Scenario Event Description

NRC Scenario 1

Facility:	**McGuire**	Scenario No.:	**1**	Op Test No.:	**N10-1**
Examiners:		Operators:			(SRO)
					(RO)
					(BOP)

Initial Conditions:	The plant is at 99% power (BOL), following an unplanned load reduction four days ago to complete corrective maintenance on the 1B CF Pump. The maintenance was completed and the pump restarted, and power level raised to the present power level three days ago. The 1B CF Pump is operating in MANUAL Control, for Vendor observation. Upon Turnover the crew is expected to restore the 1B CF Pump to Auto Control.
Turnover:	The following equipment is Out-Of-Service: 1A D/G is OOS to correct a cooling water system leak. 1EMF45A, Nuclear Service Water Radiation Monitor, failed last shift (IAE is investigating) and MCB Annunciator 1AD-9, D-6, "GLYCOL EXPANSION TNK HI-HI LEVEL," has alarmed spuriously several times over the last hour (IAE is investigating).

Event No.	Malf. No.	Event Type*	Event Description
1	NA	N-BOP N-SRO	Return 1B CF Pump to Auto Control
2	FW005	I(TS)-SRO	FWST Level Channel failure
3	IDE003C	C-RO C (TS)-SRO	Steam Dump Valve fails Open
4	OV0749C OV0748C	I-RO I-SRO	Reactor Control DCS failure
5	OV0773B	C-BOP C(TS)-SRO	1B CF Pump Rollback
6	LF003B IRE009	R-RO C-BOP C-SRO	1CF Pump trips/Turbine Runback/Rods fail in Auto
7	NC005D4	M-RO M-BOP M-SRO	Rod Ejection/SB LOCA
8	NI009A NI009B	NA	1NI-9A/10B fail to OPEN automatically
9	ISE003A ISE003B	NA	Phase A Containment Isolation Auto Signal failure

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

McGuire 2010 NRC Scenario #1

The plant is at 99% power (BOL), following an unplanned load reduction four days ago to complete corrective maintenance on the 1B CF Pump. The maintenance was completed and the pump restarted, and power level raised to the present power level three days ago. The 1B CF Pump is operating in MANUAL Control, for Vendor observation. Upon Turnover the crew is expected to restore the 1B CF Pump to Auto Control.

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Shortly after taking the watch, the operator will place the 1B CF Pump back in AUTO control in accordance with Enclosure 4.14, "Changing CF Pump Auto/Manual Control," of OP/1/A/6250/001, "Condensate and Feedwater System."

Afterwards, FWST Level, Channel I will fail low. The operator will respond in accordance with OAC Alarm, M1A003, FWST LEVEL CHANNEL I. The operator will address Technical Specification 3.3.2, "ESFAS Instrumentation."

After this, Steam Dump Valve 1SB-24 will fail to the full open position. The operator will enter AP/1/A/5500/01, "Steam Leak." The operator will address Technical Specification 3.4.1, "RCS Pressure, Temperature and Flow Departure From Nucleate Boiling (DNB) Limits."

Then, a Reactor Control DCS failure will occur causing continuous rod insertion. The operator will enter AP/1/A/5500/14, "Rod Control Malfunction." After the implementation of the AP, the failure will be corrected, and rods will be placed back in AUTO.

Subsequently, the 1B CF will rollback to minimum speed requiring manual speed control of the Main Feed Pumps and a reduction in Turbine load may be needed to stabilize the plant. The operator will enter AP/1/A/5500/06, "S/G Feedwater Malfunction." The operator will address Technical Specification 3.4.1, "RCS Pressure, Temperature and Flow Departure from Nucleate Boiling (DNB) Limits."

Following this, the 1B CF Pump will trip and a Turbine Runback will occur. The operator will enter AP/1/A/5500/03, "Load Rejection." During the Runback, the rods will fail to move in AUTO, and the operator will need to drive rods in Manual to stabilize the plant.

During the plant stabilization, Control Rod D-4 will be ejected from the core causing a 1000 gpm Small Break LOCA. The operator will trip the Reactor and actuate Safety Injection, and then enter EP/1/A/5000/E-0, "Reactor Trip or Safety Injection." On the Safety Injection actuation 1NI-9A and 1NI-10B will fail to automatically open. The operator will attempt to manually open 1NI-9A unsuccessfully, and open 1NI-10B manually to restore NV Pump injection flow. Additionally, on the Safety Injection, both Trains of Phase A Containment Isolation will fail to actuate automatically, requiring that the operator manually actuate Containment Isolation Phase A.

Upon completion of E-0, the operator will transition to EP/1/A/5000/E-1, "Loss of Reactor or Secondary Coolant." On the transition, an Orange Path will exist on the Containment Critical Safety Function, and the transition will be made to EP/1/A/5000/FR-Z.1, "Response to High Containment Pressure," prior to E-1. Upon completion of FR-Z.1 the operator will transition to E-1.

The scenario will terminate at Step 10 of E-1, after the crew has been directed to return back to the beginning of E-1.

Critical Tasks:

E-0 J

Establish flow from at least one high-head ECCS Pump by opening 1NI-10B before transition out of E-0.

Safety Significance: Failure to establish flow from the NV System after failure of the automatic actuation constitutes a demonstrated inability by the operator to recognize a failure and/or correct a failure of an ESF System or component. The FSAR analyses of response to high energy line breaks assume that at least one train of safeguards actuates. If the minimum assumed ESF components are NOT actuated the Safety Analyses results are invalid. Because compliance with the assumptions in the FSAR are part of the facility license, failure to comply constitutes a violation of the license condition.

E-0 O

Actuate Phase A Containment Isolation before transition out of E-0.

Safety Significance: Failure to close at least one Containment Isolation Valve on each critical penetration under the postulated conditions when it is possible to do so, constitutes mis-operation leading to degradation of the Containment Barrier. Failure to take this action leads to an unnecessary release of fission products to the auxiliary building, increasing the potential for release to the environment, and reducing accessibility to vital equipment within the Auxiliary Building. Higher radiation levels within the Auxiliary Building will result in a degradation of ALARA principles.

SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
☐	Sim. Setup	**Rod Step On**	
☐		**Reset to Temp** I/C 157.	**T = 0 Malfunctions:** **NI009A, 1NI-9A Fails to Open Automatically** **NI009B, 1NI-10B Fails to Open Automatically** **EPQ001A, Loss of DG Control Power** **EMF145AL = 1E+7 Lo Range failed** **OVR-NI014C 1NI-9A Open PB set to OFF** **ISE003A = 3, Block Auto, Train Phase A CIS fails in AUTO** **ISE003B = 3, Block Auto, Train Phase A CIS fails in AUTO**
☐		**RUN** **Reset all SLIMs**	**Place Tagout/O-Stick on:** **1A D/G (Tagout)** **1EMF45 (O-Stick)** **MCB Annunciator 1AD-9, D-6 (O-stick)**
☐		**Update** Status Board, **Setup OAC**	**NOTE:** RMWST DO = <1000 ppb.
☐		**Freeze.**	
☐		**Update Fresh Tech. Spec. Log.**	
☐		**Fill out the NEO's Available section of Shift Turnover Info.**	
☐	Prior to Crew Briefing	**RUN**	

	Bench Mark	ACTIVITY	DESCRIPTION
☐	**Crew Briefing** 1. Assign Crew Positions based on evaluation requirements 2. Review the Shift Turnover Information with the crew. 3. Provide Enclosure 4.14 of OP/1/A/6250/001, marked up so that Step 2.1 is initialed, and Step 3.1 Checkbox is CHECKED. 4. Provide T-SAIL Entry for 1A D/G. 5. Direct the crew to Review the Control Boards taking note of present conditions, alarms.		
☐	T-0	Begin Familiarization Period	
☐	At direction of examiner	**Event 1**	Return 1B CF Pump to Auto Control
☐	At direction of examiner	**Event 2** **(XMT) FW005 =0** **No Ramp** **Trigger #1**	FWST Level Channel failure
☐	At direction of examiner	**Event 3** **(MALF) IDE003C =100%** **No Ramp** **Trigger #3**	Steam Dump Valve fails Open **NOTE: (MALF) IDE003 will need to deleted during the event.** **NOTE: Trigger #5 (LOA-SB009 = 0 (4 minutes delayed)) is operated when operator is dispatched to isolate 1SB-24.**
☐	At direction of examiner	**Event 4** **(MALF) OV0749C = 0** **(MALF) OV0748C = 0** **Trigger #7**	Reactor Control DCS failure
☐	At direction of examiner	**Event 5** **OV0773B = 2 (True)** **Trigger #9**	1B CF Pump Rollback
☐	At direction of examiner	**Event 6** **(MALF) LF003B** **(MALF) IRE009 = 0** **Trigger #11**	1CF Pump trips/Turbine Runback/Rods fail in Auto

	Bench Mark	ACTIVITY	DESCRIPTION
☐	At direction of examiner	**Event 7** **(MALF) NC005D4 = 1000 gpm** **No Ramp** **Trigger #13**	Rod Ejection/SB LOCA **NOTE: Trigger #15 (LOA-NI024 = RI (2 minutes delayed)) is operated when operator is dispatched to Close Breaker for 1NI-173A.** **NOTE: Trigger #17 (LOA-NI025 = RI (3 minutes delayed)) is operated when operator is dispatched to Close Breaker for 1NI-178B.**
☐	Continued from Event 7	**Event 8** **(MALF) NI009A** **(MALF) NI009B**	1NI-9A/10B fail to OPEN automatically **NOTE: These malfunctions are entered at T=0**
☐	Continued from Event 7	**Event 9** **(MALF) ISE003A = Block Auto** **(MALF) ISE003B = Block Auto**	Phase A Containment Isolation Auto Signal failure **NOTE: These malfunctions are entered at T=0**
☐	**Terminate the scenario upon direction of Lead Examiner**		

Op Test No.: N10-1	Scenario # 1	Event # 1	Page 8 of 50
Event Description:	**Return 1B CF Pump to Auto Control**		

Shortly after taking the watch, the operator will place the 1B CF Pump back in AUTO control in accordance with Enclosure 4.14, "Changing CF Pump Auto/Manual Control," of OP/1/A/6250/001, "Condensate and Feedwater System."	
Booth Operator Instructions:	**NA**
Indications Available:	**NA**

Time	Pos.	Expected Actions/Behavior	Comments
OP/1/A/6250/001, CONDENSATE AND FEEDWATER SYSTEM ENCLOSURE 4.14, CHANGING CF PUMP AUTO/MANUAL CONTROL			
	BOP	(Step 3.2) Perform the following sections, as applicable:	
		• Section 3.6, Placing CF Pump in Auto During At Power Operation	
	BOP	(Step 3.6) Placing CF Pump in Auto During At Power Operation	
	BOP	(Step 3.6.1) Check one CF Pump currently operating in auto:	**NOTE:** The BOP will place the 1B CF Pump in AUTO.
		• 1A CF Pump	
		OR	
		• 1B CF Pump	
	BOP	(Step 3.6.2.2) IF 1A CF Pump Turbine in Manual…	**NOTE:** The 1A CF Pump is NOT in MANUAL.
	BOP	(Step 3.6.3) IF placing 1B CF Pump Turbine in auto, perform the following:	
	BOP	(Step 3.6.3.1) IF 1B CF Pump Turbine in L-manual…	**NOTE:** The 1B CF Pump is NOT in L-MANUAL.

Op Test No.: N10-1 Scenario # 1 Event # 1 Page 9 of 50

Event Description: **Return 1B CF Pump to Auto Control**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3.6.3.2) IF 1B CF Pump Turbine in manual, perform the following:	
		• Check the following:	
		• 1B CF Pump Turbine "LP GOV CNTRL" in manual	
		• 1B CF Pump Turbine "HP GOV CNTRL" in manual	
		• Using raise or lower pushbutton(s) on 1B CF Pump Turbine "LP GOV CNTRL/HP GOV CNTRL" as required, slowly adjust 1B CF Pump Turbine speed to match 1A CF Pump Turbine speed (within 100-200 RPM) while monitoring the following:	**NOTE:** The BOP will adjust 1B CF Pump LP Governor SLIMs to raise Turbine Speed.
		• "FPB DEM" (Feedpump B Demand) in RPM	**NOTE:** These indications are located on the DCS Computer Screen.
		• "SEL SPD" (FPB Selected Speed) in RPM	
		• "FPA DEM" (Feedpump A Demand) in RPM	
		• "SEL SPD" (FPA Selected Speed) in RPM	
		• "AUTO SPT" (Auto Setpoint signal to both CF Pumps) in RPM	
		• Place 1B CF Pump Turbine in auto as follows:	
		• Determine governor that is controlling flow:	**NOTE:** The 1B CF Pump LP Governor is controlling flow.
		▪ 1B CF Pump Turbine "LP GOV CNTRL"	
		• 1B CF Pump Turbine "HP GOV CNTRL"	
		• Place governor that is controlling flow in auto:	
		• 1B CF Pump Turbine "LP GOV CNTRL"	**NOTE:** The BOP will place the 1B CF Pump LP Governor in AUTO.

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Event Description: **Return 1B CF Pump to Auto Control**

Time	Pos.	Expected Actions/Behavior	Comments
		OR	
		• 1B CF Pump Turbine "HP GOV CNTRL"	
		• Place the other governor in auto:	
		• 1B CF Pump Turbine "LP GOV CNTRL"	
		OR	
		• 1B CF Pump Turbine "HP GOV CNTRL"	**NOTE:** The BOP will place the 1B CF Pump HP Governor in AUTO.
	BOP	(Step 3.6.3.3) Check S/G levels and CF flows stable.	
At the discretion of the Lead Examiner move to Event #2.			

Op Test No.: N10-1	Scenario # 1	Event # 2	Page 11 of 50
Event Description:	**FWST Level Channel failure**		

Afterwards, FWST Level, Channel I will fail low. The operator will respond in accordance with OAC Alarm, M1A003, FWST LEVEL CHANNEL I. The operator will address Technical Specification 3.3.2, "ESFAS Instrumentation."

Booth Operator Instructions: **Operate Trigger #1 (XMT-FW005 (0))**

Indications Available:

- OAC Alarm, M1A0003, FWST LEVEL CH 1
- 1FWP-5010, FWST CH 1, indicates 0.

Time	Pos.	Expected Actions/Behavior	Comments
OAC ALARM, M1A0003, FWST LEVEL CH I			
	BOP	(Lo Step 1) Initiate Makeup.....	**NOTE:** The BOP will conduct a Channel Check and determine that makeup is NOT needed, but that one Channel has failed.
	BOP	(Lo Step 1) Refer to OP/1/A/6100/010 M (Annunciator Response for Panel 1AD12, E4 (FWST at Makeup Level).	**NOTE:** This ARP deals with an actual low level.
	CRS	(Lo-Lo Step 1) Refer to TS 3.5.4.	**NOTE:** The CRS will check TS based on a failed FWST level channel and determine that TS 3.3.2 applies.
TECHNICAL SPECIFICATION 3.3.2, ESFAS INSTRUMENTATION			
	CRS	LCO 3.3.2 The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE.	
	SRO	APPLCIABILITY: According to Table 3.3.2-1.	
	CRS	ACTIONS	

Op Test No.: N10-1 Scenario # 1 Event # 2 Page 12 of 50

Event Description: **FWST Level Channel failure**

<table>
<tr><th>Time</th><th>Pos.</th><th colspan="3">Expected Actions/Behavior</th><th>Comments</th></tr>
<tr><td></td><td></td><td colspan="3"></td><td></td></tr>
<tr><td rowspan="3"></td><td rowspan="3">CRS</td><td>CONDITION</td><td>REQUIRED ACTION</td><td>COMPLETION TIME</td><td rowspan="3">**NOTE:** The CRS will determine that Functional Unit 7.A on Table 3.3.2-1 IS affected by this event, and that Conditions A and P are required.</td></tr>
<tr><td>A. One or more Functions with one or more required channels inoperable.</td><td>A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s).</td><td>Immediately</td></tr>
<tr><td>P. One channel inoperable.</td><td>P.1 Place channel in trip.
AND
P.2 Restore channel to OPERABLE status.</td><td>1 hour

48 hours</td></tr>
<tr><td></td><td></td><td colspan="3"></td><td></td></tr>
<tr><td colspan="6">**At the discretion of the Lead Examiner move to Event #3.**</td></tr>
</table>

Op Test No.: N10-1	Scenario # 1	Event # 3	Page 13 of 50
Event Description:	**Steam Dump Valve fails Open**		

After this, Steam Dump Valve 1SB-24 will fail to the full open position. The operator will enter AP/1/A/5500/01, "Steam Leak." The operator will address Technical Specification 3.4.1, "RCS Pressure, Temperature and Flow Departure From Nucleate Boiling (DNB) Limits."

Booth Operator Instructions: **Operate Trigger #3 (IDE003C(100))**

NOTE: This malfunction must be deleted when the RO takes the Steam Dumps to OFF RESET.

Indications Available:

- OAC Alarms, U1 PZR PRESS I, II, III, AND IV
- 1SB-24 Red Status light is LIT.
- Tavg-Tref on Rod Motion Demand moves negative, w/Auto Rod Motion Signal
- No actual Auto Rod motion (Blocked due to C-11)
- MCB Annunciator 1AD-6, C-6, PZR LO PRESS CONTROL

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The RO may defeat the Steam Dumps by the time that AP1 is entered.
AP/1/A/5500/01, STEAM LEAK			
	RO/ BOP	(Step 1) Monitor Foldout page.	
	RO	(Step 2) Reduce turbine load to maintain the following:	**NOTE:** The RO will take the Turbine to Manual and reduce load by ≈20-80MWe.
		• Excore NI's – LESS THAN OR EQUAL TO 100%	
		• NC Loop D/T's – LESS THAN 60°F D/T	
		• T-Ave – AT T-REF.	
	CRS	(Step 3) Check containment entry – IN PROGRESS.	**NOTE:** A Containment Entry is NOT in progress.
	CRS	(Step 3 RNO) GO TO Step 5.	

Op Test No.: N10-1 Scenario # 1 Event # 3 Page 14 of 50

Event Description: **Steam Dump Valve fails Open**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 5) Check Pzr pressure prior to event – GREATER THAN P-11 (1955 PSIG).	
	BOP	(Step 6) Check Pzr level – STABLE OR GOING UP.	
	CRS	(Step 7) IF AT ANY TIME while in this procedure Pzr level cannot be maintained stable, THEN RETURN TO Step 6.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	(Step 8) GO TO Step 12.	
	CRS	(Step 12) Announce occurrence on paging system.	**NOTE:** The CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	BOP	(Step 13) Identify and isolate leak on Unit 1:	
		• Check SM PORVs – CLOSED.	
	RO	• Check condenser dump valves – CLOSED.	**NOTE:** One Steam Dump Valve (1SB-24) will have failed opened and most likely have been closed by the RO already. IF NOT, the valves will be closed here.
	RO	(Step 13b RNO) IF steam dumps required to be closed, THEN perform the following;	
		• Select "OFF RESET" on the following switches:	**Booth Instructor:** Delete MALF IDE003C when the RO takes the Steam Dumps to OFF RESET.
		• "STEAM DUMP INTLK BYPASS CHANNEL A"	

Op Test No.: N10-1 Scenario # 1 Event # 3 Page 15 of 50

Event Description: **Steam Dump Valve fails Open**

Time	Pos.	Expected Actions/Behavior	Comments
		• "STEAM DUMP INTLK BYPASS CHANNEL B".	
		• IF valve will not close, THEN…..	**NOTE:** Valve Closes when Steam Dumps taken to OFF Reset.
		• WHEN leaking condenser dump valve is isolated OR repaired, THEN return the following switches to "ON":	**NOTE:** This is a Continuous Action. The SRO will make both board operators aware.
		• "STEAM DUMP INTLK BYPASS CHANNEL A"	
		• "STEAM DUMP INTLK BYPASS CHANNEL B".	**NOTE:** The CRS will dispatch an NEO. **Booth Instructor**: **Operate Trigger #5 (LOA-SB009 (4 minutes delayed)).** As **NEO** report that **1SB-24 has been isolated.**
	BOP	• (Step 13c) Check containment conditions – NORMAL:	
		• Containment temperature	
		• Containment pressure	
		• Containment humidity	
		• Containment floor and equipment sump level	
	RO	• Check TD CA pump – OFF.	
	BOP	• Check valves on "STEAM LINE DRAIN VALVES" board (1MC-9) – CLOSED.	
	CRS	• Check opposite Unit "STEAM HEADER PRESSURE" – GREATER THAN 200 PSIG.	**NOTE:** The CRS will ask U2 RO to report Steam Header Pressure. **Floor Instructor:** acknowledge as U2 RO, and report Steam Header Pressure = 980 psig.

Op Test No.: N10-1 Scenario # 1 Event # 3 Page 16 of 50

Event Description: **Steam Dump Valve fails Open**

Time	Pos.	Expected Actions/Behavior	Comments
		• Dispatch operator to check for leaks.	**NOTE:** The CRS may NOT dispatch an operator since the source of the steam leak is known to be the SD Valve.
	BOP	(Step 14) Check UST level – STABLE OR GOING UP.	
	CRS	(Step 15) Evaluate unit shutdown as follows:	
		• Check unit status – IN MODE 1 OR 2.	
		• Determine if unit shutdown or load reduction is warranted based on the following criteria:	
		• Size of leak	
		• Location of leak	
		• Rate of depletion of secondary inventory	
		• IF steam is leaking from a secondary heater relief OR MSR relief valve,	**NOTE:** Steam is NOT leaking from a secondary heater relief OR MSR relief valve.
		• IF turbine trip will isolate steam leak (Such as feedwater heater leak or MSR leak), THEN	**NOTE:** Turbine Trip is NOT necessary to isolate Steam Leak.
		• Check unit shutdown or load reduction – REQUIRED.	**NOTE:** The CRS may call WCC to address. If so, **Booth Instructor** acknowledge as WCC.
	SRO	(Step 15c RNO) Perform the following:	
		• Maintain present plant conditions until leak can be isolated or repaired.	
		• Exit this procedure.	**NOTE:** The CRS will likely conduct a Focus Brief.

Op Test No.: N10-1 Scenario # 1 Event # 3 Page 17 of 50

Event Description: **Steam Dump Valve fails Open**

Time	Pos.	Expected Actions/Behavior	Comments
TECHNICAL SPECIFICATION 3.4.1, RCS PRESSURE, TEMPERATURE, AND FLOW DEPARTURE FROM NUCLEATE BOILING (DNB) LIMITS			
	CRS	3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits.	**NOTE:** Tech Spec applicability will vary depending of how quickly the event is diagnosed. If Pzr Pressure drops < 2218 psig the TS is applicable.
	CRS	LCO 3.4.1 RCS DNB parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified in Table 3.4.1-1.	
	CRS	APPLICABILITY: MODE 1.	
	CRS	ACTIONS	
		CONDITION / REQUIRED ACTION / COMPLETION TIME A. Pressurizer pressure or RCS average temperature DNB parameters not within limits. / A.1 Restore DNB parameter(s) to within limit. / 2 hours.	
			Examiner NOTE: DO NOT move forward until the leaking Steam Dump valve has been isolated.
At the discretion of the Lead Examiner move to Event #4.			

Op Test No.: N10-1	Scenario # 1	Event # 4	Page 18 of 50
Event Description:	**Reactor Control DCS failure**		

Then, a Reactor Control DCS failure will occur causing continuous rod insertion. The operator will enter AP/1/A/5500/14, "Rod Control Malfunction." After the implementation of the AP, the failure will be corrected, and rods will be placed back in AUTO.

Booth Operator Instructions: **Operate Trigger #7 (OV0749C (0), OV0748C (0))**

Indications Available:

- Control rods heard and observed to be moving in Auto.
- Tref indication fails low

Time	Pos.	Expected Actions/Behavior	Comments
AP/1/A/5500/14, ROD CONTROL MALFUNCTION			
	RO	(Step 1) IF more than one rod dropped, THEN perform the following:	**Immediate Action** **NOTE:** No Rods have dropped.
		• Trip reactor.	
		• GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).	
	RO	(Step 2) Place control rods in manual.	**Immediate Action**
	RO	(Step 3) Check rod movement – STOPPED.	**Immediate Action**
	RO	(Step 4) Check all rods – ALIGNED WITH ASSOCIATED BANK.	
	RO	(Step 5) Check "ROD CONTROL URGENT FAILURE" alarm (1AD-2, A-10) – DARK.	
	RO	(Step 6) Check "T-AVG/T-REF FAILURE ROD STOP" alarm (1AD-2, B-7) - DARK	

Op Test No.: N10-1 Scenario # 1 Event # 4 Page 19 of 50

Event Description: **Reactor Control DCS failure**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 7) IF this AP entered due to unwarranted rod insertion or withdrawal, THEN GO TO Enclosure 3 (Response to Continuous Rod Movement).	
			NOTE: The CRS will go to Enclosure 3.
AP/1/A/5500/14, ROD CONTROL MALFUNCTION, ENCLOSURE 3, RESPONSE TO CONTINUOUS ROD MOVEMENT			
	CRS	(Step 1) Announce occurrence on paging system.	**NOTE:** The CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	CRS	(Step 2) Notify IAE to investigate problem.	**NOTE:** The CRS may call WCC/IAE to address. If so, **Booth Instructor** acknowledge as WCC/IAE.
	RO	(Step 3) Evaluate the following prior to any control rod withdrawal:	
		• Ensure no inadvertent mode change will occur.	
		• Ensure the control rods are withdrawn in a deliberate manner, while closely monitoring the reactor's response.	
	RO	(Step 4) Check T-Ref indication - NORMAL:	**NOTE:** T-Ref is lower than normal.
	RO	(Step 4 RNO) Perform the following:	
		• IF "TURB IMP PRESS CH 2" failed, THEN ensure P-7 and P-13 interlocks are in required state for existing unit conditions (Tech Spec 3.3.1.16).	**NOTE:** Channel 2 has NOT failed.
		• IF unit coastdown in progress,.....	**NOTE:** Coastdown is NOT in progress.

Op Test No.: N10-1 Scenario # 1 Event # 4 Page 20 of 50

Event Description: **Reactor Control DCS failure**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	• Perform any of the following as necessary to maintain T-Colds 555°F to 557°F:	
		• Position control rods in manual.	
		OR	
		• Borate/dilute NC System	
		OR	
		• Adjust turbine load.	
	CRS	• GO TO Step 9.	
	RO	(Step 9) WHEN problem is repaired, THEN perform the following:	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• Ensure T-Avg at T-Ref ± 1°F.	
		• IF auto rod control desired, THEN place rods in auto.	
	CRS	(Step 10) Exit this procedure.	**NOTE:** The CRS will likely conduct a Focus Brief.
			Booth Instructor: Delete MALF OV0749C and **OV748C**. As **IAE**, call and indicate that **a blown fuse was discovered in the Tref circuitry**, and **it has been replaced**.
At the discretion of the Lead Examiner move to Event #5.			

Op Test No.: N10-1	Scenario # 1	Event # 5	Page 21 of 50
Event Description:	**1B CF Pump Rollback**		

Subsequently, the 1B CF will rollback to minimum speed requiring manual speed control of the Main Feed Pumps and a reduction in Turbine load may be needed to stabilize the plant. The operator will enter AP/1/A/5500/06, "S/G Feedwater Malfunction." The operator will address Technical Specification 3.4.1, "RCS Pressure, Temperature and Flow Departure from Nucleate Boiling (DNB) Limits."

Booth Operator Instructions: Operate Trigger #9 (OV0773B)

Indications Available:

- MCB Annunciator 1AD-2, E8, DCS TROUBLE ALARM
- MCB Annunciator 1AD-4 C1, S/G A FLOW MISMATCH LO CF FLOW
- MCB Annunciator 1AD-4 C2, S/G B FLOW MISMATCH LO CF FLOW
- MCB Annunciator 1AD-4 C3, S/G C FLOW MISMATCH LO CF FLOW
- MCB Annunciator 1AD-4 C4, S/G D FLOW MISMATCH LO CF FLOW
- 1B CF Turbine speed is lowering
- All SG Narrow Range Levels are lowering
- All SG Feedwater Flows are lowering

Time	Pos.	Expected Actions/Behavior	Comments
		CONTROL ROOM CREW EXPECTATIONS MANUAL	
	RO	Immediately reduce 20MWe and then reduce as needed to maintain Rx power less than pre-transient condition.	**NOTE:** If load was NOT reduced during the previous Steam Dump failure, the RO will drop load on the Turbine ≈30-60MWe.
		AP/1/A/5500/06, S/G FEEDWATER MALFUNCTIONS	
	RO	(Step 1) Check all CF control and bypass valves – OPERATING PROPERLY.	
	BOP	(Step 2) Check both CF pumps – OPERATING PROPERLY.	
	BOP	(Step 2 RNO) Perform the following:	
		• IF malfunctioning CF pump has tripped OR pump is in rollback hold in Mode 3....	**NOTE:** The 1B CF Pump is in rollback hold, however the plant is in Mode 1.

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Event Description: **1B CF Pump Rollback**

Time	Pos.	Expected Actions/Behavior	Comments
		• IF CF pump is not controlling properly in auto, THEN control affected CF pump in manual as follows:	
	BOP	• Place low pressure governor control in manual.	
		• Place high pressure governor control in manual.	
		• Adjust CF pump speed to maintain desired CF pump discharge pressure and S/G levels.	
		• IF both of the following conditions are met:	
		▪ Flow from malfunctioning CF pump- COMPLETELY LOST	
		• Turbine Impulse pressure – GREATER THAN 400 PSIG, THEN...	**NOTE:** The flow from the 1B CF Pump is NOT completely lost.
	RO	(Step 3) Check unit status as follows:	
		• Reactor trip breakers - CLOSED	
		• Pzr pressure – GREATER THAN P-11 (1955 PSIG)	
	RO	(Step 4) IF AT ANY TIME S/G level approaches 17% OR 83%, THEN perform the following:	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• Trip Reactor	
		• GO TO EP/1/A/5000/E-O (Reactor Trip or Safety Injection)	
	CRS	(Step 5) Announce occurrence on page.	**NOTE:** The CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.

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Event Description: **1B CF Pump Rollback**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 6) Check reactor power – GREATER THAN 3%.	
	RO	(Step 7) Check CM/CF – PRESENTLY FEEDING S/Gs.	
	RO	(Step 8) Check S/G levels – STABLE OR TRENDING TO PROGRAM LEVEL.	
	RO	(Step 9) Check NC temperatures as follows:	
		• IF any NC pump on, THEN check NC T-Avg – STABLE OR TRENDING TO DESIRED TEMPERATURE.	
	RO	(Step 10) Check all S/G CF control valves – IN AUTO.	
	RO	(Step 11) Check all S/G CF control bypass valves – IN AUTO.	
	BOP	(Step 12) Check the following on running CF pumps:	
		• On DCS workstation, Feedpump Overview graphic, check "AUTO" (located below "AUTO/SPD" select button on running CF pump(s)) - INDICATED	
		• CF pump low pressure governor control – IN AUTO	
		• CF pump high pressure governor control – IN AUTO	
	RO/ BOP	(Step 13) Check all CA pumps – OFF.	

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Event Description: **1B CF Pump Rollback**

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The CRS may call WCC/IAE to address the switch position. If so, **Booth Instructor** acknowledge as WCC.
			NOTE: The CRS will likely conduct a Focus Brief.
TECHNICAL SPECIFICATION 3.4.1, RCS PRESSURE, TEMPERATURE, AND FLOW DEPARTURE FROM NUCLEATE BOILING (DNB) LIMITS			
	CRS	3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits.	**NOTE:** Tech Spec applicability will vary depending of how quickly the event is diagnosed. If Pzr Pressure drops < 2218 psig the TS is applicable.
			Examiner Note: Because of the transient nature of this event, the CRS may NOT evaluate Technical Specifications until the plant is sufficiently stabilized. Therefore, the TS should be evaluated after the scenario has been completed.
	CRS	LCO 3.4.1 RCS DNB parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified in Table 3.4.1-1.	
	CRS	APPLICABILITY: MODE 1.	
	CRS	ACTIONS	

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Event Description: **1B CF Pump Rollback**

Time	Pos.	Expected Actions/Behavior			Comments
		CONDITION	REQUIRED ACTION	COMPLETION TIME	
		A. Pressurizer pressure or RCS average temperature DNB parameters not within limits.	A.1 Restore DNB parameter(s) to within limit.	2 hours	
At the discretion of the Lead Examiner move to Event #6.					

Op Test No.: N10-1	Scenario # 1	Event # 6	Page 26 of 50
Event Description:	**1CF Pump trips/Turbine Runback/Rods fail in Auto**		

Following this, the 1B CF Pump will trip and a Turbine Runback will occur. The operator will enter AP/1/A/5500/03, "Load Rejection." During the Runback, the rods will fail to move in AUTO, and the operator will need to drive rods in Manual to stabilize the plant.

Booth Operator Instructions: Operate Trigger #11 (LF003B, IRE009 (0))

Indications Available:

- MCB Annunciator 1AD-5 C1, B CF Pump Turbine Trip.
- MCB Annunciator 1AD-1 D6, DEH TURBINE RUNBACK.
- 1B CF Pump Speed Control indicates 0.
- 1B CF Pump Green TRIP status light is LIT.
- 1B CF Pump discharge pressure drops to 0 psig.
- MWe lowers initially to ≈560 MWe.
- Rods do NOT move in Auto.

	Pos.	Expected Actions/Behavior	Comments
AP/1/A/5500/03, LOAD REJECTION			
	RO	(Step 1) Ensure control rods in auto.	**Immediate Action** **NOTE:** The RO will determine that the rods are NOT moving in AUTO, and Manually drive rods inward.
	RO	(Step 2) Check Turbine Generator response as follows:	
		• Check Generator – TIED TO GRID.	
		• Check Generator output – GOING DOWN AS REQUIRED.	
	RO	(Step 3) Check control rod response as follows:	
		• Check control banks – MOVING IN AS REQUIRED.	**NOTE:** The Control Rods will NOT be moving in as required.
	RO	(Step 3 RNO) IF no rods will move in auto, THEN perform the following:	
		• Place control rods in manual.	

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Event Description: **1CF Pump trips/Turbine Runback/Rods fail in Auto**

	Pos.	Expected Actions/Behavior	Comments
		• Insert rods to reduce T-Avg equal to programmed T-Ref.	**NOTE:** The RO will Manually drive rods inward.
		• IF no rods will move, THEN.....	**NOTE:** The rods will move in manual.
	RO	• Check all rods – ALIGNED WITH ASSOCIATED BANK.	
	BOP	(Step 4) Check CM system response as follows:	
		• Standby Hotwell and Condensate Booster pumps – RUNNING.	
		• 1CM-420 (Unit 1 Generator Load Rejection Bypass Control) – OPEN.	
	RO	(Step 5) IF 50% runback, THEN ensure turbine impulse pressure going down to less than 410 PSIG.	
	CRS	(Step 6) Announce: "UNIT 1 LOAD REJECTION, NON-ESSENTIAL PERSONNEL STAY OUT OF UNIT 1 TURBINE BLDG".	**NOTE:** CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	RO	(Step 7) Check P/R meters – LESS THAN 20%.	
	CRS	(Step 7 RNO) Perform the following:	
		• Designate an operator to continuously monitor reactor power.	**NOTE:** CRS will direct the RO to continuously monitor reactor power.
		• IF AT ANY TIME reactor power is less than 20%, THEN perform Step 8 to stabilize reactor power.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	• GO TO Step 9.	

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Event Description: **1CF Pump trips/Turbine Runback/Rods fail in Auto**

	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 9) Check condenser dump valves – MODULATING OPEN.	**NOTE:** The runback will terminate ≈50%.
	BOP	(Step 10) Check "IPB AIR FLOW TROUBLE" alarm (1AD-11, J-5) – DARK.	
	BOP	(Step 11) Check Pzr pressure control response as follows:	**NOTE:** The BOP may control 1NV-241 as needed to adjust NC Pump Seal flow.
		• Ensure Pzr heaters are in auto.	
		• Ensure Pzr spray control valves are in auto.	
		• Check Pzr PORVs – CLOSED.	
		• (Step 11d) Check Pzr spray control valves – CLOSED.	
	BOP	(Step 12) Check load rejection – DUE TO LOSS OF CF PUMP.	**NOTE:** The runback was initiated because of the 1B CF Pump.
	CRS	(Step 13) Dispatch operator as necessary to determine cause of CF pump trip.	**NOTE:** The CRS will dispatch an NEO.
	BOP	(Step 14) Ensure in service CF pump properly responds in <u>auto</u> as follows:	
		• Monitor in service CF pump discharge pressure.	
		• "1A CF PUMP DISCHARGE PRESS" (OAC point M1A1108).	
		• Monitor S/G N/R Levels.	
	CRS	• IF AT ANY TIME any of the following occurs:	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• "CF PUMP DISCHARGE HI PRESS" 1AD-8, A-4 alarms (Setpoint at 1335 PSIG)	

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Event Description: **1CF Pump trips/Turbine Runback/Rods fail in Auto**

	Pos.	Expected Actions/Behavior	Comments
		OR	
		• S/G N/R level approaches Hi Hi level (83%)	
		OR	
		• S/G N/R level approaches Lo Lo level (17%)	
	CRS	THEN take manual control of in service CF pump as follows:	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• Place low pressure governor control in manual.	
		• Place high pressure governor control in manual.	
		• Adjust CF pump speed to maintain CF header pressure 100-120 PSIG above steam header pressure.	
	CRS	• Do not continue until the following are satisfied:	
		• In service CF pump discharge pressure is stable.	**NOTE:** The CRS may hold at this Step to allow plant stabilization.
		• S/G levels are at setpoint.	
	RO	(Step 15) Check turbine impulse pressure – LESS THAN 260 PSIG.	
	CRS	(Step 15 RNO) Perform the following:	
		• IF AT ANY TIME turbine impulse pressure drops to less than 260 PSIG, THEN GO TO Step 16.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	• GO TO Step 19.	
	RO	(Step 19) Check Main Generator as follows:	
		• Check Generator Breakers – EITHER GENERATOR BREAKER CLOSED.	
		• Check Generator – TIED TO GRID.	

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Event Description: **1CF Pump trips/Turbine Runback/Rods fail in Auto**

	Pos.	Expected Actions/Behavior	Comments
		• Check generator power factor – 0.9 TO 1.0 LAGGING.	
	CRS	(Step 20) REFER TO RP/0/A/5700/000 (Classification of Emergency).	**NOTE:** The CRS may ask OSM to address. If so, **Floor Instructor** acknowledge as OSM.
	RO	(Step 21) WHEN transient is over, THEN perform the following:	
		• (Step 21.a) Check reactor power – GREATER THAN 40%.	
	BOP	• (Step 21.b) Check the following on in service CF pump(s).	**NOTE:** The 1A CF Pump is the ONLY CF Pump running.
		• Low pressure governor control – IN AUTO	
		• High pressure governor control – IN AUTO	
	RO	• (Step 21.c) Check SM flow on all S/Gs – LESS THAN 75%.	
	RO	• (Step 21.d) Check SM flow on all S/Gs – LESS THAN 25%.	
	RO	(Step 21.d RNO) Perform the following:	
		• Check the following CF control bypass valves – CLOSED:	
		• 1CF-104AB (1A S/G CF Control Bypass) – CLOSED	
		• 1CF105AB (1B S/G CF Control Bypass) - CLOSED	
		• 1CF-106AB (1C S/G CF Control Bypass) - CLOSED	
		• 1CF-107AB (1D S/G CF Control Bypass) – CLOSED.	
		• IF any CF control bypass valve is open OR throttled,.....	**NOTE:** The CF Control Bypass Valves are Closed.

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Event Description: **1CF Pump trips/Turbine Runback/Rods fail in Auto**

	Pos.	Expected Actions/Behavior	Comments
	CRS	• GO TO Step 21.f	
	BOP	• (Step 21.f) Slowly CLOSE 1CM-420 (Unit 1 Generator Load Rejection Bypass Control) while monitoring Condensate Booster pump suction pressure.	**NOTE:** The BOP will most likely call up M1A1090 on the OAC.
	BOP	• (Step 21.g) WHEN 1CM-420 is closed, THEN check load rejection signal reset (OAC turn on code "CM").	
	BOP	• (Step 21.h) Reposition manual loader for 1CM-420 to 100% OPEN.	
	BOP	• (Step 21.i) IF thermal power is greater than 15% THEN within 4 hours of reaching stable conditions, ensure each power range channel is within 2% of heat balance.	
	RO	• (Step 21.j) Check T-avg – GREATER THAN 561°F.	
	RO	• (Step 21.k) Check "CONTROL ROD BANK LO LO LIMIT" alarm (1AD-2, B-9) – DARK.	**NOTE:** 1AD-2, B-9 will be LIT.
	RO	(Step 21.k RNO) Perform the following:	
		• Ensure a shutdown margin calculation is complete within 45 minutes of runback initiation PER OP/0/A/6100/006 (Reactivity Balance Calculation), Enclosure 4.4 (Shutdown Margin – Unit at Power Modes 1 and 2).	**NOTE:** The CRS may ask U2 RO to perform this calculation. If so, **Floor Instructor** acknowledge as U2 RO.
		• WHEN calculation complete, THEN…:	**NOTE:** This calculation will NOT be completed during this scenario.

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Event Description: **1CF Pump trips/Turbine Runback/Rods fail in Auto**

	Pos.	Expected Actions/Behavior	Comments
	RO	• (Step 21.l) Check "CONTROL ROD BANK LO LIMIT" alarm (1AD-2, A-9) – DARK.	**NOTE:** 1AD-2, A-9 will be LIT.
	RO	(Step 21.l RNO) Ensure the "CONTROL ROD BANK LO LIMIT" alarm clears as Xenon builds in.	
	BOP	(Step 22) Check load rejection – DUE TO LOSS OF CF PUMP.	**NOTE:** The runback was initiated because of the 1B CF Pump.
	BOP	(Step 23) Reset CF pump recirc valves as follows:	
		• CLOSE recirc valve manual loader for CF pump that is tripped:	
		• 1CF-76 (1A CF Pump Recirc Control)	
		OR	
		• 1CF-81 (1B CF Pump Recirc Control).	
	BOP	• Depress "1A OR 1B CF PUMP RECIRC VALVE CLOSURE CIRCUIT" "RESET" pushbuttom and ensure red "ACTIVE" light goes out and yellow "RESET" light is lit.	
		• Check the following valves – OPEN:	
		• 1CM-266 (1A CF Pump Suction Isol)	
		• 1CM-272 (1B CF Pump Suction Isol).	
		• Check main oil pump on tripped CF pump – RUNNING.	

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Event Description: **1CF Pump trips/Turbine Runback/Rods fail in Auto**

	Pos.	Expected Actions/Behavior	Comments
		• Check if CF pump – TRIPPED AUTOMATICALLY.	
		• Slowly OPEN recirc valve on tripped CF pump while monitoring suction pressure on in service CF pump.	
At the discretion of the Lead Examiner move to Events #7-9.			

