER NOTE:

After reading cue, provide applicant with a copy of AD-EP-ALL-0101 (Emergency Classification) CSD-EP-CNS-0101-02 (EAL Wallcharts) and AD-EP-ALL-0304 (State and County Notifications)

STEP / STANDARD	SAT / UNSAT

START TIME: _______

STEP / STANDARD	SAT / UNSAT
Time Critical 1 Start: ____________ STEP 1: Classify the Event: Unit 2 is in an Alert (SA1.1) due to the loss of all but one AC power source 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 Unusual Event (HU2.1) due to the OBE exceeded alarm being received in the control room. Alert (SA9.1) is not applicable because only one train of a required SAFETY SYSTEM needed for the current operating mode is affected. Since Unit 2 is in a higher classification than Unit 1, the emergency classification for the site will be an Alert (SA1.1). STANDARD: Applicant determines from CSD-EP-CNS-0101-02 (EAL Wallcharts), that Catawba is in an Alert SA1.1. **Time Critical 1 Finish:** ____________ **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 ≤ 15 minutes.** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

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 $\leq$ 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 seismic event has been felt within the protected area.**
- **The following events have occurred:**
  - **Annunciator 1AD-4, B/8 OBE EXCEEDED is received in the control room.**
  - **A Loss of Offsite Power (LOOP) occurs on Unit 2.**
  - **2B D/G fails to start.**
  - **The rounds AO reports the 1A NI (Safety Injection) Pump discharge piping is cracked with water leaking out at 125 drops per minute.**

INITIATING CUES:

- **You are the Emergency Coordinator.**
- **Classify this event per AD-EP-ALL-0101 (Emergency Classification).**
- **Emergency Coordinator Judgment is NOT to be used when making this classification.**
- **Fill out the Emergency Notification Form per AD-EP-ALL-0304 (State and County Notifications).**
- **This JPM is time critical.**

Declared EAL: _______________

Declaration Time: ______________

Items marked with a * indicate critical tasks

JPM A.4 KEY

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

MESSAGE # 1 **Confirmation Phone #:** SIM:(803) 831-3807 **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 # SA1.1 * **Declaration Date**: ___/___/___ **Time:** ________

Termination Date: ___/___/___ **Time:** ________(mark "N/A" for EAL # & Description)

EAL DESCRIPTION: Loss of all but one AC power source to essential buses for 15 minutes or longer.

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)
______________________________ 9-1-803/329-1110
(date) (time)

2. ______________________________ Mecklenburg County WP/EOC
(name) 9-704/336-2441 (WP)
______________________________ 9-704/432-4120 (EOC)
(date) (time)

3. ______________________________ Gaston County WP/EOC
(name)
______________________________ 9-704/866-3300
(date) (time)

4. ______________________________ North Carolina EOC/WP
(name) 9-1-919/733-3300 (Primary)
______________________________ 9-1-800/858-0368 (Alt.)
(date) (time)

5. ______________________________ North Carolina Alt. WP
(name) 9-1-828/466-5500
______________________________ 9-1-828/466-5501
(date) (time)

6. ______________________________ North Carolina Alt. EOC
(name) 9-1-919/733-3300 (Primary)
______________________________ 9-1-800-858-0368 (Alt.)
(date) (time)

7. ______________________________ South Carolina WP
(name) 9-1-803/737-8500 (Primary)
______________________________ 9-1-800/811-8045 (Alt.)
(date) (time)

8. ______________________________ South Carolina Alt. WP
(name)
______________________________ 9-1-803/896-9621
(date) (time)

9. ______________________________ South Carolina EOC
(name) 9-1-803/737-8500 (Primary)
______________________________ 9-1-803-737-8724 (Alt.)
(date) (time)

Information Use

NUCLEAR OPERATING FLEET

ADMINISTRATIVE PROCEDURE

AD-EP-ALL-0101

EMERGENCY CLASSIFICATION

REVISION 2

Effective Dates:

07/29/2020	07/29/2020	07/29/2020	07/29/2020	07/29/2020
Brunswick	Catawba	Harris (HNP)	McGuire	Oconee
07/29/2020	07/29/2020			
Robinson	NGO			

REVISION SUMMARY
PRR 2196707 **DESCRIPTION**

- Section 4.1 Step 1: Changed 'Evaluating, classifying and declaring' to 'Evaluates, classifies and declares' to align with AD-DC-ALL-0202.
- Section 4.1 Step 2: New responsibility, 'Enters AD-EP-ALL-0111, Control Room Activation of the ERO'. PRR 2305765
- Section 4.2: Added '(TSC)'.
- Section 4.2 Step 1: Changed 'Evaluating, classifying and declaring' to 'Evaluates, classifies and declares' to align with AD-DC-ALL-0202.
- Section 4.2 Step 2: New responsibility, 'Enters AD-EP-ALL-0105, Activation and Operation of the Technical Support Center'.
- Section 5.1 Step 1 Old CAUTION: Deleted CAUTION.
- Section 5.1 Step 1 NOTE: Moved information from old CAUTION to NOTE. Added second bullet, 'The primary tool for determining the Emergency Classification Level (ECL) is the Emergency Classification Wallchart' (PRR 2229095).
- Section 5.1 Old Steps 1 through 3: Relocated to new Attachment 1, EAL Wallchart Guidance. PRR 2196707
- Section 5.1 Step 1: New step, 'The Emergency Classification Wallchart user may (but is not required to) consult the EAL Technical Basis Document in order to obtain additional information concerning the Initial Conditions (ICs) and EALs under classification consideration.' PRR 2229095
- Section 5.1 Step 2: New step, 'Determine emergency classification per EAL Wallchart.' PRR 2196707
- Section 5.1 Step 2.a: New step, 'If needed, then refer to Attachment 1, EAL Wallchart Guidance.' PRR 2196707
- Section 5.1 Step 3.c Bullet: Changed '[time]' to '[current time]'. PRR 2295310
- Section 5.1 Old Steps 6 through 8: Deleted Old Step 6 and relocated Old Steps 7 and 8 to new Attachment 1, EAL Wallchart Guidance. PRR 2196707
- Section 6.0 Old Step 1: Deleted 'All checklists, logs and forms completed as the result of implementing this procedure shall be collected at the end of the event and provided to the Site Emergency Preparedness Manager'; renumbered remaining step.
- Section 7.2 Old Steps 2, 3, 5, 6, 7, and 8: Deleted [BNP] 0PEP-02.1, [BNP] 0PEP-02.2.1 **(PRR 2280927)**, [RNP] Emergency Action Level Matrix1, [RNP] Emergency Action Level Matrix2, [RNP] Emergency Action Level Matrix3, and [RNP] EPCLA-04 **(PRR 2303130)**; renumbered remaining references.
- Section 7.3 Old Miscellaneous Documents 2 through 8: Deleted [HNP EP-EAL **(PRR 2310065)**, [CNS] EP-EAL-EALMATRIX **(PRR 2304471)**, [ONS] EP-EAL-EALMATRIX **(PRR 2305242)**, [MNS] EP - EAL-WALLCHART, [CNS] EPA D **(PRR 2304471)**, [ONS] EPA SECTION D **(PRR 2305242)**, and [HNP] FAD-HNP-EP-EPEAL MATRIX **(PRR 2310065)**.
- Section 7.3 Miscellaneous Document 2 through Section 7.3 Miscellaneous Document 13, Section 7.3 Miscellaneous Document 16: Added [BNP] CSD-EP-BNP-0101-01, [BNP] CSD-EP-BNP-0101-02 **(PRR 2280927)**, [CNS] CSD-EP-CNS-0101-01, [CNS] CSD-EP-CNS-0101-02 **(PRR 2304471)**, [HNP] CSD-EP-HNP-0101-01, [HNP] CSD-EP-HNP-0101-02 **(PRR 2310065)**, [MNS] CSD-EP-MNS-0101-01, [MNS] CSD-EP-MNS-0101-02 **(PRR 2298233)**, [ONS] CSD-EP-ONS-0101-01, [ONS] CSD-EP-ONS-0101-02 **(PRR 2305242)**, [RNP] CSD-EP-RNP-0101-01, [RNP] CSD-EP-RNP-0101-02 **(PRR 2303130)**, and RIS 2007-02 **(PRR 2213104)**.
- Attachment 1: New attachment, EAL Wallchart Guidance; renumbered remaining attachment. PRR 2196707

TABLE OF CONTENTS

1.0 PURPOSE

1. This procedure provides instruction for the evaluation, classification and declaration of an emergency at a Duke Energy nuclear site.

2. This procedure provides guidance for event termination and entry into Recovery.

2.0 SCOPE

1. This procedure applies to all Duke Energy nuclear operating sites and is continually used to assess events and conditions at the site in order to classify and declare emergencies.

3.0 DEFINITIONS

None

4.0 RESPONSIBILITIES

4.1 Shift Manager

1. Evaluates, classifies and declares emergencies prior to TSC Activation.

2. Enters AD-EP-ALL-0111, Control Room Activation of the ERO.

4.2 Emergency Coordinator (TSC)

1. Evaluates, classifies and declares emergencies after activation of the TSC.

2. Enters AD-EP-ALL-0105, Activation and Operation of the Technical Support Center.

5.0 INSTRUCTIONS

5.1 <u>Assessment, Classification and Declaration of Events</u>

NOTE

- The highest emergency classification for which an Emergency Action Level (EAL) is exceeded shall be declared.
- The primary tool for determining the Emergency Classification Level (ECL) is the Emergency Classification Wallchart.

1. The Emergency Classification Wallchart user **may** (but is not required to) **consult** the EAL Technical Basis Document in order to obtain additional information concerning the Initial Conditions (ICs) and EALs under classification consideration.

2. **Determine** emergency classification per EAL Wallchart.

   a. **<u>IF</u>** needed,
      <u>THEN</u> refer to Attachment 1, EAL Wallchart Guidance.

3. **Declare** the event using the "Update" method as follows:

   a. After completing all required verifications and determining an EAL applies, the EC shall **perform** an update as follows:

      - "Update. I intend to declare a(n) ________ [GE, SAE, Alert, UE] for EAL _______. Are there any challenges to this declaration?"

   b. **<u>IF</u>** there are challenges,
      <u>THEN</u> make corrections.

   c. **<u>IF</u>** there are no challenges or challenges have been resolved,
      <u>THEN</u> announce in the same update:

      - "Update, at _______ [current time] a(n) _________ [GE, SAE, Alert, UE] has been declared for EAL __________. Possible upgrades include __________. End of update."

5.2 Terminating from a Declared Emergency

> **NOTE**
>
> The decision to terminate an event is **NOT** time dependent. There is no regulatory 15 minute notification requirement for exiting a declared emergency.

1. **Complete** Attachment 2, Event Termination Checklist, to determine if termination conditions are met.
2. **IF** conditions do **NOT** allow event termination, **THEN continue** monitoring events.
3. **WHEN** conditions allow for event termination, **THEN perform** AD-EP-ALL-0110, Recovery, to complete termination of the event.

6.0 RECORDS

1. All logs, forms and records completed as result of implementing this procedure during an actual declared event shall be retained as permanent plant records.
   a. Nuclear Generation Record Retention Rule number 421734, Life of Plant (LOP), Record Type Code NUC-LIC-003, Licensing Life of Plant Records.

7.0 REFERENCES

7.1 Commitments

None

7.2 Procedures

1. [BNP] 0ERP, Radiological Emergency Response Plan (ERP)
2. AD-EP-ALL-0110, Recovery
3. [RNP] PLP-007, Robinson Emergency Plan
4. [HNP] PLP-201, Emergency Plan

7.3 Miscellaneous Documents

1. [CNS] Catawba Emergency Plan
2. [BNP] CSD-EP-BNP-0101-01, EAL Technical Basis Document
3. [BNP] CSD-EP-BNP-0101-02, EAL Wallchart (Both Hot and Cold)
4. [CNS] CSD-EP-CNS-0101-01, EAL Technical Basis Document
5. [CNS] CSD-EP-CNS-0101-02, EAL Wallcharts
6. [HNP] CSD-EP-HNP-0101-01, EAL Technical Basis Document
7. [HNP] CSD-EP-HNP-0101-02, EAL Wallchart (Both Hot and Cold)
8. [MNS] CSD-EP-MNS-0101-01, EAL Technical Basis Document
9. [MNS] CSD-EP-MNS-0101-02, EAL Wallchart (Both Hot and Cold)
10. [ONS] CSD-EP-ONS-0101-01, EAL Technical Basis Document
11. [ONS] CSD-EP-ONS-0101-02, EAL Wallchart (Both Hot and Cold)
12. [RNP] CSD-EP-RNP-0101-01, EAL Technical Basis Document
13. [RNP] CSD-EP-RNP-0101-02, EAL Wallchart (Both Hot and Cold)
14. [MNS] McGuire Emergency Plan
15. [ONS] Oconee Emergency Plan
16. RIS 2007-02, Clarification of NRC Guidance for Emergency Notifications During Quickly Changing Events

<< EAL Wallchart Guidance >>

1. **Evaluate** the "All Conditions" EAL Wallchart.

   - **Read** the EAL Wallchart from left to right and top to bottom.
   - **Read** the EAL Category.
   - **Read** the EAL subcategory.
   - **Read** the Initiating Condition.
   - **Read** the Mode Applicability bar.
   - **Read** the category number criterion.
   - **Read** any applicable notes or tables.
   - **Determine** EAL classification threshold applicability

2. **IF** the Reactor Coolant System temperature is greater than [BNP] 212°F **OR** [CNS, HNP, MNS, ONS, RNP] 200°F,
   THEN evaluate the "Hot Conditions" EAL Wallchart.

   - **Read** the EAL Wallchart from left to right and top to bottom.
   - **Read** the EAL Category.
   - **Read** the EAL subcategory.
   - **Read** the Initiating Condition.
   - **Read** the Mode Applicability bar.
   - **Read** the category number criterion.
   - **Read** any applicable notes or tables.
   - **Determine** EAL classification threshold applicability.

<< EAL Wallchart Guidance >>

3. **IF** the Reactor Coolant System temperature is less than or equal to [BNP] 212°F **OR** [CNS, HNP, MNS, ONS, RNP] 200°F, **THEN evaluate** the "Cold Conditions" EAL Wallchart.

   - **Read** the EAL Wallchart from left to right and top to bottom.
   - **Read** the EAL Category.
   - **Read** the EAL subcategory.
   - **Read** the Initiating Condition.
   - **Read** the Mode Applicability bar.
   - **Read** the category number criterion.
   - **Read** any applicable notes or tables.
   - **Determine** EAL classification threshold applicability.

4. **Identify** the highest applicable Emergency Classification Level (ECL).

5. **Declare** the event using the "Update" method as follows:

   a. After completing all required verifications and determining an EAL applies, the EC shall **perform** an update as follows:

      - "Update. I intend to declare a(n) ________ [GE, SAE, Alert, UE] for EAL _______. Are there any challenges to this declaration?"

   b. **IF** there are challenges, **THEN make** corrections.

   c. **IF** there are no challenges or challenges have been resolved, **THEN announce** in the same update:

      - "Update, at _______ [current time] a(n) _________ [GE, SAE, Alert, UE] has been declared for EAL __________. Possible upgrades include __________. End of update."