Op Test No.: N10-1	Scenario # 1	Event # 7, 8 & 9	Page 34 of 50
Event Description:	**Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**		

During the plant stabilization, Control Rod D-4 will be ejected from the core causing a 1000 gpm Small Break LOCA. The operator will trip the Reactor and actuate Safety Injection, and then enter EP/1/A/5000/E-0, "Reactor Trip or Safety Injection." On the Safety Injection actuation 1NI-9A and 1NI-10B will fail to automatically open. The operator will attempt to manually open 1NI-9A unsuccessfully, and open 1NI-10B manually to restore NV Pump injection flow. Additionally, on the Safety Injection, both Trains of Phase A Containment Isolation will fail to actuate automatically, requiring that the operator manually actuate Containment Isolation Phase A. Upon completion of E-0, the operator will transition to EP/1/A/5000/E-1, "Loss of Reactor or Secondary Coolant." On the transition, an Orange Path will exist on the Containment Critical Safety Function, and the transition will be made to EP/1/A/5000/FR-Z.1, "Response to High Containment Pressure," prior to E-1. Upon completion of FR-Z.1 the operator will transition to E-1. The scenario will terminate at Step 10 of E-1, after the crew has been directed to return back to the beginning of E-1.

Booth Operator Instructions: Operate Trigger #13 (NC005D4 (1000 gpm))

Indications Available:

- Control Rod D-4 Red Rod Bottom Light flashes on DRPI
- Containment Pressure starts to rise
- Charging flow starts to increase
- Pzr level starts to lower

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: Crew will carry out Immediate Actions of E-0, prior to the CRS addressing the EP.
EP/1/A/5000/E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO/ BOP	(Step 1) Monitor Foldout page.	
	RO	(Step 2) Check Reactor Trip:	**Immediate Action**
		• All rod bottom lights – LIT	**NOTE:** The Ejected Rod does NOT indicate on the Bottom.
		• Reactor trip and bypass breakers – OPEN	

Op Test No.: N10-1 Scenario # 1 Event # 7, 8 & 9 Page 35 of 50

Event Description: **Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**

Time	Pos.	Expected Actions/Behavior	Comments
		• I/R amps – GOING DOWN.	
	RO	(Step 2 RNO) Perform the following:	**Immediate Action**
		• Trip reactor.	
	RO	(Step 3) Check Turbine Trip:	**Immediate Action**
		• All throttle valves – CLOSED.	
	BOP	(Step 4) Check 1ETA and 1ETB – ENERGIZED.	**Immediate Action**
	RO/ BOP	(Step 5) Check if S/I is actuated:	**Immediate Action**
		• "SAFETY INJECTION ACTUATED" status light (1SI-18) – LIT.	
		• Both LOCA Sequencer Actuated status lights (1SI-14) – LIT.	
	CRS	(Step 6) Announce "Unit 1 Safety Injection".	**NOTE:** The CRS may ask the U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	BOP	(Step 7) Check ESF Monitor Light Panel on energized train(s):	
		• Groups 1, 2, 5 – DARK.	
		• Group 3 – LIT.	
		• OAC – IN SERVICE.	

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Event Description: **Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**

Time	Pos.	Expected Actions/Behavior	Comments
		• Group 4, Rows A through F – LIT AS REQUIRED.	**NOTE:** The light for 1NI-9A will be DARK, and the light for 1NI-10B may be DARK. Phase A CIS has NOT occurred automatically (The BOP may have may actuated Phase A CIS).
	BOP	(Step 7.d RNO) Perform the following:	
		• Ensure both trains Phase A Isolation are initiated.	
		• Align or start S/I and Phase A components with individual windows in Group 4 as required.	**NOTE:** If 1NV- 10B has NOT been opened, it may be opened here.
		• GO TO Step 7.f.	
	BOP	(Step 7.f) Check LOCA Sequencer Actuated status light (1SI-14) on energized train(s) - LIT.	
	BOP	• (Step 7.g) Check the following windows on Monitor Light Panel Group 4 – LIT:	
		• C-3 "CONT ISOL PHASE A TRN A VLVS ALIGNED"	
		• C-6 "CONT ISOL PHASE A TRN B VLVS ALIGNED"	
		• F-4 "SAFETY INEJCTION TRAIN A COMPONENTS ALIGNED"	
		• F-5 "SAFETY INEJCTION TRAIN B COMPONENTS ALIGNED"	
	BOP	(Step 7.g RNO) Perform the following on energized train(s):	
		• Check OAC Monitor Light Program ("MONL") for associated light.	

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Event Description: **Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**

Time	Pos.	Expected Actions/Behavior	Comments
		• Align valves as required, while continuing in the EP.	

CRITICAL TASK:

(E-0 J) Establish flow from at least one high-head ECCS Pump by opening 1NI-10 before transition out of E-0.

Safety Significance: Failure to establish flow from the NV System after failure of the automatic actuation constitutes a demonstrated inability by the operator to recognize a failure and/or correct a failure of an ESF System or component. The FSAR analyses of response to high energy line breaks assume that at least one train of safeguards actuates. If the minimum assumed ESF components are NOT actuated the Safety Analyses results are invalid. Because compliance with the assumptions in the FSAR are part of the facility license, failure to comply constitutes a violation of the license condition.

CRITICAL TASK:

(E-0 O) Actuate Phase A Containment Isolation before transition out of E-0.

Safety Significance: Failure to close at least one Containment Isolation Valve on each critical penetration under the postulated conditions when it is possible to do so, constitutes mis-operation leading to degradation of the Containment Barrier. Failure to take this action leads to an unnecessary release of fission products to the auxiliary building, increasing the potential for release to the environment, and reducing accessibility to vital equipment within the Auxiliary Building. Higher radiation levels within the Auxiliary Building will result in a degradation of ALARA principles.

	BOP	(Step 8) Check proper CA pump status:	
		• MD CA pumps – ON	
		• N/R level in at least 3 S/Gs – GREATER THAN 17%.	
	BOP	(Step 9) Check all KC pumps - ON	
	BOP	(Step 10) Check both RN pumps – ON.	

Op Test No.: N10-1 Scenario # 1 Event # 7, 8 & 9 Page 38 of 50

Event Description: **Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 11) Notify Unit 2 to start 2A RN pump.	**Floor Instructor:** As U2 RO report "2A RN Pump is running."
	RO	(Step 12) Check all S/G pressures – GREATER THAN 775 PSIG.	
	BOP	(Step 13) Check Containment Pressure – HAS REMAINED LESS THAN 3 PSIG.	**NOTE:** Containment pressure is ≈2.5 psig, and slowly rising due to the LOCA.
	BOP	(Step 14) Check S/I flow:	
	BOP	• Check "NV PMPS TO COLD LEG FLOW" gauge – INDICATING FLOW.	**NOTE:** If 1NV- 10B has NOT been opened, it will be opened here.
		• Check NC pressure – LESS THAN 1600 PSIG.	
		• Check NI pumps – INDICATING FLOW.	
		• Check NC pressure – Less than 286 PSIG.	
	BOP	(Step 15.d RNO) Perform the following:	
		• Ensure ND pump miniflow valve on running pump(s) open:	
		• 1ND-68A (1A ND Pump & Hx Mini Flow Isol)	
		• 1ND-67B (1B ND Pump & Hx Mini Flow Isol).	
	CRS	• IF valve(s) open on all running ND pumps, THEN GO TO Step 15.	
	CRS	(Step 15) Notify OSM or other SRO to perform EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 22 (OSM Actions Following an S/I) within 10 minutes.	**NOTE:** The CRS may ask OSM to address. If so, **Floor Instructor** acknowledge as OSM.

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Event Description: **Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 16) Check CA flow:	
		• Total CA flow – GREATER THAN 450 GPM.	
		• Check VI header pressure – GREATER THAN 60 PSIG.	
		• WHEN N/R level in any S/G greater than 11% (32% ACC), THEN control CA flow to maintain N/R levels between 11% (32% ACC) and 50%.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware. **NOTE:** The use of adverse Containment numbers is required if Containment Pressure is > 3 psig.
	RO	(Step 17) Check NC temperatures:	**NOTE:** The NC Pumps could be on or off depending on NC Subcooling and Containment Pressure.
		• IF all NC pumps off, THEN check NC T-Colds – STABLE OR TRENDING TO 557°F.	
		OR	
		• IF all NC pumps off, THEN check NC T-Colds – STABLE OR TRENDING TO 557°F.	
	BOP	(Step 18) Check Pzr PORV and spray valves:	
		• All Pzr PORVs – CLOSED.	
		• Normal Pzr spray valves - CLOSED	
	RO	(Step 19) Check NC subcooling based on core exit T/Cs – GREATER THAN 0°F.	
	BOP	(Step 19 RNO) IF at least one NV OR NI pump on, THEN stop all NC pumps while maintaining seal injection flow.	

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Event Description: **Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 20) Check if main steamlines intact:	
		• All S/G pressures – STABLE OR GOING UP	
		• All S/Gs – PRESSURIZED.	
	RO/ BOP	(Step 21) Check if S/G tubes intact:	
		• The following secondary EMFs – NORMAL:	
		• 1EMF-33 (Condenser Air Ejector Exhaust)	
		• 1EMF-34(L) (S/G Sample (Lo Range))	
		• 1EMF-24 (S/G A)	
		• 1EMF-25 (S/G B)	
		• 1EMF-26 (S/G C)	
		• 1EMF-27 (S/G D)	
		• S/G levels – STABLE OR GOING UP IN A CONTROLLED MANNER.	
	RO/ BOP	(Step 22) Check if NC System intact:	
		• Check containment EMFs – NORMAL:	**NOTE:** 1EMF-38L is in TRIP 2.
		• 1EMF-38(L) (Containment Particulate (LR))	
		• 1EMF-39(L) (Containment Gas (Lo Range))	
		• 1EMF-40 (Containment Iodine)	
		• 1EMF-9 (Reactor Bldg Incore Inst Rm)	

Op Test No.: N10-1 Scenario # 1 Event # 7, 8 & 9 Page 41 of 50

Event Description: **Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**

Time	Pos.	Expected Actions/Behavior	Comments
		• 1EMF-16 (Containment Refueling Brdg).	
	BOP	(Step 22 RNO) Perform the following:	
		• IF H_2 Igniters are off, THEN perform the following:	**NOTE:** The H2 Igniters are OFF.
		• Energize H_2 Igniters by depressing "ON" and "OVERRIDE".	
		• Dispatch operator to stop all Unit 1 NF AHUs PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 28 (De-energizing Ice Condenser AHUs).	**NOTE:** The CRS will dispatch an NEO. **Booth Instructor:** as **NEO**, acknowledge
	CRS	• IF AT ANY TIME both of the following conditions exist, THEN start one train of VX PER ENCLOSURE 4 (VX Manual Start).	**NOTE:** Neither condition exists.
		• Containment pressure is between 1 PSIG and 3 PSIG....	
			NOTE: Upon transition to E-1, an ORANGE Path will exist on Containment. The CRS will transition to FR-Z.1, rather than E-1.
EP/1/A/5000/FR-Z.1, RESPONSE TO HIGH CONTAINMENT PRESSURE			
	CRS	(Step 1) IF loss of emergency coolant recirc has occurred, THEN	**NOTE:** Loss of Emergency Coolant Recirc has NOT occurred.
	RO/ BOP	(Step 2) Monitor Foldout Page.	

Op Test No.: N10-1 Scenario # 1 Event # 7, 8 & 9 Page 42 of 50

Event Description: **Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3) Stop all NC pumps.	**NOTE:** All NC Pumps are stopped.
	BOP	(Step 4) Ensure all RV pumps are in manual and off.	
	BOP	(Step 5) Ensure operator dispatched to remove white tags and close the following breakers:	**NOTE:** The CRS will dispatch NEO. **Floor/Booth Instructor:** Acknowledge as appropriate.
		• 1EMXA-R2A (1A ND To A&B Cold Legs Cont Outside Isol Motor (1NI-173A)) (aux bldg, 750, FF-54, FF-55)	
		• 1EMXB1-6B (1B ND To C&D Cold Leg Cont Outside Isol Motor (1NI-178B)) (aux bldg, 733, GG-55, GG-56)	**Booth Instructor:** **Operate Trigger #15 (LOA-NI024 = RI (2 minutes delayed)) and Trigger #17 (LOA-NI025 = RI (3 minutes delayed)).** And then, report as NEO that **breakers are closed**.
	BOP	(Step 6) Check containment pressure – LESS THAN 15 PSIG.	**NOTE:** Containment pressure is ≈3 psig due to the LOCA.
	BOP	(Step 7) Check any NS pump - ON.	**NOTE:** Both NS Pumps are ON.
	CRS	(Step 8) Perform the remainder of this EP as time allows.	**NOTE:** The CRS may continue with FR-Z.1 or Transition to E-1. If Transition is made here, moved forward to **Page 45**.
	BOP	(Step 9) Check containment isolation:	

Op Test No.: N10-1 Scenario # 1 Event # 7, 8 & 9 Page 43 of 50

Event Description: **Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**

Time	Pos.	Expected Actions/Behavior	Comments
		• Check OAC – IN SERVICE.	
		• Check the following windows on Group 4 of ESF Monitor light Panel – LIT.	
		• C-3 "CONT ISOL PHASE A TRN A VLVS ALIGNED"	
		• C-6 "CONT ISOL PHASE A TRN B VLVS ALIGNED"	
		• G-4 "CONT ISOL PHASE B TRN A VLVS ALIGNED"	
		• G-5 "CONT ISOL PHASE B TRN B VLVS ALIGNED".	
	BOP	(Step 10) Check NS System in operation as follows:	
		• Check EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirc) – IN EFFECT.	**NOTE:** Loss of Emergency Coolant Recirc is NOT in effect.
	CRS	(Step 10.a RNO) GO TO Step 10.d.	
	BOP	• (Step 10.d) Check NS suction – ALIGNED TO FWST AS FOLLOWS:	
		• Check 1NS-18A (1A NS Pump Suct From Cont Sump Isol) – CLOSED	
		• Check 1NS-20A (1A NS Pump Suct From FWST Isol) – OPEN	
		• Check 1NS-1B (1B NS Pump Suct From Cont Sump Isol) – CLOSED	
		• Check 1NS-3B (1B NS Pump Suct From FWST Isol) - OPEN	
	BOP	• Check containment pressure – GREATER THAN 3 PSIG.	**NOTE:** Containment pressure is ≈4 psig due to the LOCA.
	BOP	• Check the following NS pump discharge valves – OPEN:	
		• 1NS-32A (1A NS Hx Outlet Cont Outside Isol)	

Op Test No.: N10-1 Scenario # 1 Event # 7, 8 & 9 Page 44 of 50

Event Description: **Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**

Time	Pos.	Expected Actions/Behavior	Comments
		• 1NS-29A (1A NS Hx Outlet Cont Outside Isol)	
		• 1NS-12B (1B NS Hx Outlet Cont Outside Isol)	
		• 1NS-15B (1B NS Hx Outlet Cont Outside Isol)	
	BOP	• Check NS pumps – ON.	
	CRS	(Step 11) Check Phase B HVAC equipment PER Enclosure 3 (Phase B HVAC Equipment).	**NOTE:** The CRS may ask U2 BOP to perform this action. If so, **Floor Instructor:** Acknowledge as U2 BOP.
	RO	(Step 12) Check the following – CLOSED:	
		• All MSIVs	
		• All MSIV bypass valves.	
	RO	(Step 13) Check steamlines intact:	
		• All S/G pressures – STABLE OR GOING UP	
		• All S/Gs – PRESSURIZED.	
	BOP	(Step 14) Check if one or two trains of ND aux containment spray should be aligned as follows:	
		• Any ND Train – OPERATING IN COLD LEG RECIRC MODE.	
	BOP	(Step 14.a RNO) Perform the following:	
		• WHEN EP/1/A/5000/ES-1.3 (Transfer To Cold Leg Recirc), is completed, THEN perform Step 14 to determine if one or two trains of ND aux spray should be aligned.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	GO TO Step 15.	

Op Test No.: N10-1 Scenario # 1 Event # 7, 8 & 9 Page 45 of 50

Event Description: **Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 15) Check containment H_2 concentration:	**NOTE:** The H2 Analyzers are NOT in service.
		• Ensure operator dispatched to stop Unit 1 NF AHUs PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 28 (De-energizing Ice Condenser AHUs).	
		• Check H_2 analyzers – IN SERVICE.	
	BOP	(Step 15 RNO) Perform the following:	**NOTE:** The CRS will dispatch NEO. **Floor/Booth Instructor:** Acknowledge as appropriate.
		• Dispatch operator to place H2 analyzers in service PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 5 (Placing H2 Analyzers In Service).	
		• WHEN H2 analyzers in service, THEN complete Steps 15.c through 15.e.	**Booth Instructor:** Wait 15 minutes, Insert **LOA:** **VX009 = In Service/Enabled** **VX010 = In Service/Enabled** And then, report as NEO that **H2 Analyzers are in service**.
	CRS	• GO TO Step 16.	
	CRS	(Step 16) RETURN TO procedure and step in effect.	**NOTE:** The CRS will transition to E-1.
			NOTE: CRS will likely conduct a Focus Brief.
EP/1/A/5000/E-1, LOSS OF REACTOR OR SECONDARY COOLANT			
	RO/ BOP	(Step 1) Monitor Foldout page.	**Examiner NOTE:** After Transition to E-1, terminate scenario at Lead Examiner discretion.

Op Test No.: N10-1 Scenario # 1 Event # 7, 8 & 9 Page 46 of 50

Event Description: **Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 2) Check NC subcooling based on core exit T/Cs – GREATER THAN 0°F.	**NOTE:** The NC Pumps should be stopped by this time, even if Subcooling is recovering.
	RO	(Step 3) Check if main steamlines intact:	
		• All S/G pressures – STABLE OR GOING UP	
		• All S/Gs – PRESSURIZED.	
		(Step 4) Control intact S/G levels:	
	RO	• Check N/R level in any intact S/G – GREATER THAN 11% (32% ACC).	**NOTE:** Adverse Containment Numbers will be used.
	BOP	• Check VI header pressure – GREATER THAN 60 PSIG.	
	RO	• Throttle feed flow to maintain all intact S/G N/R levels between 11% (32% ACC) and 50%.	**NOTE:** Adverse Containment Numbers will be used.
	CRS	(Step 5) Check secondary radiation normal as follows:	
		• Check all S/Gs – INTACT.	
		• Notify RP to perform the following:	**NOTE:** The CRS may call WCC/RP to address the switch position. If so, **Booth Instructor** acknowledge as WCC/RP.
		• Frisk all Unit 1 S/G cation columns to determine if activity level is significantly higher for any S/G.	
		• Notify Control Room of survey results.	
	CRS	• WHEN survey results reported, THEN perform the following:	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.

Op Test No.: N10-1 Scenario # 1 Event # 7, 8 & 9 Page 47 of 50

Event Description: **Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**

Time	Pos.	Expected Actions/Behavior	Comments
		• Check all S/G(s) activity levels – NORMAL.	
	BOP	• Check secondary EMFs – NORMAL:	
		• 1EMF-33 (Condenser Air Ejector Exhaust)	
		• 1EMF-34(L) (S/G Sample (Lo Range))	
		• 1EMF-24 (S/G A)	
		• 1EMF-25 (S/G B)	
		• 1EMF-26 (S/G C)	
		• 1EMF-27 (S/G D).	
	BOP	(Step 6) Check Pzr PORVs and isolation valves:	
		• Power to all Pzr PORV isolation valves – AVAILABLE.	
		• All Pzr PORVs – CLOSED.	
		• At least one Pzr PORV isolation valve – OPEN.	
		• IF AT ANY TIME any Pzr PORV opens due to high pressure, THEN after pressure goes below 2315 PSIG, ensure PORV closes or is isolated.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	RO/ BOP	(Step 7) Check S/I termination criteria:	
		• NC subcooling based on core exit T/Cs – GREATER THAN 0°F.	
		• Secondary heat sink:	
		• N/R level in at least one intact S/G – GREATER THAN 11% (32% ACC)	
		OR	
		• Total feed flow to intact S/Gs – GREATER THAN 450 GPM.	

Op Test No.: N10-1 Scenario # 1 Event # 7, 8 & 9 Page 48 of 50

Event Description: **Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**

Time	Pos.	Expected Actions/Behavior	Comments
		• NC pressure – STABLE OR GOING UP.	
		• Pzr level – GREATER THAN 11% (29% ACC).	**NOTE:** Pzr Level is NOT > 11% (29%).
	BOP	(Step 7.d RNO) Perform the following:	
		• If NC pressure going up, AND Pzr spray available, THEN....	**NOTE:** Pzr Spray is NOT available.
		• GO TO Step 7.f	
	RO/ BOP	• Monitor S/I termination criteria PER Enclosure 2 (S/I Termination Criteria) while in the procedure.	
		• IF AT ANY TIME while in this procedure S/I termination criteria is met, THEN RETURN TO Step 7.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	BOP	(Step 8) Check if NS pump should be stopped:	
		• Any NS pump – ON.	**NOTE:** The NS Pumps are both ON.
		• Containment pressure – LESS THAN 2 PSIG.	**NOTE:** Containment pressure is ≈4 psig due to the LOCA.
	BOP	(Step 8.b RNO) Perform the following:	
		• IF NS pump suction has been aligned for Cold Leg Recirc, THEN	**NOTE:** Neither NS Pump has been aligned for Cold Leg Recirc.
	CRS	• IF AT ANY TIME containment pressure is less than 2 PSIG, AND NS pump suction is still aligned to FWST, THEN perform Step 8.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	• GO TO Step 9.	
	BOP	(Step 9) Check if ND pumps should be stopped:	
		• NC pressure – GREATER THAN 286 PSIG.	

Op Test No.: N10-1 Scenario # 1 Event # 7, 8 & 9 Page 49 of 50

Event Description: **Rod Ejection/SB LOCA/1NI-9A/10B fail to OPEN automatically / Phase A Containment Isolation Auto Signal failure**

Time	Pos.	Expected Actions/Behavior	Comments
		• NC pressure – STABLE OR GOING UP.	
		• Any ND Pump – ON.	
		• Running ND Pumps Suction – ALIGNED TO FWST.	
		• Check both NS Pumps – OFF.	**NOTE:** Both NS Pumps are running.
	CRS	(Step 9.e RNO) Go To Step 10.	
	RO	(Step 10) Check NC and S/G pressures:	
		• All S/G pressures – STABLE OR GOING UP.	
		• NC pressure – STABLE OR GOING DOWN.	**NOTE:** NC System pressure is rising.
	CRS	(Step 10.b RNO) RETURN TO Step 1.	**NOTE:** The CRS will return to Step 1 of E-1, and await transition to ES-1.3 Criteria.
At the discretion of the Lead Examiner terminate the exam.			

UNIT 1 STATUS:

Power Level: 99% NCS [B] 1310 ppm Pzr [B]: 1326 ppm Xe: Per OAC

Power History: The Plant is at 99% power (BOL), for Core Burnup: 12 EFPDs three days.

CONTROLLING PROCEDURE: OP/1/A/6100/03 Controlling Procedure for Unit Operation

OTHER INFORMATION NEEDED TO ASSUME TO SHIFT:

- The plant is at 99% power (BOL), following an unplanned load reduction four days ago to complete corrective maintenance on the 1B CF Pump.
- The maintenance was completed and the pump restarted, and power level raised to the present power level three days ago.
- The 1B CF Pump is operating in MANUAL Control, for Vendor observation.
- Upon Turnover the crew is expected to restore the 1B CF Pump to Auto Control.

The following equipment is Out-Of-Service:

- 1A D/G is OOS to correct a cooling water system leak.
- 1EMF45A, Nuclear Service Water Radiation Monitor, failed last shift (IAE is investigating).
- MCB Annunciator 1AD-9, D-6, "GLYCOL EXPANSION TNK HI-HI LEVEL," has alarmed spuriously several times over the last hour (IAE is investigating).

Crew Directions:

- Return the 1B CF Pump to automatic control in accordance with Enclosure 4.14, "Changing CF Pump Auto/Manual Control," of OP/1/A/6250/001, "Condensate and Feedwater System."

Work Control SRO/Offsite Communicator **Jim**

Plant SRO **Joe**

NLO's AVAILABLE

Unit 1	**Unit 2**
Aux Bldg. John	**Aux Bldg. Chris**
Turb Bldg. Bob	**Turb Bldg. Mike**
5th Rounds. Carol	
Extra(s) Bill Ed Wayne Tanya	

Duke Energy
McGuire Nuclear Station
Condensate And Feedwater System

Procedure No.
OP/1/A/6250/001

Revision No.
176

Electronic Reference No.
MC00474P

Continuous Use

PERFORMANCE

* * * * * * * * * * UNCONTROLLED FOR PRINT * * * * * * * * * *

(ISSUED) - PDF Format

1. Limits and Precautions

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

1.2 Maximum CF Header Pressure is 1325 psig. CF Pump Turbine trip occurs at 1435 psig.

2. Initial Conditions

_____ 2.1 **IF** in Mode 1 **OR** 2, ensure reactivity management controls established per SOMP 01-02 (Reactivity Management). (R.M.)

3. Procedure

☐ 3.1 Evaluate all outstanding R&Rs that may impact performance of this procedure.

3.2 Perform the following sections, as applicable:

- ☐ Section 3.3, Placing CF Pump(s) in Manual Mode
- ☐ Section 3.4, Placing CF Pump(s) in L-manual (Local Manual) Mode
- ☐ Section 3.5, Adjusting Bias With CF Pump(s) in Auto
- ☐ Section 3.6, Placing CF Pump in Auto During At Power Operation

3.3 Placing CF Pump(s) in Manual Mode

3.3.1 Determine CF Pump Turbine to be placed in manual control:

☐ 1A CF Pump Turbine
☐ 1B CF Pump Turbine

3.3.2 On selected CF Pump Turbine, perform the following:

_____ • Place "LP GOV CNTRL" in manual
_____ • Place "HP GOV CNTRL" in manual

NOTE: Adjusting CF Pump speed will cause a change in feedwater flow and can result in the addition of relatively cold feedwater to the steam generators. (R.M.)

_____ 3.3.3 **IF** the second CF Pump Turbine is **NOT** in auto, use manual raise or lower pushbutton on "LP GOV CNTRL" or "HP GOV CNTRL" as required to maintain stable CF flow and S/G levels.

_____ 3.3.4 **IF** desired to place second CF Pump Turbine in manual control, perform the following on the second CF Pump Turbine:

_____ • Place "LP GOV CNTRL" in manual
_____ • Place "HP GOV CNTRL" in manual

NOTE: Adjusting CF Pump speed will cause a change in feedwater flow and can result in the addition of relatively cold feedwater to the steam generators. (R.M.)

_____ 3.3.5 Using manual raise or lower pushbutton on 1A (1B) CF Pump Turbine "LP GOV CNTRL" or "HP GOV CNTRL", maintain stable CF flow and S/G levels.

3.4 Placing CF Pump(s) in L-manual (Local Manual) Mode

CAUTION: Placing a CF Pump Gov. Cntrl in "L-manual" bypasses all DCS system signals and gives the operator direct valve control. "MANUAL" control should be utilized if available.

3.4.1 Determine CF Pump Turbine to be placed in L-manual control:

☐ 1A CF Pump Turbine
☐ 1B CF Pump Turbine

3.4.2 On selected CF Pump Turbine, perform the following:

_____ • Place "LP GOV CNTRL" in L-manual
_____ • Place "HP GOV CNTRL" in L-manual

NOTE: Adjusting CF Pump speed will cause a change in feedwater flow and can result in the addition of relatively cold feedwater to the steam generators. (R.M.)

_____ 3.4.3 **IF** the second CF Pump Turbine is **NOT** in auto, use L-manual raise or lower pushbutton on "LP GOV CNTRL" or "HP GOV CNTRL" as required to maintain stable CF flow and S/G levels.

CAUTION: Placing a CF Pump Gov. Cntrl in "L-manual" bypasses all DCS system signals and gives the operator direct valve control. "MANUAL" control should be utilized if available.

_____ 3.4.4 **IF** desired to place the second CF Pump Turbine in L-manual control, perform the following on the second CF Pump Turbine:

_____ • Place "LP GOV CNTRL" in L-manual
_____ • Place "HP GOV CNTRL" in L-manual

NOTE: Adjusting CF Pump speed will cause a change in feedwater flow and can result in the addition of relatively cold feedwater to the steam generators. (R.M.)

_____ 3.4.5 Using L-manual raise or lower pushbutton on 1A (1B) CF Pump Turbine "LP GOV CNTRL" or "HP GOV CNTRL", maintain stable CF flow and S/G levels.

3.5 Adjusting Bias With CF Pump(s) in Auto

NOTE: CF Pump bias is available only on the DCS soft controls via Feedpump Overview Graphic LP/HP Gov Cntrl pop-up.

3.5.1 Determine one of the following:

☐ Desired Pump RPM _____

OR

☐ Desired RPM Mismatch _____

OR

☐ Desired CF Pump Suction Flow Mismatch _____

3.5.2 On DCS Feedpump Overview Graphic, select one of the following:

☐ "CFPT A LP/HP"
☐ "CFPT B LP/HP"

NOTE:
- Adjusting CF Pump speed will cause a change in feedwater flow and can result in the addition of relatively cold feedwater to the steam generators. (R.M.)
- The following step should be performed SLOWLY allowing the CF Pump suction flows to stabilize between adjustments.

_____ 3.5.3 Using "BIAS" raise or lower pushbutton on selected CF Pump Turbine "LP GOV CNTRL", slowly adjust "BIAS" to achieve desired Pump RPM, RPM Mismatch or Suction Flow Mismatch as determined in Step 3.5.1. (R.M.)

3.6 Placing CF Pump in Auto During At Power Operation

3.6.1 Check one CF Pump currently operating in auto:

☐ 1A CF Pump

OR

☐ 1B CF Pump

NOTE:	L-manual for each CF Pump Turbine Gov is only available on the Main Control Board.

_____ 3.6.2 **IF** placing 1A CF Pump Turbine in auto, perform the following:

_____ 3.6.2.1 **IF** 1A CF Pump Turbine in L-manual, perform the following:

A. Check the following:

☐ 1A CF Pump Turbine "LP GOV CNTRL" in L-manual
☐ 1A CF Pump Turbine "HP GOV CNTRL" in L-manual

_____ B. Using L-manual raise or lower pushbuttons on 1A CF Pump Turbine "HP GOV CNTRL", match "OUTPUT" value (± 2%) to "OUTPUT" value on 1B CF Pump Turbine "HP GOV CNTRL".

_____ C. Place 1A CF Pump Turbine "HP GOV CNTRL" in manual.

_____ D. Using L-manual raise or lower pushbuttons on 1A CF Pump Turbine "LP GOV CNTRL", match "OUTPUT" value (± 2%) to "OUTPUT" value on 1B CF Pump Turbine "LP GOV CNTRL".

☐ E. Check 1A CF Pump Turbine speed and 1B CF Pump Turbine speed within 100 - 200 rpm.

_____ F. Place 1A CF Pump Turbine "LP GOV CNTRL" in manual.

_____ 3.6.2.2 **IF** 1A CF Pump Turbine in manual, perform the following:

A. Check the following:

☐ 1A CF Pump Turbine "LP GOV CNTRL" in manual
☐ 1A CF Pump Turbine "HP GOV CNTRL" in manual

NOTE: The following indications are on DCS Feedpump Overview Graphic.

_____ B. Using raise or lower pushbutton(s) on 1A CF Pump Turbine "LP GOV CNTRL/HP GOV CNTRL" as required, slowly adjust 1A CF Pump Turbine speed to match 1B CF Pump Turbine speed (within 100 - 200 RPM) while monitoring the following:

☐ "FPA DEM" (Feedpump A Demand) in RPM
☐ "Sel SPD" (FPA Selected Speed) in RPM
☐ "FPB DEM" (Feedpump B Demand) in RPM
☐ "SEL SPD" (FPB Selected Speed) in RPM
☐ "AUTO SPT" (Auto Setpoint signal to both CF Pumps) in RPM

NOTE: **WHEN** placing 1A CF Pump in auto, the CF Pumps will converge to match "AUTO SPT".

C. Place 1A CF Pump Turbine in auto as follows:

1. Determine governor that is controlling flow:

☐ 1A CF Pump Turbine "LP GOV CNTRL"
☐ 1A CF Pump Turbine "HP GOV CNTRL"

2. Place governor that is controlling flow in auto:

☐ 1A CF Pump Turbine "LP GOV CNTRL"

OR

☐ 1A CF Pump Turbine "HP GOV CNTRL"

3. Place the other governor in auto:

☐ 1A CF Pump Turbine "LP GOV CNTRL"

OR

☐ 1A CF Pump Turbine "HP GOV CNTRL"

☐ 3.6.2.3 Check S/G levels and CF flows stable.

_____ 3.6.3 **IF** placing 1B CF Pump Turbine in auto, perform the following:

_____ 3.6.3.1 **IF** 1B CF Pump Turbine in L-manual, perform the following:

A. Check the following:

☐ 1B CF Pump Turbine "LP GOV CNTRL" in L-manual
☐ 1B CF Pump Turbine "HP GOV CNTRL" in L-manual

_____ B. Using L-manual raise or lower pushbuttons on 1B CF Pump Turbine "HP GOV CNTRL", match "OUTPUT" value (± 2%) to "OUTPUT" value on 1A CF Pump Turbine "HP GOV CNTRL".

_____ C. Place 1B CF Pump Turbine "HP GOV CNTRL" in manual.

_____ D. Using L-manual raise or lower pushbuttons on 1B CF Pump Turbine "LP GOV CNTRL", match "OUTPUT" value (± 2%) to "OUTPUT" value on 1A CF Pump Turbine "LP GOV CNTRL".

☐ E. Check 1B CF Pump Turbine speed and 1A CF Pump Turbine speed within 100 - 200 rpm.

_____ F. Place 1B CF Pump Turbine "LP GOV CNTRL" in manual.

_____ 3.6.3.2 **IF** 1B CF Pump Turbine in manual, perform the following:

A. Check the following:

☐ 1B CF Pump Turbine "LP GOV CNTRL" in manual
☐ 1B CF Pump Turbine "HP GOV CNTRL" in manual

NOTE: The following indications are on DCS Feedpump Overview Graphic.

_____ B. Using raise or lower pushbutton(s) on 1B CF Pump Turbine "LP GOV CNTRL/HP GOV CNTRL" as required, slowly adjust 1B CF Pump Turbine speed to match 1A CF Pump Turbine speed (within 100 - 200 RPM) while monitoring the following:

☐ "FPB DEM" (Feedpump B Demand) in RPM
☐ "Sel SPD" (FPB Selected Speed) in RPM
☐ "FPA DEM" (Feedpump A Demand) in RPM
☐ "SEL SPD" (FPA Selected Speed) in RPM
☐ "AUTO SPT" (Auto Setpoint signal to both CF Pumps) in RPM

NOTE: **WHEN** placing 1B CF Pump in auto, the CF Pumps will converge to match "AUTO SPT".

C. Place 1B CF Pump Turbine in auto as follows:

1. Determine governor that is controlling flow:

☐ 1B CF Pump Turbine "LP GOV CNTRL"
☐ 1B CF Pump Turbine "HP GOV CNTRL"

2. Place governor that is controlling flow in auto:

☐ 1B CF Pump Turbine "LP GOV CNTRL"

OR

☐ 1B CF Pump Turbine "HP GOV CNTRL"

3. Place the other governor in auto:

   ☐ 1B CF Pump Turbine "LP GOV CNTRL"

   OR

   ☐ 1B CF Pump Turbine "HP GOV CNTRL"

☐ 3.6.3.3 Check S/G levels and CF flows stable.

End of Enclosure

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class 26

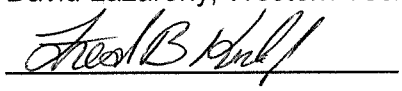
TOPIC: NRC Simulator Exam

Scenario N10-1-2

REFERENCES:

1. OP/1/A/6100/010 C, "Annunciator Response for Panel 1AD-2."
2. OP/1/A/6102/003, "DCS System Operation."
3. AP/1/A/5500/01, "Steam Leak"
4. Technical Specification 3.4.1, "RCS Pressure, Temperature and Flow Departure from Nucleate Boiling (DNB) Limits."
5. Specification 3.5.2, "ECCS System – Operating."
6. Technical Specification 3.0.3
7. AP/1/A/5500/04, "Rapid Downpower."
8. OP/1/A/6150/009, "Boron Concentration Control."
9. OAC Alarm M1P1367, U1 TAVG – TREF.
10. AP/1/A/5500/14, "Rod Control Malfunctions."
11. OAC Alarm M1D3041, 1A NC PUMP VIBRATION
12. AP/1/A/5500/08, "Malfunction of NC Pump."
13. EP/1/A/5000/E-0, "Reactor Trip or Safety Injection."
14. EP/1/A/5000/ES-0.1, "Reactor Trip Response."
15. EP/1/A/5000/E-3, "Steam Generator Tube Rupture."

Author: David Lazarony, Western Technical Services, Inc.

Facility Review: 

Rev. 070710

Scenario Event Description

NRC Scenario 2

Facility:	**McGuire**	Scenario No.:	**2**	Op Test No.:	**N10-1**
Examiners:		Operators:			(SRO)
					(RO)
					(BOP)

Initial Conditions:	The Plant is at 56% power (MOL), following a plant startup and load ascension four days ago to this power level. The power ascension was halted due to unusually high vibrations on the 1A NCP. The System Engineer has been monitoring the NCP, and vibration levels have stabilized out at normally expected levels. A load ascension is expected soon, but not planned for this shift.
Turnover:	The following equipment is Out-Of-Service: 1B ND Pump is OOS for motor replacement. 1EMF46A, Train A KC Radiation Monitor, failed last shift (IAE is investigating) and MCB Annunciator 1AD-12, F-5, "FWST EMERGENCY LOW TEMPERATURE," has alarmed even though FWST Temperature is normal (IAE is investigating).

Event No.	Malf. No.	Event Type*	Event Description
1	NV001	C-BOP C-SRO	VCT Controller Failure
2	SM002B	C-RO C(TS)-SRO	1B SG PORV Fails OPEN
3	NA	C (TS)-SRO	1A ND Pump is OOS
4	NA	R-RO N-BOP N-SRO	Rapid Downpower
5	IRE009	C-RO C-SRO	Control Rods fail to move in AUTO
6	NCP003A	C-BOP C-SRO	High Vibrations 1A NCP
7	SG001B	M-RO M-BOP M-SRO	SGTR
8	OVR SB004A SB004A	NA	Steam Dump System fails to operate

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

McGuire 2010 NRC Scenario #2

The Plant is at 56% power (MOL), following a plant startup and load ascension four days ago to this power level. The power ascension was halted due to unusually high vibrations on the 1A NCP. The System Engineer has been monitoring the NCP, and vibration levels have stabilized out at normally expected levels. A load ascension is expected soon, but not planned for this shift.

The following equipment is Out-Of-Service: 1B ND Pump is OOS for motor replacement. 1EMF46A, Train A KC Radiation Monitor, failed last shift (IAE is investigating) and MCB Annunciator 1AD-12, F-5, "FWST EMERGENCY LOW TEMPERATURE," has alarmed even though FWST Temperature is normal (IAE is investigating).

Shortly after taking the watch, the VCT level controller will fail High. The operator will respond in accordance with MCB Annunciator 1AD-2, F8, DCS ALTERNATE ACTION, and go to OP/1/A/6102/003, "DCS System Operation," Enclosure 4.4, "Removing/Returning a VCT Level Channel From/To Service."

After this, the 1B SG PORV will fail fully OPEN. The operator will enter AP/1/A/5500/01, "Steam Leak," and stabilize the plant. The operator will address Technical Specification 3.4.1, "RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits."

Subsequently, the 1A ND Pump is discovered to be inoperable. The operator will address Technical Specification 3.5.2, "ECCS System - Operating," and determine that an entry into Technical Specification 3.0.3 is needed, and a shutdown to Mode 3 within 6 hours will be required.

Shortly after this, the operator will enter AP/1/A/5500/04, "Rapid Downpower," and decrease load to enter mode 3.

During the downpower, the control rods will fail to move in AUTO. The operator will respond in accordance with OAC Alarm M1P1367, U1 TAVG – TREF (HALM), and enter AP/1/A/5500/14, "Rod Control Malfunctions," and take Manual control of the rods.

As the downpower continues, a high vibration condition will develop on the 1A NCP. The operator will respond in accordance with OAC Alarm M1D3041, 1A NC PUMP VIBRATION (HALM), and enter AP/1/A/5500/08, "Malfunction of NC Pump." The operator will eventually manually trip the reactor, and then stop the 1A NCP.

Upon reactor trip, the operator will enter EP/1/A/5000/E-0, "Reactor Trip or Safety Injection." Simultaneous with the Reactor Trip, a 700 gpm SGTR to occur in the 1C Steam Generator, and, although the operator may transition to EP/1/A/5000/ES-0.1, "Reactor Trip Response," the operator will eventually manually actuate Safety Injection and complete E-0.

Upon completion of E-0, the operator will transition to EP/1/A/5000/E-3, "Steam Generator Tube Rupture," and isolate the flow into and out of the 1C Steam Generator and then conduct a cooldown of the NC System. When the operator attempts to conduct a cooldown of the NC System, the Steam Dumps will fail to operate, and the cooldown will need to be accomplished using the Steam Generator PORVs on the intact Steam Generators.

The scenario will terminate at Step 22.c of E-3, after the crew has closed the Cold Leg Isolation Valves from the NV System.

Critical Tasks:

E-3A

Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs.

Safety Significance: Failure to isolate the ruptured SG causes a loss of ΔP between the ruptured SG and the intact SGs. Upon a loss of ΔP, the crew must transition to a contingency procedure that constitutes an incorrect performance that "necessitates the crew taking compensating action which complicates the event mitigation strategy." If the crew fails to isolate steam from the SG, or feed flow into the SG the ruptured SG pressure will tend to decrease to the same pressures as the intact SGs, requiring a transition to a contingency procedure, and delaying the stopping of RCS leakage into the SG.

E-3B

Establish/maintain an RCS temperature so that transition from E-3 does not occur because RCS temperature is either too high to maintain minimum required subcooling, or too low causing an Orange path on Subcriticality or Integrity.

Safety Significance: Failure to establish and maintain the correct RCS temperature during a SGTR leads to a transition from E-3 to a contingency procedure which constitutes an incorrect performance that "necessitates the crew taking compensating action which complicates the event mitigation strategy." If the RCS temperature is too high when RCS depressurization is started, a loss of subcooling will occur when the RCS depressurization is started. On the other hand, if RCS temperature is allowed to continue to decrease after the initial cooldown, the operator may be required to transition to the Subcriticality or Integrity response FRP, and delay the RCS depressurization.

SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
☐	Sim. Setup	**Rod Step On**	
☐		**Reset to Temp** I/C 158.	**T = 0 Malfunctions:** **ANN AD11-C05 = ON, Transformer lights** **ANN AD11-B05 = ON, Transformer lights** **ANN AD11-E05 = ON, Transformer lights** **ANN AD11-F05 = ON, Transformer lights** **MALF-EMF146A = 1E+7, 1EMF46A, Train A KC Radiation Monitor** **ANN AD12 F05 = ON** **LOA-ND003 = Racked Out, 1B ND Pump OOS**
☐		**RUN** **Reset all SLIMs**	**Place Stickers on:** **1B ND (Tagout)** **1EMF46A (O-Stick)**
☐		**Update** Status Board, **Setup OAC**	**NOTE:** RMWST DO = <1000 ppb.
☐		**Freeze.**	
☐		**Update Fresh Tech. Spec. Log.**	
☐		**Fill out the NEO's Available section of Shift Turnover Info.**	
☐	Prior to Crew Briefing	**RUN**	

	Bench Mark	ACTIVITY	DESCRIPTION
☐	**Crew Briefing** 1. Assign Crew Positions based on evaluation requirements 2. Review the Shift Turnover Information with the crew. 3. Provide T-SAIL Entry for 1B ND. 4. Direct the crew to Review the Control Boards taking note of present conditions, alarms.		
☐	T-0	Begin Familiarization Period	
☐	At direction of examiner	**Event 1** **(XMT) NV001** **Set = 100%** **No Ramp** **Trigger #1**	VCT Controller Failure
☐	At direction of examiner	**Event 2** **(MALF) SM003B** **Set = 100%** **No Ramp** **Trigger #3**	1B SG PORV Fails OPEN
☐	At direction of examiner	**Event 3** **(LOA) ND002 = Racked Out** **Trigger #5**	1A ND Pump is OOS
☐	At direction of examiner	**Event 4**	Rapid Downpower
☐	Continued from Event 4	**Event 5** **(MALF) IRE009 = 0 (AUTO ONLY)** **Trigger #7**	Control Rods fail to move in AUTO

	Bench Mark	ACTIVITY	DESCRIPTION
☐	At direction of examiner	**Event 6** **(MALF) NCP003A = 18** **No Ramp** **Trigger #9**	High Vibrations 1A NCP **NOTE: This malfunction will be subsequently set to 30, causing the NCP trip criteria to be met.**
☐	Continued from Event 6	**Event 7** **(MALF) SG001C = 700 gpm** **No Ramp** **Trigger #11**	SGTR **NOTE: Trigger #11 will be operated on the Reactor Trip.**
☐	Continued from Event 7	**Event 8** **(OVR) SB004A = ON (OFF Reset)** **(OVR) SB004B = ON (OFF Reset)** **Trigger #11**	Steam Dump System fails to operate **NOTE: Trigger #11 will be operated on the Reactor Trip.** **NOTE: Trigger #13 (3 minute delayed) will be operated during the SGTR to isolate the Steam Supply from the 1C SG, to the U1 TD CA PUMP (LOA-SA002 = 0).**
☐	**Terminate the scenario upon direction of Lead Examiner**		

Op Test No.: N10-1	Scenario # 2	Event # 1	Page 8 of 51
Event Description:	**VCT Controller Failure**		

Shortly after taking the watch, the VCT level controller will fail High. The operator will respond in accordance with MCB Annunciator 1AD-2, F8, DCS ALTERNATE ACTION, and go to OP/1/A/6102/003, "DCS System Operation," Enclosure 4.4, "Removing/Returning a VCT Level Channel From/To Service."

Booth Operator Instructions: **Operate Trigger #1 (XMT-NV001 (100))**

Indications Available:

- MCB Annunciator 1AD-7 D3, VCT ABNORMAL (Momentary)
- MCB Annunciator 1AD-2 E8, DCS TROUBLE
- MCB Annunciator 1AD-2 F8, DCS Alternate Action
- VCT Level (1NVP-5760) indicates 100%
- VCT Level (1NVP-5763) indicates that the level is lowering.
- VCT Level SLIM shifts into MANUAL

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The BOP may address ARP for 1AD-7, D3.
			NOTE: The CRS may direct the BOP to place 1NV-137 to VCT position.
MCB ANNUNCIATOR 1AD-2, F8 DCS ALTERNATE ACTION			
	CRS	(Step 1) Halt any power change in progress.	
	BOP	(Step 2) Check DCS Workstation alarms.	
DCS WORKSTATION ALARMS M1D1168, VCT LEVEL ALTERNATE ACTION			
	BOP	(Step 1) Manually control VCT level at desired valve.	
	CRS	(Step 2) Write work request and investigate repair.	

Op Test No.: N10-1 Scenario # 2 Event # 1 Page 9 of 51

Event Description: **VCT Controller Failure**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 3) GO TO OP/1/A/6102/002 (DCS System Operation).	
			NOTE: The CRS will transition to OP/1/A/6102/002.
OP/1/A/6102/002, DCS SYSTEM OPERATION **ENCLOSURE 4.4, REMOVING/RETURNING A VCT LEVEL CHANNEL FROM/TO SERVICE**			
	BOP	(Step 3.1) Performing the following section, as applicable:	
		• Section 3.2, To Respond To An Alternate Action.	
	BOP	• (Step 3.2.2) On DCS Boric Acid Blender graphic, perform the following:	
		• Select 2XS for VCT Level 1.	
		• Determine which level transmitter is NOT faulted.	
		▪ NVAA 5760 (Transmitter A)	
		▪ NVAA 5761 (Transmitter B)	**NOTE:** NVAA 5761 (Transmitter B) is NOT faulted.
		• Select the non-faulted level transmitter for VCT level input (Transmitter A or Transmitter B).	
		• Select "DEV MRE INHIBIT" to block the deviation input.	
		• Check "MRE BLOCKED" lit (blinking red),	
	BOP	• (Step 3.2.2) On DCS Boric Acid Blender Graphic, perform the following:	
		• Select 2XS for VCT Level 2.	
		• Determine which level transmitter is NOT faulted.	
		▪ NVAA 5761 (Transmitter A)	
		▪ NVAA 5760 (Transmitter B)	**NOTE:** NVAA 5761 (Transmitter A) is NOT faulted.

Op Test No.: N10-1 Scenario # 2 Event # 1 Page 10 of 51

Event Description: **VCT Controller Failure**

Time	Pos.	Expected Actions/Behavior	Comments
		• Select the non-faulted level transmitter for VCT level input (Transmitter A or Transmitter B).	
		• Select "DEV MRE INHIBIT" to block the deviation input.	
		• Check "MRE BLOCKED" lit (blinking red).	
	BOP	• (Step 3.2.3) On DCS Boric Acid Blender graphic, perform the following:	
		• Select NV-137A (VCT Level)	
		• Ensure NV-137A is in auto	
	CRS	• (Step 3.2.4) HOLD until the faulted transmitter is repaired.	**NOTE:** The CRS may call WCC/IAE to address the malfunction. If so, **Booth Instructor** acknowledge as WCC.
			NOTE: The CRS will likely conduct a Focus Brief.
At the discretion of the Lead Examiner move to Event #2.			

Op Test No.: N10-1	Scenario # 2	Event # 2	Page 11 of 51
Event Description:	**1B SG PORV Fails OPEN**		

After this, the 1B SG PORV will fail fully OPEN. The operator will enter AP/1/A/5500/01, "Steam Leak," and stabilize the plant. The operator will address Technical Specification 3.4.1, "RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits."

Booth Operator Instructions: **Call the OATC and ensure that they are engaged in a phone conversation, and Operate Trigger #3 (SM003B (100))**

Indications Available:

- 1B S/G PORV (1SV-13AB) output indicates 100%
- 1B S/G PORV (1SV-13AB) Red Status Light is LIT
- OAC Alarm M1Q3498, 1SV-13 1B SM PORV

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The CRS may enter AP1 directly.
OAC ALARM M1Q3498, 1SV-13 1B SM PORV			
	RO	(Step 1) Determine if affected SM PORV was opened per approved procedure.	**NOTE:** The PORV was NOT opened per procedure.
	RO	(Step 2) IF affected SV PORV was NOT opened per approved procedure, THEN perform the following:	
		• Attempt to isolate by performing one of the following:	
		• Close the affected PORV with the manual loader as applicable:	
		▪ 1SV01 (D SM PORV)	
		• 1SV07 (C SM PORV)	
		• 1SV13 (B SM PORV)	
		• 1SV19 (A SM PORV)	
		• Close the PORV Block Valve as applicable:	
		• IF 1SV13 (B SM PORV) OPENED, THEN close 1SV28 (B SM PORV ISOL).	

Op Test No.: N10-1 Scenario # 2 Event # 2 Page 12 of 51

Event Description: **1B SG PORV Fails OPEN**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	• GO TO AP/1/A/5500/001 (Steam Leak)	
			NOTE: The failed PORV will most likely be isolated by the time that AP1 is entered.
AP/1/A/5500/01, STEAM LEAK			
	RO/ BOP	(Step 1) Monitor Foldout page.	
	RO	(Step 2) Reduce turbine load to maintain the following:	
		• Excore NI's – LESS THAN OR EQUAL TO 100%.	
		• NC Loop D/T's – LESS THAN 60°F D/T	
		• T-Avg – AT T-REF.	
	CRS	(Step 3) Check containment entry – IN PROGRESS.	**NOTE:** A Containment Entry is NOT in progress.
	CRS	(Step 3 RNO) GO TO Step 5.	
	BOP	(Step 5) Check Pzr pressure prior to event – GREATER THAN P-11 (1955 PSIG).	
	BOP	(Step 6) Check Pzr level – STABLE OR GOING UP.	
	CRS	(Step 7) IF AT ANY TIME while in this procedure Pzr level cannot be maintained stable, THEN RETURN TO Step 6.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	(Step 8) GO TO Step 12.	

Op Test No.: N10-1 Scenario # 2 Event # 2 Page 13 of 51

Event Description: **1B SG PORV Fails OPEN**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 12) Announce occurrence on paging system.	**NOTE:** The CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	RO	(Step 13) Identify and isolate leak on Unit 1 as follows:	
		• Check SM PORVs – CLOSED.	**NOTE:** The 1B SG PORV was Opened, and most likely previously Closed. IF NOT, it will be closed here.
	RO	(Step 13 RNO) IF S/G pressure is less than 1092 PSIG, THEN perform the following:	
		• Close affected S/G SM PORV manual loader.	**NOTE:** The RO will close the Manual Loader.
		• IF SM PORV is still open, THEN …	**NOTE:** The 1B SG PORV is closed.
	RO	• (Step 13.b) Check condenser dump valves – CLOSED.	
		• Check containment conditions – NORMAL:	
		• Containment temperature	
		• Containment pressure	
		• Containment humidity	
		• Containment floor and equipment sump level.	
	BOP	• Check TD CA pump – OFF.	
	BOP	• Check valves on "STEAM LINE DRAIN VALVES" board (1MC-9) – CLOSED.	
	RO	• Check opposite Unit (Unit 2) "STEAM HEADER PRESSURE" – GREATER THAN 200 PSIG.	

Op Test No.: N10-1 Scenario # 2 Event # 2 Page 14 of 51

Event Description: **1B SG PORV Fails OPEN**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	• Dispatch operator to check for leaks.	**NOTE:** The CRS will NOT dispatch NEOs to look for leaks because it is understood that the SM PORV opening was the reason that AP-1 was entered. However, the CRS may dispatch an NEO to verify that the PORV is Closed.
	BOP	(Step 14) Check UST level – STABLE OR GOING UP.	
	CRS	(Step 15) Evaluate unit shutdown as follows:	
		• Check unit status – IN MODE 1 OR 2.	
		• Determine if unit shutdown or load reduction is warranted based on the following criteria:	**NOTE:** The CRS may call WCC/Management to address the failure. If so, **Booth Instructor** acknowledge as WCC.
		• Size of leak	
		• Location of leak	
		• Rate of depletion of secondary inventory	
		• IF steam is leaking from a secondary heater relief OR MSR relief valve, THEN	**NOTE:** A relief valve is NOT leaking.
		• IF turbine trip will isolate steam leak (such as feedwater heater leak or MSR leak), THEN	**NOTE:** A Turbine Trip is NOT needed.
		• Check unit shutdown or load reduction – REQUIRED.	**NOTE:** The CRS may call WCC/Management to address the failure. If so, **Booth Instructor** acknowledge as WCC.
	CRS	(Step 15.c RNO) Perform the following:	

Op Test No.: N10-1 Scenario # 2 Event # 2 Page 15 of 51

Event Description: **1B SG PORV Fails OPEN**

Time	Pos.	Expected Actions/Behavior	Comments
		• Maintain present plant conditions until leak can be isolated or repaired.	
	CRS	• Exit this procedure.	**NOTE:** SRO will likely conduct a Focus Brief.
TECHNICAL SPECIFICATION 3.4.1, RCS PRESSURE, TEMPERATURE, AND FLOW DEPARTURE FROM NUCLEATE BOILING (DNB) LIMITS			
	CRS	LCO 3.4.1 RCS DNB parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified in Table 3.4.1-1.	**NOTE:** Tech Spec applicability will vary depending of how quickly the event is diagnosed. If Pzr Pressure drops < 2218 psig the TS is applicable.
	CRS	APPLICABILITY: MODE 1.	
	CRS	ACTIONS	
		CONDITION / REQUIRED ACTION / COMPLETION TIME	
		A. Pressurizer pressure or RCS average temperature DNB parameters not within limits. / A.1 Restore DNB parameter(s) to within limit. / 2 hours	
TECHNICAL SPECIFICATION 3.7.4, STEAM GENERATOR POWER OPERTED RELIEF VALVES			
	CRS	LCO 3.7.4, Three SG PORV lines shall be OPERABLE.	
	CRS	MODES 1, 2, and 3, MODE 4 when steam generator is relied upon for heat removal.	

Op Test No.: N10-1 Scenario # 2 Event # 2 Page 16 of 51

Event Description: **1B SG PORV Fails OPEN**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	After evaluation, the CRS determines that NO ACTION is necessary.	
At the discretion of the Lead Examiner move to Event #3.			

Op Test No.: N10-1	Scenario # 2	Event # 3	Page 17 of 51
Event Description:	**1A ND Pump is OOS**		

Subsequently, the 1A ND Pump is discovered to be inoperable. The operator will address Technical Specification 3.5.2, "ECCS System - Operating," and determine that an entry into Technical Specification 3.0.3 is needed, and a shutdown to Mode 3 within 6 hours will be required.

Booth Operator Instructions: **Call as the Plant SRO (Joe) and state:**

Due to a burning smell coming from the 1A ND Pump breaker, the NEO will be racking out the breaker.

THEN, Operate Trigger #5 (LOA-ND002)

Indications Available:

- 1A ND RED and GREEN Breaker status light are OFF.

<table>
<tr><th>Time</th><th>Pos.</th><th>Expected Actions/Behavior</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">TECHNICAL SPECIFICATION 3.5.2, ECCS - OPERATING</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>LCO 3.5.2 Two ECCS trains shall be OPERABLE.</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>APPLICABILITY: MODE 1, 2 and 3.</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>ACTIONS</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>A. One or more trains inoperable
AND
At least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.</td><td>A.1 Restore train(s) to OPERABLE status.</td><td>72 hours</td></tr>
</table>
</td><td>NOTE: The CRS will determine that both Trains of ECCS are inoperable.</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">TECHNICAL SPECIFICATION LCO 3.0.3</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Op Test No.: N10-1 Scenario # 2 Event # 3 Page 18 of 51

Event Description: **1A ND Pump is OOS**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	LCO 3.0.3 When an LCO is not met and the associated ACTIONS are not met, and associated ACTION is not provided, or if directed by the associated ACTIONS, the unit shall be placed in a MODE or other specified condition in which the LCO is not applicable. Action shall be initiated within 1 hour to place the unit, as applicable, in:	
		• MODE 3 within 7 hours;	
		• MODE 4 within 13 hours; and	
		• MODE 5 within 37 hours.	
		Exceptions to this Specification are stated in the individual Specifications.	
			NOTE: The CRS may call plant management. Regardless, **Booth Instructor**: After TS evaluation, as **Operations Superintendent** call and direct that the plant be brought to Mode 3 in the next two hours. **NOTE:** The CRS will likely conduct a Focus Brief.
At the discretion of the Lead Examiner move to Events #4-5.			

Op Test No.: N10-1	Scenario # 2	Event # 4 & 5	Page 19 of 51
Event Description:	**Rapid Downpower/ Control Rods fail to move in AUTO**		

Shortly after this, the operator will enter AP/1/A/5500/04, "Rapid Downpower," and decrease load to enter mode 3. During the downpower, the control rods will fail to move in AUTO. The operator will respond in accordance with OAC Alarm M1P1367, U1 TAVG – TREF (HALM), and enter AP/1/A/5500/14, "Rod Control Malfunctions," and take Manual control of the rods.

Booth Operator Instructions:	**NA**
Indications Available:	**NA**

	Pos.	Expected Actions/Behavior	Comments
		AP/1/A/5500/04, RAPID DOWNPOWER	
	RO/ BOP	(Step 1) Monitor Foldout page.	
	CRS	(Step 2) Announce occurrence on page.	**NOTE:** The CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	RO	(Step 3) Check turbine control – IN AUTO.	
	RO	(Step 4) Check "MW LOOP" – IN SERVICE.	
	CRS	(Step 5) Check shutdown to Mode 3 – DESIRED.	**NOTE:** Shutdown to Mode 3 is desired.
	CRS	(Step 6) Check if "Shutdown Via Reactor Trip from 15% Power" appropriate:	
		• Shutdown Via Reactor Trip from 15% Power - DESIRED	
		• At least two CA pumps – OPERABLE.	
	RO	(Step 7) Enter target load of 180 MW in Turbine Control Panel.	

Op Test No.: N10-1 Scenario # 2 Event # 4 & 5 Page 20 of 51

Event Description: **Rapid Downpower/ Control Rods fail to move in AUTO**

	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 8) Determine the required power reduction rate (MW/min).	**NOTE:** The CRS will reduce load at ≈5-10 MWe/minute.
	RO	(Step 9) Check control rods – IN AUTO.	
	BOP	(Step 10) Notify SOC of load reduction (red dispatcher phone).	**Booth Instructor:** as **SOC**, acknowledge.
	RO	(Step 11) Initiate turbine load reduction to desired load at desired rate.	
	BOP	(Step 12) Borate NC System as follows:	
		• Check TT/1/B/EC78241/003 B (Ovation PCS Plant Transient Testing) – IN EFFECT.	
	CRS	(Step 12.a RNO) GO TO Step 12.c.	
	BOP	• Energize all backup Pzr heaters.	
		• Check unit to shutdown – VIA REACTOR TRIP FROM 15% POWER.	
	CRS	• Calculate Total Power Change	**NOTE:** The CRS calculates a ≈40% power change.
	BOP	• Determine boration amount based on the following:	
		• Power Reduction Rate (MW/min)	
		• Present NC System Boron Concentration (ppm)	
		• Total Power change (%).	
	BOP	• Record calculated boration amount: _____ gallons.	**NOTE:** The BOP calculates a ≈280-330 gallon boration.
	RO	• Check auto or manual rod control – AVAILABLE.	

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Event Description: **Rapid Downpower/ Control Rods fail to move in AUTO**

	Pos.	Expected Actions/Behavior	Comments
	BOP	• Perform boration in 4 equal additions during load reduction PER OP/1/A/6150/009 (Boron Concentration Control), Enclosure 4.7 (Boration Using 1NV-265B (Boric Acid to NV Pumps)).	**NOTE:** Allow the BOP to make at least one boration.
			BOP Examiner follow actions of **Enclosure 4.7**. **Others** should move ahead to **AP4 actions**.
OP/1/A/6150/009, BORON CONCENTRATION CONTROL ENCLOSURE 4.7, BORATION USING 1NV-265B (BORIC ACID TO NV PUMPS)			
	BOP	(Step 3.6.1) Ensure one of the following running:	
		• 1A BA Transfer Pump	
		• 1B BA Transfer Pump	
	BOP	(Step 3.6.2) Determine the length of time 1NV-265B (Boric Acid to NV Pumps) full open as follows:	
		• If using Table 4.7-1 (Time1NV-265B Full Open), record time 1NV-265B full open from Table.	**NOTE:** The BOP will determine that 1NV-265B should be opened ≈31-62 seconds.
	BOP	(Step 3.6.3) Open 1NV-265B (Boric Acid to NV Pumps).	
	BOP	(Step 3.6.4) HOLD until 1NV-265B (Boric Acid to NV Pumps) full open time elapsed, THEN close 1NV-265B (Boric Acid to NV Pumps).	
AP/1/A/5500/04, RAPID DOWNPOWER			

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Event Description: **Rapid Downpower/ Control Rods fail to move in AUTO**

	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 13) Check control rods – MOVING IN AS REQUIRED TO MAINTAIN T-AVG AT T-REF.	**NOTE:** In the subsequent steps, after the Crew has diagnosed the Rod failure, the CRS may back up to perform the Step 13 RNO.
Booth Instructor: Operate Trigger #7 (IRE009 (AUTO)). During the downpower, the control rods will fail to move in AUTO. The operator will respond in accordance with OAC Alarm M1P1367, U1 TAVG – TREF (HALM), and enter AP/1/A/5500/14, "Rod Control Malfunctions," and take Manual control of the rods.			
Indications Available: • White "RODS IN" Rod Control Status light is LIT • Inward Rod direction arrow on the rod motion demand signal indicator. • OAC Alarm M1P1367, U1 TAVG-Tref HI 1.5°F			
			Examiner NOTE: In the subsequent steps, IF the Crew places the Rods in MANUAL, and does NOT address AP14, continue with the last step performed in **AP4**. If the CRS transitions to **AP14**, to address the Rod malfunction, move forward to **AP14** actions on **Page 25**.
	RO	(Step 14) Display Rod Insertion Limits on OAC by entering turn on code "RIL".	
	CRS	(Step 15) IF AT ANY TIME "CONTROL ROD BANK LO LO LIMIT" alarm (1AD-2, B-9) is lit, THEN perform one of the following to comply with Tech Spec 3.1.6 (Control Bank Insertion Limits):	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• Ensure alarm clears within one hour as Xenon builds in.	
		OR	
		• Initiate boration as necessary within one hour to restore control rods above insertion limits.	

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Event Description: **Rapid Downpower/ Control Rods fail to move in AUTO**

	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 16) IF AT ANY TIME during this procedure C-7A is received, THEN ensure Transient Monitor freeze is triggered.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	(Step 17) REFER TO the following:	
		• RP/0/A/5700/000 (Classification of Emergency)	
		• RP/0/A5700/010 (NRC Immediate Notification Requirements).	**NOTE:** The CRS may ask OSM to address. If so, **Floor Instructor** acknowledge as OSM.
	CRS	(Step 18) Notify Reactor Group Duty Engineer of load reduction.	**NOTE:** The CRS may ask OSM to address. If so, **Floor Instructor** acknowledge as OSM. The CRS may call WCC/RE to address failure. If so, **Booth Instructor** acknowledge as WCC.
	RO	(Step 19) Check target load – LESS THAN 1000 MW.	
	RO	(Step 20) Check Unit 2 – AVAILABLE TO SUPPLY AUX STEAM (AS) HEADER.	
	CRS	(Step 21) Dispatch operator to ensure the following valves are open:	
		• 1AS-74 (Unit 1 Unit 2 Aux Steam Hdr Cross-Tie Isol) (service bldg, 739+12, room 202, R-27, over B RL Pump)	
		• Unit 2 valve 2AS-74 (Unit 1 & Unit 2 Aux Steam Hdr Cross-Tie Isol) (service bldg, 739+14, room 202, S-27, above RL strainer.	

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Event Description: **Rapid Downpower/ Control Rods fail to move in AUTO**

	Pos.	Expected Actions/Behavior	Comments
		• 1AS-253 (Unit 1 Aux Steam Hdr Isol) (service bldg, 739+15 P-28 above overhead door to Unit 1 turbine bldg).	**NOTE:** The CRS will dispatch an NEO. If so, **Floor Instructor** acknowledge as **NLO**, and after **5 minutes**, report back that **the valves are OPEN**.
	RO	(Step 22) WHEN all SM flows are less than 65% THEN ensure the following valves ramp CLOSED:	**NOTE:** The CF Control Bypass valves should be closed.
		• 1CF-104AB (1A S/G CF Control Bypass)	
		• 1CF-105AB (1B S/G CF Control Bypass)	
		• 1CF-106AB (1C S/G CF Control Bypass)	
		• 1CF-107AB (1D S/G CF Control Bypass)	
	RO	(Step 23) WHEN P/R instruments indicate less than 48%m THEN check "P-8 HI PWR LO FLO RX TRIP BLOCKED" status light (1DI-18) – LIT.	
	RO	(Step 24) Check the following:	
		• P/R meters indicate reactor power - LESS THAN 40%.	
	CRS	(Step 24 RNO) Perform the following:	**NOTE:** The CRS will hold until power is < 40%.
		• IF target load is less than 40%, THEN perform the following:	
		• Do not continue with this procedure until:	
		▪ P/R instruments indicate reactor power is less than 40%.	
		• All CF flows are less than 40%.	
		• Impulse pressure is less than 260 PSIG.	

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Event Description: **Rapid Downpower/ Control Rods fail to move in AUTO**

	Pos.	Expected Actions/Behavior	Comments
AP/1/A/5500/14, ROD CONTROL MALFUNCTION			
	RO	(Step 1) IF more than one rod dropped, THEN…..	**Immediate Action** **NOTE:** No control rods dropped during this event.
	RO	(Step 2) Place control rods in manual.	**Immediate Action** **NOTE:** The RO placed the rods in manual during the downpower when the malfunction occurred.
	RO	(Step 3) Check rod movement – STOPPED.	**Immediate Action**
	RO	(Step 4) Check all rods – ALIGNED WITH ASSOCIATED BANK.	
	RO	(Step 5) Check "ROD CONTROL URGENT FAILURE" alarm (1AD-2, A-10) – DARK.	
	RO	(Step 6) Check "T-AVG/T-REF FAILURE ROD STOP" alarm (1AD-2, B-7) – DARK.	
	RO	(Step 7) IF this AP entered due to unwarranted rod insertion or withdrawal, THEN….	**NOTE:** The CRS entered AP14 because the Rods were NOT moving when required.
	CRS	(Step 8) IF this AP entered due to a failure of rods to withdraw or insert when required, THEN GO TO Enclosure 2 (Failure Of Rods To Move On Demand).	
			NOTE: The SRO will transition to AP-14, Enclosure 2.

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Event Description: **Rapid Downpower/ Control Rods fail to move in AUTO**

	Pos.	Expected Actions/Behavior	Comments
AP/1/A/5500/14, ROD CONTROL MALFUNCTION ENCLOSURE 2, FAILURE OF RODS TO MOVE ON DEMAND			
	CRS	(Step 1) Announce occurrence on paging system.	**NOTE:** CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	RO	(Step 2) Maintain T-Avg within 1°F of T-Ref using any of the following methods:	**NOTE:** The RO will adjust Turbine Load to maintain Temperature.
		• Borate/dilute NC System	
		OR	
		• Adjust Turbine load.	
	CRS	(Step 3) Notify IAE to investigate problem.	**NOTE:** The CRS may call WCC/IAE to address the Rod Control malfunction. If so, **Booth Instructor** acknowledge as WCC.
	RO	(Step 4) Check if rod control system failure has occurred as follows:	
		• 'ROD CONTROL URGENT FAILURE" alarm (1AD-2, A-10) – LIT.	**NOTE:** The Urgent Failure light is DARK.
	RO	(Step 4 RNO) Perform the following:	
		• If Manual Rod Control available, THEN rods can be used to maintain T-avg within 1°F of T-Ref.	
	RO/ CRS	(Step 5) Do not move rods until IAE determines rod motion is permissible.	
	CRS	(Step 6) IF AT ANY TIME a runback occurs while in this procedure, THEN observe the following guidance:	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.

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Event Description: **Rapid Downpower/ Control Rods fail to move in AUTO**

	Pos.	Expected Actions/Behavior	Comments
		• IF IAE has determined that it is permissible to move rods, THEN respond to the runback PER AP/1/A/5500/03 (Load Rejection).	
		• For all other circumstances, assume rod control is not available and respond to the runback as follows:	
		• Trip Reactor.	
		• GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).	
	CRS	(Step 7) IF AT ANY TIME while in this procedure a unit shutdown is required AND rods cannot be moved, THEN perform the following:	**NOTE:** A Unit Shutdown is required, and the CRS may contact WCC/IAE and ask about the use of Control Rods in Manual. **NOTE:** If so, as **IAE**, report that the use of Manual Rod Control during the Unit Shutdown is permitted.
		• Borate as required during shutdown to maintain T-Avg at T-Ref.	
		• Monitor AFD during load reduction.	
		• IF AT ANY TIME AFD reaches Tech Spec limit AND reactor power is greater than 50%, THEN....	
		• If entry into Mode 3 is desired, THEN perform the following:	
		• WHEN the turbine is tripped OR at desired power level, THEN perform the following:	
		▪ Trip Reactor.	
		• GO TO EP/1/A/5000/E-0	
	CRS	(Step 8) Check if reactor control system failure has occurred as follows:	
		• "T-AVG/T-REF FAILURE ROD STOP" alarm (1AD-2, B-7) – LIT.	

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Event Description: **Rapid Downpower/ Control Rods fail to move in AUTO**

	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 8.a RNO) GO TO Step 9.	
	CRS	(Step 9) WHEN rod control problem is repaired, OR Engineering determines that rod control malfunction will not affect auto rod motion, THEN perform the following:	**NOTE:** A Unit Shutdown is required, and the CRS may contact WCC/IAE and ask about the use of Control Rods in Manual. **NOTE:** If so, as **IAE**, report that the use of Manual Rod Control during the Unit Shutdown is permitted. When the CRS continues the shutdown with rods in Manual, return to the last Step performed in **AP4**, starting on **Page 22 (After insertion of Rod malfunction)**.
		• Ensure T-Avg at T-Ref ± 1°F.	
		• IF auto rod control desired, THEN place control rods in auto.	
At the discretion of the Lead Examiner move to Event #6.			

Op Test No.: N10-1	Scenario # 2	Event # 6	Page 29 of 51
Event Description:	**High Vibrations 1A NCP**		

As the downpower continues, a high vibration condition will develop on the 1A NCP. The operator will respond in accordance with OAC Alarm M1D3041, 1A NC PUMP VIBRATION (HALM), and enter AP/1/A/5500/08, "Malfunction of NC Pump." The operator will eventually manually trip the reactor, and then stop the 1A NCP.

Booth Operator Instructions: Operate Trigger #9 (NCP003A (18)

Indications Available:

- MCB Annunciator 1AD-6, E11, NC PUMP HI VIBRATION
- At Reactor Coolant Pump Vibration Monitoring Cabinet:
- Motor Axial A1 = 18
- Pump Shaft X4 = 17
- Pump Shaft Y4 = 17
- OAC Alarm M1D3041, 1A NC PUMP VIBRATION

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The RO may take the Turbine to HOLD while addressing the NC Pump failure.
OAC ALARM M1D3041, 1A NC PUMP VIBRATION			
	CRS	(Step 1) Refer to OP/1/A/6100/010G – ANNUNCIATOR RESPONSE FOR PANEL 1AS6-E11 (ND Pump HI Vibration)	
AP/1/A/5500/08, MALFUNCTION OF NC PUMP CASE III, EXCESSIVE VIBRATION			
	BOP	(Step 1) Go to the NC pump vibration monitor panel and perform the following:	
		• Compare all 9 vibration channels on the alarming pump.	
		• Check if readings indicate – VALID VIBRATION PROBLEM.	**NOTE:** Several indicators are indicating vibration, reflecting a valid problem.
	BOP	(Step 2) Check NC pump vibration indication within operating limits:	
		• Motor frame vibration – LESS THAN 5 MILS.	

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Event Description: **High Vibrations 1A NCP**

Time	Pos.	Expected Actions/Behavior	Comments
		• All of the following – LESS THAN 20 MILS:	
		• Motor shaft vibration	
		• Pump shaft vibration	
		• Motor axial vibration	
		• Motor flywheel vibration	
	RO/ BOP	(Step 3) IF AT ANY TIME vibration exceeds operating limits, THEN GO TO Step 5.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	(Step 4) GO TO Step 6	
	CRS	(Step 6) Announce occurrence on paging system.	**NOTE:** CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	BOP	(Step 7) Check NC pumps – ANY RUNNING.	

Booth Instructor: **Increase severity of NCP003A to 30.**

Indications Available:

- MCB Annunciator 1AD-6, F11, NC PUMP HI-HI VIBRATION
- At Reactor Coolant Pump Vibration Monitoring Cabinet:
- Motor Axial A1 = 30
- Pump Shaft X4 = 30
- Pump Shaft Y4 = 30

			NOTE: The CRS may enter AP8 directly.
MCB ANNUNCIATOR 1AD-6, F11, NC PUMP HI-HI VIBRATION			
	CRS	(Step 1) GO to AP/1/A/5500/008 (Malfunction of NC Pump).	

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Event Description: **High Vibrations 1A NCP**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 2) IF the vibration has been slowly increasing AND the System Engineer is aware of the problem, follow any Special Orders that the System Engineer has issued.	
AP/1/A/5500/08, MALFUNCTION OF NC PUMP CASE III, EXCESSIVE VIBRATION			
			NOTE: Upon the actuation of the HI-HI Alarm, the CRS will continue with the Continuous Action previously identified within AP8.
	BOP	(Step 5) Stop affected NC pump as follows:	
		• IF A or B NC pump is the affected pump, THEN CLOSE associated spray valve:	
		• 1NC-27C (A NC Loop PZR Spray Control)	**NOTE:** The BOP will need to Close the Spray Valve.
		• Check unit status – IN MODE 1 OR 2.	
	RO	• Trip Reactor	
		• WHEN reactor power less than 5%, THEN stop affected NC pump.	
	CRS	• GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).	
Upon Reactor Trip move to Events #7-8.			

Op Test No.: N10-1 Scenario # 2 Event # 7 & 8 Page 32 of 51

Event Description: **SGTR/ Steam Dump System fails to operate**

Upon reactor trip, the operator will enter EP/1/A/5000/E-0, "Reactor Trip or Safety Injection." Simultaneous with the Reactor Trip, a 700 gpm SGTR to occur in the 1C Steam Generator, and, although the operator may transition to EP/1/A/5000/ES-0.1, "Reactor Trip Response," the operator will eventually manually actuate Safety Injection and complete E-0. Upon completion of E-0, the operator will transition to EP/1/A/5000/E-3, "Steam Generator Tube Rupture," and isolate the flow into and out of the 1C Steam Generator and then conduct a cooldown of the NC System. When the operator attempts to conduct a cooldown of the NC System, the Steam Dumps will fail to operate, and the cooldown will need to be accomplished using the Steam Generator PORVs on the intact Steam Generators. The scenario will terminate at Step 22.c of E-3, after the crew has closed the Cold Leg Isolation Valves from the NV System.

Booth Operator Instructions: **NA**

Trigger #11 (SG001C (700 gpm), OVR-SB004A, 5A (ON)) is tied to the Reactor Trip.

Indications Available:

- MCB Annunciator 1RAD-1 C1, 1EMF 71, S/G A LEAKAGE HI RAD
- MCB Annunciator 1RAD-1 D1, 1EMF 72, S/G B LEAKAGE HI RAD
- MCB Annunciator 1RAD-1 D2, 1EMF 73, S/G C LEAKAGE HI RAD
- MCB Annunciator 1RAD-1 D3, 1EMF 74, S/G D LEAKAGE HI RAD
- 1C SG Level Narrow Range level increasing uncontrollably
- Pzr level and Pressure is lowering

Time	Pos.	Expected Actions/Behavior	Comments
EP/1/A/5000/E-0, REACTOR TRIP OR SAFETY INJECTION			
		(Step 1) Monitor Foldout page.	**NOTE:** Crew will carry out Immediate Actions of E-0, prior to the SRO addressing the EP.
		(Step 2) Check Reactor Trip:	**Immediate Action**
		• All rod bottom lights – LIT	
		• Reactor trip and bypass breakers – OPEN	
		• I/R amps – GOING DOWN.	
	RO	(Step 3) Check Turbine Trip:	**Immediate Action**
		• All throttle valves – CLOSED.	

Op Test No.: N10-1 Scenario # 2 Event # 7 & 8 Page 33 of 51

Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 4) Check 1ETA and 1ETB – ENERGIZED.	**Immediate Action**
	RO/ BOP	(Step 5) Check if S/I is actuated:	**Immediate Action**
		• "SAFETY INJECTION ACTUATED" status light (1SI-18) – LIT.	
	RO/ BOP	(Step 5a RNO) Perform the following:	**Immediate Action**
		• Check if S/I is required:	
		• Pzr pressure less than 1845 PSIG	
		OR	
		• Containment pressure greater than 1 PSIG.	
		• IF S/I is required THEN....	
		• IF S/I is not required, THEN perform the following:	**NOTE:** SI is neither actuated nor presently required.
		• Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).	
		• GO TO EP/1/A/5000/ES-0.1 (Reactor Trip Response).	
			NOTE: The CRS will transition to ES-0.1, however, Pzr Level will be continuously lowering with the SGTR.
EP/1/A/5000/ES-0.1, REACTOR TRIP RESPONSE			
			NOTE: The ES-0.1 Foldout Page requires actuation of SI if Pzr Level lowers to 4%. When this occurs, the CRS will return to E-0, Step 1. **Examiners** move forward to actions on **Page 36**.

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Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	(Step 1) Monitor Foldout page.	**NOTE:** The decision to Manually actuate Safety Injection will be based on Pzr Level lowering to < 4%.
	BOP	(Step 2) Check the following:	
		• VI pressure – GREATER THAN 70 PSIG.	
		• Unit 1 6900V busses – ENERGIZED.	
	CRS	(Step 3) Announce: "Unit 1 Reactor trip, non-essential personnel stay out of Unit 1 turbine bldg".	**NOTE:** CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	CRS	(Step 4) REFER TO RP/0/A/5700/000 (Classification of Emergency).	**NOTE:** The CRS may ask OSM to address. If so, **Floor Instructor** acknowledge as OSM.
	RO	(Step 5) Check NC temperatures:	
		• IF any NC pump on, THEN check NC T-Avg – STABLE OR TRENDING TO 557°F.	**NOTE:** Tavg will be controlled by the SG PORVs at 559°F.
	RO	(Step 5 RNO) Perform the following based on plant conditions:	
		• IF temperature less than 557°F AND going down,....	**NOTE:** Tavg will be controlled by the SG PORVs at 559°F.
		• IF temperature greater than 557°F AND going up, THEN perform the following:	
		• IF steam dumps are available, THEN....	**NOTE:** The Steam Dumps are NOT available.

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Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
		• IF all S/G pressures are greater than 775 PSIG AND SM PORVs are available, THEN use SM PORVs to stabilize temperature at 557°F.	
	RO	(Step 6) Continue to monitor NC temperature as follows:	
		• Check any NC pump – ON.	**NOTE:** ONLY the 1A NCP is OFF.
	CRS	• IF AT ANY TIME while in this procedure the following occurs, THEN perform Step 5.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• NC T-Avg is less than 557°F and going down	
		OR	
		• NC T-Avg is greater than 557°F and going up.	
	RO	(Step 7) Check Main Generator as follows:	
		• Check both generator breakers – OPEN.	
		• Check "EXCITATION" – OFF.	
	RO	(Step 8) Check MSR "RESET" light – LIT.	
	CRS	(Step 9) Dispatch operator to perform Enclosure 5 (MSR Second Stage Drain Tank Isolation).	**NOTE:** The CRS will dispatch an NEO.
	RO	(Step 10) Check NC T-Avg – GREATER THAN 553°F.	
			NOTE: The ES-0.1 Foldout Page requires actuation of SI if Pzr Level lowers to 4%. When this occurs, the CRS will return to E-0, Step 1.

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Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
EP/1/A/5000/E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO/ BOP	(Step 1) Monitor Foldout page.	**NOTE:** Crew will carry out Immediate Actions of E-0, prior to the CRS addressing the EP.
	RO	(Step 2) Check Reactor Trip:	**Immediate Action**
		• All rod bottom lights – LIT	
		• Reactor trip and bypass breakers – OPEN	
		• I/R amps – GOING DOWN.	
	RO	(Step 3) Check Turbine Trip:	**Immediate Action**
		• All throttle valves – CLOSED.	
	BOP	(Step 4) Check 1ETA and 1ETB – ENERGIZED.	**Immediate Action**
	RO/ BOP	(Step 5) Check if S/I is actuated:	**Immediate Action**
		• "SAFETY INJECTION ACTUATED" status light (1SI-18) – LIT.	
		• Both LOCA Sequencer Actuated status lights (1SI-14) – LIT.	
	CRS	(Step 6) Announce "Unit 1 Safety Injection".	**NOTE:** The CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	BOP	(Step 7) Check ESF Monitor Light Panel on energized train(s):	
		• Groups 1, 2, 5 – DARK.	
		• Group 3 – LIT.	

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Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
		• OAC – IN SERVICE.	
		• Group 4, Rows A through F – LIT AS REQUIRED.	**NOTE:** Both ND Pumps are OFF.
	BOP	(Step 7.d RNO) Perform the following:	
		• Ensure both trains Phase A Isolation are initiated.	
		• Align or start S/I and Phase A components with individual windows in Group 4 as required.	
		• GO TO Step 7.f	
	BOP	• Check LOCA Sequencer Actuated status light (1SI-14) on energized train(s) – LIT.	
	BOP	• Check the following windows on Monitor Light Panel Group 4 – LIT:	
		• C-3 :CONT ISOL PHASE A TRN A VLVS ALIGNED"	
		• C-6 "CONT ISOL PHASE A TRN B VLVS ALIGNED"	
		• F-4 "SAFETY INJECTION TRAIN A COMPONENTS ALIGNED"	
		• F-5 "SAFETY INJECTION TRAIN B COMPONENTS ALIGNED".	
	BOP	(Step 8) Check proper CA pump status:	
		• MD CA pumps – ON.	
		• N/R level in at least 3 S/Gs – GREATER THAN 17%.	
	BOP	(Step 9) Check all KC pumps – ON.	
	BOP	(Step 10) Check both RN pumps – ON.	
	CRS	(Step 11) Notify Unit 2 to start 2A RN pump.	**Floor Instructor:** As U2 RO report "2A RN Pump is running."

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Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 12) Check all S/G pressures – GREATER THAN 775 PSIG.	
	BOP	(Step 13) Check Containment Pressure – HAS REMAINED LESS THAN 3 PSIG.	**NOTE:** Containment Pressure is normal.
	BOP	(Step 14) Check S/I flow:	
		• Check "NV PMPS TO COLD LEG FLOW" gauge – INDICATING FLOW.	
		• Check NC pressure – LESS THAN 1600 PSIG.	
		• Check NI pumps – INDICATING FLOW.	
		• Check NC pressure – LESS THAN 286 PSIG.	
	BOP	(Step 14d RNO) Perform the following:	
		• Ensure ND pump miniflow valve on running pump(s) open:	**NOTE:** Both ND Pumps are OFF.
		• 1ND-68A (1A ND Pump & Hx Mini Flow Isol)	
		• 1ND-67B (1B ND Pump & Hx Mini Flow Isol).	
	CRS	• IF valve(s) open on all running ND pumps, THEN GO TO Step 15.	
	CRS	(Step 15) Notify OSM or other SRO to perform EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 22 (OSM Actions Following an S/I) within 10 minutes.	**NOTE:** The CRS may ask OSM to address. If so, **Floor Instructor** acknowledge as OSM.
	BOP	(Step 16) Check CA flow:	
		• Total CA flow – GREATER THAN 450 GPM.	
		• Check VI header pressure – GREATER THAN 60 PSIG.	