<< EAL Wallchart Guidance >>

6. **IF** the classification level is below a General Emergency,
   THEN continue to monitor conditions for possible ECL upgrade.

   a. **Return** to the applicable ERO position checklist.

7. **IF** an EAL threshold has **NOT** been met or exceeded,
   THEN perform the following:

   a. **Continue** to monitor conditions for potential changes to ECL.

   b. **Return** to the applicable ERO position checklist.

ATTACHMENT 2
Page 1 of 2

<< Event Termination Checklist >>

Site: ______________________ Event: ____

		True	False	N/A
1.	Conditions no longer meet an Emergency Action Level and it appears unlikely that conditions will deteriorate.	☐	☐	☐

List any EAL(s) which is/are still exceeded and a justification as to why a state of emergency is no longer applicable:

____

____

____

____

____

____

- If Unusual Event level Emergency Classification Levels (ECLs), then go to the comments/approval section below.
- If all other ECLs, then continue with following questions.

		True	False	N/A
2.	Plant releases of radioactive materials to the environment are under control (within Technical Specifications) or have ceased and the potential for a radioactive release is acceptably low.	☐	☐	☐
3.	The radioactive plume has dissipated and plume tracking is no longer required. The only environmental assessment activities in progress are those necessary to determine the extent of deposition resulting from passage of the plume.	☐	☐	☐
4.	In-plant radiation levels are stable or decreasing, and acceptable given the plant conditions.	☐	☐	☐
5.	The reactor is in a stable operating condition or shutdown condition with long-term core cooling available.	☐	☐	☐

ATTACHMENT 2
Page 2 of 2

<< Event Termination Checklist >>

		True	False	N/A
6.	The integrity of containment is within Technical Specifications limits for the current plant mode.	☐	☐	☐
7.	The operability and integrity of radioactive waste systems, decontamination facilities, power supplies, electrical equipment and plant instrumentation including radiation monitoring equipment is acceptable.	☐	☐	☐
8.	Any fire, flood, earthquake or similar emergency condition no longer exists.	☐	☐	☐
9.	Any security issues have been resolved.	☐	☐	☐
10.	Any onsite medical issues have been resolved.	☐	☐	☐
11.	Offsite conditions do not unreasonably limit access of outside support to the site and qualified personnel and support services are available.	☐	☐	☐
12.	Discussions have been held with Federal, State and County agencies and agreement has been reached and coordination established to terminate the emergency.	☐	☐	☐
13.	All required state, local and NRC notifications for event termination have been prepared.	☐	☐	☐

It is not necessary that all responses listed above be 'TRUE'; however, all items must be considered prior to event termination from Alert or higher classification or entry into Recovery. For example, it is possible that some conditions remain which exceed an EAL threshold following a severe accident, but entry into Recovery is appropriate. Additionally, other significant items not included on this list may warrant consideration (such as severe weather).

Comments:

Approved by: ______________________________ Date/Time: ________________________
SM, EC or EOF Director in C&C of the event

Information Use

NUCLEAR OPERATING FLEET

ADMINISTRATIVE PROCEDURE

AD-EP-ALL-0304

STATE AND COUNTY NOTIFICATIONS

REVISION 3

Effective Dates:

08/24/2020	11/16/2020	11/16/2020	11/16/2020	08/24/2020
Brunswick	Catawba	Harris (HNP)	McGuire	Oconee
11/16/2020	11/16/2020			
Robinson	NGO			

REVISION SUMMARY

PRR 2322562
DESCRIPTION

- Old Section 5.2: Deleted 'Documentation'. PRR 2322562
- Section 6.0 Step 1: Changed from 'All logs, forms, and records completed as the result of implementing this procedure during the actual declared event shall be retained as permanent plant records' to 'Provide all checklists, forms, and other documentation generated by this procedure for retention in the Drill, Exercise, or actual event record package, as necessary'. PRR 2322562
- Section 6.0 Step 1.a: Changed 'Nuclear Generation Record Retention Rule Number 421734, Life of Plant (LOP), Record Type Code NUC-LIC-003, Life of Plant Records' to 'In case of an actual event, retain documentation generated by this procedure in the event record package in accordance with AD-EP-ALL-1000, Conduct of Emergency Preparedness'. PRR 2322562
- Section 6.0 Step 1.b: New step, 'In case of a Drill or Exercise, retain documentation generated by this procedure in the Drill record package in accordance with AD-EP-ALL-0803, Evaluation and Critique of Drills and Exercises'. PRR 2322562
- Section 7.2: Added AD-EP-ALL-0803 and AD-EP-ALL-1000; renumbered remaining references.
- Attachment 1: Changed 'Sample' to 'Emergency Notification Form' and placed parentheses around ENF.
- Attachment 2 Section 1.3 Step 2: Deleted 'from AD-EP-ALL-0304, State and County Notifications,'. Moved Attachment 1, Emergency Notification Form (ENF), to new Step 2.a and added 'should be used as a blank ENF' **(PRR 2305089)**. **Attachment 2 Section 1.3 Step 3 NOTE:** Added bullet concerning peer check of the ENF and the means for peer check. PRR 2304167, 2304590
- Attachment 2 Section 1.4 Old Step 1.b: Deleted 'Verify the 'Recipient Name' list is correct'; renumbered remaining steps. PRR 2299450
- Attachment 2 Section 1.4 Step 2: Changed from 'If manually faxing the ENF, then transmit the fax according to the site specific fax machine's user guide to send the ENF' to 'If **NOT** using WebEOC, then communicate information on the ENF verbally while making contact for transmission in Attachment 3, ENF Transmission'. PRR 2329139
- Attachment 4 Section 1.1 Step 3: Changed 'is located in' to 'may be found in the'. Deleted 'Procedure file cabinet' **(PRR 2311970)** and added 'or on hard copies stocked within each sites' TSC and the EOF'.
- Attachment 5: For Lines 10 & 11 added bullet 'Projection period is not required when performing a URI Rapid Dose Assessment' **(PRR 2163335)**. Changed 'Fax or Email' to 'Transmit'; changed 'notification' to 'ENF'; changed 'If completing a pre-printed or blank ENF, then use fax machine to send fax to the appropriate recipients' to 'If using a paper ENF, then transmit the ENF verbally as specified in Attachment 8, ENF Transmissions'. PRR 2329139
- Attachment 6: Under Step 5 changed 'Pre-printed ENF and Blank ENF' to 'Paper ENF'. Moved Old Step 7 to Step 8 and added EOF checkboxes. PRR 2231992
- Attachment 7 Changes **(PRR 2318460)**: On Pages 2of 8 through 8 of 8 added 'The first page of this attachment is applicable to all sites. If any of the statements below are true, then a Release is occurring' prior to Step 1. Numbered items on these pages. Under BNP Step 2 added 'with no operational radiation monitor at the release point'. On Pages 3 of 8 through 8 of 8 Step 3 added 'is' before 'occurring' and deleted 'steam line' and 'with known release path to environment (e.g., stuck open steam line valve, steam line break)'. Under CNS added new Step 3.c; under HNP added new Step 3.b; under MNS in Step 3 changed 'Primary and Secondary' to 'Primary to Secondary' and added new Step 3.c; under ONS added new Step 3.b; under RNP added new Step 3.b.
- Attachment 8 Changes: Arranged ENF Transmissions in alphabetical order (BNP, CNS, HNP, MNS, ONS, RNP) versus the current order (MNS, CNS, ONS, BNP, HNP, RNP). **PRR 2325215** Indented scripted text. **(PRR 2316401).** Under Step 1 of each site's transmission, added 'Please standby' after 'A/an Unusual Event / Alert / Site Area Emergency / General Emergency has been declared'. PRR 2317710

TABLE OF CONTENTS

1.0 PURPOSE

1. This procedure describes the instructions for Initial and Follow-up Notifications to state and county response organizations in the event of a declared emergency at a Duke Energy nuclear site.

2.0 SCOPE

1. This procedure applies to all operating Duke Energy nuclear sites when an emergency is declared in accordance with site Emergency Plans.

3.0 DEFINITIONS

1. **Authentication Code List:** A controlled list of numbers and corresponding words provided by the state(s) to authenticate communications between various parties.

2. **DEMNET:** The primary communication method used by the licensee to communicate emergency information to offsite response organizations.

3. **Emergency Notification Form (ENF):** The document prepared by the licensee to communicate Initial and Follow-up Notifications to the offsite response organizations.

4. **Emergency Release:** An unplanned, quantifiable airborne radiological release to the environment attributed to the emergency event.

5. **Follow-up Notifications:** Periodic notifications to provide updated information to offsite response organizations following an Initial Notification.

6. **Initial Notification:** The first notification made to offsite response organizations upon declaration of any emergency classification, upgrade in classification (Alert, Site Area Emergency, or General Emergency), or change in Protective Action Recommendations (PARs).

7. **Termination Notification:** The last notification sent to offsite response organizations communicating termination of the emergency.

8. **WebEOC:** An electronic emergency response communication system used to provide information within the Duke Energy emergency response facilities and to offsite response organizations.

4.0 RESPONSIBILITIES

4.1 Shift Manager, Emergency Coordinator, or EOF Director

1. Ensures required notifications are made when in Command and Control.

4.2 TSC Dose Assessor/Radiation Assessment Manager

1. Determines release levels and provides accurate and timely dose projections.

4.3 Emergency Coordinator/Accident Assessment Manager

1. Determines PARs.

4.4 Offsite Communicators

1. Complete and transmit ENFs as outlined in their position-specific checklists using the guidance provided in this procedure.

5.0 INSTRUCTIONS

5.1 General Instructions

1. Follow instructions in the position-specific checklists and procedures provided for the Control Room, TSC and EOF to make required notifications to State and County agencies.

2. Use guidance provided in the following attachments, as appropriate:

   - Attachment 1, Emergency Notification Form (ENF)
   - Attachment 2, ENF Completion
   - Attachment 3, ENF Transmission
   - Attachment 4, Authentication Guideline
   - Attachment 5, ENF Quick Reference
   - Attachment 6, Offsite Communications Turnover Checklist
   - Attachment 7, Determining Radiological Release Status
   - Attachment 8, ENF Transmissions

6.0 RECORDS

1. Provide all checklists, forms and other documentation generated by this procedure for retention in the Drill, Exercise, or actual event record package, as necessary.

   a. In case of an actual event, retain documentation generated by this procedure in the event record package in accordance with AD-EP-ALL-1000, Conduct of Emergency Preparedness, if required.

   b. In case of a Drill or Exercise, retain documentation generated by this procedure in the Drill record package in accordance with AD-EP-ALL-0803, Evaluation and Critique of Drills and Exercises, if required.

7.0 REFERENCES

7.1 Commitments

None

7.2 Procedures

1. [BNP] 0ERP, Radiological Emergency Response Plan (ERP)
2. AD-EP-ALL-0104, ERO Common Guideline and Forms
3. AD-EP-ALL-0406, Duke Emergency Management Network (DEMNET)
4. AD-EP-ALL-0803, Evaluation and Critique of Drills and Exercises
5. AD-EP-ALL-1000, Conduct of Emergency Preparedness
6. [RNP] PLP-007, Robinson Emergency Plan
7. [HNP] PLP-201, Emergency Plan

7.3 Miscellaneous Documents

1. 66 FR 5427, Consideration of Potassium Iodide in Emergency Plans
2. [CNS] Catawba Emergency Plan
3. CSD-EP-ALL-0104-01, Emergency Telephone Directory
4. [MNS] McGuire Emergency Plan
5. NRC Regulatory Issue Summary (RIS) 2007-02, Clarification of NRC Guidance for Emergency Notifications During Quickly Changing Events
6. [ONS] Oconee Emergency Plan

ATTACHMENT 1
Page 1 of 1

<< Emergency Notification Form (ENF) >>

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

MESSAGE # ________ **Confirmation Phone #:** __________________ **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:**
   ☐ BRUNSWICK ☐ CATAWBA ☐ HARRIS ☐ MCGUIRE ☐ OCONEE ☐ ROBINSON
3. **EMERGENCY CLASSIFICATION**
   ☐ UNUSUAL EVENT ☐ ALERT ☐ SITE AREA EMERGENCY ☐ GENERAL EMERGENCY
4. **EAL #**______________ **Declaration Date**: ____/____/____ **Time:** ________
   Termination Date: ____/____/____**Time:** ________(mark "N/A" for EAL # & Description)
   EAL DESCRIPTION:____
   ____
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 _________
   ☐ YES Unit 3 - _________% Power Shutdown: Date ___/_____/____Time _________
   ☐ YES Unit 4 - _________% 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:** ________________________TITLE: ___________________Date ___/_____/____Time __________
14. **NOTIFIED BY:** ____Date ___/_____/____Time __________
15. **RECEIVED BY** (ORO use only): ____________________________________Date ___/_____/____Time __________

EM-78 / Nuclear Power Facility Emergency Notification Form / March 2016 revision

<< ENF Completion >>

1.0 INSTRUCTIONS

1.1 Initial Notifications

1. Make the Initial Notification to the state(s) and counties within 15 minutes of the event declaration time or a change in Protective Action Recommendation (PAR) (evacuation and shelter only) using the information contained in the ENF. The ENF is preferred to be approved to make notifications, however it is not required to make notifications of a declared event.

2. The Initial Notification for a General Emergency classification must include PARs.

3. If a higher Emergency Classification Level (ECL) is declared before the notification begins for the lesser ECL, then perform the following: [7.3.5]

   a. If possible, then update the ENF to reflect the higher ECL and complete the notification within 15 minutes of the lesser ECL.

   b. If it is not possible to update the ENF within 15 minutes of the lesser classification, then add a Line 12 remark that explains a change in classification is forthcoming **AND** continue notification for lesser ECL to meet the 15 minute requirement.

      (1) Complete an Initial ENF for the higher ECL **AND** perform the notification within 15 minutes of declaration of the higher ECL.

<< ENF Completion >>

1.2 Follow-up Notifications

NOTES

- Examples of significant changes requiring a Follow-up Notification include: Dose Assessment Data characterizing a release or addition of KI, change in release status, evacuation or relocation of site personnel, fires onsite, chemical spills, explosions, MERT activation or injured personnel transported offsite, and any event that would cause or require offsite agency response.
- Follow-up Notifications are to occur within approximately 60 minutes from the first contact of the previous notification until a new time period is agreed upon by all offsite agencies.
- A Termination Notification is a type of Follow-up Notification. Termination Notifications must occur within 60 minutes from the time the last notification was made.
- The purpose for timely turnover from the Shift Manager/EC to the TSC/EC is to relieve the Control Room crew from burdens and distractions that might delay plant stabilization and recovery.
  - ◊ The transfer of Command and Control is a priority over ENF follow-up notifications since the regulatory requirement for timely ERO activation (i.e., within 75 minutes of classification) takes precedence over follow-up.
  - ◊ Do not allow follow-up notification to delay Command and Control turnover, which is required to be completed prior to ERO facility activation.
- It is acceptable to perform an ENF follow-up early, event oversight permitting.
  - ◊ The Shift Manager can request the Offsite Communicator to contact the Offsite Response Organizations to alert the individuals that turnover is in progress, provide a status of the event, and inform the ORO the follow-up form will be sent imminently upon turnover completion.

1. If a significant change to plant conditions occurs, then perform a Follow-up Notification as soon as possible, with the expectation of completion of notification within 30 minutes.