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Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
		• WHEN N/R level in any S/G greater than 11% (32% ACC), THEN control CA flow to maintain N/R levels between 11% (32% ACC) and 50%.	
	RO	(Step 17) Check NC temperatures:	
		• IF any NC pumps on, THEN check NC T-Avg – STABLE OR TRENDING TO 557°F.	
	BOP	(Step 18) Check Pzr PORV and spray valves:	
		• All Pzr PORVs – CLOSED.	
		• Normal Pzr spray valves – CLOSED.	
	RO	(Step 19) Check NC subcooling based on core exit T/Cs – GREATER THAN 0°F.	
	RO	(Step 20) Check if main steamlines intact:	
		• All S/G pressures – STABLE OR GOING UP	
		• All S/Gs – PRESSURIZED.	
	BOP	(Step 21) Check if S/G tubes intact:	**NOTE:** Since the Steam Dumps failed at the time of the Reactor trip, all S/G EMFs are Normal. However, all of the Steam Line monitors are in alarm, and the CRS will go to the RNO based on this.
		• The following secondary EMFs – NORMAL:	
		• 1EMF-33 (Condenser Air Ejector Exhaust)	
		• 1EMF-34(L) (S/G Sample (Lo Range))	

Op Test No.: N10-1 Scenario # 2 Event # 7 & 8 Page 40 of 51

Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
		• 1EMF-24 (S/G A)	
		• 1EMF-25 (S/G B)	
		• 1EMF-26 (S/G C)	
		• 1EMF-27 (S/G D).	
	CRS	(Step 21 RNO) IF S/G levels going up in an uncontrolled manner OR any EMF abnormal, THEN perform the following:	**NOTE:** The 1C SG Level is increasing in an uncontrolled manner.
		• Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).	
		• GO TO EP/1/A/5000/E-3 (Steam Generator Tube Rupture).	
			NOTE: The CRS will transition to E-3.
EP/1/A/5000/E-3, STEAM GENERATOR TUBE RUPTURE			
	SRO	(Step 1) Monitor Foldout page.	
	BOP	(Step 2) Identify ruptured S/G(s):	
		• Any S/G N/R level – GOING UP IN AN UNCONTROLLED MANNER	**NOTE:** The 1C SG Level is increasing in an uncontrolled manner.
			NOTE: The CRS may contact Chemistry for sampling. **Booth Instructor:** Acknowledge as appropriate.
	RO	(Step 3) Check at least one S/G – AVAILABLE FOR NC SYSTEM COOLDOWN.	
	RO	(Step 4) Isolate steam flow from ruptured S/G(s) as follows:	
		• Check ruptured S/G(s) PORV – CLOSED.	
		• IF TD CA pump is the only source of feedwater, THEN....	**NOTE:** The TD CA Pump is NOT the ONLY CA Source.
		• Check S/Gs 1B and 1C – INTACT.	

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Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 4c RNO) Isolate TD CA pump steam supply from ruptured S/G as follows:	
		• Ensure operators dispatched in next step immediately notify Control Room Supervisor when valves are closed.	**NOTE:** The CRS will dispatch an NEO.
		• Immediately dispatch 2 operators to concurrently verify (CV), unlock and CLOSE valves on ruptured S/G(s):	
		• For 1C S/G:	
		▪ 1SA-77 (1C S/G SM Supply to Unit 1 TD CA Pump Turb Loop Seal Isol) (Unit 1 interior doghouse, 767+10, FF-53).	
		• 1SA-1 (1C S/G SM Supply to Unit 1 TD CA Pump Turb Maint Isol) (Unit 1 interior doghouse, 767+10, FF-53, above ladder).	**Booth Instructor**: **Operate Trigger #13 (LOA-SA002 = 0 (Closed)** Within **3 minutes,** as **NEO** report that **steam has been isolated to the TD CA Pump from the 1C SG.**
	CRS	• IF AT ANY TIME local closure of SA valves takes over 8 minutes, THEN....	**NOTE:** Eight minutes will NOT elapse before the valves are closed.
	RO	• Check blowdown isolation valves on ruptured S/G/(s) – CLOSED.	
		• For 1C S/G:	
		• 1BB-3B (1C S/G Blowdown Cont Outside Isol Control)	
		• 1BB-7A (C S/G BB Cont Inside Isol).	
	BOP	• CLOSE steam drain on ruptured S/G(s)	
	RO	• CLOSE the following on ruptured S/G(s):	
		• MSIV	
		• MSIV bypass valve.	

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Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 5) Control ruptured S/G(s) level as follows:	
		• Check ruptured S/G(s) N/R level – GREATER THAN 11% (32% ACC).	
	BOP	• Isolate feed flow to ruptured S/G(s):	
		• For 1C S/G:	
		▪ CLOSE 1CA-50B (U1 TD CA Pump Disch TO 1C S/G Isol).	
		• CLOSE 1CA-46B (1B CA Pump Disch To 1C S/G Isol).	

CRITICAL TASK:

(E-3A) Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs.

Safety Significance: Failure to isolate the ruptured SG causes a loss of ΔP between the ruptured SG and the intact SGs. Upon a loss of ΔP, the crew must transition to a contingency procedure that constitutes an incorrect performance that "necessitates the crew taking compensating action which complicates the event mitigation strategy." If the crew fails to isolate steam from the SG, or feed flow into the SG the ruptured SG pressure will tend to decrease to the same pressures as the intact SGs, requiring a transition to a contingency procedure, and delaying the stopping of RCS leakage into the SG.

	BOP	(Step 6) Check ruptured S/G(s) pressure – GREATER THAN 280 PSIG.	
	BOP	(Step 7) Check any NC pump – RUNNING.	**NOTE:** ONLY the 1A NCP is OFF.
	BOP	(Step 8) Check Pzr pressure – GREATER THAN 1955 PSIG.	
	BOP	(Step 8 RNO) IF "P-11 PRESSURIZER S/I BLOCK PERMISSIVE" status light (1SI-18) is lit, THEN block Low Pressure Steamline Isolation as follows:	

Op Test No.: N10-1 Scenario # 2 Event # 7 & 8 Page 43 of 51

Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
		• Depress "BLOCK" on Low Pressure Steamline Isolation block switches.	
		• Maintain NC pressure less than 1955 PSIG.	
	RO	(Step 9) Initiate NC System cooldown as follows:	
	CRS	• Determine required core exit temperature based on lowest ruptured S/G pressure:	
			NOTE: The CRS will determine the target temperature to be 508°F.
	RO	• Check the following on ruptured S/G(s) – CLOSED:	
		• MSIV	
		• MSIV bypass valve.	
	RO	• Check ruptured S/G(s) SM PORV – CLOSED.	
	RO	• Check S/G(s) 1B and 1C – INTACT.	**NOTE:** The 1C SG is ruptured.
	RO	(Step 9.d RNO) IF 1B OR 1C S/G is ruptured, THEN do not continue until steam is isolated to TD CA pump from ruptured S/G per one of the following:	
		• Local isolation of SA line (per Step 4.c)	
		OR	
		• Tripping TD CA pump stop valve (per Step 4.c)	
			NOTE: If NOT already done, the CRS will direct two NLOs to CLOSE 1SA-1 and 77. **Booth Instructor**: Set LOA-SA002 = 0, (1SA-1/77) Within **3 minutes,** as **NEO** report that **steam has been isolated to the TD CA Pump from the 1C SG.**

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Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	• (Step 9e) Check condenser available:	**NOTE:** Although the Steam Dumps did NOT operate on the trip, the CRS will determine that the Condenser is available.
	RO	• "C-9 COND AVAILABLE FOR STEAM DUMP" status light (1SI-18) – LIT	
		• MSIV on intact S/G(s) – OPEN	
	RO	• (Step 9.f) Perform the following to place steam dumps in steam pressure mode:	
		• Place "STM PRESS CONTROLLER" in manual.	
		• Adjust "STM PRESS CONTROLLER" output to equal "STEAM DUMP DEMAND" signal.	
		• Place "STEAM DUMP SELECT" in steam pressure mode.	
	RO	• (Step 9g) WHEN "P-12 LO-LO TAVG" status light (1SI-18) lit, THEN place steam dumps in bypass interlock.	
	RO	• (Step 9h) Dump steam from intact S/G(s) to condenser at maximum rate while attempting to avoid a Main Steam Isolation.	**NOTE:** The Steam Dumps will fail to operate.
		(Step 9h RNO) Perform the following:	
	BOP	• Insure at least one Pzr PORV isolation valve is OPEN.	
		• IF VI is lost, OR a Phase B Isolation has occurred, THEN.....	**NOTE:** Neither condition has occurred.
		• IF Pzr pressure is greater than 1955 PSIG, THEN....	**NOTE:** Pzr Pressure is < 1955 psig.
	RO	• Depress "BLOCK" on Low Pressure Steamline Isolation block switches.	

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Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	• Maintain NC pressure less than 1955 PSIG.	
	RO	• Ensure Main Steam Isolation reset.	
	RO	• Ensure SM PORVs reset.	
	RO	• IF any intact S/G SM PORV isolation valves is closed,....	**NOTE:** The 1B SG PORV needed to be closed due to a previous malfunction, however the valve is NOT isolated.
	RO	• Dump steam using all intact S/G(s) SM PORVs at maximum rate as follows:	
		• CLOSE SM PORV manual loader on ruptured S/G(s).	
		• Place intact S/G SM PORV manual loaders at 50%.	**NOTE:** When the RO places the 1B SG PORV manual Loader in 50%, it will open immediately, due to a previous failure.
		• Select "MANUAL" on "SM PORV MODE SELECT".	
		• Adjust manual loaders on intact S/G SM PORVs as required to control intact S/G depressurization rate at approximately 2 PSIG per second.	
	CRS	• IF any intact S/G SM PORV closed, THEN....	**NOTE:** The 1B SG PORV will be OPEN at this time.
	CRS	• IF no intact S/G available, THEN.....	**NOTE:** The 1A, 1B and 1D SG are available (Although the 1A NC Pump is OFF).
	RO	• (Step 9i) Check Low Pressure Steamline Isolation – BLOCKED.	
	RO	• (Step 9.j) Check Core exit T/Cs- LESS THAN REQUIRED TEMPERATURE.	**NOTE:** It is likely that when the CRS arrives at this step, that the target temperature will NOT be reached.

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Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 9.j RNO) Perform the following:	**NOTE:** This action will be taken after the target temperature has been achieved.
		• WHEN Core exit T/Cs are less than required temperature, THEN perform the following:	
		• Stop NC System cooldown.	
		• Maintain core exit T/Cs less than required temperature.	
	CRS	• GO TO Step 10.	
	RO	(Step 10) Control intact S/G levels:	
		• Check N/R level in any intact S/G – GREATER THAN 11% (32% ACC).	
		• Throttle feed flow to maintain all intact S/G N/R levels between 22% (32% ACC) and 50%.	
	BOP	(Step 11) Check Pzr PORVs and isolation valves:	
		• Power to all Pzr PORV isolation valves – AVAILABLE.	
		• All Pzr PORVs – CLOSED.	
		• At least one Pzr PORV isolation valve – OPEN.	
	BOP	(Step 12) Reset the following:	
		• S/I	
		• Sequencers	
		• Phase A Isolation	
		• Phase B Isolation	
	BOP	(Step 13) Establish VI to containment:	
		• Open the following:	

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Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
		• 1VI-129B (VI Supply to A Cont Ess VI Hdr Outside Isol))	
		• 1VI-160B (VI Supply to B Cont Ess VI Hdr Outside Isol))	
		• 1VI-150B (Lwr Cont Non Ess Cont Outside Isol).	
		• Check VI header pressure – GREATER THAN 85 PSIG.	
	RO	(Step 14) Check if NC System cooldown should be stopped as follows:	
		• Check Core exit T/Cs – LESS THAN REQUIRED TEMPERATURE.	**NOTE:** It is likely that when the CRS arrives at this step, that the target temperature will NOT be reached.
	CRS	(Step 14a RNO) Perform the following:	
		• IF AT ANY TIME while in this step ruptured S/G pressure changes by over 100 PSIG, AND	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware, and HOLD.
		• Do not continue until core exit T/Cs are less than target temperature.	
	RO	• (Step 14b) Stop NC System cooldown.	
		• Maintain Core exit T/Cs – LESS THAN REQURIED TEMPERATURE.	

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Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
CRITICAL TASK:			
(E-3B) Establish/maintain an RCS temperature so that transition from E-3 does not occur because RCS temperature is either too high to maintain minimum required subcooling, or too low causing an Orange path on Subcriticality or Integrity.			
Safety Significance: Failure to establish and maintain the correct RCS temperature during a SGTR leads to a transition from E-3 to a contingency procedure which constitutes an incorrect performance that "necessitates the crew taking compensating action which complicates the event mitigation strategy." If the RCS temperature is too high when RCS depressurization is started, a loss of subcooling will occur when the RCS depressurization is started. On the other hand, if RCS temperature is allowed to continue to decrease after the initial cooldown, the operator may be required to transition to the Subcriticality or Integrity response FRP, and delay the RCS depressurization.			
	RO	(Step 15) Check ruptured S/G(s) pressure – STABLE OR GOING UP.	
	RO	(Step 16) Check NC subcooling based on core exit T/Cs – GREATER THAN 20°F.	
	BOP	(Step 17) Depressurize NC System as follows:	
		• Check ruptured S/G(s) NR level – LESS THAN 73% (63% ACC).	**NOTE:** The ruptured SG level will be > 73%.
	CRS	(Step 17a RNO) GO TO Step 18.	
	BOP	(Step 18) Depressurize NC System using Pzr PORV as follows:	
		• Check at least one Pzr PORV - AVAILABLE.	
		• Open one Pzr PORV.	
		• Do not continue until any of the following conditions satisfied:	
		• NC subcooling based on core exit T/Cs - LESS THAN 0°F	
		OR	
		• Pzr level - GREATER THAN 76% (58% ACC)	

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Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
		OR	
		• Both of the following:	
		• NC pressure - LESS THAN RUPTURED S/G(s) PRESSURE.	
		• Pzr level - GREATER THAN 11% (29% ACC).	
		• Close Pzr PORV.	
		• Close Pzr spray valves.	
	BOP	(Step 19) Check NC pressure - GOING UP.	
	RO/ BOP	(Step 20) Check S/I termination criteria:	
		• NC subcooling based on core exit T/Cs – GREATER THAN 0°F.	
		• Secondary heat sink:	
		• N/R level in at least one intact S/G – GREATER THAN 11% (32% ACC)	
		OR	
		• Total feed flow available to S/G(s) – GREATER THAN 450 GPM.	
		• NC pressure – STABLE OR GOING UP.	
		• Pzr level – GREATER THAN 11% (29% ACC).	
	BOP	(Step 21) Stop S/I pumps as follows:	
		• NI pumps.	
		• All but one NV pump.	
	BOP	(Step 22) Isolate NV S/I flowpath as follows:	
		• Check the following valves - OPEN	
		• 1NV-221A (NV Pumps Suct From FWST)	

Op Test No.: N10-1 Scenario # 2 Event # 7 & 8 Page 50 of 51

Event Description: **SGTR/ Steam Dump System fails to operate**

Time	Pos.	Expected Actions/Behavior	Comments
		• 1NV-222B (NV Pumps Suct From FWST).	
		• Check the following valves - OPEN	
		• 1NV-150B (NV Pumps Recirculation)	
		• 1NV-151A (NV Pumps Recirculation).	
		• Close the following valves:	
		• 1NI-9A (NC Cold Leg Inj From NV)	
		• 1NI-10B (NC Cold Leg Inj From NV).	
At the discretion of the Lead Examiner terminate the exam.			

UNIT 1 STATUS:

Power Level: 56% NCS [B] 1220 ppm Pzr [B]: 1234 ppm Xe: Per OAC

Power History: The Plant is at 56% power (MOL), for four days. Core Burnup: 250 EFPDs

CONTROLLING PROCEDURE: OP/1/A/6100/03 Controlling Procedure for Unit Operation

OTHER INFORMATION NEEDED TO ASSUME TO SHIFT:

- The Plant is at 56% power (MOL), following a plant startup and load ascension four days ago to this power level.
- The power ascension was halted due to unusually high vibrations on the 1A NCP.
- The System Engineer has been monitoring the NCP, and vibration levels have stabilized out at normally expected levels.
- A load ascension is expected soon, but not planned for this shift.

The following equipment is Out-Of-Service:

- 1B ND Pump is OOS for motor replacement.
- 1EMF46A, Train A KC Radiation Monitor, failed last shift (IAE is investigating).
- MCB Annunciator 1AD-12, F-5, "FWST EMERGENCY LOW TEMPERATURE," has alarmed.
- Control Room FWST Temperature indication is normal (IAE is investigating)

Crew Directions:

- Maintain present plant conditions.

Work Control SRO/Offsite Communicator **Jim**

Plant SRO **Joe**

NLO's AVAILABLE

Unit 1	**Unit 2**
Aux Bldg. John	**Aux Bldg. Chris**
Turb Bldg. Bob	**Turb Bldg. Mike**
5th Rounds. Carol	
Extra(s) Bill Ed Wayne Tanya	

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class 26

TOPIC: NRC Simulator Exam

Scenario N10-1-3

REFERENCES:

1. OP/1/A/6100/003, "Controlling Procedure for Unit Operation."
2. OP/1/A/6150/009, "Boron Concentration Control."
3. OP/1/A/6300/001 A, "Turbine-Generator Load Change."
4. AP/1/A/5500/14, "Rod Control Malfunction."
5. OAC Alarm M1A0960, U1 GENERATOR MVAR PRIMARY.
6. AP/1/A/5500/05, "Generator Voltage and Electrical Grid Disturbances."
7. OP/1/A/6100/010 D, "Annunciator Response for Panel 1AD-3."
8. Technical Specification 3.3.2, "ESFAS Instrumentation."
9. Alarm M1A0495, "1B NV PUMP MOTOR OUTBOARD BEARING TEMP."
10. OP/1/A/6200/001 B, "Chemical and Volume Control System – Charging."
11. Technical Specification 3.5.2, "ECCS – Operating."
12. Selected License Commitment 16.9.9, "Boration Systems – Flow Path (Operating)."
13. AP/1/A/5500/07, "Loss of Electrical Power."
14. EP/1/A/5000/ECA-0.0, "Loss of All AC Power."
15. EP/1/A/5000/E-0, "Reactor Trip or Safety Injection."
16. EP/1/A/5000/ES-0.1, "Reactor Trip Response."

Author: David Lazarony, Western Technical Services, Inc.

Facility Review: _____

Rev. 070710

Scenario Event Description

NRC Scenario 3

Facility:	**McGuire**	Scenario No.:	**3**	Op Test No.:	**N10-1**
Examiners:		Operators:			(SRO)
					(RO)
					(BOP)

Initial Conditions:	The plant is at 75% power (MOL), following a plant load decrease four days ago to this power level, due to unusually high vibrations on the 1B NCP. The System Engineer has been monitoring the NCP, and vibration levels have stabilized out at normally expected levels. A power ascension to 100% power is expected for the shift. It is expected to raise power at 3 MWe/Minute. Use of Alternate Dilute during power ascension in accordance with Enclosure 4.4, "Alternate Dilute," of OP/1/A/6150/009, "Boron Concentration Control," has been approved. The RMWST Dissolved Oxygen Concentration is 800 ppb. Conditioned Power Level is 100%.
Turnover:	The following equipment is Out-Of-Service: 1A CA Pump is OOS. 1ASP-5121, AS Header Pressure, failed last shift (IAE is investigating) and MCB Annunciator 1AD-7, J-4, "BAT EMPTY," has failed to off (IAE is investigating).

Event No.	Malf. No.	Event Type*	Event Description
1	NA	R-RO N-BOP N-SRO	Power Increase
2	IRE003A	C-RO C-SRO	Uncontrolled outward Rod Motion in AUTO
3	MG001	C-RO C-SRO	Main Generator Voltage Regulator Failure
4	XMT SM015	I(TS)-SRO	SG Pressure Transmitter fails Low
5	XMT NV075	C-BOP C(TS)-SRO	1B NV Pump Hi Bearing Temperature
6	EP009B DG003B	C-BOP C-SRO	LOP to 1ETB/1B DG trips on Auto Start
7	EP001 EQB003A	M-RO M-BOP M-SRO	Loss of Off-Site Power/1A Sequencer fails to Start the DG
8	DEH003A	NA	Main Turbine fails to Auto trip

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

McGuire 2010 NRC Scenario #3

The plant is at 75% power (MOL), following a plant load decrease four days ago to this power level, due to unusually high vibrations on the 1B NCP. The System Engineer has been monitoring the NCP, and vibration levels have stabilized out at normally expected levels. A power ascension to 100% power is expected for the shift. It is expected to raise power at 3 MWe/Minute. Use of Alternate Dilute during power ascension in accordance with Enclosure 4.4, "Alternate Dilute," of OP/1/A/6150/009, "Boron Concentration Control," has been approved. The RMWST Dissolved Oxygen Concentration is 800 ppb. Conditioned Power Level is 100%.

The following equipment is Out-Of-Service: 1A CA Pump is OOS. 1ASP-5121, AS Header Pressure, failed last shift (IAE is investigating) and MCB Annunciator 1AD-7, J-4, "BAT EMPTY," has failed to off (IAE is investigating).

Shortly after taking the watch, the operator will commence a load increase to 100% starting with Step 3.32.11 of Enclosure 4.1, Power Increase, of OP/1/A/6100/003, "Controlling Procedure for Unit Operation." The operator will dilute the NC System Boron concentration in accordance with Enclosure 4.4, "Alternate Dilute," of OP/1/A/6150/009, "Boron Concentration Control," and raise Turbine load in accordance with OP/1/A/6300/001 A, "Turbine-Generator Load Change."

After the load increase is started, the Control Rods will fail such that rods are moving outward in AUTO. The operator will enter AP/1/A/5500/14, "Rod Control Malfunction."

After this, the Main Generator Voltage Regulator will fail causing the generator to operate outside the Capability Curve. The operator will respond in accordance with OAC Alarm M1A0960, U1 GENERATOR MVAR PRIMARY, and enter AP/1/A/5500/05, "Generator Voltage and Electrical Grid Disturbances," and make adjustments of Main Generator voltage.

Subsequently, the 1A SG pressure will fail low. The DCS will respond in such a way that the plant will be unaffected. However, the operator will address MCB Annunciator 1AD-4, S/G A LO PRESS STM LINE ISOL ALERT, and Technical Specification 3.3.2, "ESFAS Instrumentation."

Subsequently, the 1B NV Pump motor will develop a hot bearing. The operator will respond in accordance with OAC Alarm M1A0495, "1B NV PUMP MOTOR OUTBOARD BEARING TEMP," and swap Charging Pumps in accordance with OP/1/A/6200/001 B, "Chemical and Volume Control System - Charging," Enclosure 4.2, "NV Pump Operation." The operator will address Technical Specification 3.5.2, "ECCS - Operating," and Selected License Commitment 16.9.9, "Boration Systems – Flow Path (Operating)."

Following this, the Normal Supply Breaker for 1ETB will trip OPEN causing an LOP on 1ETB. The operator will enter AP/1/A/5500/07, "Loss of Electrical Power." On the LOP, the 1B DG will trip, and the operator will need to start the A Train equipment.

Shortly after this, a total loss of off-site power will occur. The 1A DG will NOT start automatically, and the operator will enter EP/1/A/5000/ECA-0.0, "Loss of All AC Power." Additionally, the Main Turbine will fail to trip automatically, and the operator will trip the Turbine Manually.

Within ECA-0.0, the operator will be directed to start the 1A DG manually. After the operator starts the 1A DG, the Sequencer will fail to load Bus 1ETA automatically, requiring the operator to manually load the Train A equipment onto the Bus. Upon re-energizing and manually loading

equipment onto Bus 1ETA, the operator will transition to EP/1/A/5000/E-0, "Reactor Trip and Safety Injection," and then to EP/1/A/5000/ES-0.1, "Reactor Trip Response."

The scenario will terminate when the operator transitions to ES-0.1.

Critical Tasks:

E-0 C

Energize at least one AC Emergency Bus before completing Step 7 of ECA-0.0.

Safety Significance: Failure to energize at least one AC Emergency Bus when conditions exist that allow the operator to do so, constitutes mis-operation or incorrect operator performance that unnecessarily prolongs a degraded AC Emergency Power condition, that under varying circumstances could lead to the direct challenge of fission product barriers. For instance, if the Emergency AC Power System is degraded longer than that required by plant circumstances, a single failure in the operation of the SSF, or delayed placement in service, could affect unnecessarily and challenge the RCP Seals (NC System Barrier). Likewise, if the Emergency AC Power System is degraded longer than that required by plant circumstances, a single failure in the operation of the TDAFW Pump, or delayed placement in service, could affect unnecessarily and challenge the Heat Sink and then the Core Cooling Critical Safety Functions (NC System Barrier).

E-0 Q

Manually trip the Turbine before an Orange path develops on the Subcriticality or Integrity Critical Safety Function.

Safety Significance: Failure to trip the Main Turbine when conditions exist that allow the operator to do so, constitutes mis-operation or incorrect operator performance that unnecessarily challenges the Subcriticality or Integrity Critical Safety Function during a degraded AC Emergency Power condition. Additionally, failure to trip the Main Turbine reduces Steam Generator Inventory when the CA System is in a reduced capacity condition. Under such conditions, a Single failure, such as an overspeed of the TD AFW Pump, could result in a challenge to the Heat Sink Critical Safety Function, and subsequently, the Core Cooling Critical Safety Function.

SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
☐	Sim. Setup	**Rod Step On**	
☐		**Reset to Temp** I/C 159.	**T = 0 Malfunctions:** **ANN-AD11-C05 = ON, Transformer A Urgent Alarm** **ANN-AD11-F05 = ON, Transformer B Urgent Alarm** **ANN-AD11-B05 = ON, Transformer A Trouble Alarm** **ANN-AD11-E05 = ON, Transformer B Trouble Alarm** **LOA-CA009 = Racked Out, 1A CA Pump Breaker Racked Out** **XMT-AS001 = 0, AS Header Pressure** **ANN-AD07-J04 = 1 (OFF)** **MAL EQB003A = 2** **DEH003A, Main Turbine fails to Trip**
☐		**RUN** **Reset All SLIMS**	**Place O-Stick on:** **1A CA Pump Breaker Racked Out** **AS Header Pressure** **1AD-7, J4**
☐		**Update** Status Board, **Setup OAC**	**NOTE:** RMWST DO = <1000 ppb.
☐		**Freeze.**	
☐		**Update Fresh Tech. Spec. Log.**	
☐		**Fill out the NEO's Available section of Shift Turnover Info.**	
☐	Prior to Crew Briefing	**RUN**	

	Bench Mark	ACTIVITY	DESCRIPTION
☐		**Crew Briefing**	

1. Assign Crew Positions based on evaluation requirements

2. Review the Shift Turnover Information with the crew.

3. Provide T-SAIL Entry for 1A CA Pump.

4. Provide Enclosure 4.1 of OP/1/A/6100/003, Enclosure 4.1 marked as follows:

   Step 2.3 – Initialed.
   Step 3.1 – Checkbox checked.
   Step 3.2 – Initialed.
   Step 3.3 – Initialed.
   Step 3.3.1 – Checkbox checked.
   Step 3.3.2 – Checkbox checked, Entry Step = 3.32.1.
   Step 3.3.3 – Checkbox checked.
   Step 3.32.1 - Checkbox checked.
   Step 3.32.2 - Checkbox checked.
   Step 3.32.3 – Initialed, Person Notified - Monty Champion, Today's Date
   Step 3.32.5 - Checkbox checked.
   Step 3.32.6.1 – Initialed, Person Notified – Bob Smith, Today's Date
   Step 3.32.6.2 – NA/Initialed.
   Step 3.32.6.3 – NA/Initialed.
   Step 3.32.7.1 – Checkbox checked.
   Step 3.32.7.2 – Initialed.
   Step 3.32.8.1 – Checkbox checked.
   Step 3.32.8.2 – Checkbox checked.
   Step 3.32.8.3 – All five Checkboxes checked.
   Step 3.32.9 – NA/Initialed.
   Step 3.32.10 – NA/Initialed.

5. Provide copy of OP/1/A/6150/009.

6. Provide copy of OP/1/A/6300/001 A.

7. Provide reactivity Plan based on the following Data:

   RTP – 75.429
   Rods – SDB-226, A, B, C, D
   CBA – 226
   CBB -226
   CBC – 226
   CBD – 178
   Xe worth – 2444.09
   Sm Eq – (+)4.54
   Xe rate – (+).57 pcm/min
   NC Boron – 1135.98 ppm
   [Xe] -2395.4
   250 EFPD
   Tave – 576.4

8. Direct the crew to Review the Control Boards taking note of present conditions, alarms.

NOTE: The Floor Instructor will need to provide the CRS with a pre-printed copy of OP/1/A/6200/001 B during event 5.

	Bench Mark	ACTIVITY	DESCRIPTION
☐	T-0	Begin Familiarization Period	
☐	At direction of examiner	**Event 1**	Power Increase
☐	At direction of examiner	**Event 2** **(MALF) IRE003A = OUT** **Trigger #1**	Uncontrolled outward Rod Motion in AUTO
☐	At direction of examiner	**Event 3** **MG001 = 95%** **60 second Ramp** **Trigger #3**	Main Generator Voltage Regulator Failure
☐	At direction of examiner	**Event 4** **(XMT) SM015 = 0** **5 second Ramp** **Trigger #5**	SG Pressure Transmitter fails Low
☐	At direction of examiner	**Event 5** **(XMT) NV075 = 206** **Ramp Start Value = 185** **420 second Ramp** **Trigger #7**	1B NV Pump Hi Bearing Temperature **NOTE: Place severity at 150 on 300 second Ramp after 1B NV Pump is stopped.** **NOTE: The Floor Instructor will need to provide the CRS with a pre-printed copy of OP/1/A/6200/001 B during this event.**
☐	At direction of examiner	**Event 6** **(MALF) EP009B (5 second delayed)** **(MALF) DG003B** **Trigger #9**	LOP to 1ETB/1B DG trips on Auto Start **NOTE: This malfunction is entered at T=0**

	Bench Mark	ACTIVITY	DESCRIPTION
☐	At direction of examiner	**Event 7** **(MALF) EP001** **(MALF) EQB003A** **Trigger #11**	Loss of Off-Site Power/1A Sequencer fails to Start the DG **NOTE: This malfunction is entered at T=0** **NOTE: When directed to activate SSF, activate CAEP RUN ZZRUNSSF After 8 minutes, takes 2 minutes to complete.** **Use Trigger #13 (MALF-KC002F = 0, 30 second Ramp); when need to Close 1KC-338B.**
☐	Continued from Event 7	**Event 8** **(MALF) DEH003A**	Main Turbine fails to Auto trip **NOTE: This malfunction is entered at T=0**
☐	**Terminate the scenario upon direction of Lead Examiner**		

Op Test No.: N10-1	Scenario # 3	Event # 1	Page 9 of 46
Event Description:	**Power Increase**		

Shortly after taking the watch, the operator will commence a load increase to 100% starting with Step 3.32.11 of Enclosure 4.1, Power Increase, of OP/1/A/6100/003, "Controlling Procedure for Unit Operation." The operator will dilute the NC System Boron concentration in accordance with Enclosure 4.4, "Alternate Dilute," of OP/1/A/6150/009, "Boron Concentration Control," and raise Turbine load in accordance with OP/1/A/6300/001 A, "Turbine-Generator Load Change."
Booth Operator Instructions: **NA**
Indications Available: **NA**

Time	Pos.	Expected Actions/Behavior	Comments
OP/1/A/6100/003, CONTROLLING PROCEDURE FOR UNIT OPERATIONS ENCLOSURE 4.1, POWER INCREASE			
	CRS	(Step 3.32.11) Continue power increase to 95% RTP.	**NOTE:** The power increase will be at 3 MWe/minute.
OP/1/A/6150/009, BORON CONCENTRATION CONTROL ENCLOSURE 4.4, ALTERNATE DILUTE			
			NOTE: The BOP may repeat this task as needed during the power increase.
	BOP	(Step 3.6) Ensure the following reset to zero: (R.M.)	
		• Total Make Up Flow Counter	
		• Boric Acid Flow Counter	
	BOP	(Step 3.7) Set Total Make Up Flow Counter to value determined in Step 3.5. (R.M.)	
	BOP	(Step 3.8) Select "ALTERNATE DILUTE" on "NC Sys M/U Controller".	
	BOP	(Step 3.9) If desired to makeup only through 1NV-175A (BA Blender to VCT Outlet), select CLOSED on 1NV-171A (BA Blender to VCT Inlet).	

Op Test No.: N10-1 Scenario # 3 Event # 1 Page 10 of 46

Event Description: **Power Increase**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3.10) IF desired to adjust reactor makeup water flow	**NOTE:** It is NOT desired to adjust reactor makeup water flow.
	BOP	(Step 3.11) IF desired to manually adjust reactor makeup water flow....	
	BOP	(Step 3.12) IF AT ANY TIME it is desired to lower VCT level, perform the necessary steps.	**NOTE:** It is NOT required to lower VCT level.
	BOP	(Step 3.13) IF AT ANY TIME plant parameters require termination of dilution, perform the necessary steps.	
	BOP	(Step 3.14) Momentarily select "START" on "NC System Make Up". (R.M.)	
	BOP	(Step 3.15) Check "NC System Make Up" red light lit.	
	BOP	(Step 3.16) Check 1NV-175A (BA Blender To VCT Outlet) open.	
	BOP	(Step 3.17) Check 1NV-252A (Rx M/U Water To Blender control) open or throttled as required.	
	BOP	(Step 3.18) IF 1NV-171A (BA Blender To VCT Inlet) in "AUTO".....	**NOTE:** 1NV-171A is NOT in AUTO.
	BOP	(Step 3.19) Check Rx M/U Water Pump starts.	

Op Test No.: N10-1 Scenario # 3 Event # 1 Page 11 of 46

Event Description: **Power Increase**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3.20) Monitor Total Make Up Flow Counter. (R.M.)	
	BOP	(Step 3.21) HOLD until one of the following occurs:	
		• Amount of reactor makeup water recorded per Step 3.5 added	
		OR	
		• Reactor makeup water addition manually terminated	
	BOP	(Step 3.22) Ensure dilution terminated as follows: (R.M.)	
		• IF in "AUTO", ensure the following off:	
		• 1A Rx M/U Water Pump	
		• 1B Rx M/U Water Pump	
		• Ensure the following closed:	
		• 1NV-175A (BA Blender To VCT Outlet)	
		• 1NV-252A (RX M/U Water To Blender Control)	
		• 1NV-171A (BA Blender To VCT Inlet)	
	BOP	(Step 3.23) Ensure 1NV-171A (BA Blender to VCT Inlet) in "AUTO".	
	BOP	(Step 3.24) Ensure "Rx M/U Water Flow Control" in "AUTO". (R.M.)	
	BOP	(Step 3.25) IF "Rx M.U Water Flow Control" adjusted per Step 3.10 OR Step 3.11....	**NOTE:** The Rx M.U Water Flow Control was NOT adjusted.
	BOP	(Step 3.26) Ensure 1NV-137A (NC Filters Otlt 3-Way Control) in "AUTO".	

Op Test No.: N10-1 Scenario # 3 Event # 1 Page 12 of 46

Event Description: **Power Increase**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3.27) IF desired to flush blender....	**NOTE:** It is NOT desired to flush the blender.
	BOP	(Step 3.28) Select "AUTO" for "NC Sys M/U Controller".	
	BOP	(Step 3.29) Ensure the following reset to zero: (R.M.)	
		• Total Make Up Flow Counter	
		• Boric Acid Flow Counter	
	BOP	(Step 3.30) Momentarily select "START" on "NC System Make Up".	
	BOP	(Step 3.31) Check "NC System Make Up" red light lit.	
	BOP	(Step 3.32) Record in Auto Log that final blender content is Rx Makeup Water.	
OP/1/A/6300/001A, TURBINE-GENERATOR STARTUP/SHUTDOWN ENCLOSURE 4.1, TURBINE-GENERATOR LOAD CHANGE			
	RO	(Step 3.5) Changing Turbine Load	
		• IF Turbine in "OPERATOR AUTO", perform the following:	
		• Ensure desired change within "Calculated Capability Curve".	
		• IF turbine load will increase or decrease more than 10 MWs, notify Dispatcher of expected load change.	
		• Depress "LOAD RATE".	
		• Enter desired load rate in "VARIABLE DISPLAY".	**NOTE:** the RO will select 3 MWe/Min loading rate.

Op Test No.: N10-1	Scenario # 3	Event # 1	Page 13 of 46
Event Description:	**Power Increase**		

Time	Pos.	Expected Actions/Behavior	Comments
		• Depress "ENTER".	
		• Depress "REFERENCE".	
		• Enter desired load in "VARIABLE DISPLAY".	
		• Depress "ENTER".	
		• Depress "GO"	
		• Check load changes at selected rate.	
OP/1/A/6100/003, CONTROLLING PROCEDURE FOR UNIT OPERATIONS ENCLOSURE 4.1, POWER INCREASE			
	RO/ BOP	(Step 3.32.12) At greater than 85% steam flow from each S/G, ensure the following valves in auto and open:	
		• 1CF104AB (1A S/G CF Cntrl Vlv Bypass)	
		• 1CF105AB (1B S/G CF Cntrl Vlv Bypass)	
		• 1CF106AB (1C S/G CF Cntrl Vlv Bypass)	
		• 1CF107AB (1D S/G CF Cntrl Vlv Bypass)	
			Examiner NOTE: It may take several minutes for the next malfunction to appear. It may be prudent to GO TO the next malfunction, enter Trigger #1, while the power increase continues. This Malfunction requires an actual rod demand signal to be present to actuate the failure.
At the discretion of the Lead Examiner move to Event #2.			

Op Test No.: N10-1	Scenario # 3	Event # 2	Page 14 of 46
Event Description:	**Uncontrolled outward Rod Motion in AUTO**		

After the load increase is started, the Control Rods will fail such that rods are moving outward in AUTO. The operator will enter AP/1/A/5500/14, "Rod Control Malfunction."

Booth Operator Instructions: **Operate Trigger #1 (IRE003A)**

Indications Available:

- Rods stepping out continuously, more than the normal one to two steps.
- Tavg –Tref is positive with rods still moving outward.

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: When the malfunction is diagnosed the CRS may go to HOLD on the Turbine.
AP/1/A/5500/14, ROD CONTROL MALFUNCTION			
	RO	(Step 1) IF more than one rod dropped, THEN.....	**Immediate Action** **NOTE:** No control rods dropped during this event.
	RO	(Step 2) Place control rods in manual.	**Immediate Action**
	RO	(Step 3) Check rod movement – STOPPED.	**Immediate Action** **NOTE:** There was no rod motion when the Rods were taken to Manual.
	RO	(Step 4) Check all rods – ALIGNED WITH ASSOCIATED BANK.	
	RO	(Step 5) Check "ROD CONTROL URGENT FAILURE" alarm (1AD-2, A-10) – DARK.	
	RO	(Step 6) Check "T-AVG/T-REF FAILURE ROD STOP" alarm (1AD-2, B-7) – DARK.	

Op Test No.: N10-1 Scenario # 3 Event # 2 Page 15 of 46

Event Description: **Uncontrolled outward Rod Motion in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step7) IF this AP entered due to unwarranted rod insertion or withdrawal, THEN GO TO Enclosure 3 (Response to Continuous Rod Movement).	**NOTE:** The SRO will transition to AP-14, Enclosure 3.
AP/1/A/5500/14, ROD CONTROL MALFUNCTION ENCLOSURE 3, RESPONSE TO CONTINUOUS ROD MOVEMENT			
	CRS	(Step 1) Announce occurrence on paging system.	**NOTE:** The CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	CRS	(Step 2) Notify IAE to investigate problem.	**NOTE:** The CRS may call WCC/IAE to address the Rod Control malfunction. If so, **Booth Instructor** acknowledge as WCC.
	RO	(Step 3) Evaluate the following prior to any control rod withdrawal:	
		• Ensure no inadvertent mode change will occur	
		• Ensure control rods are withdrawn in a deliberate manner, while closely monitoring the reactor's response.	
	RO	(Step 4) Check T-Ref indication – NORMAL.	
	RO	(Step 5) Do not move rods until IAE determines rod motion is permissible.	
	RO	(Step 6) Maintain T-Avg within 1°F of programmed T-Ref as follows:	

Op Test No.: N10-1 Scenario # 3 Event # 2 Page 16 of 46

Event Description: **Uncontrolled outward Rod Motion in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• Adjust Turbine load	**NOTE:** The RO will adjust Turbine Load as needed to maintain T-avg.
		OR	
		• Borate/dilute NC System.	
	RO	(Step 7) IF AT ANY TIME a runback occurs while in this procedure, THEN observe the following guidance:	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• IF IAE has determined that it is permissible to move rods, THEN respond to the runback PER AP/1/A/5500/03 (Load Rejection).	
		• For all other circumstances, assume rod control is not available and respond to the runback as follows:	
		• Trip Reactor.	
		• GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).	
	RO	(Step 8) IF AT ANY TIME while in this procedure a unit shutdown is required AND rods cannot be moved, THEN perform the following:	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• Borate as required during shutdown to maintain T-Avg at T-Ref.	
		• Monitor AFD during load reduction.	
		• IF AT ANY TIME AFD reaches Tech Spec limit AND reactor power is greater than 50%, THEN perform the following:	
		• Trip Reactor.	
		• GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).	

Op Test No.: N10-1	Scenario # 3	Event # 2	Page 17 of 46
Event Description:	**Uncontrolled outward Rod Motion in AUTO**		

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The CRS may call WCC/IAE to address. If so, **Booth Instructor** acknowledge as WCC. **After 5 minutes**, report that the **Control Rods must be kept in MANUAL, and that they can move rods in MANUAL as needed**.
	RO	(Step 9) WHEN problem is repaired, THEN perform the following:	**NOTE:** The CRS will likely conduct a Focus Brief.
At the discretion of the Lead Examiner move to Event #3.			

Op Test No.: N10-1	Scenario # 3	Event # 3	Page 18 of 46
Event Description:	**Main Generator Voltage Regulator Failure**		

After this, the Main Generator Voltage Regulator will fail causing the generator to operate outside the Capability Curve. The operator will respond in accordance with OAC Alarm M1A0960, U1 GENERATOR MVAR PRIMARY, and enter AP/1/A/5500/05, "Generator Voltage and Electrical Grid Disturbances," and make adjustments of Main Generator voltage.

Booth Operator Instructions: Operate Trigger #3 (MG001 (95% on 60 second Ramp))

Indications Available:

- OAC Alarm M1A0960, U1 GENERATOR MVAR PRIMARY LO-LO
- MCB MVAR indication lower from 150 to -242
- Main Generator Power Factor moves to Leading 0.95
- Main Generator Voltage 22.71KV

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The CRS may enter AP5 directly.
OAC ALARM M1A0960, U1 GENERATOR MVAR PRIMARY			
	CRS	(Step 1) LO-LO – 100 MVARs Leading (-100 MVARS)	
		• GO TO AP/1/A/5500/05 (Generator Voltage and Electric Grid Disturbances).	**NOTE:** The CRS will transition to AP5.
AP/1/A/5500/05, GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES			
	CRS	(Step 1) Announce occurrence on page.	**NOTE:** The CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	CRS	(Step 2) Ensure dispatcher is aware of problem.	**NOTE:** The CRS/BOP will contact SOC. **Booth Instructor:** as **SOC**, acknowledge.