2. An Initial General Emergency Notification should be followed by another Follow-up Notification to include Dose assessment and Meteorological data as soon as possible, with the expectation of completion of notification within 30 minutes.

3. Follow-up Notifications continue to be made throughout the event within approximately 60 minutes from the first contact of the previous notification in Attachment 8, Section 2, or as agreed upon by all offsite agencies receiving the ENF.

1.2 Follow-up Notifications (continued)

a. Documentation (log name of officials agreeing to new schedule) shall be maintained for any agreed-upon schedule change.

4. If a Follow-up Notification is due and an upgrade to a higher classification is declared, then do not complete the Follow-up ENF and complete the Initial Notification for the higher classification.

1.3 <u>ENF Completion</u>

1. If WebEOC is available, then access the WebEOC ENF.

2. If WebEOC is **<u>NOT</u>** available, then obtain a pre-printed or blank ENF.

   a. Attachment 1, Emergency Notification Form (ENF), should be used as a blank ENF.

NOTE

- Attachment 5, Page 2, lists the positions responsible for providing information to complete the ENF.
- Only one ENF can be open at a time for the same event (e.g., opening an ENF in the TSC and then opening in the EOF will not allow the EOF to finalize the ENF).
- Peer check of the ENF is a best practice. Means for peer check include, but are not limited to, the following:
  - ◊ Control Room - Review by another person in the Control Room
  - ◊ TSC or EOF - Using a video projector for all TSC or EOF personnel review
  - ◊ EOF - EOF Offsite Communicator sharing their computer screen with the TSC Offsite Communicator for cross-facility review

3. Complete the ENF per Attachment 5, ENF Quick Reference.

4. Select the 'Approve' button on the WebEOC ENF to automatically open the WebEOC Emergency Notification Management panel with the recipient name list auto-populated.

<< ENF Completion >>

1.4 Sending the ENF

1. If using WebEOC, then perform the following:

   a. Access the Emergency Notification Management panel for the applicable ENF.

   b. Select the 'Send ENF' button.

   c. Select 'OK'.

      (1) The 'Emergency Notification Management' panel will indicate it is sending the messages.

   d. When 'Completed Sending Messages' appears, then select 'OK'.

2. If **NOT** using WebEOC, then communicate information on the ENF verbally while making contact for transmission in Attachment 3, ENF Transmission.

<< ENF Transmission >>

1.0 INSTRUCTIONS

1.1 General Information

NOTE
• Blast dial is a reverse conference call that calls recipients rather than the recipients calling in. • Once initiated, the recipients will be called. • Once the recipient answers, recipient will join the call automatically. • Notification can then be made.

1. Duke Emergency Management Network (DEMNET) is the primary communication device.
   a. Commercial telephone (blast dial) is the first back-up.
   b. Commercial Telephone line (Individual Line) is the second back-up.
   c. Satellite Phone is the third back-up.
2. Information regarding blast dial and back-up phone numbers is located in CSD-EP-ALL-0104-01, Emergency Telephone Directory.
3. DEMNET instructions are contained in AD-EP-ALL-0406, Duke Emergency Management Network (DEMNET).
4. The NRC requires that ALL state and county agencies be notified within 15 minutes of emergency declaration. Attachment 3, ENF Transmission, Step 7 meets the 15 minute notification time requirement.

1.2 Communicating the ENF using DEMNET Ethernet Phone Group Call

1. Verify that there is not another DEMNET call in progress that another Notify call would override by either method below:
   - Verifying DEMNET icon status
   - Contacting the Control Room, TSC, or EOF via landline

<< ENF Transmission >>

1.2 Communicating the ENF using DEMNET Ethernet Phone Group Call (continued)

2. Initiate a "Notify" call to the offsite agencies as follows:

   a. Verify the appropriate screen for the affected nuclear site has been selected.

   b. Select the orange oval group "Notify" button.

   c. When the prompt appears on screen asking to connect the call, then select 'Yes'.

      (1) Verify as the call is being connected that the 'Call in Progress' screen is displayed.

   d. Press **AND** hold the push-to-talk (PTT) button whenever it is desired to talk to the agencies.

NOTE

Attachment 8, ENF Transmissions, is used to perform and document communications with the offsite agencies for the appropriate site

3. When agencies start to answer the call, then state the plant name and the declaration of the emergency using Attachment 8, Section 1.

4. Note the time of the first contact on Attachment 8, Section 2. This is the start time for the next Follow-Up Notification.

5. Repeat Attachment 3 Section 1.2 Step 3 until it is believed that all agencies have answered the call.

NOTE

Message authentication can be requested any time; however, authentication is only required if message transmittal is other than via DEMNET.

6. Refer to Attachment 4, Authentication Guideline as needed.

7. Once it is believed that all agencies have answered the notification call, state the reason for the notification using Attachment 8, Section 3.

8. Conduct and document a roll call using Attachment 8, Section 3 to verify all required agencies are on the line by stating each State or County agency and allowing time for a reply.

<< ENF Transmission >>

1.2 Communicating the ENF using DEMNET Ethernet Phone Group Call (continued)

9. If an offsite agency does not answer, then contact the missing agency by any other means (i.e. commercial phone, cell phone, satellite phone, radio) while continuing with the DEMNET notification if possible:

   a. If needed, then request another communicator contact the agency using other means (i.e. commercial phone, cell phone, satellite phone, radio) to complete the notification.

10. Record the time that all agencies were notified on Attachment 8, Section 4.

11. Verify each agency has received the ENF using Attachment 8, Section 5, and record the names of the person receiving the notification.

   a. If the form was transmitted verbally, then there is no need to verify that the agency/agencies received the ENF by other means.

12. Determine if there are any agency questions and then conclude the message using Attachment 8, Section 6.

   a. If a question applies to information on the ENF, then provide the information to the requesting agency.

   b. If a question requires follow up, then document the questions and state that you will follow up with the requesting agency after the notification is complete.

13. Depress the "Hang up" button to end the DEMNET Call.

14. If using the WebEOC ENF, then perform the following:

   a. Open the control panel.

   b. Select 'EN Form' from the WebEOC control panel.

   c. Select 'View' button in the Notification Management column for the applicable message.

   d. Record recipient names in the Government Agencies Notified 'Received By' field and enter times and dates.

   e. Select the 'Update' Button.

<< ENF Transmission >>

1.2 Communicating the ENF using DEMNET Ethernet Phone Group Call (continued)

f. Enter the Time and Date that the first agency responded into the Notification Time and Date fields.

g. Verify or record the name of the Off Site Communicator making the notification call in the 'Notified By' field.

h. Select the 'Save' button to auto populate the ENF with the Notification Time and Date on Line 14.

15. If not using WebEOC, then:

a. If desired, then record offsite agency recipient names on the back of the ENF.

b. Document the notification time and date on Line 14 of the approved original ENF.

16. If an agency question requires follow up, then perform the following:

a. Document the questions in the Communicator's position log.

b. Document the name, agency, and contact information of the individual making the request.

c. Inform the individual you will contact them regarding the question.

d. Obtain the answer to the question from the appropriate ERO member and request the SM, Emergency Coordinator, or EOF Director to approve release of the information to the off-site agency.

e. Document the answer provided by the Shift Manager, Emergency Coordinator, or EOF Director in the Communicator's position log.

f. Contact requesting agency.

g. Provide the answer to the requesting agency.

h. Document the time the answer was provided to the requesting agency in the Communicator's position log.

<< Authentication Guideline >>

1.0 INSTRUCTIONS

1.1 General Information

1. When using the DEMNET phone, then authentication is typically **NOT** required unless requested by an off-site agency.

2. The Authentication Code List is a controlled list of numbers and corresponding words provided by the state(s) to authenticate communications between the various parties.

    a. Authentication provides assurance to the receiver that the information is valid.

    b. Authentication may be performed anytime the receiver wishes to assure the information received from the transmitter is valid.

    c. The receiver provides a number from the Authentication Code List.

    d. The transmitter provides the word that corresponds to the number provided by the receiver.

3. The Authentication Code List may be found in the WebEOC Emergency Notification Management panel using 'Get Authentication Code' button or on hard copies stocked within each sites' TSC and the EOF.

1.2 Responding to a Request for Authentication

1. If using WebEOC, then perform the following:

    a. Access the Emergency Notification Management panel for the appropriate message (ENF).

    b. If Authentication is requested, then perform the following:

        (1) Request the state or county representative to provide a number from the Authentication Code List.

        (2) Enter the number provided by the Agency into the AUTHENTICATION # field.

        (3) Select 'Get Authentication Code' (the Code Word(s) will appear).

        (4) Provide code word(s) to the requestor.

        (5) Select "OK" in the Pop up window to make the window disappear.

<< Authentication Guideline >>

1.2 Responding to a Request for Authentication (continued)

(6) Select 'Save' to populate the ENF.

c. If Authentication is **NOT** requested, then perform the following:

(1) Enter N/A into the AUTHENTICATION # field.

(2) Select 'Save' to auto-populate the ENF.

2. If not using WebEOC, then perform the following:

a. If Authentication is requested, then request state or county representative to provide a number from the Authentication Code List.

(1) Provide code word(s) corresponding to number from the Authentication Code List.

(2) Document the number in the AUTHENTICATION # field located at the top of the ENF.

b. If Authentication is **NOT** requested, then enter N/A in the AUTHENTICATION # field located at the top of the ENF.

1.3 Receiving a Call

1. If receiving a call from an off-site agency and the identity of call is **NOT** known, then perform the following:

a. Tell the caller you'd like to authenticate the call.

b. Provide a number from Authentication Code List to caller.

c. Obtain code word(s) corresponding with number on the Authentication Code List from the caller.

d. If caller has questions pertaining to the event in progress, then perform Attachment 3 Section 1.2 Step 16.

ATTACHMENT 5
Page 1 of 2

<< ENF Quick Reference >>

* Performance Indicator Accuracy Measure

Above line 1	Select 'Initial' or 'Follow-up'. Verify or record **Message Number.** • Only lines 1-6 and line 13 are required for an Initial Notification. • Only lines 1-6, 7-11 and 13 are required for a Follow-up Notification
Line 1*	**Event** - Select or ensure appropriate block for Drill, Actual Declaration, or Termination. • Only lines 1, 2, 4 and 13 are required for a Termination Message.
Line 2*	Verify, record, or select correct site. Verify, record, or select appropriate **Confirmation Phone#.**
Line 3*	**Emergency Classification** - Select or ensure correct classification.
Line 4*	• Verify, record, or select correct Emergency Action Level **(EAL) #** and corresponding EAL Description**.** • If termination, then verify, select or record "N/A for EAL# and EAL Description. • Select or enter **Declaration** or **Termination Date and Time**.
Line 5*	**Release to the environment -** Select or verify appropriate block for None, Is Occurring**,** or Has Occurred. (Refer to Attachment 7, Determining Radiological Release Status, for additional guidance)
Line 6*	**Protective Action Recommendations** • If Unusual Event, Alert, or Site Area Emergency, then verify, select or mark None. • If General Emergency, then select or mark 'Evacuate' and/or 'Shelter' as appropriate. Verify, select or record appropriate zones. If circumstance warrant, then select or mark 'KI' or 'Other'. • Once an evacuation PAR has been issued for a zone, it shall **<u>NOT</u>** be rescinded until recovery.
Line 7	**Prognosis** - If it is likely a higher emergency classification or a change in PARS will be required before the next follow-up, then select or mark 'Yes'. Otherwise mark 'No'.
Line 8	**Site Unit(s) status** • Select or verify 'Yes' for the unit(s) affected with the highest classification or units with the same classification caused by the same event. **Complete for all Units** • If Unit(s) is (are) Shutdown, then record 0% power **<u>AND</u>** Shutdown Time and Date. • If Unit(s) is (are) **<u>NOT</u>** Shutdown, then record % reactor power only.
Line 9	**Meteorological Data –** Verify, record or import Meteorological data including wind speed, direction, precipitation, and stability class.
Lines 10 & 11	Airborne Release Characterization and Dose Projection - Record or import radiological information. Lines 10 and 11 are only completed if Line 5 has 'Is Occurring' or Has Occurred' selected. • Only BNP Vent Stack is an Elevated Release. • All releases other than BNP Vent Stack are Ground Releases. • Projection period is not required when performing a URI Rapid Dose Assessment.
Line 12	**Remarks -** Record any additional information using short narratives without acronyms.
Line 13	**Approved By -** Enter or record approvers name, title, and date and time.
Line 14	**Notified By -** If known, then enter the name of the person who will be notifying the State/Counties, OR if unknown, then leave blank and it will be filled out when the notification is complete.
Line 15	**Received By – This field is only used by off-site agencies.** This field will not be present on WebEOC.
Validate	• If using WebEOC, then select 'Validate' to identify issues for resolution. • If completing a pre-printed or blank ENF, then review all data to identify and resolve issues.
Approve	• If using WebEOC, then obtain approval and select 'Approve'. • If completing a pre-printed or blank ENF, then obtain approval by having approver sign the ENF
Transmit	If using WebEOC, after the form is approved, then the screen will advance to the notification management screen. Ensure correct recipients are specified and select **Send ENF.** If using a paper ENF, then transmit the ENF verbally as specified in Attachment 8, ENF Transmissions.
Record Notification	Record the **notification date, time, and notified by, and authentication** (if performed) information either in WebEOC or manually.

ATTACHMENT 5
Page 2 of 2

<< ENF Quick Reference >>

ENF Completion Responsibilities

Above Line 1	Off-Site Communicator
Line 1	Off-Site Communicator
Line 2	Off-Site Communicator
Line 3	Shift Manager / Operations Manager / Accident Assessment Manager
Line 4	Shift Manager / Operations Manager / Accident Assessment Manager
Line 5	Shift Manager / Radiation Protection Manager / Radiological Assessment Manager
Line 6	Shift Manager / Radiation Protection Manager / Radiological Assessment Manager
Line 7	Shift Manager / Operations Manager / Accident Assessment Manager
Line 8	Shift Manager / Operations Manager / Accident Assessment Manager
Line 9	Shift Manager / Radiation Protection Manager / Radiological Assessment Manager
Line 10	Shift Manager / Radiation Protection Manager / Radiological Assessment Manager
Line 11	Shift Manager / Radiation Protection Manager / Radiological Assessment Manager
Line 12	Anyone
Line 13	Shift Manager / Emergency Coordinator / EOF Director
Line 14	Off-Site Communicator

<< Offsite Communications Turnover Checklist >>

1. Affected Site(s):

Brunswick Nuclear Plant (BNP)	
Catawba Nuclear Station (CNS)	
Harris Nuclear Plant (HNP)	
McGuire Nuclear Station (MNS)	
Oconee Nuclear Station (ONS)	
Robinson Nuclear Plant (RNP)	

2. Obtain the most recent notification forms.

3. Emergency Classification (check):

   ☐ UE ☐ Alert ☐ Site Area Emergency ☐ General Emergency

   Emergency Declaration (time): ____________

4. Last Emergency Notification Form Message #: ______
   Notification (time): _________

5. Using: ☐ WebEOC, ☐ Paper ENF

6. Next Message Due at (time): _________

7. Communications Problems or Offsite agencies activated:

   ____
   ____
   ____

8. Alternate Facility Activated - TSC: ☐ Yes ☐ No OSC: ☐ Yes ☐ No

   EOF: ☐ Yes ☐ No

9. Site Assembly Status: N/A ☐ In progress ☐ Completed ☐

   Time Site Assembly Initiated: ________

   Number of persons unaccounted for: _________

<< Offsite Communications Turnover Checklist >>

10. Site Evacuation: ☐ Yes ☐ No Time Evacuation Initiated: _______

Approximate Number of persons being evacuated: ________

Site Evacuation Location (indicate relocation area):

BNP	**Yes**	**No**
Technical Training Center (TTC)		
Home		

CNS	**Yes**	**No**
Plant Allen (Belmont, NC)		
York Operations Center (York, SC)		
Home		

HNP	**Yes**	**No**
Administration Building		
Home		

MNS	**Yes**	**No**
TTTC (Bldg. 7403)		
Cowans Ford Dam Service Bay		
Mt. Holly Training Center		
McGuire Office Complex (MOC) Auditorium (Bldg. 7422)		
Home		

ONS	**Yes**	**No**
Daniel High School		
Keowee Elementary School		
Home		

RNP	**Yes**	**No**
Unit 2 Administration Building		
Building 110 (Next to Lake Robinson)		
Home		

<< Offsite Communications Turnover Checklist >>

11. Other Pertinent Information (e.g., fires or explosions onsite, MERT activation, injured personnel transported offsite, chemical spills.)

____

____

____

12. Turnover Completed by: ______________________________

    At (date/time): ________________

<< Determining Radiological Release Status >>

Use the following guidance in determining how to report radiological release status on ENF.

A release in progress must be:

- Quantifiable
- Airborne
- Attributed to the declared emergency event

An increase on a radiation monitor is defined as a validated reading resulting from plant conditions (e.g., not attributable to instrument drift or electronic noise) above pre-emergency levels.

The following are release designations as listed on the Emergency Notification Form (ENF):

None - No release of quantifiable airborne radioactivity attributed to the emergency event.

Has Occurred - Any quantifiable airborne radioactivity released to the environment attributed to the emergency event, but has stopped.

Is Occurring - Any quantifiable airborne radioactivity release to the environment attributed to the emergency event, and is currently in progress as defined by the following criteria.

<< Determining Radiological Release Status >>

BNP

The first page of this attachment is applicable to all sites. If any of the statements below are true, then a Release is occurring.

1. Any gaseous radiation monitor below shows increase in activity:
   a. Main Stack: D12-RM-23S
   b. Reactor Building Vent Noble Gas: CAC-AQH-1264-3
   c. Turbine Building Vent Rad: D12-RM-23
2. Any drywell radiation monitor below showing an increase in activity **AND** a known leak path to environment exists with no operational radiation monitor at the release point:
   a. Drywell High Rad Monitor 30 ft elevation: D-22-RM-4195
   b. Drywell High Rad Monitor 57 ft elevation: D-22-RM-4196
   c. Drywell High Rad Monitor 23 ft elevation: D-22-RM-4197
   d. Drywell High Rad Monitor 57 ft elevation: D-22-RM-4198
3. A known unmonitored release path exists **AND** a radioactive source exists (RCS or fuel damage).
4. Field Monitoring Team results of airborne radioactivity (other than naturally occurring) detected by survey or sampling.

<< Determining Radiological Release Status >>

CNS

The first page of this attachment is applicable to all sites. If any of the statements below are true, then a Release is occurring.

1. Any gaseous radiation monitor below that shows an increase in activity:
   a. Unit Vent Low/High: 1/2 EMF-36 L/H
   b. Unit Vent Extended: 1/2 EMF-54
2. Any containment radiation monitor below that shows an increase in activity **AND** known leak path to environment exists:
   a. Containment High Range: 1/2 EMF-53 A/B
   b. Containment Gas Low/High: 1/2 EMF-39 L/H
3. Any radiation monitor below that shows an increase in activity **AND** Primary to Secondary leakage is occurring:
   a. Unit 1 Steam Line: 1 EMF-26/27/28/29
   b. Unit 2 Steam Line: 2 EMF-10/11/12/13
   c. Condenser Steam Air Ejector: 1/2 EMF-33 (not for use in dose assessment)
4. A known unmonitored release path exists **AND** a radioactive source exists (RCS or fuel damage).
5. Field Monitoring Team results of airborne radioactivity (other than naturally occurring) detected by survey or sampling.

<< Determining Radiological Release Status >>

HNP

The first page of this attachment is applicable to all sites. If any of the statements below are true, then a Release is occurring.

1. Any gaseous radiation monitor below that shows an increase in activity:
   a. Plant Vent: RM-21AV-3509-1SA
   b. Turbine Building: RM-1TV-3536-1
   c. Waste Processing Building Vent 5: RM-1WV-3546-1
   d. Waste Processing Building Vent 5A: RM-1WV-3547-1
2. Any containment radiation monitor below that shows an increase in activity **AND** known leak path to environment exists:
   a. Containment High Range: RM-01CR-3589SA
   b. Containment High Range: RM-01CR-3590SB
   c. Containment Gas: REM-01LT-3502ASA
3. Any radiation monitor below that shows an increase in activity **AND** Primary to Secondary leakage is occurring:
   a. Main Steam Line A/B/C: RM-01MS-3591/3592/3593
   b. Turbine Building Vent Stack Wide Range Gas Monitor: RM-01TV-3536-1

<< Determining Radiological Release Status >>

HNP (continued)

4. Damage to irradiated fuel in conjunction with a valid high alarm on any Containment or Fuel Handling Building radiation monitor listed below:

   a. Containment Ventilation Isolation: RM-1CR-3561 A/B/C/D

   b. Spent Fuel Pool SW, SE, SW: RM-1FR-3564A-SA

   c. Spent Fuel Pool SW, SE, SE: RM-1FR-3564B-SB

   d. Spent Fuel Pool SW, SE, SW: RM-1FR-3565A-SA

   e. Spent Fuel Pool SW, SE, SE: RM-1FR-3565B-SB

   f. Spent Fuel Pool NE, NW, NE: RM-1FR-3566A-SA

   g. Spent Fuel Pool NW, NE, NW: RM-1FR-3566B-SB

   h. Spent Fuel Pool NW, NE, NW: RM-1FR-3567A-SA

   i. Spent Fuel Pool NE, NW, NE: RM-1FR-3567B-SB

5. A known unmonitored release path exists **AND** a radioactive source exists (RCS or fuel damage).

6. Field Monitoring Team results of airborne radioactivity (other than naturally occurring) detected by survey or sampling.

<< Determining Radiological Release Status >>

MNS

The first page of this attachment is applicable to all sites. If any of the statements below are true, then a Release is occurring.

1. Any gaseous radiation monitor below that shows an increase in activity:
   a. Unit Vent Low/High/High-High: 1/2 EMF-36 L/H/HH
2. Any Containment radiation monitor below that shows an increase in activity **AND** known leak path to environment exists:
   a. Containment High Range: 1/2 EMF-51 A/B
   b. Containment Gas Low/High: 1/2 EMF-39 L/H
3. Any radiation monitor below that shows an increase in activity **AND** Primary to Secondary leakage is occurring:
   a. Unit 1 Steam Line: 1 EMF-24/25/26/27
   b. Unit 2 Steam Line: 2 EMF-10/11/12/13
   c. Condenser Steam Air Ejector: 1 & 2 EMF-33
4. A known unmonitored release path exists **AND** a radioactive source exists (RCS or fuel damage).
5. Field Monitoring Team results of airborne radioactivity (other than naturally occurring) detected by survey or sampling.

<< Determining Radiological Release Status >>

ONS

The first page of this attachment is applicable to all sites. If any of the statements below are true, then a Release is occurring.

1. Any gaseous radiation monitor below that shows an increase in activity:
   a. Unit Vent Low: 1/2/3 RIA-45
   b. Unit Vent High: 1/2/3 RIA-46
   c. Unit Vent High Gross Gamma: 1/2/3 RIA-56
2. Any Containment radiation monitor below that shows an increase in activity **AND** known leak path to environment exists:
   a. Containment High Range: 1/2/3 RIA-57
   b. Containment High Range: 1/2/3 RIA-58
   c. Containment Gas Low: 1/2/3 RIA-49
   d. Containment Gas High: 1/2/3 RIA-49A
3. Any radiation monitor below that shows an increase in activity **AND** Primary to Secondary leakage is occurring:
   a. Steam Line: 1/2/3 RIA-16/17
   b. Air Ejector Off Gas: 1/2/3 RIA-40
4. A known unmonitored release path exists **AND** a radioactive source exists (RCS or fuel damage).
5. Field Monitoring Team results of airborne radioactivity (other than naturally occurring) detected by survey or sampling.

<< Determining Radiological Release Status >>

RNP

The first page of this attachment is applicable to all sites. If any of the statements below are true, then a Release is occurring.

1. Any gaseous radiation monitor below that shows an increase in activity:
   a. Plant Vent Low/Mid/High: R-14 C/D/E
   b. Fuel Handling Building Exhaust: R-20
   c. Fuel Handling Building Exhaust High: R-30
2. Any Containment radiation monitor below that shows an increase in activity **AND** known leak path to environment exists:
   a. Containment High Range: R-32 A/B
   b. Containment Gas: R-12
3. Any radiation monitor below that shows an increase in activity **AND** Primary to Secondary leakage is occurring:
   a. Steam Line: R-31 A/B/C
   b. Condenser Air Ejector Gas: R-15
4. A known unmonitored release path exists **AND** a radioactive source exists (RCS or fuel damage).
5. Field Monitoring Team results of airborne radioactivity (other than naturally occurring) detected by survey or sampling.

<< ENF Transmissions >>

1.	"This is the **Brunswick Nuclear Plant** A/an **Unusual Event / Alert / Site Area Emergency / General Emergency** has been declared. Please standby." **OR** "We have terminated from the **Unusual Event / Alert / Site Area Emergency / General Emergency**. Please standby."		ENF # ____ Initial / Follow-up UE / AL / SAE / GE	ENF # ____ Initial / Follow-up UE / AL / SAE / GE	ENF # ____ Initial / Follow-up UE / AL / SAE / GE
2.	Record time of first agency on the phone. Repeat the above until all agencies are on-line.		Time: _________	Time: _________	Time: _________
3.	"The Brunswick Nuclear Plant has declared a/an Unusual Event / Alert / Site Area Emergency / General Emergency." If Initial or Follow-up of GENERAL EMERGENCY, then state: "We recommend the following protective actions:" (read ENF LINE 6) "I'm now going to conduct a roll call." (verify each agency is on the line) **OR** "The Brunswick Nuclear Plant has Terminated from the Unusual Event / Alert / Site Area Emergency / General Emergency." "I need to confirm required agencies are on-line."	Brunswick County	Verified ☐	Verified ☐	Verified ☐
		New Hanover County	Verified ☐	Verified ☐	Verified ☐
		North Carolina	Verified ☐	Verified ☐	Verified ☐
		Coast Guard	Verified ☐	Verified ☐	Verified ☐
4.	Record time all required agencies are notified.		Time: _________	Time: _________	Time: _________
5.	"A copy of message # _____ has been sent to you. When I call your agency, please state whether you have received the message and also state your name." Verify receipt of message and RECORD names. → If any agency did not receive the ENF **OR** you cannot transmit the ENF, then request the agency to obtain a blank ENF and transmit the message verbally line by line	Brunswick County			
		New Hanover County			
		North Carolina			
		Coast Guard			
6.	"Are there any questions?" Record questions per Attachment 3 Section 1.2 Step 16 "This concludes the notification, my name is ____. Duke Energy clear."				Page ___ of ___

<< ENF Transmissions >>

1.	"This is the **Catawba Nuclear Station** A/an **<u>Unusual Event / Alert / Site Area Emergency / General Emergency</u>** has been declared. Please standby." **OR** "We have terminated from the **<u>Unusual Event / Alert / Site Area Emergency / General Emergency</u>**. Please standby."		ENF # ____ Initial / Follow-up UE / AL / SAE / GE	ENF # ____ Initial / Follow-up UE / AL / SAE / GE	ENF # ____ Initial / Follow-up UE / AL / SAE / GE
2.	Record time of <u>first agency</u> on the phone. Repeat the above until all agencies are on-line.		Time: _________	Time: _________	Time: _________
3.	"The Catawba Nuclear Station has declared a/an **<u>Unusual Event / Alert / Site Area Emergency / General Emergency</u>**." If Initial or Follow-up of <u>GENERAL EMERGENCY</u>, then state: "We recommend the following protective actions:" (read ENF LINE 6) "I'm now going to conduct a roll call." (verify each agency is on the line) **OR** "The Catawba Nuclear Station has Terminated from the **<u>Unusual Event / Alert / Site Area Emergency / General Emergency</u>**." "I need to confirm required agencies are on-line."	York County	Verified ☐	Verified ☐	Verified ☐
		Mecklenburg Co.	Verified ☐	Verified ☐	Verified ☐
		Gaston County	Verified ☐	Verified ☐	Verified ☐
		North Carolina	Verified ☐	Verified ☐	Verified ☐
		South Carolina	Verified ☐	Verified ☐	Verified ☐
4.	Record time all required agencies are notified.		Time: _________	Time: _________	Time: _________
5.	"A copy of message # _____ has been sent to you. When I call your agency, please state whether you have received the message and also state your name." Verify receipt of message and RECORD names. → If any agency did not receive the ENF **<u>OR</u>** you cannot transmit the ENF, then request the agency to obtain a blank ENF and transmit the message verbally line by line	York County			
		Mecklenburg Co.			
		Gaston County			
		North Carolina			
		South Carolina			
6.	"Are there any questions?" Record questions per Attachment 3 Section 1.2 Step 16 "This concludes the notification, my name is ____. Duke Energy clear."				Page ___ of ___

<< ENF Transmissions >>

1.	"This is the **Harris Nuclear Plant** A/an **Unusual Event / Alert / Site Area Emergency / General Emergency** has been declared. Please standby." **OR** "We have terminated from the **Unusual Event / Alert / Site Area Emergency / General Emergency**. Please standby."		ENF # ____ Initial / Follow-up UE / AL / SAE / GE	ENF # ____ Initial / Follow-up UE / AL / SAE / GE	ENF # ____ Initial / Follow-up UE / AL / SAE / GE
2.	Record time of first agency on the phone. Repeat the above until all agencies are on-line.		Time: _________	Time: _________	Time: _________
3.	"The Harris Nuclear Plant has declared a/an Unusual Event / Alert / Site Area Emergency / General Emergency." If Initial or Follow-up of GENERAL EMERGENCY, then state: "We recommend the following protective actions:" (read ENF LINE 6) "I'm now going to conduct a roll call." (verify each agency is on the line) **OR** "The Harris Nuclear Plant has Terminated from the Unusual Event / Alert / Site Area Emergency / General Emergency." "I need to confirm required agencies are on-line."	Wake County	Verified ☐	Verified ☐	Verified ☐
		Chatham County	Verified ☐	Verified ☐	Verified ☐
		Harnett County	Verified ☐	Verified ☐	Verified ☐
		Lee County	Verified ☐	Verified ☐	Verified ☐
		North Carolina	Verified ☐	Verified ☐	Verified ☐
4.	Record time all required agencies are notified.		Time: _________	Time: _________	Time: _________
5.	"A copy of message # _____ has been sent to you. When I call your agency, please state whether you have received the message and also state your name." Verify receipt of message and RECORD names. → If any agency did not receive the ENF **OR** you cannot transmit the ENF, then request the agency to obtain a blank ENF and transmit the message verbally line by line	Wake County			
		Chatham County			
		Harnett County			
		Lee County			
		North Carolina			
6.	"Are there any questions?" Record questions per Attachment 3 Section 1.2 Step 16 "This concludes the notification, my name is ________________________________. Duke Energy clear."				Page ___ of ___