Op Test No.: N10-1 Scenario # 3 Event # 3 Page 19 of 46

Event Description: **Main Generator Voltage Regulator Failure**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 3) Notify Unit 2 to evaluate implementing AP/2/A/5500/05 (Generator Voltage and Electric Grid Disturbances).	**Floor Instructor:** As **U2 RO**, acknowledge.
	RO	(Step 4) Check Unit 1 Generator – TIED TO GRID.	
	RO	(Step 5) IF AT ANY TIME reactor power is greater than 100%, THEN reduce turbine load to maintain reactor power less than 100%.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	RO	(Step 6) Check Unit 1 Generator frequency-GREATER THAN 58.5 Hz.	
	RO	(Step 7) Monitor Generator Capability Curve as follows:	**NOTE:** The RO or BOP will most likely place Curve on OAC Screen.
		• Check Generator voltage – LESS THAN 24 KV.	
		• Check OAC – IN SERVICE.	
		• Monitor Generator Capability Curve PER OAC turn on code "GENCAP".	
	RO	(Step 8) Check Generator MVARs – WITHIN LIMITS OF GENERATOR CAPABILITY CURVE.	**NOTE:** The MVARs will NOT be within the capability curve.
	CRS	(Step 8 RNO) GO TO Step 11.	
	RO	(Step 11) Adjust MVARs to within the capability curve by performing one of the following:	
		• Depress "RAISE" on the "VOLTAGE ADJUST" to reduce leading MVARs.	**NOTE:** This adjustment will NOT be effective at controlling MVARs.

Op Test No.: N10-1 Scenario # 3 Event # 3 Page 20 of 46

Event Description: **Main Generator Voltage Regulator Failure**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 12) Check Generator MVARs – WITHING LIMITS OF GENERATOR CAPABILITY CURVE.	**NOTE:** The MVARs will NOT be within the capability curve.
	RO	(Step 12 RNO) IF actions in Step 11 do not restore MVARs, THEN perform the following:	
		• IF voltage regulator in "AUTO", THEN perform the following:	
		• Place voltage regulator in "MAN".	
		• Adjust MVARs to within the capability curve.	
		• IF unable to maintain MVARs within curve, THEN....	**NOTE:** The MVARs will be able to be adjusted with the Voltage Regulator in MANUAL.
	RO	(Step 13) Monitor Generator frequency as follows:	
		• Check generator frequency – AT 60 Hz.	
		• IF AT ANY TIME generator frequency is abnormal OR TCC/SOC reports abnormal grid frequency condition, THEN GO TO Step 13d.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	• GO TO Step 16.	
	RO	(Step 16) Check if voltage regulator malfunction has occurred:	
		• Generator MVARs – FLUCTUATING (SWINGING) WITHOUT A KNOWN GRID DISTURBANCE IN EFFECT	
		OR	
		• OAC turn on code "MAINGEN" – INDICATES PROBLEM WITH VOLTAGE REGULATOR.	
		OR	

Op Test No.: N10-1 Scenario # 3 Event # 3 Page 21 of 46

Event Description: **Main Generator Voltage Regulator Failure**

Time	Pos.	Expected Actions/Behavior	Comments
		• "VOLTAGE REGULATOR COMMON TROUBLE" alarm (1AD-1, D-4) – LIT.	**NOTE:** The RO will conclude that a Voltage Regulator malfunction has occurred because it would NOT operate in AUTO.
	CRS	(Step 17) Contact the following personnel for guidance:	**NOTE:** The CRS may call WCC to address the malfunction. If so, **Booth Instructor** acknowledge as WCC.
		• System Engineering	
		• Maintenance Technical Support.	
	CRS	(Step 18) IF AT ANY TIME System Engineering or Maintenance Technical Support request operation of the voltage regulator from the local panel, THEN dispatch licensed operator to perform applicable section(s) of OP/1/A/6300/001 (Turbine Generator Startup/Shutdown), Enclosure 4.10 (Voltage Regulator Operation From U1 Gen Voltage Reg Local Control Panel).	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	RO	(Step 19) Check voltage regulator - IN "AUTO".	**NOTE:** The Voltage Regulator is NOT in AUTO.
	RO	(Step 19 RNO) Perform the following:	
		• Notify SOC of the following:	**NOTE:** The CRS/BOP will contact SOC. **Booth Instructor:** as **SOC**, acknowledge.
		• Unit 1 voltage regulator is in manual.	
		• Ensure "Real Time Contingency Analysis" (RTCA) considers status of the Unit 1 voltage regulator.	

Op Test No.: N10-1 Scenario # 3 Event # 3 Page 22 of 46

Event Description: **Main Generator Voltage Regulator Failure**

Time	Pos.	Expected Actions/Behavior	Comments
		• WHEN Engineering or Maintenance directs restoring voltage regulator to "AUTO", THEN	**NOTE:** The investigation will continue.
	CRS	(Step 20) Check if TCC or SOC has reported any of the following:	
		• "Real Time Contingency Analysis" (RTCA) indicated that switchyard voltage would not be adequate should the unit trip.	
		OR	
		• "Real Time Contingency Analysis" (RTCA) indicates that switchyard voltage would not be adequate if further grid degradation occurs.	
		OR	
		• Actual or predicted Megawatt reserves are less than 500 MW.	
		OR	
		• North American Electric Reliability Corporation (NERC) Alert Level 2 or 3 has been declared.	
		OR	
		• Degraded 230 KV switchyard (grid) voltage or frequency condition exists.	**NOTE:** SOC has NOT reported any of the listed conditions.
	CRS	(Step 20 RNO) GO TO Step 27.	
	CRS	(Step 27) IF AT ANY TIME TCC notifies control room that "Real Time Contingency Analysis" (RTCA) will be out of service for greater that four hours, THEN.....	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	CRS	(Step 28) WHEN conditions return to normal, THEN perform the following:	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.

Op Test No.: N10-1 Scenario # 3 Event # 3 Page 23 of 46

Event Description: **Main Generator Voltage Regulator Failure**

Time	Pos.	Expected Actions/Behavior	Comments
		• Check Generator frequency – HAS REMAINED GREATER THAN 58.5 HZ.	
		• Check Unit 1 Generator – TIED TO GRID.	
		• Ensure Unit 1 Generator Bus Voltage is adjusted PER Data Book, Enclosure 4.3, Table 3.1.3, "Generator Voltage Operating Schedule", including any operational restrictions.	
	CRS	• Exit this AP.	**NOTE:** The CRS will likely conduct a Focus Brief.
At the discretion of the Lead Examiner move to Event #4.			

Op Test No.: N10-1	Scenario # 3	Event # 4	Page 24 of 46
Event Description:	**SG Pressure Transmitter fails Low**		

Subsequently, the 1A SG pressure will fail low. The DCS will respond in such a way that the plant will be unaffected. However, the operator will address MCB Annunciator 1AD-4, S/G A LO PRESS STM LINE ISOL ALERT, and Technical Specification 3.3.2, "ESFAS Instrumentation."

Booth Operator Instructions: Operate Trigger #5 (XMT-SM015 (0 on 5 second Ramp))

Indications Available:

- MCB Annunciator 1AD-2 E-8, DCS TROUBLE
- MCB Annunciator 1AD-3 A-1, S/G A LO PRESS STM LINE ISOL ALERT
- MCB Annunciator 1AD-4 B-5, S/G LO STEAM PRESS
- 1A SG Pressure (1SMP-5100) indicates 0 psig.

	Pos.	Expected Actions/Behavior	Comments
MCB ANNUNCIATOR 1AD-3, A1, S/G A LO PRESS STM LINE ISOL ALERT			
	CRS	(Step 1) Notify IAE.	**NOTE:** The CRS may call WCC/IAE to address the malfunction. If so, **Booth Instructor** acknowledge as WCC.
	CRS	(Step 2) Refer to Tech Specs.	
TECHNICAL SPECIFICATION 3.3.2, ESFAS INSTRUMENTATION			
	CRS	LCO 3.3.2 The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE (Functions 4.d.1 and 2).	
	CRS	APPLICABILITY: According to Table 3.3.2-1.	

Op Test No.: N10-1 Scenario # 3 Event # 4 Page 25 of 46

Event Description: **SG Pressure Transmitter fails Low**

<table>
<tr><th></th><th>Pos.</th><th colspan="3">Expected Actions/Behavior</th><th>Comments</th></tr>
<tr><td></td><td>CRS</td><td colspan="3">ACTIONS</td><td></td></tr>
<tr><td></td><td></td><td colspan="3"></td><td></td></tr>
<tr><td rowspan="2"></td><td rowspan="2">CRS</td><td>CONDITION</td><td>REQUIRED ACTION</td><td>COMPLETION TIME</td><td rowspan="2"></td></tr>
<tr><td>A. One or more Functions with one or more required channels or trains inoperable</td><td>A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s).</td><td>Immediately</td></tr>
<tr><td></td><td></td><td>D. One channel inoperable.</td><td>D.1 Place channel in trip.
OR
D.2.1 Be in MODE 3.
AND
D.2.2 Be in MODE 4.</td><td>72 hours

78 hours

84 hours</td><td></td></tr>
<tr><td></td><td></td><td colspan="3"></td><td></td></tr>
<tr><td colspan="6">At the discretion of the Lead Examiner move to Event #5.</td></tr>
</table>

Op Test No.: N10-1	Scenario # 3	Event # 5	Page 26 of 46
Event Description:	**1B NV Pump Hi Bearing Temperature**		

Subsequently, the 1B NV Pump motor will develop a hot bearing. The operator will respond in accordance with OAC Alarm M1A0495, "1B NV PUMP MOTOR OUTBOARD BEARING TEMP," and swap Charging Pumps in accordance with OP/1/A/6200/001 B, "Chemical and Volume Control System - Charging," Enclosure 4.2, "NV Pump Operation." The operator will address Technical Specification 3.5.2, "ECCS - Operating," and Selected License Commitment 16.9.9, "Boration Systems – Flow Path (Operating)."

Booth Operator Instructions: **Operate Trigger #7 (XMT-NV075 (206 on 420 second Ramp (starting from 1850))**

NOTE: The Floor Instructor will provide the CRS with a pre-printed copy of OP/1/A/6200/001 B per the scripted response.

Indications Available:

- OAC Alarm M1A0495, 1B NV PUMP MOTOR OUTBOARD BEARING TEMP.

Time	Pos.	Expected Actions/Behavior	Comments
OAC ALARM M1A0495, 1B NV PUMP MOTOR OUTBOARD BEARING TEMP			
	BOP	(Step 1) Check oil levels on affected Pump and Motor.	**NOTE:** The CRS will dispatch an NEO to evaluate the pump. If so, **Booth Instructor** wait **4 minutes** and report back that **the 1B NV Pump motor casing is very hot**.
	BOP	(Step 2) If either oil level is low (Below red tape).....	
	BOP	(Step 3) If motor oil ring is NOT rotating	
	BOP	(Step 4) If motor bearing temperature is increasing greater than 2°F/minute, Shutdown Affected Pump per OP/1/A/6200/001 B (Chemical and Volume Control System – Charging)	**NOTE:** The CRS will obtain a copy of OP/1/A/6200/001 B. **Floor Instructor:** When the CRS seeks to obtain copy, provide a pre-printed copy.
	BOP	(Step 5) Monitor affected NV bearing Temperature on point trend.	

Op Test No.: N10-1 Scenario # 3 Event # 5 Page 27 of 46

Event Description: **1B NV Pump Hi Bearing Temperature**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 6) Verify thrust bearing oil temp gauge is less than 150°F.	
	BOP	(Step 7) Notify Engineering of the high NV Bearing temperature.	**NOTE:** The CRS may call WCC/Maintenance to address the Pump Motor. If so, **Booth Instructor** acknowledge as WCC.
OP/1/A/6200/001 B, CHEMICAL AND VOLUME CONTROL SYSTEM – CHARGING ENCLOSURE 4.2, NV PUMP OPERATION			
	CRS	(Step 3.1) Evaluate all outstanding R&Rs that may impact performance of this procedure.	**NOTE:** The CRS may call WCC/Maintenance to address the 1A NV Pump. If so, **Booth Instructor** report as WCCS that there are no outstanding R&Rs that could affect the performance of the 1A NV Pump.
	CRS	(Step 3.2) Perform the following section, as applicable.	
		• Section 3.4, Shifting from 1B NV Pump to 1A NV Pump with all reactor Coolant Cold Leg Temperatures Greater Than 300°F.	**NOTE:** The CRS will go to Section 3.4.
	BOP	(Step 3.4) Shifting from 1B NV Pump to 1A NV Pump with all reactor Coolant Cold Leg Temperatures Greater Than 300°F.	
		• If NC System is less than 400 psig…..	**NOTE:** The NC System is > 400 psig.
		• If immediate pump swap is NOT required….	**NOTE:** There are several steps designed to allow the operator to start the pump immediately if needed.

Op Test No.: N10-1 Scenario # 3 Event # 5 Page 28 of 46

Event Description: **1B NV Pump Hi Bearing Temperature**

Time	Pos.	Expected Actions/Behavior	Comments
		• If immediate pump swap is NOT required....	
		• If immediate pump swap is NOT required....	
	BOP	• Start 1A NV Lube Oil Pump.	
		• If this is a routine start of the 1A NV Pump.....	**NOTE:** This is NOT a routine Start of the Pump.
		• Start the 1A NV Pump.	
	BOP	• Place in "AUTO" 1A NV Lube Oil Pump.	
		• Depress "STP" for 1A NV Lube Oil Pump.	
		• Check "START" pushbutton released AND "OFF" lit for 1A NV Lube Oil Pump.	
		• Calculate DP between Seal Balancing Line Pressure and Suction Pressure for 1A NV Pump.	**NOTE:** The BOP will contact the NEO to obtain the local pressures necessary for this calculation. **Booth Instructor:** as NEO, report the following: 1NVPG-5810 (Seal Balancing Line Pressure) = 51.2 psig 1NVPG-5790 (Suction Pressure) = 31.2
		• If DP between Seal Balancing Line Pressure and Suction Pressure greater than 50 psid.....	**NOTE:** The DP is < 50 psid.
		• Stop the 1B NV Pump.	**Booth Instructor:** When the 1B NV Pump is stopped, **change severity** of **XMT-NV075** to **150**, ramped over **300 seconds**.
		• Adjust charging flow and seal flow as needed.	
		• Evaluate back leakage through 1B NV Pump as follows:	
		• HOLD until Pzr level stable at setpoint, THEN check 1NV-238 (Charging Line Flow Control) output.	

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Event Description: **1B NV Pump Hi Bearing Temperature**

<table>
<tr><th>Time</th><th>Pos.</th><th>Expected Actions/Behavior</th><th>Comments</th></tr>
<tr><td></td><td></td><td>• If charging flow less than or equal to 75 gpm AND 1NV-238 output greater than 74%,.....</td><td>NOTE: No back leakage will be indicated.</td></tr>
<tr><td></td><td></td><td></td><td>NOTE: The CRS will likely conduct a Focus Brief.</td></tr>
<tr><td colspan="4">TECHNICAL SPECIFICATION 3.5.2, ECCS-OPERATING</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>LCO 3.5.2 Two ECCS trains shall be OPERABLE.</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>APPLICABILITY: MODES 1, 2, and 3.</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>ACTIONS</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>A. One or more trains inoperable
AND
At least 100% of the ECCS flow equivalent to a single OPERALBE ECCS train available.</td><td>A.1 Restore train(s) to OPERABLE status.</td><td>72 hours</td></tr>
</table>
</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">SELECTED LICENSEE COMMITMENT 16.9.9, BORATION SYSTEMS – FLOW PATH (OPERATING)</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>16.9.9 Boration Systems – Flow Path (Operating)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>COMMITMENT: Two of the following three boron injection flow paths shall be OPERABLE:</td><td></td></tr>
</table>

Op Test No.: N10-1 Scenario # 3 Event # 5 Page 30 of 46

Event Description: **1B NV Pump Hi Bearing Temperature**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	• The flow path from a boric acid tank via a boric acid transfer pump and a charging pump to the reactor coolant system	
		AND	
	CRS	• Two flow paths from the refueling water storage tank via charging pumps to the reactor coolant system.	
	CRS	APPLICABILITY: MODES 1, 2, and 3.	
	CRS	ACTIONS	
	CRS	CONDITION / REQUIRED ACTION / COMPLETION TIME	
		A. One required boron injection flow path inoperable. / A.1 Restore the required boron injection flow path to OPERABLE status. / 72 hours	

At the discretion of the Lead Examiner move to Event #6.

Op Test No.: N10-1	Scenario # 3	Event # 6	Page 31 of 46
Event Description:	**LOP to 1ETB/1B DG trips on Auto Start**		

Following this, the Normal Supply Breaker for 1ETB will trip OPEN causing an LOP on 1ETB. The operator will respond enter AP/1/A/5500/07, "Loss of Electrical Power." On the LOP, the 1B DG will trip, and the operator will need to start the A Train equipment.

Booth Operator Instructions: **Operate Trigger #9 (EP009B (5 second delay), DG003B)**

Indications Available:

- MCB Annunciator 1AD-11 D-1, ETB 4.16 KV TROUBLE
- MCB Annunciator 1AD-11 D-2, ETB 600V LC TROUBLE
- MCB Annunciator 1AD-11 D-3, ETB 600/120V TROUBLE
- MCB Annunciator 1AD-11 D-6, D/G PANEL TROUBLE
- ISI-14 Status Light, ETB LOSS/UNDERVOLTAGE PHASE X is LIT
- ISI-14 Status Light, ETB LOSS/UNDERVOLTAGE PHASE Y is LIT
- ISI-14 Status Light, ETB LOSS/UNDERVOLTAGE PHASE Z is LIT
- ISI-14 Status Light, BLACKOUT SEQ ACTUATED TRAIN B is LIT
- 1B DG Diesel Generator voltage reading 0 volts

Time	Pos.	Expected Actions/Behavior	Comments
AP/1/A/5500/07, LOSS OF ELECTRICAL POWER **CASE II, LOSS OF NORMAL POWER TO EITHER 1ETA OR 1ETB**			
	BOP	(Step 1) Check affected bus(s) – ENERGIZED AND SEQUENCER APPLYING LOADS.	**Immediate Action** **NOTE:** The Sequencer will NOT be applying loads.
	BOP	(Step 1 RNO) Perform the following:	**Immediate Action**
		• IF both busses de-energized THEN....	**NOTE:** 1ETA is energized.
		• Ensure the following pumps running on energized bus:	
		• NV pump	
		• KC pumps	**NOTE:** The BOP will need to start the 1A1 and 1A2 KC Pumps.
		• RN pump	**NOTE:** The BOP will need to start the 1A RN Pump.

Op Test No.: N10-1 Scenario # 3 Event # 6 Page 32 of 46

Event Description: **LOP to 1ETB/1B DG trips on Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 2) Ensure NC pump thermal barrier isolation valves on energized train(s) – OPEN.	**Immediate Action**
	RO	(Step 3) Maintain reactor power less than or equal to 100%.	
	BOP	(Step 4) Check 1ETA and 1ETB – BOTH ENERGIZED.	**NOTE:** ONLY 1ETA is energized.
	CRS	(Step 4 RNO) GO TO Step 6.	
	BOP	(Step 6) Check – S/I HAS OCCURRED DURING THIS EVENT.	**NOTE:** SI has NOT occurred.
	BOP	(Step 6 RNO) Perform the following:	
		• IF both NV pumps off, THEN....	**NOTE:** The 1A NV Pump is running.
	CRS	• IF any pump was manually started per AP07 Immediate Action, THEN GO TO Step 8.	**NOTE:** Both the KC and RN Pumps were started as Immediate Actions.
	BOP	(Step 8) Check D/Gs – OFF.	**NOTE:** The 1B D/G has failed, Both D/Gs are OFF.
	BOP	(Step 9) Check ND System status:	
		• ND System – IN RHR MODE AT TIME OF B/O.	
	CRS	(Step 9 RNO) GO TO Step 10.	
	BOP	(Step 10) Check any RN pump – RUNNING.	**NOTE:** The 1A RN Pump is running.
	BOP	(Step 11) Align KC as follows:	

Op Test No.: N10-1 Scenario # 3 Event # 6 Page 33 of 46

Event Description: **LOP to 1ETB/1B DG trips on Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		• Place recirc valve on operating train in "AUTO".	
		• 1KC-51A (Train A Recirc Isol)	
		• Ensure KC flow remains less than 4000 GPM per operating KC pump while performing next step.	
		• Ensure the following valves on energized train are OPEN:	
		• A Train:	
		▪ OPEN 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol)	
		• OPEN 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol)	
		• OPEN 1KC-394A (A NC Pump Therm Bar Otlt)	
		• OPEN 1KC-345A (C NC Pump Therm Bar Otlt)	
	BOP	(Step 12) Check any charging pump – RUNNING.	
	BOP	(Step 13) Align RN as follows:	
		• Check 1A RN pump – RUNNING.	
		• Ensure 1RN-86A (A KC Hx Inlet Isol) is OPEN.	
		• CLOSE 1RN-43A (Train B To Non Ess Hdr Isol).	
		• THROTTLE 1RN-89A (RN to A KC Hx Control) for desired KC cooling.	
	CRS	(Step 14) Notify Unit 2 RO to start 2A RN pump.	**Floor Instructor:** As **U2 RO** acknowledge.
At the discretion of the Lead Examiner move to Events #7-8.			

Op Test No.: N10-1	Scenario # 3	Event # 7 & 8	Page 34 of 46
Event Description:	**Loss of Off-Site Power/1A Sequencer fails to Start the DG/ Main Turbine fails to Auto trip**		

Shortly after this, a total loss of off-site power will occur. The 1A DG will NOT start automatically, and the operator will enter EP/1/A/5000/ECA-0.0, "Loss of All AC Power." Additionally, the Main Turbine will fail to trip automatically, and the operator will trip the Turbine Manually. Within ECA-0.0, the operator will be directed to start the 1A DG manually. After the operator starts the 1A DG, the Sequencer will fail to load Bus 1ETA automatically, requiring the operator to manually load the Train A equipment onto the Bus. Upon re-energizing and manually loading equipment onto Bus 1ETA, the operator will transition to EP/1/A/5000/E-0, "Reactor Trip and Safety Injection," and then to EP/1/A/5000/ES-0.1, "Reactor Trip Response." The scenario will terminate when the operator transitions to ES-0.1.

Booth Operator Instructions: Operate Trigger #11 (EP001)

Indications Available:

- ISI-14 Status Light, ETA LOSS/UNDERVOLTAGE PHASE X is LIT
- ISI-14 Status Light, ETA LOSS/UNDERVOLTAGE PHASE Y is LIT
- ISI-14 Status Light, ETA LOSS/UNDERVOLTAGE PHASE Z is LIT
- Control Room lighting darkens
- DRPI Screens go dark.
- Reactor Trip Breaker GREEN status lights are LIT
- NC Pumps Breaker GREEN status lights are LIT

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The BOP may try to start the 1A DG manually.
ECA-0.0, LOSS OF ALL AC POWER			
	CRS	(Step 1) CSF Status trees should be monitored for information only. EPs referenced by them should not be implemented.	**NOTE:** Crew will carry out Immediate Actions of ECA-0.0, prior to the CRS addressing the EP.
	RO	(Step 2) Check Reactor Trip:	**Immediate Action**
		• All rod bottom lights – LIT	
		• Reactor trip and bypass breakers – OPEN	
		• I/R amps – GOING DOWN.	**NOTE:** The RO will NOT be able to determine rod bottom lights LIT and implement the Step 2 RNO.

Op Test No.: N10-1 Scenario # 3 Event # 7 & 8 Page 35 of 46

Event Description: **Loss of Off-Site Power/1A Sequencer fails to Start the DG/ Main Turbine fails to Auto trip**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 2 RNO) Trip reactor.	**Immediate Action**
	RO	(Step 3) Check Turbine Trip:	**Immediate Action**
		• All throttle valves – CLOSED.	
	RO	(Step 3 RNO) Perform the following:	**Immediate Action**
		• Trip the Turbine	
		• IF the Turbine will not trip, THEN....	**NOTE:** When the RO manually trips the Turbine, the turbine will trip.

CRITICAL TASK:

(E-0 Q) Manually trip the Turbine before an Orange path develops on the Subcriticality or Integrity Critical Safety Function.

Safety Significance: Failure to trip the Main Turbine when conditions exist that allow the operator to do so, constitutes mis-operation or incorrect operator performance that unnecessarily challenges the Subcriticality or Integrity Critical Safety Function during a degraded AC Emergency Power condition. Additionally, failure to trip the Main Turbine reduces Steam Generator Inventory when the CA System is in a reduced capacity condition. Under such conditions, a Single failure, such as an overspeed of the TD AFW Pump, could result in a challenge to the Heat Sink Critical Safety Function, and subsequently, the Core Cooling Critical Safety Function.

	CRS	(Step 4) Establish NC pump seal injection from the SSF as follows:	
		• Dispatch operator to SSF to perform the following:	**NOTE:** The CRS will dispatch NEO to complete Enclosure 1. If so, **Booth Instructor/Floor Instructor** acknowledge. **Wait 10 minutes** and report that Enclosure 1 is complete.
		• Obtain Brown Folder at SSF and complete Enclosure 1 (Unit 1 SSF – ECA-0.0 Actions).	
		• Dispatch operator to 1ETA room as follows:	

Op Test No.: N10-1 Scenario # 3 Event # 7 & 8 Page 36 of 46

Event Description: **Loss of Off-Site Power/1A Sequencer fails to Start the DG/ Main Turbine fails to Auto trip**

Time	Pos.	Expected Actions/Behavior	Comments
		• Check if operator will enter Aux Bldg – FROM MG SET ROOM.	
		• Give operator dosimeter from Unit 2 BOP desk.	
	CRS	• Dispatch operator to perform Enclosure 2 (Unit 1 EMXA4 – ECA-0.0 Actions).	**NOTE:** The CRS will dispatch NEO to complete Enclosure 2. If so, **Booth Instructor/Floor Instructor** acknowledge as appropriate. **Booth Instructor:** wait **8 minutes**, then **RUN CAEP file ZZRUNSSF_ECA0.0**. **Wait 2 minutes** and report that Enclosure 2 is complete.
	CRS	• Use any of the following to notify security to immediately dispatch officer with key to SSF to ensure operator can access SSF:	**NOTE:** The CRS will contact Security. **Booth Instructor:** As **SAS Operator**, acknowledge.
		• Security ringdown phone (located on Unit 2 BOP desk)	
		• 2688	
		• 4900.	
	BOP	(Step 5) Check NC System – ISOLATED:	
		• Check the following letdown orifice isolation valves – CLOSED.	
		• 1NV-458A (75 GPM L/D Orifice Outlet Cont Isol).	
		• 1NV-457A (45 GPM L/D Orifice Outlet Cont Isol).	
		• 1NV-35A (Variable L/D Orifice Outlet Cont Isol).	
		• CLOSE the following valves:	
		• 1NV-1A (NC L/D Isol To Regen Hx)	
		• 1NV-2A (NC L/D Isol To Regen Hx).	
		• Check Pzr PORVs - CLOSED	

Op Test No.: N10-1 Scenario # 3 Event # 7 & 8 Page 37 of 46

Event Description: **Loss of Off-Site Power/1A Sequencer fails to Start the DG/ Main Turbine fails to Auto trip**

Time	Pos.	Expected Actions/Behavior	Comments
		• Check the following excess letdown isolation valves – CLOSED:	
		• 1NV-24B (C NC Loop To Exs L/D Hx Isol)	
		• 1NV-25B (C NC Loop To Exs L/D Hx Isol).	
		• Check 1NV-121 (U1 ND Letdown Control) – CLOSED.	
	BOP	(Step 6) Check total CA flow – GREATER THAN 450 GPM.	**NOTE:** The TD CA pump is the only operating CA pump, and the discharge flow control valves may have been throttled closed, due to the previous Blackout on 1ETA.
	BOP	(Step 7) Try to restore power to 1ETA or 1ETB as follows:	
		• Place both trains D/G mode select switches to control room.	
		• Perform the following for any D/G(s) that are off:	
		• Depress, then release, "RESET" on sequencer.	
		• Start D/G.	**NOTE:** the 1A D/G will start but NOT sequence loads.
		• Check both D/Gs – RUNNING.	
		• (Step 7c RNO) Perform the following:	
		• Initiate S/I	
		• Notify Unit 2 to immediately ensure flow path to 2B RN pump **PER** Enclosure 6 (Unit 2 Actions).	**Floor Instructor:** As U2 BOP acknowledge.
	CRS	• IF at least one D/G starts, **THEN GO TO** Step 7.d.	**NOTE:** The 1A D/G is running but loads are NOT sequencing on.

Op Test No.: N10-1 Scenario # 3 Event # 7 & 8 Page 38 of 46

Event Description: **Loss of Off-Site Power/1A Sequencer fails to Start the DG/ Main Turbine fails to Auto trip**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	• (Step 7.d).Check bus energized and sequencer applying loads.	**NOTE:** The Sequencer will NOT be applying loads.
	BOP	(Step 7.d RNO) Perform the following:	
		• Ensure normal and standby breakers open to allow auto loading of bus.	
		• IF bus not energized OR sequencer not applying loads, THEN GO TO Enclosure 4 (Manual Loading of Emergency Bus).	
ECA-0.0, LOSS OF ALL AC POWER **ENCLOSURE 4 – MANUAL LOADING OF EMERGNECY BUS**			
	BOP	(Step 1) Reset S/I as follows:	
		• Ensure 1 minute has elapsed since initiation of S/I.	
		• Reset S/I.	
	BOP	(Step 2) Check the following:	
		• 1A D/G – RUNNING.	
		• 1ETA Emergency Breaker - CLOSED	**NOTE:** The 1A D/G is running but the 1ETA Emergency Breaker is OPEN.
	CRS	(Step 2.b RNO) GO TO Step 4.	
	RO/ BOP	(Step 4) Hold "RESET" on 1A sequencer while completing Steps 5 through 7.	**NOTE:** This task will require both the RO and the BOP.
	RO/ BOP	(Step 5) Unload 1ETA emergency bus as follows:	
		• Open 1A CA pump breaker.	**NOTE:** The 1A CA Pump is OOS.

Op Test No.: N10-1 Scenario # 3 Event # 7 & 8 Page 39 of 46

Event Description: **Loss of Off-Site Power/1A Sequencer fails to Start the DG/ Main Turbine fails to Auto trip**

Time	Pos.	Expected Actions/Behavior	Comments
		• Open remaining pump breakers on 1ETA:	
		• 1A NV pump	
		• 1A ND pump	
		• 1A NI pump	
		• 1A1 KC pump	
		• 1A2 KC pump	
		• 1A RN pump	
		• 1A KF pump	
		• Check 1A NS pump breaker – OPEN.	
		• Open the following 600 V essential transformer feeder breakers:	
		• 1ELXA	
		• 1ELXE	
		• 1ELXC	
	RO/ BOP	(Step 6) Place 1A D/G Mode Select switch to control room.	
	RO/ BOP	(Step 7) Close 1ETA Emergency Breaker	**NOTE:** 1ETA is now energized.

Op Test No.: N10-1 Scenario # 3 Event # 7 & 8 Page 40 of 46

Event Description: **Loss of Off-Site Power/1A Sequencer fails to Start the DG/ Main Turbine fails to Auto trip**

Time	Pos.	Expected Actions/Behavior	Comments
CRITICAL TASK: **(E-0 C) Energize at least one AC Emergency Bus before completing Step 7 of ECA-0.0.** Safety Significance: Failure to energize at least one AC Emergency Bus when conditions exist that allow the operator to do so, constitutes mis-operation or incorrect operator performance that unnecessarily prolongs a degraded AC Emergency Power condition, that under varying circumstances could lead to the direct challenge of fission product barriers. For instance, if the Emergency AC Power System is degraded longer than that required by plant circumstances, a single failure in the operation of the SSF, or delayed placement in service, could affect unnecessarily challenge the RCP Seals (NC System Barrier). Likewise, if the Emergency AC Power System is degraded longer than that required by plant circumstances, a single failure in the operation of the TDAFW Pump, or delayed placement in service, could affect unnecessarily challenge the Heat Sink and then the Core Cooling Critical Safety Functions (NC System Barrier).			
	RO/ BOP	(Step 8) Release "RESET" on 1A sequencer.	
	BOP	(Step 9) Load 1ETA emergency bus as follows:	
		• Close 1ELXA feeder breaker	
		• Close 1ELXC feeder breaker	**NOTE:** Control Room lights will come back on.
		• Close 1ELXE feeder breaker	
		• CLOSE 1RN-43A (Train B To Non Ess Hdr Isol).	
		• Ensure 1A RN pump suction and discharge flowpath is available.	
		• Start 1A RN pump.	
		• Ensure the following valves are OPEN:	
		• 1RN-70A (A D/G Hx Inlet Isol)	
		• 1RN-73A (A D/G Outlet Isol)	
		• Start 1A NV pump.	

Op Test No.: N10-1 Scenario # 3 Event # 7 & 8 Page 41 of 46

Event Description: **Loss of Off-Site Power/1A Sequencer fails to Start the DG/ Main Turbine fails to Auto trip**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 10) Observe the following limitations while placing loads on 1ETA emergency bus in the next step:	
		• Continuous load on 1A D/G should not exceed 4000 KW.	
		• Voltage and frequency should be allowed to stabilize before applying the next load group.	
	BOP	(Step 11) Continue loading 1ETA emergency bus as follows:	
		• Ensure EVCA battery charger indicates "ON".	
		• Ensure EVCC battery charger indicates "ON".	
		• CLOSE 1KC-338B (NC Pump Sup Hdr Cont Outside Isol).	**NOTE:** 1KC-338B has no power.
	BOP	(Step 11.c RNO) Perform the following:	
		• CLOSE the following valves:	
		• 1KC-50A (Ten A Aux Bldg Non Ess Sup Isol)	
		• 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol)	
		• Dispatch operator to CLOSE 1KC-338B (aux bldg, 750+11, HH-52, 10 ft west of UHI blue valves).	**NOTE:** The CRS will dispatch NEO. **Booth Instructor/Floor Instructor** acknowledge as appropriate. **Wait 2 minutes, Operate Trigger #13 (MALF-KC002F = 0, 30 second Ramp)** Report that **1KC-338B is Closed**.
		• WHEN 1 KC-338B is closed, THEN evaluate RE-OPENING any valve that was closed in Step 1 of this RNO.	

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Event Description: **Loss of Off-Site Power/1A Sequencer fails to Start the DG/ Main Turbine fails to Auto trip**

Time	Pos.	Expected Actions/Behavior	Comments
		• CLOSE 1KC-425A (NC Pumps Ret Hdr Cont Outside Isol).	
	CRS	• Place info stickers next to 1KC-425A and 1KC-338B switches stating: "Do not reopen due to steam voiding in NCP thermal barriers".	**NOTE:** CRS may ask U2 RO to make stickers. If so, **Floor Instructor** acknowledge as U2 RO.
	BOP	• Place 1KC-51A (Train A Recirc Isol) in "AUTO"	
		Start 1A1 KC pump.	
		Start 1A2 KC pump	
		• Monitor KC surge tank levels for system leakage due to water hammers.	
		Start 1A CA pump.	**NOTE:** The 1A CA Pump is OOS.
	BOP	(Step 11.j RNO) IF CA pump breaker locked out, THEN.....	**NOTE:** The 1A CA Pump is OOS.
		• On OAC graphic for 1ETA bus, check 1ELXC load center breaker to 1EMXG – CLOSED.	
	BOP	(Step 12) Check the following:	
		• 1B D/G - RUNNING	**NOTE:** The 1B D/G is NOT running.
	CRS	(Step 12a RNO) Perform the following:	
		• IF at least one bus energized, THEN GO TO Step 7.e in body of this procedure.	**NOTE:** The CRS will go back to the body of ECA-0.0.
ECA-0.0, LOSS OF ALL AC POWER			

Op Test No.: N10-1 Scenario # 3 Event # 7 & 8 Page 43 of 46

Event Description: **Loss of Off-Site Power/1A Sequencer fails to Start the DG/ Main Turbine fails to Auto trip**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	• (Step 7.e.) Notify dispatched operators at 1EMXA-4 and SSF to stop where they are at.	**NOTE:** The CRS will direct the two dispatched NEOs to cease and desist assigned actions at the SSF. **Booth Instructor:** If actions are delayed and the field actions have already been taken, RUN CAEP file ZZSDSSF.
		• (Step 7.f) Check status of the following local actions:	
		• SSF D/G – OFF	**NOTE:** The SSF D/G may be ON.
	CRS	(Step 7.f.1 RNO) Perform the following:	
		• Have another operator perform Enclosure 5 (Recovery from SSF Actions) while continuing with this procedure.	**NOTE:** The CRS may ask an NEO to perform Enclosure 5. If so, **Floor Instructor** acknowledge as NEO.
	CRS	• GO TO Step 7.h.	
	CRS	• (Step 7.h) Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).	
	CRS	• RETURN TO procedure and step in effect.	**NOTE:** The SRO will go to E-0.
EP/1/A/5000/E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO/ BOP	(Step 1) Monitor Foldout page.	
	RO	(Step 2) Check Reactor Trip:	**Immediate Action**
		• All rod bottom lights – LIT	
		• Reactor trip and bypass breakers – OPEN	

Op Test No.: N10-1 Scenario # 3 Event # 7 & 8 Page 44 of 46

Event Description: **Loss of Off-Site Power/1A Sequencer fails to Start the DG/ Main Turbine fails to Auto trip**

Time	Pos.	Expected Actions/Behavior	Comments
		• I/R amps – GOING DOWN.	
	RO	(Step 3) Check Turbine Trip:	**Immediate Action**
		• All throttle valves – CLOSED.	
	BOP	(Step 4) Check 1ETA and 1ETB – ENERGIZED.	**Immediate Action**
			Immediate Action
	BOP	(Step 4 RNO) Perform the following:	
		• If both busses de-energized, THEN GO TO EP/1/A/5000/ECA-0.0 (Loss of ALL AC Power).	**NOTE:** 1ETA is energized.
	BOP/ CRS	• WHEN time allows, THEN try to restore power to de-energized bus PER AP/1/A/5500/07 (Loss of Electrical Power) while continuing with this procedure.	
	RO/ BOP	(Step 5) Check if S/I is actuated:	**Immediate Action**
		• "SAFETY INJECTION ACTUATED" status light (1SI-18) – LIT.	
		(Step 5.a RNO) Perform the following:	
		• Check if S/I is required:	
		• Pzr pressure less than 1845 PSIG	
		OR	
		• Containment pressure greater than 1 PSIG	
		• If S/I is required THEN initiate S/I.	
		• IF S/I is not required THEN perform the following:	
		• Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).	

Op Test No.: N10-1 Scenario # 3 Event # 7 & 8 Page 45 of 46

Event Description: **Loss of Off-Site Power/1A Sequencer fails to Start the DG/ Main Turbine fails to Auto trip**

Time	Pos.	Expected Actions/Behavior	Comments
		• GO TO EP/1/A/5000/ES-0.1 (Reactor Trip Response).	**NOTE:** SI will NOT be activated or required.
At the discretion of the Lead Examiner terminate the exam.			

UNIT 1 STATUS:

Power Level: 75% NCS [B] 1136 ppm Pzr [B]: 1145 ppm Xe: Per OAC

Power History: The Plant is at 75% power (MOL), for four days. Core Burnup: 250 EFPDs

CONTROLLING PROCEDURE: OP/1/A/6100/03 Controlling Procedure for Unit Operation

OTHER INFORMATION NEEDED TO ASSUME TO SHIFT:

- The Plant is at 75% power (MOL), following a plant load decrease four days ago to this power level, due to unusually high vibrations on the 1B NCP.
- The System Engineer has been monitoring the NCP, and vibration levels have stabilized out at normally expected levels.
- A power ascension to 100% power is expected for the shift.
- It is expected to raise power at 3 MWe/Minute.
- The RMWST Dissolved Oxygen Concentration is 800 ppb.
- Conditioned Power Level is 100%.

The following equipment is Out-Of-Service:

- 1A CA Pump is OOS.
- 1ASP-5121, AS Header Pressure, failed last shift (IAE is investigating).
- MCB Annunciator 1AD-7, J-4, "BAT EMPTY," has failed to off (IAE is investigating).

Crew Directions:

- Raise power to 100% starting at Step 3.32.11 of Enclosure 4.1 of OP/1/A/6100/03, "Controlling Procedure for Unit Operation."
- Use of Alternate Dilute during power ascension in accordance with Enclosure 4.4, "Alternate Dilute," of OP/1/A/6150/009, "Boron Concentration Control," has been approved.
- The Reactor Group has recommended that a Dilution of 100 gallons be made during initial power increase.

Work Control SRO/Offsite Communicator **Jim**

Plant SRO **Joe**

NLO's AVAILABLE

Unit 1	**Unit 2**
Aux Bldg. John	**Aux Bldg. Chris**
Turb Bldg. Bob	**Turb Bldg. Mike**
5th Rounds. Carol	
Extra(s) Bill Ed Wayne Tanya	

Duke Energy
McGuire Nuclear Station
Controlling Procedure For Unit Operation

Procedure No.
OP/1/A/6100/003
Revision No.
163
Electronic Reference No.
MC00472R

Continuous Use

PERFORMANCE

This Procedure was printed on 07/08/10 at 08:23:44 from the electronic library as:

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Compare with Control Copy every 14 calendar days while work is being performed.

Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

Date(s) Performed	Work Order/Task Number (WO#)

COMPLETION

- ☐ Yes ☐ NA Checklists and/or blanks initialed, signed, dated, or filled in NA, as appropriate?
- ☐ Yes ☐ NA Required enclosures attached?
- ☐ Yes ☐ NA Charts, graphs, data sheets, etc. attached, dated, identified, and marked?
- ☐ Yes ☐ NA Calibrated Test Equipment, if used, checked out/in and referenced to this procedure?
- ☐ Yes ☐ NA Procedure requirements met?

Verified By	Date
Procedure Completion Approved	Date

Remarks (*attach additional pages, if necessary*)

IMPORTANT: Do **NOT** mark on barcodes.

Printed Date: *07/08/2010*

Enclosure No.: *4.1*

Revision No.: *163*

Procedure No.: *OP/1/A/6100/003*

1. Limits and Precautions

1.1 This procedure is Reactivity Management related because it controls activities that can affect core reactivity by changing NC System temperature and by changing neutron absorption in the reactor core. (R.M.)

1.2 Any inadvertent power reduction requires investigation and correction prior to continuing power increase.

NOTE: Limit and Precautions 1.3 and 1.4 are **NOT** applicable during performance of PT/0/A/4150/027 A (End of Cycle Moderator Temperature Coefficient Determination Boron / Dilution Method). {PIP 08-4252}

1.3 **WHEN** Turbine Generator paralleled to grid, maximum Tavg deviation from Tref is ±4°F. (Assumption in the accident analysis in the UFSAR)

1.4 **WHEN** Turbine Generator paralleled to grid with Steam Dumps closed **AND** CRD Select in "MANUAL", maximum Tavg deviation from Tref is ±3°F.