ATTACHMENT 8
Page 4 of 6

<< ENF Transmissions >>

1.	"This is the **McGuire Nuclear Station** A/an **Unusual Event / Alert / Site Area Emergency / General Emergency** has been declared. Please standby." **OR** "We have terminated from the **Unusual Event / Alert / Site Area Emergency / General Emergency**. Please standby."		ENF # ____ Initial / Follow-up UE / AL / SAE / GE	ENF # ____ Initial / Follow-up UE / AL / SAE / GE	ENF # ____ Initial / Follow-up UE / AL / SAE / GE
2.	Record time of first agency on the phone. Repeat the above until all agencies are on-line.		Time: _________	Time: _________	Time: _________
3.	"The McGuire Nuclear Station has declared a/an **Unusual Event / Alert / Site Area Emergency / General Emergency**." If Initial or Follow-up of GENERAL EMERGENCY, then state: "We recommend the following protective actions:" (read ENF LINE 6) "I'm now going to conduct a roll call." (verify each agency is on the line) **OR** "The McGuire Nuclear Station has Terminated from the **Unusual Event / Alert / Site Area Emergency / General Emergency**." "I need to confirm required agencies are on-line."	Gaston County	Verified ☐	Verified ☐	Verified ☐
		Lincoln County	Verified ☐	Verified ☐	Verified ☐
		Iredell County	Verified ☐	Verified ☐	Verified ☐
		Mecklenburg Co.	Verified ☐	Verified ☐	Verified ☐
		Catawba County	Verified ☐	Verified ☐	Verified ☐
		Cabarrus County	Verified ☐	Verified ☐	Verified ☐
		North Carolina	Verified ☐	Verified ☐	Verified ☐
4.	Record time all required agencies are notified.		Time: _________	Time: _________	Time: _________
5.	"A copy of message # _____ has been sent to you. When I call your agency, please state whether you have received the message and also state your name." Verify receipt of message and RECORD names. → If any agency did not receive the ENF **OR** you cannot transmit the ENF, then request the agency to obtain a blank ENF and transmit the message verbally line by line.	Gaston County			
		Lincoln County			
		Iredell County			
		Mecklenburg Co.			
		Catawba County			
		Cabarrus County			
		North Carolina			
6.	"Are there any questions?" Record questions per Attachment 3 Section 1.2 Step 16 "This concludes the notification, my name is ____. Duke Energy clear."				Page ___ of ___

<< ENF Transmissions >>

1.	"This is the **Oconee Nuclear Station** A/an **Unusual Event / Alert / Site Area Emergency / General Emergency** has been declared. Please standby." **OR** "We have terminated from the **Unusual Event / Alert / Site Area Emergency / General Emergency**. Please standby."		ENF # ____ Initial / Follow-up UE / AL / SAE / GE	ENF # ____ Initial / Follow-up UE / AL / SAE / GE	ENF # ____ Initial / Follow-up UE / AL / SAE / GE
2.	Record time of first agency on the phone. Repeat the above until all agencies are on-line.		Time: _________	Time: _________	Time: _________
3.	"The Oconee Nuclear Station has declared a/an **Unusual Event / Alert / Site Area Emergency / General Emergency**." If Initial or Follow-up of GENERAL EMERGENCY, then state: "We recommend the following protective actions:" (read ENF LINE 6) "I'm now going to conduct a roll call." (verify each agency is on the line) **OR** "The Oconee Nuclear Station has Terminated from the **Unusual Event / Alert / Site Area Emergency / General Emergency**." "I need to confirm required agencies are on-line."	Oconee County	Verified ☐	Verified ☐	Verified ☐
		Pickens County	Verified ☐	Verified ☐	Verified ☐
		South Carolina	Verified ☐	Verified ☐	Verified ☐
4.	Record time all required agencies are notified.		Time: _________	Time: _________	Time: _________
5.	"A copy of message # _____ has been sent to you. When I call your agency, please state whether you have received the message and also state your name." Verify receipt of message and RECORD names. → If any agency did not receive the ENF **OR** you cannot transmit the ENF, then request the agency to obtain a blank ENF and transmit the message verbally line by line	Oconee County			
		Pickens County			
		South Carolina			
6.	"Are there any questions?" Record questions per Attachment 3 Section 1.2 Step 16 "This concludes the notification, my name is ____. Duke Energy clear."				

ATTACHMENT 8
Page 6 of 6

<< ENF Transmissions >>

1.	"This is the **Robinson Nuclear Plant** A/an **Unusual Event / Alert / Site Area Emergency / General Emergency** has been declared. Please standby." **OR** "We have terminated from the **Unusual Event / Alert / Site Area Emergency / General Emergency**. Please standby."		ENF # ____ Initial / Follow-up UE / AL / SAE / GE	ENF # ____ Initial / Follow-up UE / AL / SAE / GE	ENF # ____ Initial / Follow-up UE / AL / SAE / GE
2.	Record time of first agency on the phone. Repeat the above until all agencies are on-line.		Time: _________	Time: _________	Time: _________
3.	"The Robinson Nuclear Plant has declared a/an **Unusual Event / Alert / Site Area Emergency / General Emergency**." If Initial or Follow-up of GENERAL EMERGENCY, then state: "We recommend the following protective actions:" (read ENF LINE 6) "I'm now going to conduct a roll call." (verify each agency is on the line) **OR** "The Robinson Nuclear Plant has Terminated from the **Unusual Event / Alert / Site Area Emergency / General Emergency**." "I need to confirm required agencies are on-line."	Darlington County	Verified ☐	Verified ☐	Verified ☐
		Chesterfield County	Verified ☐	Verified ☐	Verified ☐
		Lee County	Verified ☐	Verified ☐	Verified ☐
		South Carolina	Verified ☐	Verified ☐	Verified ☐
4.	Record time all required agencies are notified.		Time: _________	Time: _________	Time: _________
5.	"A copy of message # _____ has been sent to you. When I call your agency, please state whether you have received the message and also state your name." Verify receipt of message and RECORD names. → If any agency did not receive the ENF **OR** you cannot transmit the ENF, then request the agency to obtain a blank ENF and transmit the message verbally line by line	Darlington County			
		Chesterfield County			
		Lee County			
		South Carolina			
6.	"Are there any questions?" Record questions per Attachment 3 Section 1.2 Step 16 "This concludes the notification, my name is ______________________________. Duke Energy clear."				Page ___ of ___

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

MESSAGE # ________ **Confirmation Phone #:** SIM:(803) 831-3807 **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 # SA1.1 **Declaration Date**: ____/____/____ **Time:** ________

Termination Date: ____/____/____ **Time:** ________(mark "N/A" for EAL # & Description)

EAL DESCRIPTION: Loss of all but one AC power source to essential buses for 15 minutes or longer.

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: ____________________TITLE: Emergency Coordinator Date ___/_____/____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)
________________________________ 9-1-803/329-1110
(date) (time)

2. ________________________________ Mecklenburg County WP/EOC
(name) 9-704/336-2441 (WP)
________________________________ 9-704/432-4120 (EOC)
(date) (time)

3. ________________________________ Gaston County WP/EOC
(name)
________________________________ 9-704/866-3300
(date) (time)

4. ________________________________ North Carolina EOC/WP
(name) 9-1-919/733-3300 (Primary)
________________________________ 9-1-800/858-0368 (Alt.)
(date) (time)

5. ________________________________ North Carolina Alt. WP
(name) 9-1-828/466-5500
________________________________ 9-1-828/466-5501
(date) (time)

6. ________________________________ North Carolina Alt. EOC
(name) 9-1-919/733-3300 (Primary)
________________________________ 9-1-800-858-0368 (Alt.)
(date) (time)

7. ________________________________ South Carolina WP
(name) 9-1-803/737-8500 (Primary)
________________________________ 9-1-800/811-8045 (Alt.)
(date) (time)

8. ________________________________ South Carolina Alt. WP
(name)
________________________________ 9-1-803/896-9621
(date) (time)

9. ________________________________ South Carolina EOC
(name) 9-1-803/737-8500 (Primary)
________________________________ 9-1-803-737-8724 (Alt.)
(date) (time)

EAL WALLCHARTS

R — Abnorm. Rad Levels / Rad Effluent

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT

1 Rad Effluent

GENERAL EMERGENCY — Release of gaseous radioactivity resulting in offsite dose greater than 1,000 mrem TEDE or 5,000 mrem thyroid CDE

1 | 2 | 3 | 4 | 5 | 6 | DEF

RG1.1
Reading on **any** Table R-1 effluent radiation monitor > column "GE" for ≥ 15 min. (Notes 1, 2, 3, 4)

RG1.2
Dose assessment using actual meteorology indicates doses > 1000 mrem TEDE or 5000 mrem thyroid CDE at or beyond the SITE BOUNDARY (Notes 4)

RG1.3
Field survey results indicate **EITHER** of the following at or beyond the SITE BOUNDARY:
- Closed window dose rates > 1000 mR/hr expected to continue for ≥ 60 min.
- Analyses of field survey samples indicate thyroid CDE > 5000 mrem for 60 min. of inhalation.

(Notes 1, 2)

SITE AREA EMERGENCY — Release of gaseous radioactivity resulting in offsite dose greater than 100 mrem TEDE or 500 mrem thyroid CDE

1 | 2 | 3 | 4 | 5 | 6 | DEF

RS1.1
Reading on **any** Table R-1 effluent radiation monitor > column "SAE" for ≥ 15 min. (Notes 1, 2, 3, 4)

RS1.2
Dose assessment using actual meteorology indicates doses > 100 mrem TEDE or 500 mrem thyroid CDE at or beyond the SITE BOUNDARY (Notes 4)

RS1.3
Field survey results indicate **EITHER** of the following at or beyond the SITE BOUNDARY:
- Closed window dose rates > 100 mR/hr expected to continue for ≥ 60 min.
- Analyses of field survey samples indicate thyroid CDE > 500 mrem for 60 min. of inhalation.

(Notes 1, 2)

ALERT — Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mrem TEDE or 50 mrem thyroid CDE

1 | 2 | 3 | 4 | 5 | 6 | DEF

RA1.1
Reading on **any** Table R-1 effluent radiation monitor > column "ALERT" for ≥ 15 min. (Notes 1, 2, 3, 4)

RA1.2
Dose assessment using actual meteorology indicates doses > 10 mrem TEDE or 50 mrem thyroid CDE at or beyond the SITE BOUNDARY (Notes 4)

RA1.3
Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses > 10 mrem TEDE or 50 mrem thyroid CDE at or beyond the SITE BOUNDARY for 60 min. of exposure (Notes 1, 2)

RA1.4
Field survey results indicate **EITHER** of the following at or beyond the SITE BOUNDARY:
- Closed window dose rates > 10 mR/hr expected to continue for ≥ 60 min.
- Analyses of field survey samples indicate thyroid CDE > 50 mrem for 60 min. of inhalation.

(Notes 1, 2)

UNUSUAL EVENT — Release of gaseous or liquid radioactivity greater than 2 times the SLC/TS limits for 60 minutes or longer

1 | 2 | 3 | 4 | 5 | 6 | DEF

RU1.1
Reading on **any** Table R-1 effluent radiation monitor > column "UE" for ≥ 60 min. (Notes 1, 2, 3)

RU1.2
Sample analysis for a gaseous or liquid release indicates a concentration or release rate > 2 x SLC/TS limits for ≥ 60 min. (Notes 1, 2)

2 Irradiated Fuel Event

GENERAL EMERGENCY — Spent fuel pool level cannot be restored to at least the top of the fuel racks for 60 minutes or longer

1 | 2 | 3 | 4 | 5 | 6 | DEF

RG2.1
Spent fuel pool level cannot be restored to at least 14.5 ft. (Level 3) on 1(2)KFP5780 or 1(2)NVP8790 for ≥ 60 min. (Note 1)

SITE AREA EMERGENCY — Spent fuel pool level at the top of the fuel racks

1 | 2 | 3 | 4 | 5 | 6 | DEF

RS2.1
Lowering of spent fuel pool level to 14.5 ft. (Level 3) on 1(2)KFP5780 or 1(2)NVP8790

ALERT — Significant lowering of water level above, or damage to, irradiated fuel

1 | 2 | 3 | 4 | 5 | 6 | DEF

RA2.1
Uncovery of irradiated fuel in the REFUELING PATHWAY

RA2.2
Damage to irradiated fuel resulting in a release of radioactivity
AND
A Trip 2 radiation alarm on **any** of the following radiation monitor indications:
- 1EMF15 (2EMF4) Spent Fuel Building Refueling Bridge
- 1EMF17 (2EMF2) Reactor Building Refueling Bridge
- 1EMF42 (2EMF42) Spent Fuel Pool Ventilation
- 1EMF39L (2EMF39L) Containment Noble Gas

RA2.3
Lowering of spent fuel pool level to 24.5 ft. (Level 2) on 1(2)KFP5780 or 1(2)NVP8790

UNUSUAL EVENT — Unplanned loss of water level above irradiated fuel

1 | 2 | 3 | 4 | 5 | 6 | DEF

RU2.1
UNPLANNED water level drop in the REFUELING PATHWAY as indicated by low water level alarm or indication
AND
UNPLANNED rise in corresponding area radiation levels as indicated by **any** of the following radiation monitors:
- 1EMF15 (2EMF4) Spent Fuel Building Refueling Bridge
- 1EMF17 (2EMF2) Reactor Building Refueling Bridge

Table R-1 Effluent Monitor Classification Thresholds

	Release Point	Monitor	GE	SAE	Alert	UE
Gaseous	Unit Vent Noble Gas Low	1/2EMF36L	--------	--------	4.18E+6 cpm	5.75E+3 cpm
Gaseous	Unit Vent Noble Gas High	1/2EMF36H	2.21E+4 cpm	2.22E+3 cpm	2.42E+2 cpm	--------
Liquid	Liquid Waste Effluent Line	0EMF49L	--------	--------	--------	4.50E+6 cpm
Liquid	Monitor Tank Discharge	0EMF57L	--------	--------	--------	4.97E+5 cpm

Table R-2 Safe Operation & Shutdown Rooms/Areas

Bldg. Elevation	Unit 1 Room/Area	Unit 2 Room/Area	Mode
Auxiliary 577'	Rm 478 (1EMXA)	Rm 469 (2EMXA)	4
	Rm 496 (1ETA)	Rm 486 (2ETA)	4
	Rm 496 (1EMXS)	Rm 486 (2EMXS)	4
	AB-577', JJ-57 (1MXK)	AB-577', JJ-57 (2MXK)	4
Auxiliary 560'	Rm 330 (1EMXJ)	Rm 320 (2EMXJ)	4
	Rm 372 (1ETB)	Rm 362 (2ETB)	4
	Rm 372 (1EMXD)	Rm 362 (2EMXD)	4