1.5 **WHEN** transferring CRD Select from "MANUAL" to "AUTO", T_{avg} maximum deviation from T_{ref} is ±1°F.

1.6 **WHEN** Reactor critical, minimum T_{avg} is 551°F.

1.7 Maximum Power Mismatch is ±2% for each Power Range channel (NIS vs BETP) during steady state power operations. (Should be calibrated within 4 hrs)

NOTE: The following recommended AFD targets are **NOT** applicable during initial cycle startup.

1.8 The following AFD targets are recommended by Nuclear Engineering:

- 1% of target from 90 – 100% RTP with equilibrium xenon
- 2% of target from 90 – 100% RTP with transient xenon
- 2% of target from 50 – 90% RTP
- 5% of target from 20 – 50% RTP
- 10% of target below 20% RTP

1.9 Maximum Boron concentration difference between Pzr and NC System is 50 ppm.

1.10 **IF** in Mode 3 and SDM is outside required limit, TS 3.1.1 requires boration within 15 minutes to restore SDM.

1.11 Maximum S/G tube leakage from any S/G is 100 gpd.

1.12 **IF** both Rod Position Indicator systems (DRPI and OAC) become inoperable during Mode 3, Tech Specs require tripping the Reactor..

1.13 Minimum individual S/G outlet pressure is 870 psig to prevent flow induced vibration of S/G tubes. {MDUK-1242.01-0001.001 (Temperature and Power Limits for Operation As Controlled by Pressure Boundary Structural Analysis and Safety Analysis)}

1.14 The following apply to Fuel Maneuvering Limits:

- Fuel Maneuvering Limits apply to power increase and **NOT** power decrease
- Fuel Maneuvering Limits are based on Reactor Power and **NOT** Generator Load
- The Reactor Group shall be contacted for any questions that arise concerning Fuel Maneuvering Limits

1.15 Control Rod withdrawal rate is limited by Fuel Maneurvering Limits (Data Book Section 1.3). The rod withdrawal rate for unconditioned fuel above 50% power is limited to 3 steps/hour. Fuel is considered conditioned with respect to rod position once the control rods have been withdrawn to a given position at a given power level.

1.16 During power changes, the following alternate indications for Reactor Power are available:

- Thermal Power Best Estimate (TPBE)
- Tavg, Tcold, NC Loop Delta-T
- Intermediate Range Channels
- Turbine Impulse Pressure, Megawatt output
- CF flowrate

NOTE: This enclosure will affect reactivity of the core and is therefore designated important to Reactivity Management per the guidelines of NSD 703 (Reactivity Management) (R.M.)

2. Initial Conditions

____ 2.1 Mode 3 with NC System at 557°F and 2235 psig in anticipation of Reactor Startup

OR

____ 2.2 Mode 2

OR

2K 2.3 Mode 1 in anticipation of power increase

3. Procedure

NOTE: **IF** initial power escalation for a fuel cycle, this procedure will be performed in parallel with Nuclear Engineering procedure PT/0/A/4150/021 (Post Refueling Controlling Procedure for Criticality, Zero Power Physics and Power Escalation Testing).

☑ 3.1 Evaluate all outstanding R&Rs that may impact performance of this procedure.

2K SRO 3.2 Evaluate OP/1/A/6100/SU-19 (Heatup to 557 Degrees F), Enclosure 4.4 (Pre-Startup System Alignments) to determine if additional actions may need to be performed.

2K SRO 3.3 **IF** plant conditions require entering this procedure at some point other than the beginning, perform the following:

☑ 3.3.1 Determine entry step based upon plant conditions.

☑ 3.3.2 Record entry step: 3.32.1

☑ 3.3.3 Evaluate all steps prior to that recorded in Step 3.3.2 for additional actions that need to be performed.

____ 3.4 **IF** Zero Power Physics Testing will be performed, maintain the following:

☐ NC System pressure within ± 20 psig of 2235 psig
☐ NC System T_{avg} within ± 1.0°F of 557°F by throttling S/G blowdown

____ 3.5 **WHEN** NC System temperature has been 557°F for at least 6 hours, configure Loose Parts Monitoring System for at power monitoring per OP/1/B/6150/016 (Loose Parts Monitoring System).

☐ 3.6 Maintain proper NC System parameters by operating Pzr Htr Groups as required per Enclosure 4.6 (Operation of Pzr Heaters).

_____ 3.7 On DCS Workstation Feedpump Overview graphic, ensure operating CF Pump Turbine in auto.

_____ 3.8 Ensure the following S/G CF Cntrl Bypass Valves in auto:

_____ • 1CF-104AB (1A S/G CF Control Bypass)

_____ • 1CF-105AB (1B S/G CF Control Bypass)

_____ • 1CF-106AB (1C S/G CF Control Bypass)

_____ • 1CF-107AB (1D S/G CF Control Bypass)

3.9 Defeat Hi Flux at Shutdown alarms as follows:

_____ 3.9.1 Place "Hi Flux At Shutdown" for Channel N31 to "BLOCK". (SR drawer)

_____ 3.9.2 Place "Hi Flux At Shutdown" for Channel N32 to "BLOCK". (SR drawer)

☐ 3.9.3 Check 1AD-2, D2 (S/R High Flux Alm Blocked) lit.

_____ 3.9.4 Place "Shutdown Monitor A Annun Bypass" to "BYPASS".

_____ 3.9.5 Place "Shutdown Monitor B Annun Bypass" to "BYPASS".

3.10 Within 4 hours prior to achieving criticality, perform the following to check SDM:

NOTE: **IF** the REACT program says "Reactivity Summation is negative! Please perform an ECB". This means that with all rods out the reactor is **NOT** predicted to go critical.

☐ 3.10.1 Check Estimated Critical Rod Position is above COLR insertion limit per OP/0/A/6100/006 (Reactivity Balance Calculation).

☐ 3.10.2 Check all control rods operable.

☐ 3.10.3 Record in PT/1/A/4600/008 (Surveillance Requirements for Unit Heatup).

_____ 3.11 **IF** TV/GV hot calibration was started in OP/1/A/6100/SU-19 (Heatup to 557 Degrees F) **AND** has **NOT** been completed, perform the following:

_____ 3.11.1 Notify IAE to stop/suspend TV/GV hot calibration.

_____ _____/_____
Person Notified Date Time

_____ 3.11.2 **HOLD** until confirmed that IAE is **NOT** performing TV/GV hot calibration.
IAE

_____ 3.12 Ensure a Reactor startup 91-01 briefing has been performed:
SRO

Management Designee: _____

Evolution Coordinator: _____

3.13 Begin Reactor startup to critical as follows:

NOTE:
- Minimum 1 decade overlap required between SR and IR.
- Minimum 1 decade overlap required between IR and PR.
- IF positive reactivity addition occurs, Mode 2 can be achieved with all control rods inserted.
- Tech Specs define Mode 2. (Mode 2 may be declared when Control Banks are initially withdrawn from fully inserted position).

_____ SRO _____ RO 3.13.1 IF Reactor startup being performed by control rod withdrawal, complete Enclosure 4.3 (Guidelines For Approaching Criticality Via Control Rod Withdrawal) before control bank withdrawal.

☐ 3.13.2 Announce over page, "Commencing Unit 1 Reactor Startup".

☐ 3.13.3 Using "Plant Mode Change & Alarm Look Ahead", change OAC to "Mode 2".

3.13.4 On the DCS Work Station, change the DCS Modal Alarming to "MODE 2" as follows:

☐ 3.13.4.1 Access DCS "PLANT MODE SELECTION" Screen (6012).

☐ 3.13.4.2 Select "MODE 2".

☐ 3.13.4.3 Select "ACCEPT MODE".

☐ 3.13.4.4 Check "MODE 2" is displayed in "CURRENT PLANT MODE".

_____ SRO _____ RO 3.13.5 Notify SRO and RO to continuously monitor the following to determine when the Reactor is supercritical:

- Constant positive SUR without control rod movement or NC System dilution
- Log Power increasing linearly without control rod movement or NC System dilution

3.13.6 Initiate 1/M plot per one of the following:

☐ Nuclear Engineering procedure guidance on initial startup for fuel cycle

OR

☐ PT/0/A/4150/047 (1/M Monitoring During Startup)

_____ 3.13.7 **WHEN** control rods are being withdrawn, perform Table 4.1-1 (Control Rod Bank Parameters).

_____ 3.13.8 Select "HI" on "Nuclear Power (%)" recorder. (1ENBCR9450)

3.13.9 Withdraw control banks per one of the following:

_____ 3.13.9.1 **IF** initial startup for fuel cycle, withdraw control rods per Nuclear Engineering procedure guidance.

OR

3.13.9.2 Perform the following:

_____ A. Place "CRD Bank Select" in "MANUAL".

☐ B. Withdraw control banks in 50 - 60 step increments.

☐ C. Wait until SR counts stabilize. (1 minute)

☐ D. Repeat Steps B - C until Reactor is critical.

_____ 3.13.10 **IF** IR Compensating Voltage was adjusted to -40VDC due to improper compensation **OR** IR Detector Replacement, evaluate IR Compensating Voltage adjustments.
IAE

Table 4.1-1. Control Rod Bank Parameters

	Record Bank and step position at each stop point. Initial box after checking each parameter.									
Bank:										
Step:										
Parameter:										
WHEN below ECP lower limit window, a rapid decrease in SUR.										
Proper count rate, SUR and recorder response.										
Proper Bank Overlap between Control Banks per Unit 1 Data Book, Enc 4.3, Sect 1.13										
DRPI vs bank demand counters acceptable.										
1/M plot acceptable.										
$T_{avg} > 551°F$										

_____ 3.13.11 **WHEN** Reactor critical, begin increasing IR power to 1 x 10^{-8} Amps.

☐ 3.13.12 Check at least one decade overlap between SR and IR instrumentation.

_____ 3.13.13 **WHEN** greater than 1 x 10^{-10} Amps, perform the following:

☐ 3.13.13.1 Check lit "P-6 S/R Block Permissive". (1SI-18)

_____ 3.13.13.2 Place both "Source Range Select" to "BLOCK".

3.13.13.3 Check lit on 1SI-18:

☐ SR Train A Trip Blkd Hi Voltage Off
☐ SR Train B Trip Blkd Hi Voltage Off

_____ 3.13.13.4 Select both IR channels on "Nuclear Power (%)" recorder. (1ENBCR9450)

☐ 3.13.14 Maintain Reactor Power at 1 x 10^{-8} Amps.

☐ 3.13.15 Record the following:

- Rod Position Bank _____Steps_____
- T_{avg} _____°F
- Boron Concentration _____ppm
- Time _____
- Xenon worth _____pcm (OAC)
- Samarium difference from equilibrium _____pcm (OAC)

☐ 3.13.16 Record above parameters in Autolog.

_____ 3.13.17 Select "LO" on "Nuclear Power (%)" recorder. (1ENBCR9450)

_____ 3.13.18 **IF** initial power escalation for a fuel cycle:

_____ 3.13.18.1 Perform Zero Power Physics Test as advised by Nuclear Engineering procedure PT/0/A/4150/021 (Post Refueling Controlling Procedure for Criticality, Zero Power Physics and Power Escalation Testing).

_____ 3.13.18.2 **HOLD** until Nuclear Engineering testing complete.

_____ _____/_____
Person Notified Date Time

_____ 3.13.19 Ensure one PR channel selected on "Nuclear Power (%)" recorder. (1ENBCR9450)

_____ 3.14 Begin performance of Enclosure 4.8 (Guidelines For Power Increase).
SRO

3.15 Perform the following to control NC System temperature until Turbine Generator is paralleled to the grid:

NOTE: Steps 3.15.1 - 3.15.2 should be performed concurrently.

3.15.1 Maintain the following by adjusting setpoint on "STM PRESS CONTROLLER":

☐ Tcold 557 - 559°F
☐ SM Pressure 1060 - 1110 psig

NOTE:
- While maintaining Tcold at 557 - 559°F using Steam Dumps, Table 4.1-2 should be used to approximate Tavg for a given Reactor Power level.
- Increasing Reactor Power while Turbine Power remains constant will result in Tavg exceeding Program Tref (557°F). (Turbine Impulse Pressure Channels will **NOT** increase until Turbine Generator is paralleled to the grid.)

☐ 3.15.2 Refer to Table 4.1-2 (Reactor Power / Expected Tavg) for expected Tavg for a given Reactor Power level:

Table 4.1-2 Reactor Power / Expected Tavg

Reactor Power (%)	Expected Tavg (°F)
15	561.215
14	560.934
13	560.653
12	560.372
11	560.091
10	559.810
9	559.529
8	559.248
7	558.967
6	558.686
5	558.405
4	558.124
3	557.843
2	557.562
1	557.281
0	557.000

_____ 3.16 **IF** feedwater flow is aligned to CA nozzles, perform the following:

NOTE:	Thermal Power Best Estimate calculations during low power conditions use a weighted (double counted) value for CA Nozzle flow. This results in conservative indication of TPBE. To prevent this, feedwater flow should be swapped to CF Nozzles prior to 20% RTP. {PIP 03-5427}

_____ 3.16.1 Ensure Reactor Power will remain less than 20% RTP.

☐ 3.16.2 Evaluate swapping to CF nozzles per OP/1/A/6250/001 (Condensate and Feedwater System)

_____ 3.17 Ensure in service CF Pump Turbine "LP GOV CNTRL" and "HP GOV CNTRL" in auto.

NOTE:	Due to inherent design of BWI S/Gs, S/G WR level will decrease as Reactor Power is increased through 3% RTP.

_____ 3.18 **IF AT ANY TIME** S/G N/R Level decreases to 28% **OR** exceeds 52%, perform the following:

_____ 3.18.1 **IF** individual S/G level control problem, perform the following:

_____ 3.18.1.1 Place affected S/G CF Control Bypass and/or CF Control Valve in manual.

_____ 3.18.1.2 Adjust affected S/G CF Control Bypass or CF Control Valve as required to return affected S/G N/R level to setpoint.

_____ 3.18.1.3 Place affected S/G CF Control Bypass and/or CF Control Valve in auto.

_____ 3.18.2 **IF** all S/G's indicate level control problems, perform the following:

_____ 3.18.2.1 Place operating CF Pump Turbine "LP GOV CNTRL" and "HP GOV CNTRL" in manual.

_____ 3.18.2.2 Use CF Pump Turbine "LP GOV CNTRL" increase/decrease pushbuttons to restore associated S/G NR levels to normal.

_____ 3.18.2.3 **WHEN** S/G NR levels normal, place operating CF Pump Turbine "HP GOV CNTRL" in auto.

_____ 3.18.2.4 **WHEN** in service CF Pump Turbine speed within 50 - 100 rpm of "AUTO SPT" on DCS Feedpump Overview graphic, place "LP GOV CNTRL" in auto.

☐ 3.19 Increase Reactor Power to 2% RTP (2.0 - 2.5%).

_____ 3.20 **HOLD** at 2% RTP (2.0 - 2.5%) for a minimum of 10 minutes.

3.21 Increase Rx Power to 4% RTP (3.5 - 4.0%) as follows:

_____ 3.21.1 **WHEN** greater than 3% RTP, perform the following:

3.21.1.1 Open:

_____ • 1SM-83 (A SM Line Drain)
_____ • 1SM-89 (B SM Line Drain)
_____ • 1SM-95 (C SM Line Drain)
_____ • 1SM-101 (D SM Line Drain)

NOTE: **IF** the Turbine is placed in manual in the following step, 1AD-1, F4 (Turbine in Manual) will alarm. This is an expected alarm.

_____ 3.21.1.2 Ensure Turbine in "MANUAL".

_____ 3.21.1.3 Close Governor Valves using "GV Lower".

NOTE: Mode 1 is entered at 5% RTP.

_____ 3.22 **WHEN** at 4% RTP, perform the following:

_____ 3.22.1 **HOLD** at 4% RTP (3.5 - 4.0%) for a minimum of 10 minutes.

☐ 3.22.2 Using "Plant Mode Change & Alarm Look Ahead", change the OAC to "Mode 1".

3.22.3 On the DCS Work Station, change the DCS Modal Alarming to Mode 1 as follows:

☐ 3.22.3.1 Access DCS "PLANT MODE SELECTION" Screen (6012).

☐ 3.22.3.2 Select "MODE 1".

☐ 3.22.3.3 Select "ACCEPT MODE".

☐ 3.22.3.4 Check "MODE" 1 is displayed in "CURRENT PLANT MODE".

☐ 3.23 Increase Reactor Power to 6% RTP (6.0 - 6.5%).

_____ 3.24 **HOLD** at 6% RTP (6.0 - 6.5%) for a minimum of 10 minutes.

_____ 3.25 **WHEN** any S/G CF Control Bypass Valve indicates between 50 - 60% open, place the associated S/G CF Cntrl Valve in service as follows:

3.25.1 Ensure the following S/G CF Control Bypass valves in auto:

_____ • 1CF-104AB (1A S/G CF Control Bypass)
_____ • 1CF-105AB (1B S/G CF Control Bypass)
_____ • 1CF-106AB (1C S/G CF Control Bypass)
_____ • 1CF-107AB (1D S/G CF Control Bypass)

3.25.2 Place S/G CF Control Valves in service as follows:

NOTE:
- Placing S/G CF Cntrl Vlv's in auto should be performed in a controlled manner, one S/G at a time.
- Allow CF flow and S/G water level to stabilize one S/G at a time.
- S/G CF Control Bypass Valves are expected to modulate when the S/G CF Cntrl Valves are placed in service.
- S/G CF Cntrl Valves can be placed in service in any order.

CAUTION: A greater than 65% demand on the S/G CF Control Bypass Valve sends a 5% minimum open demand signal to the associated S/G CF Control Valve. The CF Bypass Valve has to close to less than 35% to clear the demand signal to the S/G CF Control Valve.

3.25.3 For A S/G, perform the following:

_____ 3.25.3.1 Ensure 1CF-32AB (1A S/G CF Control) in manual and closed.

3.25.3.2 Open the following:

_____ • 1CF-31 (A S/G CF Cntrl Inlet Isol)
_____ • 1CF-33 (A S/G CF Cntrl Outlet Isol)

☐ 3.25.3.3 Check 1CF-104AB (1A S/G CF Control Bypass) output less than 65%.

_____ 3.25.3.4 Place 1CF-32AB (1A S/G CF Control) in auto.

3.25.4 For B S/G, perform the following:

_____ 3.25.4.1 Ensure 1CF-23AB (1B S/G CF Control) in manual and closed.

3.25.4.2 Open the following:

_____ • 1CF-22 (B S/G CF Cntrl Inlet Isol)
_____ • 1CF-24 (B S/G CF Cntrl Outlet Isol)

☐ 3.25.4.3 Check 1CF-105AB (1B S/G CF Control Bypass) output less than 65%.

_____ 3.25.4.4 Place 1CF-23AB (1B S/G CF Control) in auto.

3.25.5 For C S/G, perform the following:

_____ 3.25.5.1 Ensure 1CF-20AB (1C S/G CF Control) in manual and closed.

3.25.5.2 Open the following:

_____ • 1CF-19 (C S/G CF Cntrl Inlet Isol)
_____ • 1CF-21 (C S/G CF Cntrl Outlet Isol)

☐ 3.25.5.3 Check 1CF-106AB (1C S/G CF Control Bypass) output less than 65%.

_____ 3.25.5.4 Place 1CF-20AB (1C S/G CF Control) in auto.

3.25.6 For D S/G, perform the following:

_____ 3.25.6.1 Ensure 1CF-17AB (1D S/G CF Control) in manual and closed.

3.25.6.2 Open the following:

_____ • 1CF-16 (D S/G CF Cntrl Inlet Isol)
_____ • 1CF-18 (D S/G CF Cntrl Outlet Isol

☐ 3.25.6.3 Check 1CF-107AB (1D S/G CF Control Bypass) output less than 65%.

_____ 3.25.6.4 Place 1CF-17AB (1D S/G CF Control) in auto.

☐ 3.26 Increase Rx Power to 8% RTP (8.0 - 8.5%).

_____ 3.27 **WHEN** at 8% RTP (8.0 - 8.5%), perform the following:

_____ 3.27.1 **HOLD** at 8% RTP (8.0 - 8.5%) for a minimum of 10 minutes.

_____ 3.27.2 Notify Secondary Chemistry to verify secondary water chemistry acceptable for operation greater than 15% RTP.

_____ _____/_____
Person Notified Date Time

☐ 3.27.3 Place BB Pump in service per OP/1/A/6250/008 (Steam Generator Blowdown).

_____ 3.27.4 **IF** required for S/G cleanup, adjust the following while maintaining NC System temperature:

_____ • 1BB-123 (A S/G BB Flow Control)
_____ • 1BB-124 (B S/G BB Flow Control)
_____ • 1BB-125 (C S/G BB Flow Control)
_____ • 1BB-126 (D S/G BB Flow Control)

3.28 Increase Reactor Power to 10 - 12% RTP as follows:

☐ 3.28.1 Begin power increase to 10 - 12% RTP.

_____ 3.28.2 **WHEN** Reactor Power reaches 10% RTP, perform the following:

3.28.2.1 Check on 1SI-18:

☐ "P-10 Nuclear at Power" lit
☐ "P-7 Lo Power Reactor Trips Blocked" dark

_____ 3.28.2.2 Block the IR high level trip and rod stop by depressing both "Intermediate Range Block" pushbuttons.

3.28.2.3 Check lit on 1SI-18:

☐ I/R Train A Trip Blocked
☐ I/R Train B Trip Blocked

_____ 3.28.2.4 Block PR low setpoint trip by depressing both "Power Range Block" pushbuttons.

3.28.2.5 Check lit on 1SI-18:

☐ P/R Lo Setpoint Train A Trip Blocked
☐ P/R Lo Setpoint Train B Trip Blocked

_____ 3.28.3 **IF** required for IAE to tune Process Control Systems, perform the following:

_____ 3.28.3.1 **HOLD** at 10 - 12% RTP.

☐ 3.28.3.2 Allow IAE to gather data on Process Control Systems.

_____ 3.28.3.3 **WHEN** IAE data gathering and tuning complete, continue power increase.

3.29 Increase Reactor Power to 12 - 18% RTP as follows:

☐ 3.29.1 Begin power increase to 12 - 15% RTP.

_____ 3.29.2 **HOLD** until Reactor Power is 12 - 15% RTP.

_____ 3.29.3 Ensure proper secondary water chemistry for operation greater than 15% RTP.
CHEM

☐ 3.29.4 Begin power increase to 18% RTP.

☐ 3.29.5 Maintain 12 - 18% RTP.

NOTE: **IF** TV/GV hot calibration was **NOT** started in OP/1/A/6100/SU-19 (Heatup to 557 Degrees F), the following step restores LH to Throttle Valves.

_____ 3.29.6 **IF** TV/GV hot calibration **NOT** complete, notify IAE to begin/resume performing TV/GV hot calibration.

_____ _____/_____
Person Notified Date Time

☐ 3.29.7 Reset Main Turbine per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

NOTE: Steps 3.29.8 - 3.29.10 may be performed in any order or concurrently.

_____ 3.29.8 Calibrate Power Range NIS channels to maintain Power Mismatch (NIs vs BETP) ±1% for each Power Range channel.
IAE

_____ 3.29.9 **IF** required for IAE to tune Process Control Systems, **HOLD** at 12 - 18% RTP until IAE gathers data on Process Control Systems.

☐ 3.29.10 Roll Main Turbine to 1800 rpm per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

NOTE: Engineering will determine if PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test) is to be performed with Turbine Generator at 1800 rpm or at greater than 112 MWE.

_____ 3.29.11 Notify Engineering to determine if and when PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test) will be performed.

_____ _____/_____
Person Notified Date Time

_____ 3.29.12 **IF** PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test) will be performed with Turbine Generator at 1800 rpm, complete the following:

☐ 3.29.12.1 Maintain 12 - 18% RTP.

☐ 3.29.12.2 Perform PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test).

_____ 3.29.12.3 **WHEN** PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test) complete, perform TV/GV Transfer and place Voltage Regulator in service per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

_____ 3.29.13 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing, complete the following:

_____ 3.29.13.1 **IF** performed, **HOLD** until Step 3.29.12 complete.

_____ 3.29.13.2 Ensure TV/GV Transfer complete and Voltage Regulator placed in service per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

_____ 3.29.13.3 **HOLD** until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

_____ 3.29.14 **IF** required to perform Main Generator Flux Mapping, notity Maintenance Main Generator Team to perform mapping.

_____ _____/_____
Person Notified Date Time

_____ 3.29.15 **HOLD** until Step 3.29.13 complete.

_____ 3.29.16 Ensure TV/GV Transfer complete and Voltage Regulator placed in service per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

☐ 3.29.17 Close Generator MODs per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

☐ 3.29.18 Synchronize Generator and load Generator to 120 MWE per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

_____ 3.29.19 **WHEN** Main Generator Breakers closed, record the following values and notify System Engineer:

☐ 1A Main Generator Breaker Air Compressor Pilot Valve Counter
_____

☐ 1B Main Generator Breaker Air Compressor Pilot Valve Counter
_____

☐ Date/Time 1A Main Generator Breaker Closed ____/____

☐ Date/Time 1B Main Generator Breaker Closed ____/____

_____ _____/_____
Person Notified Date Time

_____ 3.29.20 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing on line at 15% RTP, **HOLD** until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

NOTE:
- **IF** Turbine Generator holds for 2 hours at 112 MWE for PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test), Reactor Core Flux Mapping may be performed during the hold.
- **IF** Turbine Generator holds for 2 hours at 112 MWE for PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test), Generator / Automatic Voltage Regulator (AVR) testing may be performed during the hold.

_____ 3.29.21 **IF** PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test) to be performed following load increase to greater than 112 MWe, perform the following:

☐ 3.29.21.1 Maintain 12 - 18% RTP.

_____ 3.29.21.2 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing, **HOLD** until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

_____ 3.29.21.3 **IF** required to perform 15% RTP Reactor Core Flux Mapping during 2 hour hold at greater than 112 MWE, perform flux mapping.

_____ 3.29.21.4 **IF** required to perform Main Generator Flux Mapping, notity Maintenance Main Generator Team to perform mapping.

_____ _____/_____
Person Notified Date Time

_____ 3.29.21.5 **HOLD** until Steps 3.29.21.2 and 3.29.21.3 complete.

☐ 3.29.21.6 Shutdown Generator per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

☐ 3.29.21.7 Perform PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test).

☐ 3.29.21.8 Startup Turbine and parallel Generator per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

_____ 3.29.22 **WHEN** steam dumps close, perform the following:

_____ 3.29.22.1 **IF** "C-7A Loss of Load Intlk Cond Dump" on 1SI-18 lit, perform the following:

_____ A. Momentarily place "Steam Dump Select" to C-7A Reset".

☐ B. Check "C-7A Loss of Load Intlk Cond Dump" dark.

_____ 3.29.22.2 Place "Steam Dump Select" to "T-AVG".

_____ 3.29.22.3 Place "STM PRESS CONTROLLER" to auto.

_____ 3.29.22.4 Set "STM PRESS CONTROLLER" setpoint at 1092 psig (1090 - 1095).

3.29.23 Perform the following:

3.29.23.1 Monitor the following while opening 1SP-1 (SM to CF Pump 1A Isol) and 1SP-2 (SM to CF Pump 1B Isol): (PIP 09-6340)

☐ M1A0723 (U1 H/P Steam to 1A CFPT Press)
☐ M1A0729 (U1 H/P Steam to 1B CFPT Press)

NOTE: 1SP-1 (SM to CF Pump 1A Isol) and 1SP-2 (SM to CF Pump 1B Isol) are physically located such that verifying the position is difficult. {PIP 09-6340}

3.29.23.2 Open:

_____ _____ CV • 1SP-1 (SM to CF Pump 1A Isol)

_____ _____ CV • 1SP-2 (SM to CF Pump 1B Isol)

3.29.23.3 Check the following for corresponding increase in steam pressure with 1SP-1 (SM to CF Pump 1A Isol) and 1SP-2 (SM to CF Pump 1B Isol) open: (PIP 09-6340)

☐ M1A0723 (U1 H/P Steam to 1A CFPT Press)
☐ M1A0729 (U1 H/P Steam to 1B CFPT Press)

☐ 3.29.24 Check operating CF Pump greater than 3600 rpm and in auto per OP/1/A/6250/001 (Condensate and Feedwater System).

_____ 3.29.25 **IF** 15% RTP Reactor Core Flux Map performed, notify Nuclear Engineering to perform the following:

☐ 3.29.25.1 Evaluate flux mapping data.

☐ 3.29.25.2 Determine allowed power increase.

☐ 3.29.25.3 Record limiting power level per Nuclear Engineering procedure: _____ % RTP

_____ _____/_____
Person Notified Date Time

_____ 3.29.26 Ensure TV/GV hot calibrations complete (Step 3.29.6).
IAE

_____ 3.29.27 **HOLD** at 12 - 18% RTP until Step 3.29.25 completed.

_____ 3.29.28 Complete Enclosure 4.8 (Guidelines For Power Increase).
SRO

3.30 Increase Reactor Power to 30% RTP as follows:

_____ 3.30.1 Notify IAE to stand by for periodic adjustments of Power Range NI channels.

_____ _____/_____
Person Notified Date Time

_____ 3.30.2 **IF AT ANY TIME** "Power Mismatch %" (Excore/Thermal Power Mismatch) indicates greater than 4% during power increase, perform the following:

☐ 3.30.2.1 Stop power increase.

_____ 3.30.2.2 Have IAE calibrate each Power Range NI Channel to ±1% Power Mismatch (NIs vs BETP).

_____ 3.30.2.3 **WHEN** calibration complete, continue with power increase.

☐ 3.30.3 Begin power increase to 30% RTP.

☐ 3.30.4 Load turbine per OP/1/A/6300/001 A (Turbine-Generator Load Change).

NOTE: **IF** OAC out of service, monitoring 1A and 1B XFMR Oil Temps may be performed at local gauges.

_____ 3.30.5 **WHEN** M1A0913 (1A XFMR Oil Temp) indicates greater than 45°C, ensure cooling groups energized on 1A Main Transformer:

_____ • Circuit 1
_____ • Circuit 2
_____ • Circuit 3
_____ • Circuit 4
_____ • Circuit 5
_____ • Circuit 6
_____ • Circuit 7
_____ • Circuit 8

_____ 3.30.6 **WHEN** M1A0925 (1B XFMR Oil Temp) indicates greater than 45°C, ensure cooling groups energized on 1B Main Transformer:

- _____ Circuit 1
- _____ Circuit 2
- _____ Circuit 3
- _____ Circuit 4
- _____ Circuit 5
- _____ Circuit 6
- _____ Circuit 7
- _____ Circuit 8

_____ 3.30.7 Place "Exh Hood Spray" in "MAN".

_____ 3.30.8 **WHEN** "C-5 Lo Turb Impulse Press Rod Block" dark, CRD Bank Select may be placed in "AUTO".

_____ 3.30.9 **WHEN** Turbine Imp Press greater than 75 psig, check "P-13 Turbine Not At Power" dark. (1SI-18)

_____ 3.30.10 Prior to 20% RTP, ensure Main Feedwater flow to all S/Gs through CF nozzles per OP/1/A/6250/001 (Condensate and Feedwater System).

NOTE:
- At approximately 18% CF flow, each S/G will transition from "LOW POWER" mode to "HIGH POWER" mode.
- S/G "HIGH POWER" mode includes validated steam flow, validated feedwater flow, validated N/R level, and N/R level setpoint to calculate the feedwater flow demand for that S/G.
- CF Flow, in percent flow, is indicated on DCS Feedwater Overview Graphic for all four S/G's.

_____ 3.30.11 **AFTER** exceeding 18% CF flow, check each S/G in "HIGH POWER" mode as follows:

☐ 3.30.11.1 On DCS Workstation, select Steam Generator A Level graphic

☐ 3.30.11.2 On Steam Generator A Level graphic, check "HIGH POWER" lit.

☐ 3.30.11.3 On DCS Workstation, select Steam Generator B Level graphic

☐ 3.30.11.4 On Steam Generator B Level graphic, check "HIGH POWER" lit.

☐ 3.30.11.5 On DCS Workstation, select Steam Generator C Level graphic

☐ 3.30.11.6 On Steam Generator C Level graphic, check "HIGH POWER" lit.

☐ 3.30.11.7 On DCS Workstation, select Steam Generator D Level graphic

☐ 3.30.11.8 On Steam Generator D Level graphic, check "HIGH POWER" lit.

_____ 3.30.12 Ensure BB Pump in service per OP/1/A/6250/008 (Steam Generator Blowdown).

3.30.13 Initiate maximum BB flow for S/G cleanup while maintaining NC System temperature by throttling the following:

_____ • 1BB-123 (A S/G BB Flow Control)
_____ • 1BB-124 (B S/G BB Flow Control)
_____ • 1BB-125 (C S/G BB Flow Control)
_____ • 1BB-126 (D S/G BB Flow Control)

☐ 3.30.14 Adjust letdown to desired flow per OP/1/A/6200/001 A (Chemical and Volume Control System Letdown).

CAUTION: **IF** 1AS-11 (SM to AS Header Control) is to supply AS Header, anticipate an increase in Reactor Power or a decrease in NC System temperature when opening 1AS-12 (SM to AS).

3.30.15 Align AS as follows:

_____ 3.30.15.1 Slowly open 1AS-12 (Main Steam to Aux Steam).

_____ 3.30.15.2 Open 1AS-9 (C Htr Bleed to Aux Steam).

_____ 3.30.15.3 **IF** Aux Electric Boilers no longer required, perform following:

_____ A. Close 1AS-120 (Aux Elec Blr A & B to AS Isol).

☐ B. Shutdown Aux Electric Boilers per OP/1/B/6250/007 B (Auxiliary Electric Boiler).

NOTE: Steam Seal Supply should remain on AS for improved efficiency.

_____ 3.30.16 **IF** conditions require, transfer Steam Seal Supply to SM as follows:

_____ 3.30.16.1 Slowly open 1TL-3 (SM to Steam Seal Isol).

_____ 3.30.16.2 Close 1TL-21 (AS to Steam Seal Isol).

_____ 3.30.17 **WHEN** Turbine impulse pressure is greater than 200 psig:

_____ 3.30.17.1 Ensure "Turb Drn Vlvs Cntrl" in "AUTO".

☐ 3.30.17.2 Check all turbine drain valves closed.

_____ 3.30.18 Ensure second Hotwell Pump operating.

_____ 3.30.19 Ensure standby Hotwell Pump in "AUTO".

_____ 3.30.20 Ensure second CM Booster Pump operating.

_____ 3.30.21 Ensure standby CM Booster Pump in "AUTO".

☐ 3.30.22 Close valves per OP/1/B/6250/004 (Feedwater Heater Vents, Drains and Bleed System), Enclosure 4.4 (Startup Vent Valve Checklist).

NOTE:
- At approximately 30% steam flow, all S/G CF Bypass Valves will go closed and S/G level will be controlled by S/G CF Valves and CF Pump Turbine speed demand.
- SM Flow, in percent flow, is indicated on DCS Feedwater Overview Graphic for all four S/G's.

3.30.23 At greater than 30% steam flow from each S/G, check the following valves in auto and closed:

- ☐ 1CF-104AB (1A S/G CF Contrl Bypass)
- ☐ 1CF-105AB (1B S/G CF Contrl Bypass)
- ☐ 1CF-106AB (1C S/G CF Contrl Bypass)
- ☐ 1CF-107AB (1D S/G CF Contrl Bypass)

☐ 3.30.24 Check S/G levels stable and at program for current power level.

_____ 3.30.25 **HOLD** at 30% RTP and concurrently perform the following:

_____ IAE 3.30.25.1 **IF** required to tune Process Control Systems, perform the following:

_____ A. **HOLD** at 30% RTP

☐ B. Allow IAE to gather data on Process Control Systems.

_____ 3.30.25.2 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing at 30% RTP, **HOLD** until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

_____ 3.30.25.3 **IF** 30% RTP Reactor Core Flux Map to be performed, notify Nuclear Engineering to perform the following:

☐ A. Perform flux mapping.

☐ B. Evaluate flux mapping data.

☐ C. Determine allowed power increase.

☐ D. Record limiting power level per Nuclear Engineering procedure: _____ % RTP

_____ _____/_____
Person Notified Date Time

3.31 Increase power to 50% RTP as follows:

_____ 3.31.1 Notify Secondary Chemistry to verify secondary water chemistry acceptable for operation greater than 50% RTP

_____ _____/_____
Person Notified Date Time

☐ 3.31.2 Maintain control rods within insertion and withdrawal limits per COLR.

NOTE: Maintaining AFD within Nuclear Engineering recommended limits prevents AFD exceeding Tech Spec Limits (Limit and Precaution 1.8).

☐ 3.31.3 Maintain AFD within target band per OP/1/A/6100/022 (Unit 1 Data Book), Enclosure 4.3, Graph(s) 1.1.

_____ 3.31.4 **IF** initial startup following refueling outage, check Bank D Control Rods greater than or equal to 200 steps withdrawn.

_____ 3.31.5 Notify IAE to stand by for periodic adjustments of Power Range NI channels.

_____ _____/_____
Person Notified Date Time

_____ 3.31.6 **IF AT ANY TIME** "Power Mismatch %" (Excore/Thermal Power Mismatch) indicates greater than 4% during power increase, perform the following:

☐ 3.31.6.1 Stop power increase.

_____ 3.31.6.2 Have IAE calibrate each Power Range NI Channel to ±1% Power Mismatch (NIs vs BETP).

_____ 3.31.6.3 **WHEN** calibration complete, continue with power increase.

☐ 3.31.7 Begin power increase to 50% RTP.

☐ 3.31.8 Maintain one pen selected to PR channel on "Nuclear Power (%)" recorder. (1ENBCR9450)

☐ 3.31.9 Maintain other pen as desired on "Nuclear Power (%)" recorder. (1ENBCR9450)

NOTE: To prevent tripping BB Pump on low BB Tank level, 1BB-238 (S/G BB Demineralizers) and 1BB-44 (Blowdown Blowoff Recirc Control) must be allowed time to reposition while positioning flow control valves in substeps of 3.31.10.

_____ 3.31.10 **WHEN** plant conditions permit, swap Blowdown Blowoff Tank Vent from the Condenser to D Heater Extraction as follows:

☐ 3.31.10.1 Record the following:

☐ 1BB-123 (A S/G BB Flow Control)_____ lbs m/hr
☐ 1BB-124 (B S/G BB Flow Control)_____ lbs m/hr
☐ 1BB-125 (C S/G BB Flow Control)_____ lbs m/hr
☐ 1BB-126 (D S/G BB Flow Control)_____ lbs m/hr

3.31.10.2 Throttle the following to minimum flow (2000 – 7000 lbs m/hr) over 15 minutes:

_____ • 1BB-123 (A S/G BB Flow Control)
_____ • 1BB-124 (B S/G BB Flow Control)
_____ • 1BB-125 (C S/G BB Flow Control)
_____ • 1BB-126 (D S/G BB Flow Control)

_____ 3.31.10.3 Place "1BB-98 & 100 BB Tank Vent D Htr/Cond" to "D HTR".

☐ 3.31.10.4 Check open 1BB-98 (Blowdown Blowoff Tank Vent to D Heater Extraction Isol).

☐ 3.31.10.5 Check closed 1BB-100 (Blowdown Blowoff Tank Vent to Condenser).

3.31.10.6 Throttle the following to positions recorded in Step 3.31.10.1 or as directed by Secondary Chemistry over 15 minutes:

_____ • 1BB-123 (A S/G BB Flow Control)
_____ • 1BB-124 (B S/G BB Flow Control)
_____ • 1BB-125 (C S/G BB Flow Control)
_____ • 1BB-126 (D S/G BB Flow Control)

NOTE: Power increase may continue while performing Step 3.31.11.

_____ 3.31.11 **WHEN** 35% RTP, transfer to GV Sequential Valve Mode as follows:

_____ 3.31.11.1 Ensure "MW OUT" lit.

_____ 3.31.11.2 Ensure "IMP IN" lit.

_____ 3.31.11.3 Depress "SINGLE/SEQUENTIAL".

NOTE:
- A digital clock will appear on the DEH OIU Graphic 200 and indicate the amount of time left in the Single Valve / Sequential Valve Transfer.
- Speed Loop will be automatically removed from service at intiation of transfer and will be automatically placed back in service following transfer.

_____ 3.31.11.4 Depress "START/HALT" to begin transfer.

_____ 3.31.11.5 Ensure "SPEED OUT" lit.

_____ 3.31.11.6 **WHEN** transfer is complete, perform the following:

_____ A. Ensure "SPEED IN" lit.

_____ B. Place Turbine in "MANUAL".

_____ C. Ensure "IMP OUT" lit.

_____ D. Place Turbine in "OPERATOR AUTO".

_____ E. Select "MW IN".

3.31.12 Ensure the following valves greater than 25% open and controlling S/G levels at program level:

_____ • 1CF-32AB (1A S/G CF Control)
_____ • 1CF-23AB (1B S/G CF Control)
_____ • 1CF-20AB (1C S/G CF Control)
_____ • 1CF-17AB (1D S/G CF Control)

☐ 3.31.13 Adjust Turbine load per OP/1/A/6300/001 A (Turbine-Generator Load Change).

3.31.14 Perform the following to start the third Hotwell Pump:

_____ 3.31.14.1 Notify Secondary Chemistry of the following:

- Third Hotwell Pump is about to be started
- Check Polishing Demineralizers bypassed or isolated {PIP M99-2044}
- Monitor Polishing Demineralizers for signs of pressure induced damage after Hotwell Pump start {PIP M99-1828}

_____ _____/_____
Person Notified Date Time

☐ 3.31.14.2 Place third Hotwell Pump in service per OP/1/A/6250/001 (Condensate and Feedwater System).

NOTE: AMSAC will automatically "UNBLOCK" when Turbine Impulse Pressure increases to 290 psig.

_____ 3.31.15 Prior to 40% Turbine load (290 psig Impulse Pressure), check all "AMSAC S/G Low Flow" status lights dark. (1SI-4)

_____ 3.31.16 **WHEN** Turbine load greater than 40% (290 psig Impulse Pressure), begin aligning MSRs per OP/1/B/6250/011 (Moisture Separator Reheater Operation).

_____ 3.31.17 **WHEN** Turbine Impulse Pressure 295 - 305 psig, check "AMSAC ACTUATION BLOCK/UNBLOCK" as follows:

_____ 3.31.17.1 **IF** "UNBLOCK" dark, reset as follows:

☐ A. Check all "AMSAC S/G LOW FLOW" status lights dark.

☐ B. Check "S/G PATH CLSD >30 SEC" dark.

_____ C. Depress "UNBLOCK" for "AMSAC ACTUATION BLOCK/UNBLOCK".

☐ 3.31.17.2 Check "UNBLOCK" lit.

_____ 3.31.18 **WHEN** 40% RTP, perform the following:

NOTE: Steps 3.31.18.1 and 3.31.18.2 can be performed concurrently.

_____ 3.31.18.1 Notify RP to adjust setpoints for the following: {PIP 99-5073}

- 1EMF-71 (S/G A Leakage Hi Rad)
- 1EMF-72 (S/G B Leakage Hi Rad)
- 1EMF-73 (S/G C Leakage Hi Rad)
- 1EMF-74 (S/G D Leakage Hi Rad)

_____ _____/_____
Person Notified Date Time

_____ 3.31.18.2 **IF** 1HM-95 (AS to A & B CF Pumps) is open, close by concurrently performing the following:

☐ A. Check operating CF Pump in auto.

B. Monitor OAC Graphic for operating CF Pump:

☐ 1A CF PUMP DETAIL
☐ 1B CF PUMP DETAIL

_____ C. On operating CF Pump Turbine, monitor "LP GOV CNTRL"and "HP GOV CNTRL" positions.

NOTE:
- 1HM-95 will almost be closed before an effect is seen. (approximately 90% closed)
- On operating CF Pump, LP Gov. demand will be 100% before HP Gov begins to open.

_____ D. Slowly pulse 1HM-95 (AS to A & B CF Pumps) closed. (R.M.)

E. Monitor the following on CF Pump graphic:

☐ LP Gov position
☐ HP Gov position
☐ Decrease in LP Steam Supply Pressure

_____ F. **IF** any of the following occur, perform the following:

- Operating CF Pump speed decreases
- Operating CF Pump discharge pressure decrease

_____ 1. Stop closing 1HM-95.

_____ 2. Place operating CF Pump Turbine "LP GOV CNTRL" and "HP GOV CNTRL" in manual.

☐ 3. Stabilize operating CF Pump speed / discharge pressure.

_____ 4. Continue to close 1HM-95 while maintaining operating CF Pump speed / discharge pressure.

_____ 5. **WHEN** 1HM-95 closed, place operating CF Pump governors in auto per OP/1/A/6250/001 (Condensate and Feedwater System).

CAUTION: Generator / Automatic Voltage Regulator (AVR) testing must be performed prior to reactor power exceeding permissive P-8.

_____ 3.31.19 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing at 45% RTP, perform the following:

_____ 3.31.19.1 **HOLD** at 45% RTP until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

_____ 3.31.19.2 **WHEN** Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup, begin power increase to 50% RTP.

_____ 3.31.20 **IF** performing Generator Reactive Limits Verification testing at 45 - 50% RTP, perform the following:

☐ 3.31.20.1 Perform applicable sections of PT/1/B/4350/001 C (Generator Reactive Limits Verification Test).

_____ 3.31.20.2 **HOLD** until Testing Personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

NOTE: Steps 3.31.21 and 3.31.22 may be performed concurrently as long as conditions for both steps are met. {PIP 08-2768}

_____ 3.31.21 **WHEN** 48 - 56% RTP, place second CF Pump in service as follows:

☐ 3.31.21.1 Maintain constant Reactor Power.

☐ 3.31.21.2 Check CF Pump supplying CF Header in auto.

☐ 3.31.21.3 Start second CF Pump per OP/1/A/6250/001 (Condensate and Feedwater System), Enclosure 4.17 (CF Pump Reset / Startup), Section 3.4 (1A CF Pump Startup) or Section 3.5 (1B CF Pump Startup).

_____ 3.31.21.4 **WHEN** CF Pump operation stabilized, continue power increase.

CAUTION: Reactor Power ramp rate is limited by Fuel Maneurvering Limits (Data Book Section 1.3). The recommended load rate for unconditioned fuel above 50% power is 3% / hour, but shall never exceed 4% / hour, 7% / 2 hours, 10% / 3 hours or a 3% step change. {PIP 08-2768}

3.31.22 Prior to 50% RTP, perform the following concurrently:

_____ 3.31.22.1 Ensure proper secondary water chemistry for operation greater than 50% RTP.
CHM

☐ 3.31.22.2 Evaluate air ejector off gas and nozzle operation per OP/1/B/6300/006 (Main Vacuum and Vacuum Priming System).

☐ 3.31.22.3 Record highest value:

- 1A Main Generator Breaker Air Compressor Pilot Valve Counter _____
- 1B Main Generator Breaker Air Compressor Pilot Valve Counter _____
- Date/Time of counter readings ____/____

_____ 3.31.22.4 Notify System Engineer to calculate Main Generator Breaker air leakage using counter readings from Step 3.29.19 and Step 3.31.22.3.

_____ _____/_____
Person Notified Date Time

_____ 3.31.22.5 Notify TCC (Transmission Control Center) (382-9401 or 382-9402) to check amperage output balanced on both busses to switchyard.

_____ _____/_____
Person Notified Date Time

NOTE: Maintaining AFD within Nuclear Engineering recommended limits prevents AFD exceeding Tech Spec Limits (Limit and Precaution 1.8).

☐ 3.31.22.6 Maintain AFD within target band per OP/1/A/6100/022 (Unit 1 Data Book), Enclosure 4.3, Graph(s) 1.1.

_____ 3.31.22.7 **IF** Power Range detectors have been replaced **AND** startup is **NOT** an Initial Cycle Startup, check the following:
IAE

☐ New detector current data inserted
☐ Power Range High Flux (High Range) setpoints at 109%

_____ 3.31.22.8 **IF** Initial Cycle Startup, perform the following:

_____ A. Notify Reactor Engineering to determine if Power Range NI calibration is required prior to 50% RTP.

_____ _____/_____
Person Notified Date Time

_____ B. **IF** Power Range NI calibration is required prior to 50% RTP, perform the following:

☐ 1. Stop power increase.

_____ 2. Have IAE calibrate desired Power Range NI Channel(s).

_____ 3. **WHEN** calibration complete, continue power increase.

NOTE: Quadrant Power Tilt Ratio (QPTR) is **NOT** applicable until calibration of the Power Range NIs is completed subsequent to refueling. (TS 3.2.4)

_____ C. Check QPTR less than or equal to 1.02.

_____ 3.31.22.9 **IF NOT** Initial Cycle Startup, check QPTR less than or equal to 1.02.

☐ 3.31.22.10 Check "P-8 Hi Pwr Lo Flo Reactor Trip Blocked" dark. (1SI-18)

3.32 Increase power to 95% RTP as follows:

☑ 3.32.1 Maintain control rods within insertion and withdrawal limits per COLR.

NOTE: Maintaining AFD within Nuclear Engineering recommended limits prevents AFD exceeding Tech Spec Limits (Limit and Precaution 1.8).

☑ 3.32.2 Maintain AFD within target band per OP/1/A/6100/022 (Unit 1 Data Book), Enclosure 4.3, Graph(s) 1.1.

2K 3.32.3 Notify IAE to stand by for periodic adjustments of Power Range NI channels.

Marty Champion ____/____
Person Notified Date Time

____ 3.32.4 **IF AT ANY TIME** "Power Mismatch %" (Excore/Thermal Power Mismatch) indicates greater than 4% during power increase, perform the following:

☐ 3.32.4.1 Stop power increase.

____ 3.32.4.2 Have IAE calibrate each Power Range NI Channel to ±1% Power Mismatch (NIs vs BETP).

____ 3.32.4.3 **WHEN** calibration complete, continue power increase.

☑ 3.32.5 Begin power increase to 95% RTP

3.32.6 Prior to exceeding 56% Main Turbine power, perform the following:

2K 3.32.6.1 Notify System Engineer to determine if Main Generator Breakers air leakage has been calculated, based on Engineering review.

Bob Smith ____/____
Person Notified Date Time

N/A 2K 3.32.6.2 **IF** System Engineer desires cycling 1A Main Generator Breaker, perform the following:

____ A. Ensure Main Turbine power less than 56%.

☐ B. Maintain Main Turbine power less than 56%.

____ C. Open 1A Main Generator Breaker.

____ D. Close 1A Main Generator Breaker.

N/A 2K 3.32.6.3 **IF** System Engineer desires cycling 1B Main Generator Breaker, perform the following:

____ A. Ensure Main Turbine power less than 56%.

☐ B. Maintain Main Turbine power less than 56%.

____ C. Open 1B Main Generator Breaker.

____ D. Close 1B Main Generator Breaker.

3.32.7 At 70% RTP or as directed by Secondary Chemistry, perform the following:

☑ 3.32.7.1 Begin placing C HDT Pumps in service per OP/1/B/6250/004 (Feedwater Heater Vents, Drains, and Bleed System).

2K 3.32.7.2 **WHEN** C HDT Pumps are in service, stop one Hotwell Pump per OP/1/A/6250/001 (Condensate and Feedwater System).

3.32.8 At 77-80% RTP, enable OTDT DCS alarming as follows:

☑ 3.32.8.1 On DCS graphics, select "MAINTENANCE MENU".

☑ 3.32.8.2 Select "TAVG, DELTA T INPUTS & ALARM CHECKING" graphic.

3.32.8.3 Select "ON" for the following:

☑ NCAA 5422
☑ NCAA 5462
☑ NCAA 5502
☑ NCAA 5542
☑ OTDELTAT-FAIL

N/A 2K 3.32.9 **IF** initial startup, perform the following:

_____ 3.32.9.1 Notify Nuclear Engineering to evaluate power increase to 78% RTP.

_____ _____/_____
Person Notified Date Time

☐ 3.32.9.2 Record limiting power level per Nuclear Engineering procedure: _____ % RTP

☐ 3.32.9.3 Begin power increase to desired power level.

_____ 3.32.9.4 **HOLD** at desired power level until Reactor Core Flux Mapping completed.

_____ 3.32.9.5 Notify Nuclear Engineering to evaluate allowed power increase.

_____ _____/_____
Person Notified Date Time

☐ 3.32.9.6 Record desired power level. _____ % RTP

N/A 2K 3.32.10 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing at 78% RTP, **HOLD** until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

☐ 3.32.11 Continue power increase to 95% RTP.

CAUTION: IF CF Feed Reg Valves modulate less than 25%, potential exists to activate AMSAC. Power increase may continue at OSM's discretion.

NOTE:
- At approximately 85% steam flow from each S/G, all S/G CF Bypass valves will ramp open (approximately 2 minute ramp) to 100% open position. S/G CF Valves will modulate to control S/G level.
- S/G SM Flow, in percent, can be monitored on DCS Feedwater Overview Graphic for all four S/G's.

3.32.12 At greater than 85% steam flow from each S/G, ensure the following valves in auto and open:

_____ • 1CF-104AB (1A S/G CF Cntrl Vlv Bypass)
_____ • 1CF-105AB (1B S/G CF Cntrl Vlv Bypass)
_____ • 1CF-106AB (1C S/G CF Cntrl Vlv Bypass)
_____ • 1CF-107AB (1D S/G CF Cntrl Vlv Bypass)

_____ 3.32.13 **WHEN** at 976 MWE, check AS supply transferred from SM to C Heater Bleed by checking 1AS-11 (SM Supply to Aux Steam Control) closed.

_____ 3.32.14 **IF** 1AS-11 failed to close, coordinate with SRO to establish required setpoint on 1AS-11 controller to allow valve to close.

_____ 3.32.15 **WHEN** 85% RTP, place G Htr Drn Tank Pumps in service per OP/1/B/6250/004 (Feedwater Heater Vents, Drains, and Bleed System).

_____ 3.32.16 **IF** startup is from a trip, shutdown, or load reduction to less than 90% RTP, perform the following:

_____ 3.32.16.1 **HOLD** at 90% RTP.

_____ 3.32.16.2 Notify Nuclear Engineering to evaluate performing PT/0/A/4150/006 (Thermal Power Output Calculation).

_____ _____/_____
Person Notified Date Time

_____ 3.32.16.3 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing at 90% RTP, **HOLD** until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

_____ 3.32.17 Notify IAE to stand by for periodic adjustments of Power Range NI channels.

_____ _____/_____
Person Notified Date Time

NOTE: Step 3.31.19 is applicable for operation greater than 90% RTP.

_____ 3.32.18 **IF AT ANY TIME** "Power Mismatch %" (Excore/Thermal Power Mismatch) indicates greater than 1.5% during power increase, perform the following:

☐ 3.32.18.1 Stop power increase.

CAUTION: Allowing NC System temperature to change while calibrating NI's can result in a non-conservative adjustment which can result in exceeding 100% RTP. {PIP 03-2117}

☐ 3.32.18.2 Maintain steady state power and temperature.

_____ 3.32.18.3 Have IAE calibrate each Power Range NI Channel to ±1% Power Mismatch (NIs vs BETP).

_____ 3.32.18.4 **WHEN** calibration complete, continue power increase.

NOTE: Nuclear Engineering may perform PT/0/A/4150/003 (Thermal Power Output Measurement) between 85 - 95% RTP.

_____ 3.32.19 **IF** startup is from a refueling outage, perform the following:

_____ 3.32.19.1 **HOLD** at 95% RTP.

_____ 3.32.19.2 Ensure PT/0/A/4150/003 (Thermal Power Output Measurement) completed.
RX ENG

_____ 3.32.19.3 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing at 95% RTP, **HOLD** until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

_____ 3.32.20 Notify Maintenance to remove "Limited Access" signs used for startup per Model Work Order 0433323.

_____ _____/_____
Person Notified Date Time

_____ 3.32.21 **WHEN** 95% RTP, perform the following:

3.32.21.1 Ensure cooling groups energized on 1A Main Transformer:

_____ • Circuit 1
_____ • Circuit 2
_____ • Circuit 3
_____ • Circuit 4
_____ • Circuit 5
_____ • Circuit 6
_____ • Circuit 7
_____ • Circuit 8

3.32.21.2 Ensure cooling groups energized on 1B Main Transformer:

_____ • Circuit 1
_____ • Circuit 2
_____ • Circuit 3
_____ • Circuit 4
_____ • Circuit 5
_____ • Circuit 6
_____ • Circuit 7
_____ • Circuit 8

3.33 Increase power to 100% RTP as follows:

☐ 3.33.1 Begin power increase to 100% RTP.

_____ 3.33.2 **IF AT ANY TIME** 1AD-6, E10 (Loop D/T Deviation) is received, perform the following:

_____ 3.33.2.1 Notify Reactor Engineering to evaluate.

_____ _____/_____
Person Notified Date Time

_____ 3.33.2.2 Determine impact on power escalation.
CRS

_____ 3.33.2.3 **IF** power escalation **CANNOT** commence due to alarms, notify IAE to calibrate D/T channels.

_____ _____/_____
Person Notified Date Time

☐ 3.33.3 Maintain control rods within insertion and withdrawal limits per COLR.

NOTE: Maintaining AFD within Nuclear Engineering recommended limits prevents AFD exceeding Tech Spec Limits (Limit and Precaution 1.8).

☐ 3.33.4 Maintain AFD within target band per OP/1/A/6100/022 (Unit 1 Data Book), Enclosure 4.3, Graph(s) 1.1.

NOTE: Dilution rates for reaching and maintaining 100% power may change significantly based on change in Xenon worth.

☐ 3.33.5 Generate Xenon Prediction printout per OAC or REACT to determine expected changes in dilution rates. {PIP-99-0669}

_____ 3.33.6 **WHEN** 98% RTP, perform the following:

_____ 3.33.6.1 Depress "MW IN/MW OUT".

_____ 3.33.6.2 Ensure lit "MW OUT".

☐ 3.33.6.3 Adjust Turbine load per OP/1/A/6300/001 A (Turbine-Generator Load Change).

_____ 3.33.7 **IF** performing Generator Reactive Limits Verification testing at 98% RTP, perform the following:

☐ 3.33.7.1 Perform applicable sections of PT/1/B/4350/001 C (Generator Reactive Limits Verification Test).

_____ 3.33.7.2 **HOLD** until Testing Personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

NOTE: The intent of the following hold step is to allow a more controlled final approach to 100% power.

_____ 3.33.8 **WHEN** 99.5% RTP, perform the following: {PIP 06-0754}

_____ 3.33.8.1 **HOLD** power escalation for at least 10 minutes to allow for Xenon and AFD oscillations to be seen.

_____ 3.33.8.2 **WHEN** at least 10 minutes have elapsed, continue power increase.

_____ 3.33.9 **WHEN** 100% RTP, perform the following:

CAUTION: Maximum #4 Governor Valve position is 45% with feedback loops out of service to ensure valve maintained within its controlling band.

_____ 3.33.9.1 Ensure #4 Governor Valve less than 45% open unless advised by System Engineer.

☐ 3.33.9.2 Check 100% RTP at 3411 MWT. (M1P1355)

_____ 3.33.9.3 **IF** necessary, have IAE calibrate each Power Range NI channel to ±1% Power Mismatch (NIs vs BETP).

☐ 3.33.9.4 Suspend logging Fuel Maneuvering Limit on RO Turnover Checklist.

☐ 3.33.9.5 Remove Pzr Htr Groups A, B and D from service per Enclosure 4.6 (Operation of Pzr Heaters).

_____ 3.33.10 **WHEN** Nuclear Power (PR) instruments indicate 100%, perform the following:

3.33.10.1 Check the following between $10^{1.75}$ - $10^{2.25}$%: {PIP-98-2017}

☐ 1A W/R Neutron Flux (%) (1ENBPI9510)
☐ 1B W/R Neutron Flux (%) (1ENBPI9520)

_____ 3.33.10.2 **IF** outside of range, notify IAE to perform IP/0/A/3207/006 A (Gamma-Metrics Neutron Flux Monitor Calorimetric Adjustments).
SRO

_____ _____/_____
Person Notified Date Time

☐ 3.33.11 Maintain proper NC System parameters by operating Pzr Htr Groups as required per Enclosure 4.6 (Operation of Pzr Heaters).

End of Enclosure

Scenario Event Description

NRC Scenario 4

Facility:	**McGuire**	Scenario No.:	**4**	Op Test No.:	**N10-1**
Examiners:		Operators:			(SRO)
					(RO)
					(BOP)

Initial Conditions:	The plant is at 18% power (MOL), following a plant startup on the previous shift. The plant had been shutdown for the previous six days to repair the 1A DG. A power ascension to 30% power is expected for the shift. It is expected to raise power at 2 MWe/Minute. Use of Alternate Dilute during power ascension in accordance with Enclosure 4.4, "Alternate Dilute," of OP/1/A/6150/009, "Boron Concentration Control," has been approved. The RMWST Dissolved Oxygen Concentration is 800 ppb.
Turnover:	The following equipment is Out-Of-Service: 1C Hotwell Pump is OOS for Motor maintenance. 1NB LT-5420, RMWST Level, failed low last shift (IAE is investigating) and MCB Annunciator 1AD-1, F-9, "DEH/MSR SYSTEM MALFUNCT," has failed to off (IAE is investigating).

Event No.	Malf. No.	Event Type*	Event Description
1	NA	R-RO N-BOP N-SRO	Power Increase
2	SM010	C-RO C-SRO	Steam Seal Pressure Regulator Failure
3	SLIM06_07	C-BOP C(TS)-SRO	Pzr Spray Valve (1NC-27) Controller fails OPEN
4	IRE006 M12	C-RO C(TS)-SRO	Dropped Rod
5	RN007B	C-BOP C-SRO	1B RN Pump Trips
6	CF006C	M-RO M-BOP M-SRO	Unisolable Feedline Break (Doghouse) 1C SG
7	IPE001A IPE001B	NA	Auto Reactor Trip Failure
8	ISE007A ISE007B	NA	Feedwater Isolation Signal fails in AUTO

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

McGuire 2010 NRC Scenario #4

The plant is at 18% power (MOL), following a plant startup on the previous shift. The plant had been shutdown for the previous six days to repair the 1A DG. A power ascension to 30% power is expected for the shift. It is expected to raise power at 2 MWe/Minute. Use of Alternate Dilute during power ascension in accordance with Enclosure 4.4, "Alternate Dilute," of OP/1/A/6150/009, "Boron Concentration Control," has been approved. The RMWST Dissolved Oxygen Concentration is 800 ppb.

The following equipment is Out-Of-Service: 1C Hotwell Pump is OOS for Motor maintenance. 1NB LT-5420, RMWST Level, failed low last shift (IAE is investigating) and MCB Annunciator 1AD-1, F-9, "DEH/MSR SYSTEM MALFUNCT," has failed to off (IAE is investigating).

Shortly after taking the watch, the operator will commence a load increase to 30% starting with Step 3.30 of Enclosure 4.1, "Power Increase," of OP/1/A/6100/003, "Controlling Procedure for Unit Operation." The operator will dilute the NC System Boron concentration in accordance with Enclosure 4.4, "Alternate Dilute," of OP/1/A/6150/009, "Boron Concentration Control," and raise Turbine load in accordance with OP/1/A/6300/001 A, "Turbine-Generator Load Change."

After this, the Steam Seal Header Pressure Control Valve, 1TL-6, will fail closed. The operator will respond to OAC alarm M1A0689, "U1 GLAND STEAM SEAL HEADER PRESSURE," and restore Main Turbine and CFPT Sealing Steam Pressure before a low Main Condenser Vacuum condition develops.

Subsequently, the Pzr Spray Valve Controller, 1NC-27C A Spray, demand will fail to full output. The operator will enter AP/1/A/5500/11, "Pressurizer Pressure Anomalies." The operator will address Technical Specification 3.4.1, "RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits."

Afterwards, Control Rod M12 will drop into the core. The operator will enter AP/1/A/5500/14, "Control Rod Malfunction," and address Enclosure 1, "Response to Dropped or Misaligned Rod." The operator will address Technical Specification 3.1.4, "Rod Group Alignment Limits."

Shortly after this, the 1B RN Pump will trip on overcurrent. The operator will enter AP/1/A/5500/20, "Loss of RN." The operator will address Technical Specification 3.7.7, "Nuclear Service Water System (NSWS)."

Following this, a major feedline break will occur in the 1C Steam Generator Feedline inside the Doghouse. The Reactor will not trip automatically, and the operator will be required to manually trip the Reactor. Also, the Feedwater Isolation Signal (FWIS) will fail in AUTO. The operator will need to manually actuate FWIS.

The operator will enter EP/1/A/5000/E-0, "Reactor Trip or Safety Injection," and then transition to EP/1/A/5000/E-2, "Faulted Steam Generator Isolation." The operator will isolate flow to and from the 1C Steam Generator and then transition to EP/1/A/5000/ES-1.1, "SI Termination."

The scenario will terminate at Step 7.c of ES-1.1, after the crew has closed 1NI-9A and 1NI-10B.

Critical Tasks:

E-0 A

Manually trip the reactor prior to transition to FR-S.1, "Response to Nuclear Generation/ATWS."

Safety Significance: Failure to trip the reactor when required causes a challenge to the Subcriticality Critical Safety Function that otherwise would not exist. This mis-operation by the operator necessitates the crew taking compensating action which complicates the event mitigation strategy and demonstrates an inability by the operator to recognize a failure of the automatic actuation of the RPS.

E-2 A

Isolate the Faulted Steam Generator before transitioning out of E-2.

Safety Significance: Failure to isolate a Faulted SG that can be isolated causes challenges to the Critical Safety Functions that would not otherwise occur. Failure to isolate flow could result in an unwarranted Orange or Red Path condition on NC Integrity and/or Subcriticality (if cooldown is allowed to continue uncontrollably).

SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
☐	Sim. Setup	**Rod Step On**	
☐		**Reset to Temp** I/C 160.	**T = 0 Malfunctions:** **ANN-AD11-C05 = ON, Transformer A Urgent Alarm** **ANN-AD11-F05 = ON, Transformer B Urgent Alarm** **ANN-AD11-B05 = ON, Transformer A Trouble Alarm** **ANN-AD11-E05 = ON, Transformer B Trouble Alarm** **MALF IPE001A, Auto Reactor Trip Failure** **MALF IPE001B, Auto Reactor Trip Failure** **XMT-NB001 = 0, RWMST Level Low** **LOA-CM058 = Racked Out, 1C Hotwell Pump** **(MALF) ISE007A, Auto FWIS failure** **(MALF) ISE007B, Auto FWIS failure** **ANN-AD1-F09 = OFF, DEH/MSR SYSTEM MALFUNCT**
☐		**RUN** **RESET all SLIMS**	**Place O-Stick on:** **RWMST Level** **DEH/MSR SYSTEM MALFUNCT** **Place Red Tag Label on:** **1C Hotwell Pump**
☐		**Update** Status Board, **Setup OAC**	**NOTE:** RMWST DO = <1000 ppb.
☐		**Freeze.**	
☐		**Update Fresh Tech. Spec. Log.**	
☐		**Fill out the NEO's Available section of Shift Turnover Info.**	
☐	Prior to Crew Briefing	**RUN**	

	Bench Mark	ACTIVITY	DESCRIPTION
☐	**Crew Briefing** 1. Assign Crew Positions based on evaluation requirements 2. Review the Shift Turnover Information with the crew. 3. Provide Enclosure 4.1 of OP/1/A/6100/003, marked up as follows: Step 2.3 – Initialed. Step 3.1 – Checkbox checked. Step 3.2 – Initialed. Step 3.3 – Initialed. Step 3.3.1 – Checkbox checked. Step 3.3.2 – Checkbox checked, Entry Step = 3.30. Step 3.3.3 – Checkbox checked. Step 3.30.1 –Initialed/ Person Notified: Monty Champion – Today's Date/Time. 4. Provide copy of OP/1/A/6150/009. 5. Provide copy of OP/1/A/6300/001 A. 6. Provide reactivity Plan based on the following Data: Rods – SDB-226, A, B, C, D CBA – 226 CBB -226 CBC – 221/220 CBD – 105/104 18.6% PTPBE Xe worth – 3778.46 Sm Eq – (-)41.98 Xe rate – (-)2.32 pcm/min NC Boron – 1586 ppm [Xe] -46.83 250 EFPD Tave – 561.7 7. Direct the crew to Review the Control Boards taking note of present conditions, alarms.		
☐	T-0	Begin Familiarization Period	
☐	At direction of examiner	**Event 1**	Power Increase
☐	At direction of examiner	**Event 2** **(MALF) SM010 = 0** **120 second Ramp** **Trigger #1**	Steam Seal Pressure Regulator Failure

	Bench Mark	ACTIVITY	DESCRIPTION
☐	At direction of examiner	**Event 3** **(MALF) SLIM-06_07 = 1 (SLIM fails to MANUAL)** **(MALF) SLIM-06_04 = 1 (Raise Output)** **Trigger #3**	Pzr Spray Valve (1NC-27) Controller fails OPEN
☐	At direction of examiner	**Event 4** **IRE006M12 = 1** **Trigger #5**	Dropped Rod
☐	At direction of examiner	**Event 5** **(MALF) RN007B** **Trigger #7**	1B RN Pump Trips
☐	At direction of examiner	**Event 6** **(MALF) CF006C = 2.2E7** **30 second Ramp** **Trigger #9**	Unisolable Feedline Break (Doghouse) 1C SG
☐	Continued from Event 6	**Event 7** **(MALF) IPE001A** **(MALF) IPE001B**	Auto Reactor Trip Failure **NOTE: These malfunctions are entered at T=0**
☐	Continued from Event 6	**Event 8** **(MALF) ISE007A = 3** **(MALF) ISE007B = 3**	Feedwater Isolation Signal fails in AUTO **NOTE: These malfunctions are entered at T=0** **NOTE: During the implementation will need to operate:** **Trigger #11 – LOA-DG018 = Stop PB, 1B DG Emergency Stop (3 minutes delayed)** **Trigger #13, LOA-SA002 = 0, Close 1C TD CA Pump Steam Supply (5 minutes delayed)**
☐	**Terminate the scenario upon direction of Lead Examiner**		

Op Test No.: N10-1	Scenario # 4	Event # 1	Page 8 of 47
Event Description:	**Power Increase**		

Shortly after taking the watch, the operator will commence a load increase to 30% starting with Step 3.30 of Enclosure 4.1, "Power Increase," of OP/1/A/6100/003, "Controlling Procedure for Unit Operation." The operator will dilute the NC System Boron concentration in accordance with Enclosure 4.4, "Alternate Dilute," of OP/1/A/6150/009, "Boron Concentration Control," and raise Turbine load in accordance with OP/1/A/6300/001 A, "Turbine-Generator Load Change."

Booth Operator Instructions: **NA**

Indications Available: **NA**

Time	Pos.	Expected Actions/Behavior	Comments
OP/1/A/6100/003, CONTROLLING PROCEDURE FOR UNIT OPERATIONS ENCLOSURE 4.1, POWER INCREASE			
	CRS	(Step 3.30.2) IF AT ANY TIME "Power Mismatch%" (Excore/Thermal Power Mismatch) indicates greater than 4% during power increase, perform the following:	**NOTE:** The power increase will be at 2 MWe/minute.
		• Stop power increase.	
		• Have IAE calibrate each Power Range NI Channel to ±1% Power Mismatch (Nis vs BETP).	
		• WHEN calibration complete, continue with power increase.	
	BOP/ RO	(Step 3.30.3) Begin power increase to 30% RTP.	
OP/1/A/6150/009, BORON CONCENTRATION CONTROL ENCLOSURE 4.4, ALTERNATE DILUTE			
			NOTE: The BOP may perform this task more than once.
	BOP	(Step 3.6) Ensure the following reset to zero: (R.M.)	
		• Total Make Up Flow Counter	

Op Test No.: N10-1 Scenario # 4 Event # 1 Page 9 of 47

Event Description: **Power Increase**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3.7) Set Total Make Up Flow Counter to value determined in Step 3.5. (R.M.)	
	BOP	(Step 3.8) Select "ALTERNATE DILUTE" on "NC Sys M/U Controller".	
	BOP	(Step 3.9) IF desired to make up only through 1NV-175A (BA Blender to VCT Outlet), select "CLOSED" on 1NV-171A (BA Blender to VCT Inlet).	
	BOP	(Step 3.10) IF desired to adjust reactor makeup water flow	**NOTE:** It is NOT desired to adjust makeup flow.
	BOP	(Step 3.11) If desired to manually adjust reactor makeup water flow,....	
	BOP	(Step 3.12) IF AT ANY TIME it is desired to lower VCT level....	**NOTE:** It is NOT required to lower VCT level.
	BOP	(Step 3.13) IF AT ANY TIME plant parameters require termination of dilution, ...	
	BOP	(Step 3.14) Momentarily select "START" on "NC System Make Up". (R.M.)	
	BOP	(Step 3.15) Check "NC System Make Up" red light lit.	
	BOP	(Step 3.16) Check 1NV-175A (BA Blender To VCT Outlet) open.	
	BOP	(Step 3.17) Check 1NV-252A (Rx M/U Water To Blender control) open or throttled as required.	

Op Test No.: N10-1 Scenario # 4 Event # 1 Page 10 of 47

Event Description: **Power Increase**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3.18) IF 1NV-171A (BA Blender To VCT Inlet) in "AUTO",....	**NOTE:** 1NV-171A is NOT in AUTO.
	BOP	(Step 3.19) Check Rx M/U Water Pump starts.	
	BOP	(Step 3.20) Monitor Total Make Up Flow Counter. (R.M.)	
	BOP	(Step 3.21) HOLD until one of the following occurs:	
		• Amount of reactor makeup water recorded per Step 3.5 added	
		OR	
		• Reactor makeup water addition manually terminated	
	BOP	(Step 3.22) Ensure dilution terminated as follows: (R.M.)	
		• IF in "AUTO", ensure the following off:	
		• 1A Rx M/U Water Pump	
		• 1B Rx M/U Water Pump	
		• Ensure the following closed:	
		• 1NV-175A (BA Blender To VCT Outlet)	
		• 1NV-252A (RX M/U Water To Blender Control)	
		• 1NV-171A (BA Blender To VCT Inlet)	
	BOP	(Step 3.23) Ensure 1NV-171A (BA Blender to VCT Inlet) in "AUTO".	
	BOP	(Step 3.24) Ensure "Rx M/U Water Flow Control" in "AUTO".	

Op Test No.: N10-1 Scenario # 4 Event # 1 Page 11 of 47

Event Description: **Power Increase**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3.25) IF "Rx M/U Water Flow Control" adjusted per Step 3.10 OR Step 3.11....	**NOTE:** The Rx M.U Water Flow Control was NOT adjusted.
	BOP	(Step 3.26) Ensure 1NV-137A (NC Filters Otlt 3-Way Control) in "AUTO".	
	BOP	(Step 3.27) IF desired to flush blender,,	**NOTE:** It is NOT desired to flush the blender.
	BOP	(Step 3.28) Select "AUTO" for "NC Sys M/U Controller".	
	BOP	(Step 3.29) Ensure the following reset to zero: (R.M.)	
		• Total Make Up Flow Counter	
		• Boric Acid Flow Counter	
	BOP	(Step 3.30) Momentarily select "START" on "NC System Make Up".	
	BOP	(Step 3.31) Check "NC System Make Up" red light lit.	
	BOP	(Step 3.32) Record in Auto Log that final blender content is Rx Makeup Water.	
OP/1/A/6300/001A, TURBINE-GENERATOR STARTUP/SHUTDOWN ENCLOSURE 4.1, TURBINE-GENERATOR LOAD CHANGE			
	RO	(Step 3.5) Changing Turbine Load	
		• IF Turbine in "OPERATOR AUTO", perform the following:	
		• Ensure desired change within "Calculated Capability Curve".	

Op Test No.: N10-1 Scenario # 4 Event # 1 Page 12 of 47

Event Description: **Power Increase**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	• IF turbine load will increase or decrease more than 10 MWs, notify Dispatcher of expected load change.	
		• Depress "LOAD RATE".	
		• Enter desired load rate in "VARIABLE DISPLAY".	**NOTE:** the RO will select 2 MWe/Min loading rate.
		• Depress "ENTER".	
		• Depress "REFERENCE".	
		• Enter desired load in "VARIABLE DISPLAY".	
		• Depress "ENTER".	
		• Depress "GO"	
		• Check load changes at selected rate.	
OP/1/A/6100/003, CONTROLLING PROCEDURE FOR UNIT OPERATIONS ENCLOSURE 4.1, POWER INCREASE			
	RO	(Step 3.30.4) Load turbine per OP/1/A/6300/001 A (Turbine-Generator Load Change).	
	BOP	(Step 3.30.5) WHEN M1A0913 (1A XFMR Oil Temp) indicates greater than 45°C, ensure cooling groups energized on 1A Main Transformer	
	BOP	(Step 3.30.6) WHEN M1A0925 (1B XFMR Oil Temp) indicates greater than 45°C, ensure cooling groups energized on 1B Main Transformer	
	RO	(Step 3.30.7) Place "Exh Hood Spray" in "MAN".	

Op Test No.: N10-1 Scenario # 4 Event # 1 Page 13 of 47

Event Description: **Power Increase**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 3.30.8) WHEN "C-5 Lo Turb Impulse Press Rod Block" dark, CRD Bank Select may be placed in "AUTO".	**NOTE:** The RO will place rods in AUTO.
	RO	(Step 3.30.9) WHEN Turbine Imp Press greater than 75 psig, check "P-13 Turbine Not At Power" dark. (1SI-18)	
	RO	(Step 3.30.10) Prior to 20% RTP, ensure Main Feedwater flow to all S/G through CF nozzles per OP/1/A/6250/001 (Condensate and Feedwater System).	**NOTE:** The CF nozzles are in service per OP/1/A/6250/001.
	RO/ BOP	(Step 3.30.11) AFTER exceeding 18% CF flow, check each S/G in "HIGH POWER" mode as follows:	
		• On DCS Workstation, select Steam Generator A Level graphic	
		• On Steam Generator A Level graphic, check "HIGH POWER" lit.	
		• On DCS Workstation, select Steam Generator B Level graphic	
		• On Steam Generator B Level graphic, Check "HIGH POWER" lit.	
		• On DCS Workstation, select Steam Generator C Level graphic	
		• On Steam Generator C Level graphic, check "HIGH POWER" lit.	
		• On DCS Workstation, select Steam Generator D Level graphic	
		• On Steam Generator D Level graphic, check "HIGH POWER" lit.	
	RO	(Step 3.30.12) Ensure BB Pump is service per OP/1/A/6250/008 (Steam Generator Blowdown).	**NOTE:** The BB Pump is in service per OP/1/A/6250/008.

Op Test No.: N10-1 Scenario # 4 Event # 1 Page 14 of 47

Event Description: **Power Increase**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 3.30.13) Initiate maximum BB flow for S/G cleanup while maintaining NC System temperature by throttling the following:	
		• 1BB-123 (A S/G BB Flow Control)	
		• 1BB-124 (B S/G BB Flow Control)	
		• 1BB-125 (C S/G BB Flow Control)	
		• 1BB-126 (D S/G BB Flow Control)	
	BOP	(Step 3.30.14) Adjust letdown to desired flow per OP/1/A/6200/001 A (Chemical and Volume Control System Letdown).	
At the discretion of the Lead Examiner move to Event #2.			

Op Test No.: N10-1	Scenario # 4	Event # 2	Page 15 of 47
Event Description:	**Steam Seal Pressure Regulator Failure**		

After this, the Steam Seal Header Pressure Control Valve, 1TL-6, will fail closed. The operator will respond to OAC alarm M1A0689, "U1 GLAND STEAM SEAL HEADER PRESSURE," and restore Main Turbine and CFPT Sealing Steam Pressure before a low Main Condenser Vacuum condition develops.

Booth Operator Instructions: Operate Trigger #1 (SM010 (0%) on 120 second Ramp)

Indications Available:

- OAC Alarm M1A0689, U1 GLAND STEAM HEADER PRESSURE
- OAC Alarm M1A0801, 1A & 1B CFPT SEALING STEAM PRESSURE
- 1TLP-5010, STM Seal Header Press, indications lowers to 0 psig.

Time	Pos.	Expected Actions/Behavior	Comments
OAC ALARM M1A0689, U1 GLAND STEAM SEAL HEADER PRESSURE			
	RO	(Step 1) Throttle open 1TL-8 (HP Steam Seal Bypass Valve) to maintain "STM SEAL HEADER PRESS" between 90-120 PSIG.	
	CRS	(Step 2) Notify maintenance to troubleshoot 1TL-6 (Steam Seal Hdr Pressure Control Valve).	**NOTE:** The CRS may call WCC/Maintenance to address the malfunction. If so, **Booth Instructor** acknowledge as WCC.
	CRS	(Step 3) IF "STM SEAL HEADER PRESS" cannot be maintained at least 90 PSIG, dispatch an operator to look for steam leaks and verify valve alignment per OP/1/B/6300/005 (STEAM SEAL SYSTEM).	**NOTE:** The CRS dispatch an NEO to the valve. If so, **Booth Instructor** acknowledge as NEO.
			NOTE: This alarm will come in if the operator delays getting the Bypass Open. If so, the crew may address this alarm as well, and dispatch an NEO.
OAC ALARM M1A0801, 1A & 1B CFPT SEALING STEAM PRESS			

Op Test No.: N10-1 Scenario # 4 Event # 2 Page 16 of 47

Event Description: **Steam Seal Pressure Regulator Failure**

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ NEO	(Step 1) Ensure Valve 1TF-2 (CF Pump Turb Steam Seal Ctrl) working properly to maintain steam seal pressure between 1 to 4 PSIG.	**Booth Instructor:** The NEO report should be FPGS pressure is 0 if they have NOT opened ITL-8, and pressure is reading normal (2.5 psig) if they do.
	RO	(Step 2) IF necessary, open 1TF-4 (CF Pump Turb Steam Seal Ctrl Byp) to maintain steam seal pressure between 1 to 4 PSIG.	
			NOTE: The CRS will likely conduct a Focus Brief.
			NOTE: There is a possibility that the crew may enter **AP23** due to **Low Condenser Vacuum**. However, Condenser Vacuum will be improving, and the next event can be initiated while in this AP.
At the discretion of the Lead Examiner move to Event #3.			

Op Test No.: N10-1	Scenario # 4	Event # 3	Page 17 of 47
Event Description:	**Pzr Spray Valve (1NC-27) Controller fails OPEN**		

Subsequently, the Pzr Spray Valve Controller, 1NC-27C A Spray, demand will fail to full output. The operator will enter AP/1/A/5500/11, "Pressurizer Pressure Anomalies." The operator will address Technical Specification 3.4.1, "RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits."

Booth Operator Instructions: Operate Trigger #3 (SLIM-06_07 (1), SLIM-06_04 (1))

Indications Available:

- OAC Alarms Pzr Pressure Channel I through IV – Low
- MCB Pzr Pressure gauges lowering
- Pzr Spray Valve Controller, 1NC-27C A Spray, goes to 100% output.
- Pzr Spray Valve Controller, 1NC-27C A Spray, Limit Switch indicates valve OPEN
- MCB Annunciator 1AD-6, C-6, PZR LO PRESS CONTROL

	Pos.	Expected Actions/Behavior	Comments
			NOTE: The BOP may take all the necessary actions in the Immediate Actions, before CRS reads AOP.
AP/1/A/5500/11, PRESSURIZER PRESSURE ANOMALIES			
	BOP	(Step 1) Check Pzr pressure – HAS GONE DOWN.	**Immediate Action**
	BOP	(Step 2) Check Pzr PORVs – CLOSED.	**Immediate Action**
	BOP	(Step 3) Check Pzr spray valves - CLOSED	**Immediate Action**
	BOP	(Step 3 RNO) CLOSE Pzr spray valve(s).	**NOTE:** The BOP will recognize that the SLIMs is NOT effective at controlling the valve, and operate the EMERG SWITCH.
	BOP	(Step 4) Check Pzr PORVs – CLOSED.	

Op Test No.: N10-1 Scenario # 4 Event # 3 Page 18 of 47

Event Description: **Pzr Spray Valve (1NC-27) Controller fails OPEN**

	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 5) Check Pzr spray valves – CLOSED.	**NOTE:** IF the BOP has already used the EMERG SWITCH, the CRS may answer YES, and continue to Step 6. If NOT, the Step 5 RNO will be performed (Scripted).
	BOP	(Step 5 RNO) IF NC pressure below desired pressure, THEN perform the following:	
		• Ensure Pzr spray emergency close switch on 1MC-10 is in the "CLOSE" position for failed spray valve.	**NOTE:** When the BOP uses this switch the Spray Valve will Close.
	CRS	• IF Pzr spray valve closed, THEN GO TO Step 6.	
	CRS	(Step 6) Announce occurrence on page.	**NOTE:** CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	BOP	(Step 7) Check 1NV-21A (NV Spray to PZR Iso) – CLOSED.	
	BOP	(Step 8) Check the following Pzr heaters – ON:	
		• 1A	
		• 1B	
		• 1D	
	BOP	(Step 8 RNO) IF NC pressure below desired pressure, THEN perform the following:	**NOTE:** NC System pressure is ≈2150 psig.
		• Place Pzr heater mode select switches in manual.	
		• Turn on heaters as necessary to control pressure.	

Op Test No.: N10-1 Scenario # 4 Event # 3 Page 19 of 47

Event Description: **Pzr Spray Valve (1NC-27) Controller fails OPEN**

	Pos.	Expected Actions/Behavior	Comments
		• WHEN Pzr pressure returns to normal AND automatic Pzr pressure control desired, THEN place Pzr heater in auto.	
	BOP	(Step 9) Check 1C Pzr heater – ON.	
	BOP	(Step 10) Check "PZR PRESS MASTER" – IN AUTO.	
	BOP	(Step 11) Check "1NC-27 PRESSURIZER SPRAY EMERGENCY CLOSE" switch – SELECTED TO "NORMAL".	**NOTE:** In order to close the malfunctioning Spray Valve, the BOP had to take the EMERG SWITCH to CLOSE.
	CRS	(Step 11 RNO) Notify station management to ensure switch restored to "NORMAL" once spray valve is repaired.	**NOTE:** The CRS may call WCC/Station Management to address the switch position. If so, **Booth Instructor** acknowledge as WCC.
	BOP	(Step 12) Check "1NC-29 PRESSURIZER SPRAY EMERGENCY CLOSE" switch – SELECTED TO NORMAL.	
	BOP	(Step 13) Check Pzr pressure – GOING UP TO DESIRED PRESSURE.	
	CRS	(Step 14) Exit this procedure.	**NOTE:** The CRS may call WCC/IAE to address the valve failure. If so, **Booth Instructor** acknowledge as WCC.
			NOTE: The CRS will likely conduct a Focus Brief.