3 Area Rad Levels

GENERAL EMERGENCY — None

SITE AREA EMERGENCY — None

ALERT — Radiation levels that IMPEDE access to equipment necessary for normal plant operations, cooldown or shutdown

1 | 2 | 3 | 4 | 5 | 6 | DEF

RA3.1
Dose rates > 15 mR/hr in **EITHER** of the following areas:
Control Room (EMF12)
OR
Central Alarm Station (by survey)

RA3.2
An UNPLANNED event results in radiation levels that prohibit or IMPEDE access to **any** Table R-2 rooms or areas (Note 5)

UNUSUAL EVENT — None

H — Hazards

1 Security

GENERAL EMERGENCY — None

SITE AREA EMERGENCY — HOSTILE ACTION within the PROTECTED AREA

1 | 2 | 3 | 4 | 5 | 6 | DEF

HS1.1
A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Security Shift Supervision

ALERT — HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes

1 | 2 | 3 | 4 | 5 | 6 | DEF

HA1.1
A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the Security Shift Supervision

HA1.2
A validated notification from NRC of an aircraft attack threat within 30 min. of the site

UNUSUAL EVENT — Confirmed SECURITY CONDITION or threat

1 | 2 | 3 | 4 | 5 | 6 | DEF

HU1.1
A SECURITY CONDITION that does **not** involve a HOSTILE ACTION as reported by the Security Shift Supervision

HU1.2
Notification of a credible security threat directed at the site

HU1.3
A validated notification from the NRC providing information of an aircraft threat

2 Seismic Event

ALERT — None

[Refer to EAL CA6.1 OR SA9.1 for escalation due to seismic event]

UNUSUAL EVENT — Seismic event greater than OBE level

1 | 2 | 3 | 4 | 5 | 6 | DEF

HU2.1
Seismic event > OBE as indicated by OBE EXCEEDED alarm on 1AD-4, B/8

3 Natural or Tech. Hazard

ALERT — None

[Refer to EAL CA6.1 OR SA9.1 for escalation due to natural or technological hazard]

UNUSUAL EVENT — Hazardous event

1 | 2 | 3 | 4 | 5 | 6 | DEF

HU3.1
A tornado strike within the PROTECTED AREA

HU3.2
Internal room or area FLOODING of a magnitude sufficient to require manual or automatic electrical isolation of a SAFETY SYSTEM component needed for the current operating mode

HU3.3
Movement of personnel within the PROTECTED AREA is IMPEDED due to an offsite event involving hazardous materials (e.g., an offsite chemical spill or toxic gas release)

HU3.4
A hazardous event that results in on-site conditions sufficient to prohibit the plant staff from accessing the site via personal vehicles (Note 7)

NOTES

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Note 3: If the effluent flow past an effluent monitor is known to have stopped, indicating that the release path is isolated, the effluent monitor reading is no longer VALID for classification purposes.

Note 4: The pre-calculated effluent monitor values presented in EALs RA1.1, RS1.1 and RG1.1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

Note 5: If the equipment in the listed room or area was already inoperable or out-of-service before the event occurred, then no emergency classification is warranted.

Note 6: If CONTAINMENT CLOSURE is re-established prior to exceeding the 30-minute time limit, declaration of a General Emergency is not required.

Note 7: This EAL does not apply to routine traffic impediments such as fog, snow, ice, or vehicle breakdowns or accidents.

Note 8: A manual trip action is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and does not include manually driving in control rods or implementation of boron injection strategies.

Note 9: In the absence of reliable NCS temperature indication caused by the loss of decay heat removal capability, classification should be based on time to boil data when in Mode 5 and 6.

Note 10: If the loss of containment cooling threshold is exceeded due to loss of both trains of VX-CARF, this EAL only applies if at least one train of VX-CARF is not operating, per design, after the 10 minute actuation delay for greater than or equal to 15 minutes.

Note 11: If the affected SAFETY SYSTEM train was already inoperable or out of service before the hazardous event occurred, then this emergency classification is not warranted.

Note 12: If the hazardous event only resulted in VISIBLE DAMAGE, with no indications of degraded performance to at least one train of a SAFETY SYSTEM, then this emergency classification is not warranted.

4 Fire

GENERAL EMERGENCY — None

CNS

SITE AREA EMERGENCY — None

ALERT — [Refer to EAL CA6.1 OR SA9.1 for escalation due to FIRE]

Table H-1 Fire Areas

- Reactor Building (Containment)
- Auxiliary Building
- Diesel Generator Rooms
- RN Pump House
- Dog Houses
- Standby Shutdown Facility (SSF)

UNUSUAL EVENT — FIRE potentially degrading the level of safety of the plant

1 | 2 | 3 | 4 | 5 | 6 | DEF

HU4.1
A FIRE is **not** extinguished within 15 min. of **any** of the following FIRE detection indications (Note 1):
- Report from the field (i.e., visual observation)
- Receipt of multiple (more than 1) fire alarms or indications
- Field verification of a single fire alarm

AND
The FIRE is located within any Table H-1 area

HU4.2
Receipt of a single fire alarm (i.e., no other indications of a FIRE)
AND
The fire alarm is indicating a FIRE within any Table H-1 area
AND
The existence of a FIRE is not verified within 30 min. of alarm receipt (Note 1)

HU4.3
A FIRE within the plant PROTECTED AREA not extinguished within 60 min. of the initial report, alarm or indication (Note 1)

HU4.4
A FIRE within the plant PROTECTED AREA that requires firefighting support by an offsite fire response agency to extinguish

Table H-2 Safe Operation & Shutdown Rooms/Areas

Bldg. Elevation	Unit 1 Room/Area	Unit 2 Room/Area	Mode
Auxiliary 577'	Rm 478 (1EMXA)	Rm 469 (2EMXA)	4
	Rm 496 (1ETA)	Rm 486 (2ETA)	4
	Rm 496 (1EMXS)	Rm 486 (2EMXS)	4
	AB-577', JJ-57 (1MXK)	AB-577', JJ-57 (2MXK)	4
Auxiliary 560'	Rm 330 (1EMXJ)	Rm 320 (2EMXJ)	4
	Rm 372 (1ETB)	Rm 362 (2ETB)	4
	Rm 372 (1EMXD)	Rm 362 (2EMXD)	4

5 Hazardous Gases

ALERT — Gaseous release IMPEDING access to equipment necessary for normal plant operations, cooldown or shutdown

4

HA5.1
Release of a toxic, corrosive, asphyxiant or flammable gas into **any** Table H-2 rooms or areas
AND
Entry into the room or area is prohibited or IMPEDED (Note 5)

UNUSUAL EVENT — None

6 Control Room Evacuation

GENERAL EMERGENCY — None

SITE AREA EMERGENCY — Inability to control a key safety function from outside the Control Room

1 | 2 | 3 | 4 | 5 | 6

HS6.1
An event has resulted in plant control being transferred from the Control Room to the Auxiliary Shutdown Panels or Standby Shutdown Facility
AND
Control of **any** of the following key safety functions is **not** reestablished within 15 min. (Note 1):
- Reactivity (Modes 1, 2 and 3 **only**)
- Core Cooling
- NCS heat removal

ALERT — Control Room evacuation resulting in transfer of plant control to alternate locations

1 | 2 | 3 | 4 | 5 | 6 | DEF

HA6.1
An event has resulted in plant control being transferred from the Control Room to the Auxiliary Shutdown Panels or Standby Shutdown Facility

UNUSUAL EVENT — None

7 EC Judgment

GENERAL EMERGENCY — Other conditions exist which in the judgment of the Site Emergency Coordinator warrant declaration of a General Emergency

1 | 2 | 3 | 4 | 5 | 6 | DEF

HG7.1
Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area

SITE AREA EMERGENCY — Other conditions existing that in the judgment of the Site Emergency Coordinator warrant declaration of a Site Area Emergency

1 | 2 | 3 | 4 | 5 | 6 | DEF

HS7.1
Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts, (1) toward site personnel or equipment that could lead to the likely failure of or, (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the SITE BOUNDARY.

ALERT — Other conditions exist that in the judgment of the Site Emergency Coordinator warrant declaration of an Alert

1 | 2 | 3 | 4 | 5 | 6 | DEF

HA7.1
Other conditions exist which, in the judgment of the Emergency Coordinator, indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

UNUSUAL EVENT — Other conditions existing that in the judgment of the Site Emergency Coordinator warrant declaration of a UE

1 | 2 | 3 | 4 | 5 | 6 | DEF

HU7.1
Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of SAFETY SYSTEMS occurs.

E — ISFSI

GENERAL EMERGENCY — None

Table E-1 ISFSI Dose Limits

NAC UMS	NAC MAGNASTOR
• 100 mrem/hr (neutron + gamma) on the side	• 240 mrem/hr gamma on the vertical surfaces
• 100 mrem/hr (neutron + gamma) on the top	• 10 mrem/hr neutron on the vertical surfaces
• 200 mrem/hr (neutron + gamma) at the air inlets or outlets	• 900 mrem/hr (neutron + gamma) on the top

UNUSUAL EVENT — Damage to a loaded cask CONFINEMENT BOUNDARY

1 | 2 | 3 | 4 | 5 | 6 | DEF

EU1.1
Damage to a loaded canister CONFINEMENT BOUNDARY as indicated by an on-contact radiation reading on the surface of a loaded spent fuel cask > **any** Table E-1 dose limit

Modes: 1 Power Operation | 2 Startup | 3 Hot Standby | 4 Hot Shutdown | 5 Cold Shutdown | 6 Refuel | DEF Defueled

DUKE ENERGY

Catawba Nuclear Station

CSD-EP-CNS-0101-02 Rev 000

C — Cold SD/ Refuel System Malfunct.

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT

1 NCS Level

GENERAL EMERGENCY — Loss of NCS inventory affecting fuel clad integrity with containment challenged

5 | 6

CG1.1
NCS level **cannot** be monitored for ≥ 30 min. (Note 1)
AND
Core uncovery is indicated by **any** of the following:
- UNPLANNED increase in **any** Table C-6 sump or tank level due to a loss of NCS inventory
- Visual observation of UNISOLABLE NCS leakage
- Reactor Building Refueling Bridge Monitor 1EMF17 (2EMF2) reading > 9,000 mR/hr
- Erratic Source Range or Gamma Metric Monitor indication

AND
Any Containment Challenge indication, Table C-1

SITE AREA EMERGENCY — Loss of NCS inventory affecting core decay heat removal capability

5 | 6

CS1.1
NCS level **cannot** be monitored for ≥ 30 min. (Note 1)
AND
Core uncovery is indicated by **any** of the following:
- UNPLANNED increase in **any** Table C-6 sump or tank level due to a loss of NCS inventory
- Visual observation of UNISOLABLE NCS leakage
- Reactor Building Refueling Bridge Monitor 1EMF17 (2EMF2) reading > 9,000 mR/hr
- Erratic Source Range or Gamma Metric Monitor indication

ALERT — Loss of NCS inventory

5 | 6

CA1.1
UNPLANNED loss of NCS inventory as indicated by NCS water level < 6.5% (wide range)

CA1.2
NCS water level **cannot** be monitored for ≥ 15 min. (Note 1)
AND EITHER
- UNPLANNED increase in **any** Table C-6 sump or tank level due to a loss of NCS inventory
- Visual observation of UNISOLABLE NCS leakage

UNUSUAL EVENT — UNPLANNED loss of NCS inventory for 15 minutes or longer

5 | 6

CU1.1
UNPLANNED loss of NCS inventory results in NCS water level less than a required lower limit for ≥ 15 min. (Note 1)

CU1.2
NCS water level **cannot** be monitored
AND EITHER
- UNPLANNED increase in **any** Table C-6 sump or tank level due to a loss of NCS inventory
- Visual observation of UNISOLABLE NCS leakage

2 Loss of Essential AC Power

GENERAL EMERGENCY — None

SITE AREA EMERGENCY — None

ALERT — Loss of **all** offsite and **all** onsite AC power to essential buses for 15 minutes or longer

5 | 6 | DEF

CA2.1
Loss of **all** offsite and **all** onsite AC power capability to essential 4160V buses 1(2)ETA and 1(2)ETB for ≥ 15 min. (Note 1)

UNUSUAL EVENT — Loss of **all but one** AC power source to essential buses for 15 minutes or longer

5 | 6 | DEF

CU2.1
AC power capability, Table C-2, to essential 4160V buses 1(2)ETA and 1(2)ETB reduced to a single power source for ≥ 15 min. (Note 1)
AND
Any additional single power source failure will result in loss of **all** AC power to SAFETY SYSTEMS

3 NCS Temp

GENERAL EMERGENCY — None

SITE AREA EMERGENCY — None

ALERT — Inability to maintain plant in cold shutdown

5 | 6

CA3.1
UNPLANNED increase in NCS temperature to > 200°F for > Table C-3 duration (Notes 1, 9)
OR
UNPLANNED NCS pressure increase > 10 psig due to a loss of NCS cooling (this does **not** apply during water-solid plant conditions)

UNUSUAL EVENT — UNPLANNED increase in NCS temperature

5 | 6

CU3.1
UNPLANNED increase in NCS temperature to > 200°F due to loss of decay heat removal capability

CU3.2
Loss of **all** NCS temperature and NCS level indication for ≥ 15 min. (Note 1)

4 Loss of Vital DC Power

GENERAL EMERGENCY — None

SITE AREA EMERGENCY — None

ALERT — None

UNUSUAL EVENT — CU4 Loss of Vital DC power for 15 minutes or longer

5 | 6

CU4.1
< 105 VDC bus voltage indications on Technical Specification **required** 125 VDC buses for ≥ 15 min. (Note 1)

5 Loss of Comm

GENERAL EMERGENCY — None

SITE AREA EMERGENCY — None

ALERT — None

UNUSUAL EVENT — Loss of **all** onsite or offsite communications capabilities

5 | 6 | DEF

CU5.1
Loss of **all** Table C-4 onsite communication methods
OR
Loss of **all** Table C-4 ORO communication methods
OR
Loss of **all** Table C-4 NRC communication methods

6 Hazardous Event Affecting Safety Systems

GENERAL EMERGENCY — None

SITE AREA EMERGENCY — None

ALERT — Hazardous event affecting a SAFETY SYSTEM needed for the current operating mode

5 | 6

CA6.1
The occurrence of **any** Table C-5 hazardous event
AND
- Event damage has caused indications of degraded performance on one train of a SAFETY SYSTEM needed for the current operating mode

AND EITHER of the following:
- Event damage has caused indications of degraded performance to a second train of the SAFETY SYSTEM needed for the current operating mode.
- Event damage has resulted in VISIBLE DAMAGE to the second train of the SAFETY SYSTEM needed for the current operating mode

(Note 11, 12)

UNUSUAL EVENT — None

Table C-1 Containment Challenge Indications

- CONTAINMENT CLOSURE **not** established (Note 6)
- Containment hydrogen concentration > 6%
- UNPLANNED rise in containment pressure

Table C-2 AC Power Sources

Offsite
- ATC (Train A)
- SATA (Train A) (if already aligned)
- ATD (Train B)
- SATB (Train B) (if already aligned)

Onsite
- D/G A (Train A)
- D/G B (Train B)

Table C-3 NCS Heat-up Duration Thresholds

NCS Status	Containment Closure Status	Heat-up Duration
Intact (but **not** reduced inventory)	N/A	60 min.*
Not intact **OR** At reduced inventory	established	20 min.*
	not established	0 min.

* If an NCS heat removal system is in operation within this time frame and NCS temperature is being reduced, the EAL is **not** applicable

Table C-4 Communication Methods

System	Onsite	ORO	NRC
Public Address	X		
Internal Telephones	X		
Onsite Radios	X		
DEMNET		X	
Commercial Telephones		X	X
Satellite Phones		X	X
Cellular Phones		X	X
NRC Emergency Telecommunications System (ETS)		X	X

Table C-5 Hazardous Events

- Seismic event (earthquake)
- Internal or external FLOODING event
- High winds or tornado strike
- FIRE
- EXPLOSION
- Other events with similar hazard characteristics as determined by the Shift Manager

Table C-6 Sumps/Tanks

- Containment Floor & Equipment Sump
- Incore Sump (alarm)
- ND/NS sump
- NCDT
- PRT

NOTES

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Note 3: If the effluent flow past an effluent monitor is known to have stopped, indicating that the release path is isolated, the effluent monitor reading is no longer VALID for classification purposes.

Note 4: The pre-calculated effluent monitor values presented in EALs RA1.1, RS1.1 and RG1.1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

Note 5: If the equipment in the listed room or area was already inoperable or out-of-service before the event occurred, then no emergency classification is warranted.

Note 6: If CONTAINMENT CLOSURE is re-established prior to exceeding the 30-minute time limit, declaration of a General Emergency is not required.

Note 7: This EAL does not apply to routine traffic impediments such as fog, snow, ice, or vehicle breakdowns or accidents.

Note 8: A manual trip action is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and does not include manually driving in control rods or implementation of boron injection strategies.

Note 9: In the absence of reliable NCS temperature indication caused by the loss of decay heat removal capability, classification should be based on time to boil data when in Mode 5 and 6.

Note 10: If the loss of containment cooling threshold is exceeded due to loss of both trains of VX-CARF, this EAL only applies if at least one train of VX-CARF is not operating, per design, after the 10 minute actuation delay for greater than or equal to 15 minutes.

Note 11: If the affected SAFETY SYSTEM train was already inoperable or out of service before the hazardous event occurred, then this emergency classification is not warranted.

Note 12: If the hazardous event only resulted in VISIBLE DAMAGE, with no indications of degraded performance to at least one train of a SAFETY SYSTEM, then this emergency classification is not warranted.

Date & Time of Shutdown

________ Date ________ Time

CNS

EAL Identifier

XXX.X

- Category (R, H, E, C, S, F)
- Emergency classification (G, S, A, U)
- Subcategory number (1 if no subcategory)
- Sequential number within subcategory/classification

MODES 5, 6 & Defueled

GENERAL EMERGENCY | SITE AREA EMERGENCY | ALERT | UNUSUAL EVENT

R — Abnorm. Rad Levels / Rad Effluent

1 — Rad Effluent

General Emergency — Release of gaseous radioactivity resulting in offsite dose greater than 1,000 mrem TEDE or 5,000 mrem thyroid CDE

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

RG1.1
Reading on **any** Table R-1 effluent radiation monitor > column "GE" for ≥ 15 min. (Notes 1, 2, 3, 4)

RG1.2
Dose assessment using actual meteorology indicates doses > 1000 mrem TEDE or 5000 mrem thyroid CDE at or beyond the SITE BOUNDARY (Note 4)

RG1.3
Field survey results indicate **EITHER** of the following at or beyond the SITE BOUNDARY:
- Closed window dose rates > 1000 mR/hr expected to continue for ≥ 60 min.
- Analyses of field survey samples indicate thyroid CDE > 5000 mrem for 60 min. of inhalation.

(Notes 1, 2)

Site Area Emergency — Release of gaseous radioactivity resulting in offsite dose greater than 100 mrem TEDE or 500 mrem thyroid CDE

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

RS1.1
Reading on **any** Table R-1 effluent radiation monitor > column "SAE" for ≥ 15 min. (Notes 1, 2, 3, 4)

RS1.2
Dose assessment using actual meteorology indicates doses > 100 mrem TEDE or 500 mrem thyroid CDE at or beyond the SITE BOUNDARY (Note 4)

RS1.3
Field survey results indicate **EITHER** of the following at or beyond the SITE BOUNDARY:
- Closed window dose rates > 100 mR/hr expected to continue for ≥ 60 min.
- Analyses of field survey samples indicate thyroid CDE > 500 mrem for 60 min. of inhalation.

(Notes 1, 2)

Alert — Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mrem TEDE or 50 mrem thyroid CDE

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

RA1.1
Reading on **any** Table R-1 effluent radiation monitor > column "ALERT" for ≥ 15 min. (Notes 1, 2, 3, 4)

RA1.2
Dose assessment using actual meteorology indicates doses > 10 mrem TEDE or 50 mrem thyroid CDE at or beyond the SITE BOUNDARY (Note 4)

RA1.3
Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses > 10 mrem TEDE or 50 mrem thyroid CDE at or beyond the SITE BOUNDARY for 60 min. of exposure (Notes 1, 2)

RA1.4
Field survey results indicate **EITHER** of the following at or beyond the SITE BOUNDARY:
- Closed window dose rates > 10 mR/hr expected to continue for ≥ 60 min.
- Analyses of field survey samples indicate thyroid CDE > 50 mrem for 60 min. of inhalation.

(Notes 1, 2)

Unusual Event — Release of gaseous or liquid radioactivity greater than 2 times the SLC/TS limits for 60 minutes or longer

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

RU1.1
Reading on **any** Table R-1 effluent radiation monitor > column "UE" for ≥ 60 min. (Notes 1, 2, 3)

RU1.2
Sample analysis for a gaseous or liquid release indicates a concentration or release rate > 2 x SLC/TS limits for ≥ 60 min. (Notes 1, 2)

2 — Irradiated Fuel Event

General Emergency — Spent fuel pool level cannot be restored to at least the top of the fuel racks for 60 minutes or longer

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

RG2.1
Spent fuel pool level cannot be restored to at least 14.5 ft. (Level 3) on 1(2)KFP5780 or 1(2)NVP8790 for ≥ 60 min. (Note 1)

Site Area Emergency — Spent fuel pool level at the top of the fuel racks

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

RS2.1
Lowering of spent fuel pool level to 14.5 ft. (Level 3) on 1(2)KFP5780 or 1(2)NVP8790

Alert — Significant lowering of water level above, or damage to, irradiated fuel

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

RA2.1
Uncovery of irradiated fuel in the REFUELING PATHWAY

RA2.2
Damage to irradiated fuel resulting in a release of radioactivity
AND
A Trip 2 radiation alarm on **any** of the following radiation monitor indications:
- 1EMF15 (2EMF4) Spent Fuel Building Refueling Bridge
- 1EMF17 (2EMF2) Reactor Building Refueling Bridge
- 1EMF42 (2EMF42) Spent Fuel Pool Ventilation
- 1EMF39L (2EMF39L) Containment Noble Gas

RA2.3
Lowering of spent fuel pool level to 24.5 ft. (Level 2) on 1(2)KFP5780 or 1(2)NVP8790

Unusual Event — Unplanned loss of water level above irradiated fuel

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

RU2.1
UNPLANNED water level drop in the REFUELING PATHWAY as indicated by low water level alarm or indication
AND
UNPLANNED rise in corresponding area radiation levels as indicated by **any** of the following radiation monitors:
- 1EMF15 (2EMF4) Spent Fuel Building Refueling Bridge
- 1EMF17 (2EMF2) Reactor Building Refueling Bridge

Table R-1 Effluent Monitor Classification Thresholds

	Release Point	Monitor	GE	SAE	Alert	UE
Gaseous	Unit Vent Noble Gas Low	1/2EMF36L	--------	--------	4.18E+6 cpm	5.75E+3 cpm
Gaseous	Unit Vent Noble Gas High	1/2EMF36H	2.21E+4 cpm	2.22E+3 cpm	2.42E+2 cpm	--------
Liquid	Liquid Waste Effluent Line	0EMF49L	--------	--------	--------	4.50E+6 cpm
Liquid	Monitor Tank Discharge	0EMF57L	--------	--------	--------	4.97E+5 cpm

3 — Area Rad Levels

Table R-2 Safe Operation & Shutdown Rooms/Areas

Bldg. Elevation	Unit 1 Room/Area	Unit 2 Room/Area	Mode
Auxiliary 577'	Rm 478 (1EMXA)	Rm 469 (2EMXA)	4
	Rm 496 (1ETA)	Rm 486 (2ETA)	4
	Rm 496 (1EMXS)	Rm 486 (2EMXS)	4
	AB-577', JJ-57 (1MXK)	AB-577', JJ-57 (2MXK)	4
Auxiliary 560'	Rm 330 (1EMXJ)	Rm 320 (2EMXJ)	4
	Rm 372 (1ETB)	Rm 362 (2ETB)	4
	Rm 372 (1EMXD)	Rm 362 (2EMXD)	4

Alert — Radiation levels that IMPEDE access to equipment necessary for normal plant operations, cooldown or shutdown

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

RA3.1
Dose rates > 15 mR/hr in **EITHER** of the following areas:
Control Room (EMF12)
OR
Central Alarm Station (by survey)

RA3.2
An UNPLANNED event results in radiation levels that prohibit or IMPEDE access to **any** Table R-2 rooms or areas (Note 5)

Unusual Event — None

H — Hazards

1 — Security

General Emergency — None

Site Area Emergency — HOSTILE ACTION within the PROTECTED AREA

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

HS1.1
A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Security Shift Supervision

Alert — HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

HA1.1
A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the Security Shift Supervision

HA1.2
A validated notification from NRC of an aircraft attack threat within 30 min. of the site

Unusual Event — Confirmed SECURITY CONDITION or threat

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

HU1.1
A SECURITY CONDITION that does **not** involve a HOSTILE ACTION as reported by the Security Shift Supervision

HU1.2
Notification of a credible security threat directed at the site

HU1.3
A validated notification from the NRC providing information of an aircraft threat

2 — Seismic Event

Alert — None

[Refer to EAL CA6.1 OR SA9.1 for escalation due to seismic event]

Unusual Event — Seismic event greater than OBE level

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

HU2.1
Seismic event > OBE as indicated by OBE EXCEEDED alarm on 1AD-4, B/8

NOTES

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Note 3: If the effluent flow past an effluent monitor is known to have stopped, indicating that the release path is isolated, the effluent monitor reading is no longer VALID for classification purposes.

Note 4: The pre-calculated effluent monitor values presented in EALs RA1.1, RS1.1 and RG1.1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

Note 5: If the equipment in the listed room or area was already inoperable or out-of-service before the event occurred, then no emergency classification is warranted.

Note 6: If CONTAINMENT CLOSURE is re-established prior to exceeding the 30-minute time limit, declaration of a General Emergency is not required.

Note 7: This EAL does not apply to routine traffic impediments such as fog, snow, ice, or vehicle breakdowns or accidents.

Note 8: A manual trip action is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and does not include manually driving in control rods or implementation of boron injection strategies.

Note 9: In the absence of reliable NCS temperature indication caused by the loss of decay heat removal capability, classification should be based on time to boil data when in Mode 5 and 6.

Note 10: If the loss of containment cooling threshold is exceeded due to loss of both trains of VX-CARF, this EAL only applies if at least one train of VX-CARF is not operating, per design, after the 10 minute actuation delay for greater than or equal to 15 minutes.

Note 11: If the affected SAFETY SYSTEM train was already inoperable or out of service before the hazardous event occurred, then this emergency classification is not warranted.

Note 12: If the hazardous event only resulted in VISIBLE DAMAGE, with no indications of degraded performance to at least one train of a SAFETY SYSTEM, then this emergency classification is not warranted.

3 — Natural or Tech. Hazard

Alert — None

[Refer to EAL CA6.1 OR SA9.1 for escalation due to natural or technological hazard]

Unusual Event — Hazardous event

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

HU3.1
A tornado strike within the PROTECTED AREA

HU3.2
Internal room or area FLOODING of a magnitude sufficient to require manual or automatic electrical isolation of a SAFETY SYSTEM component needed for the current operating mode

HU3.3
Movement of personnel within the PROTECTED AREA is IMPEDED due to an offsite event involving hazardous materials (e.g., an offsite chemical spill or toxic gas release)

HU3.4
A hazardous event that results in on-site conditions sufficient to prohibit the plant staff from accessing the site via personal vehicles (Note 7)

4 — Fire

General Emergency — None

Site Area Emergency — None

Alert — [Refer to EAL CA6.1 OR SA9.1 for escalation due to FIRE]

Table H-1 Fire Areas
- Reactor Building (Containment)
- Auxiliary Building
- Diesel Generator Rooms
- RN Pump House
- Dog Houses
- Standby Shutdown Facility (SSF)

Unusual Event — FIRE potentially degrading the level of safety of the plant

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

HU4.1
A FIRE is **not** extinguished within 15 min. of **any** of the following FIRE detection indications (Note 1):
- Report from the field (i.e., visual observation)
- Receipt of multiple (more than 1) fire alarms or indications
- Field verification of a single fire alarm

AND
The FIRE is located within any Table H-1 area

HU4.2
Receipt of a single fire alarm (i.e., no other indications of a FIRE)
AND
The fire alarm is indicating a FIRE within any Table H-1 area
AND
The existence of a FIRE is not verified within 30 min. of alarm receipt (Note 1)

HU4.3
A FIRE within the plant PROTECTED AREA not extinguished within 60 min. of the initial report, alarm or indication (Note 1)

HU4.4
A FIRE within the plant PROTECTED AREA that requires firefighting support by an offsite fire response agency to extinguish

Table H-2 Safe Operation & Shutdown Rooms/Areas

Bldg. Elevation	Unit 1 Room/Area	Unit 2 Room/Area	Mode
Auxiliary 577'	Rm 478 (1EMXA)	Rm 469 (2EMXA)	4
	Rm 496 (1ETA)	Rm 486 (2ETA)	4
	Rm 496 (1EMXS)	Rm 486 (2EMXS)	4
	AB-577', JJ-57 (1MXK)	AB-577', JJ-57 (2MXK)	4
Auxiliary 560'	Rm 330 (1EMXJ)	Rm 320 (2EMXJ)	4
	Rm 372 (1ETB)	Rm 362 (2ETB)	4
	Rm 372 (1EMXD)	Rm 362 (2EMXD)	4

5 — Hazardous Gases

General Emergency — None

Site Area Emergency — None

Alert — Gaseous release IMPEDING access to equipment necessary for normal plant operations, cooldown or shutdown

Modes: 4

HA5.1
Release of a toxic, corrosive, asphyxiant or flammable gas into **any** Table H-2 rooms or areas
AND
Entry into the room or area is prohibited or IMPEDED (Note 5)

Unusual Event — None

6 — Control Room Evacuation

CNS

Site Area Emergency — Inability to control a key safety function from outside the Control Room

Modes: 1 | 2 | 3 | 4 | 5 | 6

HS6.1
An event has resulted in plant control being transferred from the Control Room to the Auxiliary Shutdown Panels or Standby Shutdown Facility
AND
Control of **any** of the following key safety functions is **not** reestablished within 15 min. (Note 1):
- Reactivity (Modes 1, 2 and 3 **only**)
- Core Cooling
- NCS heat removal

Alert — Control Room evacuation resulting in transfer of plant control to alternate locations

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

HA6.1
An event has resulted in plant control being transferred from the Control Room to the Auxiliary Shutdown Panels or Standby Shutdown Facility

Unusual Event — None

7 — EC Judgment

General Emergency — Other conditions exist which in the judgment of the Site Emergency Coordinator warrant declaration of a General Emergency

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

HG7.1
Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area

Site Area Emergency — Other conditions existing that in the judgment of the Site Emergency Coordinator warrant declaration of a Site Area Emergency

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

HS7.1
Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts, (1) toward site personnel or equipment that could lead to the likely failure of or, (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the SITE BOUNDARY.

Alert — Other conditions exist that in the judgment of the Site Emergency Coordinator warrant declaration of an Alert

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

HA7.1
Other conditions exist which, in the judgment of the Emergency Coordinator, indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Unusual Event — Other conditions existing that in the judgment of the Site Emergency Coordinator warrant declaration of a UE

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

HU7.1
Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of SAFETY SYSTEMS occurs.

E — ISFSI

General Emergency — None

Table E-1 ISFSI Dose Limits

NAC UMS	NAC MAGNASTOR
• 100 mrem/hr (neutron + gamma) on the side • 100 mrem/hr (neutron + gamma) on the top • 200 mrem/hr (neutron + gamma) at the air inlets or outlets	• 240 mrem/hr gamma on the vertical surfaces • 10 mrem/hr neutron on the vertical surfaces • 900 mrem/hr (neutron + gamma) on the top

Unusual Event — Damage to a loaded cask CONFINEMENT BOUNDARY

Modes: 1 | 2 | 3 | 4 | 5 | 6 | DEF

EU1.1
Damage to a loaded canister CONFINEMENT BOUNDARY as indicated by an on-contact radiation reading on the surface of a loaded spent fuel cask > **any** Table E-1 dose limit

Modes: 1 Power Operation | 2 Startup | 3 Hot Standby | 4 Hot Shutdown | 5 Cold Shutdown | 6 Refuel | DEF Defueled

DUKE ENERGY

Catawba Nuclear Station

CSD-EP-CNS-0101-02 Rev 000

GENERAL EMERGENCY | SITE AREA EMERGENCY | ALERT | UNUSUAL EVENT

S — System Malfunct.

1 — Loss of Essential AC Power

General Emergency — Prolonged loss of **all** offsite and **all** onsite AC power to essential buses

Modes: 1 | 2 | 3 | 4

SG1.1
Loss of **all** offsite and **all** onsite AC power capability to essential 4160V buses 1(2)ETA and 1(2)ETB
AND
SSF fails to supply NC pump seal injection
OR
CA supply to SGs
AND EITHER:
- Restoration of at least one essential bus in < 4 hours is **not** likely (Note 1)
- Core Cooling RED PATH conditions met

Site Area Emergency — Loss of **all** offsite and **all** onsite AC power to essential buses for 15 minutes or longer

Modes: 1 | 2 | 3 | 4

SS1.1
Loss of **all** offsite and **all** onsite AC power capability to essential 4160V buses 1(2)ETA and 1(2)ETB for ≥ 15 min. (Note 1)

Alert — Loss of **all but one** AC power source to essential buses for 15 minutes or longer

Modes: 1 | 2 | 3 | 4

SA1.1
AC power capability, Table S-1, to essential 4160V buses 1(2)ETA and 1(2)ETB reduced to a single power source for ≥ 15 min. (Note 1)
AND
Any additional single power source failure will result in loss of **all** AC power to SAFETY SYSTEMS

Unusual Event — Loss of **all** offsite AC power capability to essential buses for 15 minutes or longer

Modes: 1 | 2 | 3 | 4

SU1.1
Loss of **all** offsite AC power capability, Table S-1, to essential 4160V buses 1(2)ETA and 1(2)ETB for ≥ 15 min. (Note 1)

Table S-1 AC Power Sources

Offsite
- ATC (Train A)
- SATA (Train A) (if already aligned)
- ATD (Train B)
- SATB (Train B) (if already aligned)

Onsite
- D/G A (Train A)
- D/G B (Train B)

2 — Loss of Vital DC Power

General Emergency — Loss of **all** essential AC and vital DC power sources for 15 minutes or longer

Modes: 1 | 2 | 3 | 4

SG1.2
Loss of **all** offsite and **all** onsite AC power capability to essential 4160V buses 1(2)ETA and 1(2)ETB for ≥ 15 min.
AND
Loss of **all** 125 VDC power based on battery bus voltage indications < 105 VDC on **all** vital DC buses EDA, EDC, EDB and EDD for ≥ 15 min.
(Note 1)

Site Area Emergency — Loss of all vital DC power for 15 minutes or longer

Modes: 1 | 2 | 3 | 4

SS2.1
Loss of **all** 125 VDC power based on battery bus voltage indications < 105 VDC on **all** vital DC buses EDA, EDC, EDB and EDD for ≥ 15 min. (Note 1)

Alert — None

Unusual Event — None

3 — Loss of CR Indications

General Emergency — None

Site Area Emergency — None

Alert — UNPLANNED loss of Control Room indications for 15 minutes or longer with a significant transient in progress

Modes: 1 | 2 | 3 | 4

SA3.1
An UNPLANNED event results in the inability to monitor one or more Table S-2 parameters from within the Control Room for ≥ 15 min. (Note 1)
AND
Any significant transient is in progress, Table S-3

Unusual Event — UNPLANNED loss of Control Room indications for 15 minutes or longer

Modes: 1 | 2 | 3 | 4

SU3.1
An UNPLANNED event results in the inability to monitor one or more Table S-2 parameters from within the Control Room for ≥ 15 min. (Note 1)

Table S-3 Significant Transients
- Reactor trip
- Runback > 25% thermal power
- Electrical load rejection > 25% electrical load
- Safety injection actuation

4 — NCS Activity

General Emergency — None

Unusual Event — NCS activity greater than Technical Specification allowable limits

Modes: 1 | 2 | 3 | 4

SU4.1
NCS activity > Technical Specification 3.4.16 limits or Facility Operating License limits (151/159), whichever is more restrictive

Table S-2 Safety System Parameters
- Reactor power
- NCS level
- NCS pressure
- In-core T/C temperature
- Level in at least one S/G
- Auxiliary or emergency feed flow in at least one S/G

5 — NCS Leakage

General Emergency — None

Site Area Emergency — None

Unusual Event — NCS leakage for 15 minutes or longer

Modes: 1 | 2 | 3 | 4

SU5.1
NCS unidentified or pressure boundary leakage > 10 gpm for ≥ 15 min.
OR
NCS identified leakage > 25 gpm for ≥ 15 min.
OR
Leakage from the NCS to a location outside containment > 25 gpm for ≥ 15 min.
(Note 1)

6 — RPS Failure

General Emergency — None

Site Area Emergency — Inability to shut down the reactor causing a challenge to core cooling or NCS heat removal

Modes: 1

SS6.1
An automatic or manual trip fails to shut down the reactor as indicated by reactor power ≥ 5%
AND
All actions to shut down the reactor are not successful as indicated by reactor power ≥ 5%
AND EITHER:
- Core Cooling RED PATH conditions met
- Heat Sink RED PATH conditions met

Alert — Automatic or manual trip fails to shut down the reactor and subsequent manual actions taken at the reactor control consoles are not successful in shutting down the reactor

Modes: 1

SA6.1
An automatic or manual trip fails to shut down the reactor as indicated by reactor power ≥ 5%
AND
Manual trip actions taken at the reactor control console (manual reactor trip switches or turbine manual trip) are **not** successful in shutting down the reactor as indicated by reactor power ≥ 5% (Note 8)

Unusual Event — Automatic or manual trip fails to shut down the reactor

Modes: 1

SU6.1
An automatic trip did **not** shut down the reactor as indicated by reactor power ≥ 5% after **any** RPS setpoint is exceeded
AND
A subsequent automatic trip or manual trip action taken at the reactor control console (manual reactor trip switches or turbine manual trip) is successful in shutting down the reactor as indicated by reactor power < 5% (Note 8)

SU6.2
A manual trip did **not** shut down the reactor as indicated by reactor power ≥ 5% after **any** manual trip action was initiated
AND
A subsequent automatic trip or manual trip action taken at the reactor control console (manual reactor trip switches or turbine manual trip) is successful in shutting down the reactor as indicated by reactor power < 5% (Note 8)

NOTES

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Note 3: If the effluent flow past an effluent monitor is known to have stopped, indicating that the release path is isolated, the effluent monitor reading is no longer VALID for classification purposes.

Note 4: The pre-calculated effluent monitor values presented in EALs RA1.1, RS1.1 and RG1.1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

Note 5: If the equipment in the listed room or area was already inoperable or out-of-service before the event occurred, then no emergency classification is warranted.

Note 6: If CONTAINMENT CLOSURE is re-established prior to exceeding the 30-minute time limit, declaration of a General Emergency is not required.

Note 7: This EAL does not apply to routine traffic impediments such as fog, snow, ice, or vehicle breakdowns or accidents.

Note 8: A manual trip action is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and does not include manually driving in control rods or implementation of boron injection strategies.

Note 9: In the absence of reliable NCS temperature indication caused by the loss of decay heat removal capability, classification should be based on time to boil data when in Mode 5 and 6.

Note 10: If the loss of containment cooling threshold is exceeded due to loss of both trains of VX-CARF, this EAL only applies if at least one train of VX-CARF is not operating, per design, after the 10 minute actuation delay for greater than or equal to 15 minutes.

Note 11: If the affected SAFETY SYSTEM train was already inoperable or out of service before the hazardous event occurred, then this emergency classification is not warranted.

Note 12: If the hazardous event only resulted in VISIBLE DAMAGE, with no indications of degraded performance to at least one train of a SAFETY SYSTEM, then this emergency classification is not warranted.

7 — Loss of Comm

Unusual Event — Loss of **all** onsite or offsite communications capabilities

Modes: 1 | 2 | 3 | 4

SU7.1
Loss of **all** Table S-4 onsite communication methods
OR
Loss of **all** Table S-4 ORO communication methods
OR
Loss of **all** Table S-4 NRC communication methods

Table S-4 Communication Methods

System	Onsite	ORO	NRC
Public Address	X		
Internal Telephones	X		
Onsite Radios	X		
DEMNET		X	
Commercial Telephones		X	X
Satellite Phones		X	X
Cellular Phones		X	X
NRC Emergency Telecommunications System (ETS)		X	X

8 — CMT Failure

Unusual Event — Failure to isolate containment or loss of containment pressure control

Modes: 1 | 2 | 3 | 4

SU8.1
EITHER:
Any penetration is **not** isolated within 15 min. of a VALID containment isolation signal (Note 1)
OR
Containment pressure > 3 psig with < one full train of containment cooling operating per design for > 15 min.
(Notes 1, 10)

9 — Hazardous Event Affecting Safety Systems

Table S-5 Hazardous Events
- Seismic event (earthquake)
- Internal or external FLOODING event
- High winds or tornado strike
- FIRE
- EXPLOSION
- Other events with similar hazard characteristics as determined by the Shift Manager

Alert — SA9 Hazardous event affecting a SAFETY SYSTEM needed for the current operating mode

Modes: 1 | 2 | 3 | 4

SA9.1
The occurrence of **any** Table S-5 hazardous event
AND
- Event damage has caused indications of degraded performance on one train of a SAFETY SYSTEM needed for the current operating mode

AND EITHER of the following:
- Event damage has caused indications of degraded performance to a second train of the SAFETY SYSTEM needed for the current operating mode.
- Event damage has resulted in VISIBLE DAMAGE to the second train of the SAFETY SYSTEM needed for the current operating mode

(Note 11, 12)

CNS

Table F-2 Containment Radiation - R/hr (EMF53A/B)

Time After S/D	FC Loss	NCS Loss	CMT Potential Loss
0 - 1	550	8.8	5500
1 - 2	400	8.4	4000
2 - 8	160	7.0	1600
>8	100	6.2	1000

F — Fission Product Barriers

FG1.1 Modes: 1 | 2 | 3 | 4
Loss of **any** two barriers
AND
Loss or potential loss of third barrier (Table F-1)

FS1.1 Modes: 1 | 2 | 3 | 4
Loss or potential loss of **any** two barriers (Table F-1)

FA1.1 Modes: 1 | 2 | 3 | 4
Any loss or **any** potential loss of either Fuel Clad or NCS (Table F-1)

Table F-1 Fission Product Barrier Threshold Matrix

	Fuel Clad (FC) Barrier		Reactor Coolant System (NCS) Barrier		Containment (CMT) Barrier	
	Loss	Potential Loss	Loss	Potential Loss	Loss	Potential Loss
A. NCS or SG Tube Leakage	None	None	1. An automatic or manual ECCS (SI) actuation required by **EITHER**: • UNISOLABLE NCS leakage • SG tube RUPTURE	1. CSFST Integrity-RED PATH conditions met	1. A leaking or RUPTURED SG is FAULTED outside of containment	None
B. Inadequate Heat Removal	1. CSFST Core Cooling-RED PATH conditions met	1. CSFST Core Cooling-ORANGE PATH conditions met 2. CSFST Heat Sink-RED PATH conditions met **AND** Heat sink is required	None	1. CSFST Heat Sink-RED PATH conditions met **AND** Heat sink is required	None	1. CSFST Core Cooling-RED PATH conditions met **AND** Restoration procedures **not** effective within 15 min. (Note 1)
C. CMT Radiation / NCS Activity	1. EMF53A/B > Table F-2 column "FC Loss" 2. Dose equivalent I-131 coolant activity > 300 µCi/gm	None	1. EMF53A/B > Table F-2 column "NCS Loss"	None	None	1. EMF53A/B > Table F-2 column "CMT Potential Loss"
D. CMT Integrity or Bypass	None	None	None	None	1. Containment isolation is required **AND EITHER** • Containment integrity has been lost based on Emergency Coordinator judgment • UNISOLABLE pathway from Containment to the environment exists 2. Indications of NCS leakage outside of containment	1. CSFST Containment-RED PATH conditions met 2. Containment hydrogen concentration > 6% 3. Containment pressure > 3 psig with < one full train of containment cooling operating per design for > 15 min. (Notes 1, 10)
E. EC Judgment	1. **Any** condition in the opinion of the Emergency Coordinator that indicates loss of the Fuel Clad barrier	1. **Any** condition in the opinion of the Emergency Coordinator that indicates potential loss of the Fuel Clad barrier	1. **Any** condition in the opinion of the Emergency Coordinator that indicates loss of the NCS barrier	1. **Any** condition in the opinion of the Emergency Coordinator that indicates potential loss of the NCS barrier	1. **Any** condition in the opinion of the Emergency Coordinator that indicates loss of the Containment barrier	1. **Any** condition in the opinion of the Emergency Coordinator that indicates potential loss of the Containment barrier

EAL Identifier

XXX.X

Category (R, H, E, C, S, F)
Emergency classification (G, S, A, U)
Sequential number within subcategory/classification
Subcategory number (1 if no subcategory)

MODES 1, 2, 3 & 4