Op Test No.: N10-1 Scenario # 4 Event # 3 Page 20 of 47

Event Description: **Pzr Spray Valve (1NC-27) Controller fails OPEN**

	Pos.	Expected Actions/Behavior	Comments
TECHNICAL SPECIFICATION 3.4.1, RCS PRESSURE, TEMPERATURE, AND FLOW DEPARTURE FROM NUCLEATE BOILING (DNB) LIMITS			
	CRS	3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits.	**NOTE:** NC System Pressure drops to ≈2150 psig on the failure, and TS 3.4.1 was entered and exited during the transient.
	CRS	LCO 3.4.1 RCS DNB parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified in Table 3.4.1-1.	
	CRS	APPLICABILITY: MODE 1.	
	CRS	ACTIONS	
		CONDITION / REQUIRED ACTION / COMPLETION TIME	
		A. Pressurizer pressure or RCS average temperature DNB parameters not within limits. / A.1 Restore DNB parameter(s) to within limit. / 2 hours	
At the discretion of the Lead Examiner move to Event #4.			

Op Test No.: N10-1	Scenario # 4	Event # 4	Page 21 of 47
Event Description: **Dropped Rod**			

Afterwards, Control Rod M12 will drop into the core. The operator will enter AP/1/A/5500/14, "Control Rod Malfunction," and address Enclosure 1, "Response to Dropped or Misaligned Rod." The operator will address Technical Specification 3.1.4, "Rod Group Alignment Limits."

Booth Operator Instructions: **Operate Trigger #5 (IRE006M12)**

Indications Available:

- 1AD-2/D9, "RPI At Bottom Rod Drop."
- 1AD-2/A10, "Rod Control Urgent Failure."
- 1AD-2/D10, "RPI Urgent Failure."
- NC Temperature drops (Tavg < Tref).
- Power Range recorders indicate a prompt flux drop.

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The RO may immediately adjust load on the Turbine to maintain Tavg-Tref = 1°F.
AP/1/A/5500/14, ROD CONTROL MALFUNCTION			
	RO	(Step 1) IF more than one rod dropped, THEN	**Immediate Action** **NOTE:** Only one Rod Dropped during this event.
	RO	(Step 2) Place control rods in manual.	**Immediate Action** **NOTE:** The will RO place the rods in Manual.
	RO	(Step 3) Check rod movement – STOPPED.	**Immediate Action**
	RO	(Step 4) Check all rods – ALIGNED WITH ASSOCIATED BANK.	
	RO	(Step 4 RNO) Perform the following.	
		• IF two or more rods are misaligned....	**NOTE:** Only one rod is misaligned.

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Event Description: **Dropped Rod**

Time	Pos.	Expected Actions/Behavior	Comments
		• IF T-Avg has gone down, THEN lower Turbine load as necessary to restore T-Avg to T-Ref.	**NOTE:** The RO may adjust load on the Turbine to maintain Tavg-Tref = 1°F.
		• GO TO Enclosure 1 (Response To Dropped or Misaligned Rod)	
			NOTE: The CRS will transition to Enclosure 1.
AP/1/A/5500/14, ROD CONTROL MALFUNCTION ENCLOSURE 2, FAILURE OF RODS TO MOVE ON DEMAND			
	CRS	(Step 1) Announce occurrence on paging system.	**NOTE:** The CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	SRO	(Step 2) Dispatch rod control system qualified IAE to perform the following:	**NOTE:** The CRS may call WCC/IAE to address. If so, Booth Instructor acknowledge as WCC/IAE as appropriate.
		• Correct cause of misaligned rod.	
		• Notify Control Room operators when auto or manual rod motion is available for reactivity control.	
	CRS	(Step 3) Check "ROD CONTROL URGENT FAILURE" alarm (1AD-2, A-10) – DARK.	**NOTE:** 1AD-2, A-10 is LIT.
	RO	(Step 3 RNO) Perform the following:	
		• Do not move control rods while the "ROD CONTROL URGENT FAILURE" alarm is lit, unless instructed by IAE.	
		• IF AT ANY TIME IAE desires to reset 'ROD CONTROL URGENT FAILURE" alarm, THEN depress the 'ROD CONTROL ALARM RESET" pushbutton.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.

Op Test No.: N10-1 Scenario # 4 Event # 4 Page 23 of 47

Event Description: **Dropped Rod**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	• IF AT ANY TIME while in this procedure a runback occurs AND no rods will move, THEN perform the following:	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• Trip Reactor.	
		• GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).	
	RO	(Step 4) Use OAC point MP1385 (Reactor Thermal Power, Best Estimate), to determine reactor power in subsequent steps.	
	CRS/ RO	(Step 5) Check AFD (Tech Spec 3.2.3) – WITHIN TECH SPEC LIMITS.	
	CRS	(Step 6) Check QPTR (Tech Spec 3.2.4) – WITHIN TECH SPEC LIMITS.	**NOTE:** The highest QPTR is 1.09.
	RO	(Step 6 RNO) Reduce reactor power as required by Tech Specs as follows:	**NOTE:** because of the low present power level, a power reduction is NOT needed.
		• Do not move rods until IAE determines rod movement is available.	
	BOP	• Borate as required during power reduction to maintain T-Ave at T-Ref.	
	RO	• Monitor AFD during load reduction.	
	CRS	• IF AT ANY TIME AFD reaches Tech Spec limit AND reactor power is greater than 50%, THEN.....	**NOTE:** Reactor power is < 50%.
	RO/ BOP	• Reduce load as required by Tech Specs PER	**NOTE:** Because of the low present power level, a power reduction is NOT needed.
	CRS	(Step 7) Refer to the following Tech Specs:	
		• Tech Spec 3.1.4 (Rod Group Alignment Limits).	
		• Tech Spec 3.1.5 (Shutdown Bank Insertion Limits).	

Op Test No.: N10-1 Scenario # 4 Event # 4 Page 24 of 47

Event Description: **Dropped Rod**

Time	Pos.	Expected Actions/Behavior	Comments
		• Tech Spec 3.1.6 (Control Bank Insertion Limits).	
		• Ensure shutdown margin calculation is performed within 1 hour.	**NOTE:** The CRS may check the TS now and conclude that LCO 3.1.4 must be entered.
	CRS	(Step 8) Contact Reactor Engineering for instructions.	**NOTE:** The CRS may call WCC/RE to address the switch position. If so, **Booth Instructor** acknowledge as WCC.
	RO	(Step 9) Check reactor power – GREATER THAN OR EQUAL TO 5%	
	RO	(Step 10) Maintain T-Avg within 1°F of programmed T-Ref as follows:	
		• Adjust Turbine load.	**NOTE:** The RO may adjust load on the Turbine as needed.
		OR	
		• Borate/Dilute NC System.	
	RO	(Step 11) Determine if power reduction is required as follows:	
		• Check any misaligned rod – GREATER THAN 12 STEPS MISALIGNED.	
		• Check only one rod – MISALIGNED.	
		• Check reactor power – GREATER than 50%	**NOTE:** Power is < 50%.
	CRS	(Step 11 RNO) GO TO Step 12.f.	
	RO	(Step 12.f) Check only one rod – MISALIGNED.	

Op Test No.: N10-1 Scenario # 4 Event # 4 Page 25 of 47

Event Description: **Dropped Rod**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 12.g) Do not continue until the following conditions for rod alignment are satisfied:	
		• Reactor power is stable less than 50%.	
		• 15 hours have elapsed from the time of rod misalignment.	
			NOTE: The CRS will likely conduct a Focus Brief.
TECHNICAL SPECIFICATION 3.1.4, ROD GROUP ALIGNMENT LIMITS			
	CRS	LCO 3.1.4 All shutdown and control rods shall be OPERABLE, with all individual indicated rod positions within 12 steps of their group step counter demand position.	
	CRS	APPLICABILITY: MODES 1 and 2.	
		ACTIONS	
		CONDITION / REQUIRED ACTION / COMPLETION TIME	

Op Test No.: N10-1 Scenario # 4 Event # 4 Page 26 of 47

Event Description: **Dropped Rod**

Time	Pos.	Expected Actions/Behavior			Comments
		B. One rod not within alignment limits.	B.1 Restore rod to within alignment limits. OR B.2.1.1 Verify SDM is within the limit specified in the COLR. OR B.2.1.2 Initiate boration to restore SDM to within limit. AND B.2.2 Reduce THERMAL POWER to ≤ 75% RTP. AND B.2.3 Verify SDM is within the limit specified in the COLR. AND B.2.4 Perform SR 3.2.1.1. AND B.2.5 Perform SR 3.2.2.1. AND B.2.6 Re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions.	1 hour 1 hour 1 hour 2 hours Once per 12 hours 72 hours 72 hours 5 days	

At the discretion of the Lead Examiner move to Event #5.

Op Test No.: N10-1	Scenario # 4	Event # 5	Page 27 of 47
Event Description:	**1B RN Pump Trips**		

Shortly after this, the 1B RN Pump will trip on overcurrent. The operator will enter AP/1/A/5500/20, "Loss of RN." The operator will address Technical Specification 3.7.7, "Nuclear Service Water System (NSWS)."

Booth Operator Instructions: Operate Trigger #7 (RN007B)

Indications Available:

- MCB Annunciator 1AD-12, A-3, A RN PUMP DISCHARGE LO PRESSURE
- MCB Annunciator 1AD-12, A-4, B RN PUMP DISCHARGE LO PRESSURE
- MCB Annunciator 1AD-12, E-3, B RN PUMP ABNRMAL FLOW
- 1B RN Pump GREEN Breaker Status Light is LIT
- 1B RN Pump ammeter indicating 0 amps

Time	Pos.	Expected Actions/Behavior	Comments
AP/1/A/5500/20, LOSS OF RN CASE I, LOSS OF OPERATING RN TRAIN			
	BOP	(Step 1) Check for potential loss of LLI as follows:	
		• Check Unit 2 RN pump(s) that are aligned to LLI – OPERATING PROPERLY.	**Floor Instructor:** If asked, As **U2 RO** report "2A RN Pump is running properly."
		• Check suction flowpath – AVAILABLE.	
	CRS	(Step 2) Announce occurrence on page.	**NOTE:** CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	BOP	(Step 3) Check if significant RN pump cavitation (flow, pressure, amps swinging) – IS OCCURRING.	
	CRS	(Step 3 RNO) GO TO Step 6.	
	BOP	(Step 6) Place idle RN train in service as follows:	

Op Test No.: N10-1 Scenario # 4 Event # 5 Page 28 of 47

Event Description: **1B RN Pump Trips**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	• Check idle RN train – AVAILABLE TO START.	
		• Start one train of RN as follows:	
		• TO start 1A RN pump perform the following:	
		• Place manual loader for 1RN-89A (RN to A KC Hx Control) to 10% OPEN.	
		• Start 1A RN pump.	
		• Ensure the following valve for train being started – OPEN.	
		• 1RN-86A (A KC Hx Inlet Isol).	
		• Ensure malfunctioning RN pump is off.	
		• Check if local venting of RN pump has been performed PER one of the following:	**NOTE:** Local venting of RN pump has NOT been performed.
	BOP	(Step 6.e RNO) GO TO Step 6.g.	
	BOP	• Check Enclosure 9 (NV Pump Cooling Via Gravity Drain To Sump) – HAS BEEN PERFORMED.	**NOTE:** Enclosure 9 has NOT been performed.
	CRS	(Step 6.g RNO) GO TO Sep 6.i.	
	BOP	• Check Case II (Loss of Low Level or RC Supply Crossover) – HAS BEEN IMPLEMENTED.	**NOTE:** Case II has NOT been performed.
	CRS	(Step 6.i RNO) GO TO Step 7.	
	BOP	(Step 7) Ensure cooling to KC as follows:	

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Event Description: **1B RN Pump Trips**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	• Check 1A KC pump(s) – RUNNING.	**NOTE:** The B Train of KC is operating.
	CRS	(Step 7.a RNO) GO TO Step 7.f.	
	BOP	• Check 1B KC pump(s) – RUNNING.	
	BOP	• Ensure 1B KC pumps aligned to reactor bldg non essential header as follows:	
		• OPEN the following valves:	
		• 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).	
		• 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).	
		• CLOSE the following valves:	
		• 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).	
		• 1KC-3A (Trn A Rx bldg Non Ess Ret Isol).	
	BOP	• Check 1B RN pump – OFF.	
	BOP	• Check 1RN-187B (B KC Hx Inlet Isol) – LOCALLY THROTTLED DURING THIS PROCEDURE.	**NOTE:** 1RN-187B has NOT been locally throttled.
	CRS	(Step 7.i RNO) Perform the following:	
		• Place 1RN0187B "MODE SELECT" switch to manual.	
		• OPEN 1RN-187B (B KC Hx Inlet Isol).	
	BOP	(Step 8) Perform the following on operating train:	
		• A Train:	

Op Test No.: N10-1 Scenario # 4 Event # 5 Page 30 of 47

Event Description: **1B RN Pump Trips**

Time	Pos.	Expected Actions/Behavior	Comments
		• IF 1A RN pump is aligned to LLI, THEN THROTTLE 1 RN089A (RN to A KC Hx Control) to establish desired flow while attempting to maintain 1A RN pump flow less than 16,000 GPM.	
	BOP/ CRS	(Step 9) Investigate reason for loss of RN train as follows:	
		• Dispatch operator to check RN pump.	**NOTE:** The BOP/CRS will dispatch an NEO. **Booth Instructor:** After 5 minutes, as NEO, report that the 51 Relay on the 1B RN Pump breaker has operated.
		• Dispatch operator to check RN pump breaker.	
		• Check suction flowpath alignment.	
		• Check discharge flowpath alignment.	**NOTE:** The CRS may call WCC/IAE to address the Pump malfunction. If so, **Booth Instructor** acknowledge as WCC.
	CRS	(Step 10) Ensure Control Room Area Chiller in service PER Enclosure 4 (VC/YC Operation).	**NOTE:** CRS may ask U2 BOP to perform this Enclosure. If so, **Floor Instructor** acknowledge as U2 RO.
	BOP	(Step 11) Perform one of the following as necessary to align operating RN train with train of equipment cooled by RN:	
		• Swap operating equipment cooled by affected train of RN to opposite train....	

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Event Description: **1B RN Pump Trips**

<table>
<tr><th>Time</th><th>Pos.</th><th>Expected Actions/Behavior</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td>Examiner NOTE: The CRS and BOP may proceed with evaluating equipment to realigned, and NOT address the TS.
If SO, move to next event, and evaluate the RN TS after the scenario.</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">TECHNICAL SPECIFICATION 3.7.7, NUCLEAR SERVICE WATER SYSTEM</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>3.7.7 Nuclear Service Water System (NSWS)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>LCO 3.7.7 Two NSWS trains shall be OPERABLE.</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>APPLICABILITY: MODES 1, 2, 3, and 4.</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>ACTIONS</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>CRS</td><td>
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>A. One NSWS train inoperable.</td><td>A.1 Restore NSWS train to OPERABLE status.</td><td>72 hours</td></tr>
</table>
</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">At the discretion of the Lead Examiner move to Events #6-8.</td></tr>
</table>

Op Test No.: N10-1	Scenario # 4	Event # 6, 7 & 8	Page 32 of 47
Event Description:	**Unisolable Feedline Break (Doghouse) 1C SG/ Auto Reactor Trip Failure/ Feedwater Isolation Signal fails in AUTO**		

Shortly after this, the 1B RN Pump will trip on overcurrent. The operator will enter AP/1/A/5500/20, "Loss of RN." The operator will address Technical Specification 3.7.7, "Nuclear Service Water System (NSWS)." Following this, a major feedline break will occur in the 1C Steam Generator Feedline inside the Doghouse. The Reactor will not trip automatically, and the operator will be required to manually trip the Reactor. Also, the Feedwater Isolation Signal (FWIS) will fail in AUTO. The operator will need to manually actuate FWIS. The operator will enter EP/1/A/5000/E-0, "Reactor Trip or Safety Injection," and then transition to EP/1/A/5000/E-2, "Faulted Steam Generator Isolation." The operator will isolate flow to and from the 1C Steam Generator and then transition to EP/1/A/5000/ES-1.1, "SI Termination."

Booth Operator Instructions: Operate Trigger #9 (CF006C (2.2E7))

Indications Available:

- MCB Annunciator 1AD-4, A-3, S/G C FLOW MISMATCH LO STM FLOW
- MCB Annunciator 1AD-4, B-3, S/G C LEVEL DEVIATION
- MCB Annunciator 1AD-4, E-3, S/G C LO LEVEL ALERT
- MCB Annunciator 1AD-4, F-3, S/G C LO-LO LEVEL ALERT
- 1C S/G Narrow Range Level lowers
- 1C S/G Fed Flow lowers

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: Crew will carry out Immediate Actions of E-0, prior to the CRS addressing the EP.
EP/1/A/5000/E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO/ BOP	(Step 1) Monitor Foldout page.	
	RO	(Step 2) Check Reactor trip:	**Immediate Action**
		• All rod bottom lights – LIT	
		• Reactor trip and bypass breakers – OPEN	
		• I/R amps – GOING DOWN	

Op Test No.: N10-1 Scenario # 4 Event # 6, 7 & 8 Page 33 of 47

Event Description: **Unisolable Feedline Break (Doghouse) 1C SG/ Auto Reactor Trip Failure/ Feedwater Isolation Signal fails in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The crew may NOT address the Step 2 RNO, even though the action is taken, based on the timing of reading the Step.
	RO	(Step 2 RNO) Perform the following	**Immediate Action**
		• Trip reactor	
		• IF reactor will not trip.....	**NOTE:** The Reactor will trip Manually.

CRITICAL TASK:

(E-0 A) Manually trip the reactor prior to transition to FR-S.1, "Response to Nuclear Generation/ATWS."

Safety Significance: Failure to trip the reactor when required causes a challenge to the Subcriticality Critical Safety Function that otherwise would not exist. This mis-operation by the operator necessitates the crew taking compensating action which complicates the event mitigation strategy and demonstrates an inability by the operator to recognize a failure of the automatic actuation of the RPS.

	RO	(Step 3) Check Turbine Trip:	**Immediate Action**
		• All throttle valves – CLOSED.	
	BOP	(Step 4) Check 1ETA and 1ETB – ENERGIZED.	**Immediate Action**
	RO/ BOP	(Step 5) Check if S/I is actuated:	**Immediate Action**
		• "A SAFETY INJECTION ACTUATED" status light (1SI-18) – LIT.	
		• Both LOCA Sequencer Actuated status lights (1SI-14) – LIT.	

Op Test No.: N10-1 Scenario # 4 Event # 6, 7 & 8 Page 34 of 47

Event Description: **Unisolable Feedline Break (Doghouse) 1C SG/ Auto Reactor Trip Failure/ Feedwater Isolation Signal fails in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 6) Announce "Unit 1 Safety Injection".	**NOTE:** The CRS may ask U2 RO to make Plant Announcement. If so, **Floor Instructor** acknowledge as U2 RO.
	BOP	(Step 7) Check ESF Monitor Light Panel on energized train(s):	
		• Groups 1, 2, 5 – DARK.	
		• Group 3 – LIT.	
		• OAC – IN SERVICE.	
		• Group 4, Rows A through F – LIT AS REQUIRED.	**NOTE:** The lights show that 1NV-150B and 151A are OPEN.
	BOP/ RO	(Step 7.d RNO) Perform the following:	
		• Ensure both trains Phase A Isolation are initiated.	
		• Align or start S/I and Phase A components with individual windows in Group 4 as required.	
	CRS	• GO TO Step 7.f.	**NOTE:** The BOP will CLOSE 1NV-150B and 151A when NC pressure < 1500 psig.
	BOP	• Check LOCA Sequencer Actuated status light (1SI-14) on energized train(s) – LIT.	
	BOP	• Check the following window on Monitor Light Panel Group 4 - LIT.	**NOTE:** The lights show that the FWIVs are OPEN.
		• C-3 "CONT ISOL PHASE A TRN A VLVS ALIGNED"	
		• C-6 "CONT ISOL PHASE A TRN B VLVS ALIGNED"	
		• F-4 "SAFETY INJECTION TRAIN A COMPONENTS ALIGNED"	

Op Test No.: N10-1 Scenario # 4 Event # 6, 7 & 8 Page 35 of 47

Event Description: **Unisolable Feedline Break (Doghouse) 1C SG/ Auto Reactor Trip Failure/ Feedwater Isolation Signal fails in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• F-5 "SAFETY INJECTION TRAIN B COMPONENTS ALIGNED"	
	RO/ BOP	(Step 7.g RNO) Perform the following on energized train(s):	
		• Check OAC Monitor Light Program ("MONL") for associated light.	
		• Align valves as required, while continuing in the EP.	**NOTE:** The RO will CLOSE the FWIVs.
	BOP	(Step 8) Check proper CA pump status:	
		• MD CA pumps - ON	
		• N/R level in at least 3 S/Gs – GREATER THAN 17%.	
	BOP	(Step 9) Check all KC pumps – ON.	
	BOP	(Step 10) Check both RN pumps – ON.	**NOTE:** The 1B RN Pump is NOT on.
		(Step 10 RNO) Perform the following:	
		• Start pump(s).	**NOTE:** The 1B RN Pump cannot be started based on Control Room Expectation Manual requirement.
	BOP	• IF any RN pump off, THEN perform the following:	
		• IF 1A RN pump is off, THEN	**NOTE:** The 1A RN Pump is running.
		• IF affected train is deenergized, AND its D/G is off, THEN	**NOTE:** Both Trains are energized, and both D/Gs are running.
		• Reset the following on affected train:	

Op Test No.: N10-1 Scenario # 4 Event # 6, 7 & 8 Page 36 of 47

Event Description: **Unisolable Feedline Break (Doghouse) 1C SG/ Auto Reactor Trip Failure/ Feedwater Isolation Signal fails in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• S/I	**NOTE:** Train B is the affected Train.
		• Sequencer	
	BOP/ CRS	• Dispatch operator to stop affected D/G using emergency stop pushbutton.	**NOTE:** The CRS/BOP will dispatch an NEO. **Booth Instructor:** Operate **Trigger #11** (LOA—DG018 (3 minutes delayed). Within **3 minutes,** as **NEO** report that **the 1B D/G has been emergency stopped.**
	RO/ BOP	• Monitor affected RN cooled components and shut down as necessary.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware. **Examiner NOTE:** In this event, 1B RN Pump is NOT available, causing the operator to Reset SI and stop the 1B DG. Because of this, B Train equipment will start to heat up, and the operator may elect to stop B train equipment, after verifying that its associated A Train component is operating.
	CRS	(Step 11) Notify Unit 2 to start 2A RN pump.	**Floor Instructor:** As U2 RO report "2A RN Pump is running."
	RO	(Step 12) Check all S/G pressures – GREATER THAN 775 PSIG.	**NOTE:** 1C SG Pressure is decreasing uncontrollably.
	RO	(Step 12 RNO) Perform the following:	
		• Check the following closed:	
		• All MSIVs	
		• All MSIV bypass valves	
		• All SM PORVs.	

Op Test No.: N10-1 Scenario # 4 Event # 6, 7 & 8 Page 37 of 47

Event Description: **Unisolable Feedline Break (Doghouse) 1C SG/ Auto Reactor Trip Failure/ Feedwater Isolation Signal fails in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• IF any valve open, THEN....	**NOTE:** All SG Valves are Closed.
	BOP	(Step 13) Check Containment Pressure – HAS REMAINED LESS THAN 3 PSIG.	**NOTE:** Containment Pressure is normal.
	BOP	(Step 14) Check S/I flow:	
		• Check "NV PMPS TO COLD LEG FLOW" gauge – INDICATING FLOW.	
		• Check NC pressure – LESS THAN 1600 PSIG.	**NOTE:** NC Pressure is ≈800 psig.
		• Check NI pumps – INDICATING FLOW.	
		• Check NC pressure – LESS THAN 286 PSIG.	
	BOP	(Step 14.d RNO) Perform the following:	
		• Ensure ND pump miniflow valve on running pump(s) open:	
		• 1ND-68A (1A ND Pump & Hx Mini Flow Isol)	
		• 1ND-67B (1B ND Pump & Hx Mini Flow Isol).	
		• IF valve(s) open on all running ND pumps, THEN GO TO Step 15.	
	CRS	(Step 15) Notify OSM or other SRO to perform EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 22 (OSM Actions Following an S/I) within 10 minutes.	**NOTE:** The CRS may ask OSM to address. If so, **Floor Instructor** acknowledge as OSM.
	BOP	(Step 16) Check CA flow:	
		• Total CA flow – GREATER THAN 450 GPM.	
		• Check VI header pressure – GREATER THAN 60 PSIG.	

Op Test No.: N10-1 Scenario # 4 Event # 6, 7 & 8 Page 38 of 47

Event Description: **Unisolable Feedline Break (Doghouse) 1C SG/ Auto Reactor Trip Failure/ Feedwater Isolation Signal fails in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• WHEN N/R level in any S/G greater than 11% (32% ACC), THEN control CA flow to maintain N/R levels between 11% (32% ACC) and 50%.	
	RO	(Step 17) Check NC temperatures:	**NOTE:** During this event, Subcooling is momentarily lost, and regained. Based on this, it is expected that the NC Pumps will be ON, but may have been turned off.
		• IF any NC pump on, THEN check NC T-Avg – STABLE OR TRENDING TO 557°F.	
		OR	
		• IF all NC pumps off, THEN check NC T-Colds – STABLE OR TRENDING TO 557°F.	**NOTE:** Tavg is < 557°F.
	RO	(Step 17 RNO) Perform the following based on plant conditions:	
		• IF temperature less than 557°F AND going down, THEN attempt to stop cooldown PER Enclosure 3 (Uncontrolled NC System Cooldown).	
		• IF temperature greater than 557°F AND going up, THEN.....	**NOTE:** Tavg is < 557°F.
			NOTE: The CRS may assign the RO or the BOP to perform this action. If so, **appropriate Examiner** follow actions of **Enclosure 3**. **Others** should move ahead to **Page 40** to continue in E-0.
EP/1/A/5000/E-0, REACTOR TRIP OR SAFETY INJECTION ENCLOSURE 3, UNCONTROLLED NC SYSTEM COOLDOWN			

Op Test No.: N10-1 Scenario # 4 Event # 6, 7 & 8 Page 39 of 47

Event Description: **Unisolable Feedline Break (Doghouse) 1C SG/ Auto Reactor Trip Failure/ Feedwater Isolation Signal fails in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 1) Check steam dump valves – CLOSED.	**Examiner NOTE:** Follow the actions associated with Enclosure 3 if RO is assigned by CRS to perform.
	RO	(Step 2) Check all SM PORVs – CLOSED.	
	RO	(Step 3) Check MSR "RESET" light – LIT.	
	RO	(Step 3 RNO) Perform the following on MSR controls:	
		• Depress "SYSTEM MANUAL"	
		• Depress "RESET"	
	RO	(Step 4) Check any NC pump – ON.	**NOTE:** During this event, Subcooling is momentarily lost, and regained. Based on this, it is expected that the NC Pumps will be ON, but may have been turned off.
	RO	(Step 5) Check NC T-Avg – GOING DOWN.	
	RO	(Step 6) Control feed flow as follows:	
		• IF S/G N/R level is less than 11% (32% ACC) in all S/Gs, THEN....	**NOTE:** N/R Level in at least one SG is > 11%.
		• WHEN N/R level is greater than 11% (32% ACC) in at least one S/G, THEN throttle feed flow further to:	
		• Minimize cooldown	
		• Maintain at least one S/G N/R level greater than 11% (32% ACC).	
	RO	(Step 7) Check MSIVs – ANY OPEN.	**NOTE:** All MSIVs will be CLOSED.

Op Test No.: N10-1 Scenario # 4 Event # 6, 7 & 8 Page 40 of 47

Event Description: **Unisolable Feedline Break (Doghouse) 1C SG/ Auto Reactor Trip Failure/ Feedwater Isolation Signal fails in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 7 RNO) Perform the following:	
		• Close MSIV bypass valves.	
		• Exit this enclosure.	
			NOTE: The RO will report that Enclosure 3 is complete.
			Examiner NOTE: Examiners NOT following the actions associated with Enclosure 3 continue **HERE**.
EP/1/A/5000/E-0, REACTOR TRIP OR SAFETY INJECTION			
	BOP	(Step 18) Check Pzr PORV and spray valves:	
		• All Pzr PORVs – CLOSED.	
		• Normal Pzr spray valves – CLOSED.	
	RO	(Step 19) Check NC subcooling based on core exit T/Cs – GREATER THAN 0°F.	
	RO	(Step 20) Check if main steamlines intact:	
		• All S/G pressures – STABLE OR GOING UP	**NOTE:** The 1C SG is Faulted.
		• All S/Gs – PRESSURIZED.	
	CRS	(Step 20 RNO) IF any S/G is faulted, THEN perform the following:	
		• IF fault is outside containment, THEN perform the following:	
		• Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).	
		• GO TO EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).	**NOTE:** The CRS will transition to E-2.

Op Test No.: N10-1 Scenario # 4 Event # 6, 7 & 8 Page 41 of 47

Event Description: **Unisolable Feedline Break (Doghouse) 1C SG/ Auto Reactor Trip Failure/ Feedwater Isolation Signal fails in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
			Examiner NOTE: In this event, 1B RN Pump is NOT available, causing the operator to Reset SI and stop the 1B DG. Because of this, B Train equipment will start to heat up, and the operator may elect to stop B train equipment, after verifying that its associated A Train component is operating.
EP/1/A/5000/E-2, FAULTED STEAM GENERATOR ISOLATION			
	RO/ BOP	(Step 1) Monitor Foldout page.	
	RO	(Step 2) Maintain at least one S/G available for NC System cooldown in subsequent steps.	
	RO/ BOP	(Step 3) Maintain any faulted S/G or secondary break isolated during subsequent recovery actions unless needed for NC System cooldown.	**NOTE:** The 1C SG is Faulted.
	RO	(Step 4) Check the following – CLOSED:	
		• All MSIVs	
		• All MSIV bypass valves.	
	RO/ BOP	(Step 5) Check at least one S/G pressure – STABLE OR GOING UP.	**NOTE:** Although all SG pressures may be decreasing slowly, the operator will report stable based on plant conditions (i.e. faulted SG). Otherwise a transition to ECA-2.1 will be made.
	RO/ BOP	(Step 6) Identify faulted S/G(s):	**NOTE:** The 1C SG is Faulted.

Op Test No.: N10-1 Scenario # 4 Event # 6, 7 & 8 Page 42 of 47

Event Description: **Unisolable Feedline Break (Doghouse) 1C SG/ Auto Reactor Trip Failure/ Feedwater Isolation Signal fails in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• Any S/G pressure – GOING DOWN IN AN UNCONTROLLED MANNER	
		OR	
		• Any S/G – DEPRESSURIZED.	
	RO	(Step 7) Check faulted S/G(s) SM PORV – CLOSED.	
	BOP	(Step 8) Reset CA modulating valves.	
	BOP	(Step 9) IF TD CA pump is the only source of feedwater, THEN...	**NOTE:** The TD CA Pump is NOT the ONLY source of feedwater.
	BOP	(Step 10) Isolate faulted S/G(s) as follows:	
		• For 1C S/G:	
		• Check "S/G C FDW ISOLATED" status light (1SI-4) – LIT.	
		• Close 1CA-50B (U1 TD CA Pump Disch To S/G Isol).	
		• Close 1CA-46B (1B CA Pump Disch To 1C S/G Isol).	
		• Dispatch operator to unlock and close:	
		• 1SA-1 (1C S/G SM Supply to Unit 1 TD CA Pump Turb Maint Isol) (Unit 1 interior doghouse, 767+10, FF-53, above ladder).	

Op Test No.: N10-1 Scenario # 4 Event # 6, 7 & 8 Page 43 of 47

Event Description: **Unisolable Feedline Break (Doghouse) 1C SG/ Auto Reactor Trip Failure/ Feedwater Isolation Signal fails in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• 1SA-77 (1C S/G SM Supply to Unit 1 TD CA Pump Turb Loop Seal Isol) (Unit 1 interior doghouse, 767+10m FF-53)	**NOTE:** The CRS/BOP will dispatch an NEO. **Booth Instructor:** Operate **Trigger #13** (LOA—SA002 (5 minutes delayed). Within **5 minutes,** as **NEO** report that **steam supply to the TD CA Pump from the 1C SG has been isolated.**
		• Check BB valves – CLOSED:	
		• 1BB-3B (1C S/G Blowdown Cont Outside Isol Control)	
		• 1BB-7A (C S/G BB Cont Inside Isol).	
		• Close 1SM-95 (C SM Line Drain Isol).	
CRITICAL TASK: **(E-2 A) Isolate the Faulted Steam Generator before transitioning out of E-2.** Safety Significance: Failure to isolate a Faulted SG that can be isolated causes challenges to the Critical Safety Functions that would not otherwise occur. Failure to isolate flow could result in an unwarranted Orange or Red Path condition on NC Integrity and/or Subcriticality (if cooldown is allowed to continue uncontrollably).			
	RO	(Step 11) Close 1AS-12 (Main Steam To Aux Steam).	
	BOP	(Step 12) Check if S/G tubes intact:	
		• Check steamline EMF's – NORMAL:	
		• 1EMF-24 (S/G A)	
		• 1EMF-25 (S/G B)	
		• 1EMF-26 (S/G C)	
		• 1EMF-27 (S/G D).	
		• IF any S/G has previously been identified as ruptured.....	**NOTE:** There have been no SGTRs identified.

Op Test No.: N10-1 Scenario # 4 Event # 6, 7 & 8 Page 44 of 47

Event Description: **Unisolable Feedline Break (Doghouse) 1C SG/ Auto Reactor Trip Failure/ Feedwater Isolation Signal fails in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	(Step 13) Check S/I termination criteria:	
		• NC subcooling based on core exit T/Cs – GREATER THAN 0°F.	
		• Secondary heat sink:	
		• N/R level in at least one intact S/G – GREATER THAN 11% (32% ACC)	
		OR	
		• Total feed flow to intact S/Gs – GREATER THAN 450 GPM.	
		• NC pressure – STABLE OR GOING UP.	
		• Pzr level – GREATER THAN 11% (29% ACC).	
		• GO TO EP/1/A/5000/ES-1.1 (Safety Injection Termination).	**NOTE:** The CRS will transition to ES-1.1
EP/1/A/5000/ES-1.1, SAFETY INJECTION TERMINATION			
	RO/ BOP	(Step 1) Monitor Foldout page.	
	BOP	(Step 2) Reset the following:	
		• S/I.	
		• Sequencers.	
		• Phase A Isolation.	
		• Phase B Isolation.	
		• IF AT ANY TIME a B/O signal occurs, THEN restart S/I equipment previously on.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
	BOP	(Step 3) Establish VI to containment as follows:	
		• Open the following:	

Op Test No.: N10-1 Scenario # 4 Event # 6, 7 & 8 Page 45 of 47

Event Description: **Unisolable Feedline Break (Doghouse) 1C SG/ Auto Reactor Trip Failure/ Feedwater Isolation Signal fails in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• 1VI-129B (VI Supply to A Cont Ess VI Hdr Outside Isol)	
		• 1VI-160B (VI Supply to B Cont Ess Hdr Outside Isol)	
		• 1VI-150B (Lwr Cont Non-Ess Cont Outside Isol).	
		• Check VI header pressure – GREATER THAN 85 PSIG.	
	BOP	(Step 4) Check if NS pumps should be stopped:	
		• Any NS pump – ON.	**NOTE:** All NS Pumps are OFF.
	CRS	(Step 4.a RNO) Perform the following:	
		• IF AT ANY TIME while in this procedure an NS pump starts, THEN perform Step 4.	**NOTE:** This is a Continuous Action. The CRS will make both board operators aware.
		• GO TO Step 5.	
	BOP	(Step 5) Stop all but one NV pump.	**NOTE:** The BOP should stop the 1B NV Pump, if it has NOT been stopped already.
	BOP	(Step 6) Check NC pressure – STABLE OR GOING UP.	
	BOP	(Step 7) Isolate NV S/I flowpath as follows:	
		• Check the following valves – OPEN:	
		• 1NV-221A (NV Pumps Suct From FWST)	
		• 1NV-222B (NV Pumps Suct From FWST)	
		• Check the following valves - OPEN	
		• 1NV-150B (NV Pumps Recirculation)	

Op Test No.: N10-1 Scenario # 4 Event # 6, 7 & 8 Page 46 of 47

Event Description: **Unisolable Feedline Break (Doghouse) 1C SG/ Auto Reactor Trip Failure/ Feedwater Isolation Signal fails in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
		• 1NV-151A (NV Pumps Recirculation).	
	BOP	• CLOSE the following valves:	
		• 1NI-9A (NC Cold Leg Inj From NV)	
		• 1NI-10B (NC Cold Leg Inj From NV).	
At the discretion of the Lead Examiner terminate the exam.			

UNIT 1 STATUS:

Power Level: 18% NCS [B] 1586 ppm Pzr [B]: 1589 ppm Xe: Per OAC

Power History: The Plant is at 18% power (MOL), following plant startup. Core Burnup: 250 EFPDs

CONTROLLING PROCEDURE: OP/1/A/6100/03 Controlling Procedure for Unit Operation

OTHER INFORMATION NEEDED TO ASSUME TO SHIFT:

- The Plant is at 18% power (MOL), following a plant startup on the previous shift.
- Control Rods are in MANUAL.
- The plant had been shutdown for the previous six days to repair the 1A DG.
- A load ascension to 30% power is expected for the shift.
- It is expected to raise power at 2 MWe/Minute.
- The RMWST Dissolved Oxygen Concentration is 800 ppb.
- CF Nozzles are in service per OP/1/A/6250/001.
- Chemistry has requested 7,500 lbm/hr Blowdown Flow
- 1A BB Pump has been placed in Service OP/1/A/6250/008.

The following equipment is Out-Of-Service:

- 1C Hotwell Pump is OOS for Motor maintenance.
- 1NB LT-5420, RMWST Level, failed low last shift (IAE is investigating).
- MCB Annunciator 1AD-1, F-9, "DEH/MSR SYSTEM MALFUNCT," has failed to off (IAE is investigating)

Crew Directions:

- Raise power to 30% starting at Step 3.30.2 of Enclosure 4.1 of OP/1/A/6100/03, "Controlling Procedure for Unit Operation."
- Use of Alternate Dilute during power ascension in accordance with Enclosure 4.4, "Alternate Dilute," of OP/1/A/6150/009, "Boron Concentration Control," has been approved.
- The Reactor Group has recommended that a Dilution of 200 gallons be made during initial power increase.

Work Control SRO/Offsite Communicator **Jim**

Plant SRO **Joe**

NLO's AVAILABLE

Unit 1	Unit 2
Aux Bldg. John	**Aux Bldg. Chris**
Turb Bldg. Bob	**Turb Bldg. Mike**
5th Rounds. Carol	
Extra(s) Bill Ed Wayne Tanya	

Duke Energy
McGuire Nuclear Station
Controlling Procedure For Unit Operation

Procedure No.
OP/1/A/6100/003
Revision No.
163
Electronic Reference No.
MC00472R

Continuous Use

PERFORMANCE

This Procedure was printed on 07/08/10 at 08:38:13 from the electronic library as:

(ISSUED) - PDF Format

Compare with Control Copy every 14 calendar days while work is being performed.

Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

Date(s) Performed	Work Order/Task Number (WO#)

COMPLETION

- ☐ Yes ☐ NA Checklists and/or blanks initialed, signed, dated, or filled in NA, as appropriate?
- ☐ Yes ☐ NA Required enclosures attached?
- ☐ Yes ☐ NA Charts, graphs, data sheets, etc. attached, dated, identified, and marked?
- ☐ Yes ☐ NA Calibrated Test Equipment, if used, checked out/in and referenced to this procedure?
- ☐ Yes ☐ NA Procedure requirements met?

Verified By _____ Date _____

Procedure Completion Approved _____ Date _____

Remarks (*attach additional pages, if necessary*)

IMPORTANT: Do **NOT** mark on barcodes.

Printed Date: *07/08/2010*

Enclosure No.: *4.1*

Revision No.: *163*

Procedure No.: *OP/1/A/6100/003*

1. Limits and Precautions

1.1 This procedure is Reactivity Management related because it controls activities that can affect core reactivity by changing NC System temperature and by changing neutron absorption in the reactor core. (R.M.)

1.2 Any inadvertent power reduction requires investigation and correction prior to continuing power increase.

NOTE: Limit and Precautions 1.3 and 1.4 are **NOT** applicable during performance of PT/0/A/4150/027 A (End of Cycle Moderator Temperature Coefficient Determination Boron / Dilution Method). {PIP 08-4252}

1.3 **WHEN** Turbine Generator paralleled to grid, maximum Tavg deviation from Tref is ±4°F. (Assumption in the accident analysis in the UFSAR)

1.4 **WHEN** Turbine Generator paralleled to grid with Steam Dumps closed **AND** CRD Select in "MANUAL", maximum Tavg deviation from Tref is ±3°F.

1.5 **WHEN** transferring CRD Select from "MANUAL" to "AUTO", T_{avg} maximum deviation from T_{ref} is ±1°F.

1.6 **WHEN** Reactor critical, minimum T_{avg} is 551°F.

1.7 Maximum Power Mismatch is ±2% for each Power Range channel (NIS vs BETP) during steady state power operations. (Should be calibrated within 4 hrs)

NOTE: The following recommended AFD targets are **NOT** applicable during initial cycle startup.

1.8 The following AFD targets are recommended by Nuclear Engineering:

- 1% of target from 90 – 100% RTP with equilibrium xenon
- 2% of target from 90 – 100% RTP with transient xenon
- 2% of target from 50 – 90% RTP
- 5% of target from 20 – 50% RTP
- 10% of target below 20% RTP

1.9 Maximum Boron concentration difference between Pzr and NC System is 50 ppm.

1.10 **IF** in Mode 3 and SDM is outside required limit, TS 3.1.1 requires boration within 15 minutes to restore SDM.

1.11 Maximum S/G tube leakage from any S/G is 100 gpd.

1.12 **IF** both Rod Position Indicator systems (DRPI and OAC) become inoperable during Mode 3, Tech Specs require tripping the Reactor..

1.13 Minimum individual S/G outlet pressure is 870 psig to prevent flow induced vibration of S/G tubes. {MDUK-1242.01-0001.001 (Temperature and Power Limits for Operation As Controlled by Pressure Boundary Structural Analysis and Safety Analysis)}

1.14 The following apply to Fuel Maneuvering Limits:

- Fuel Maneuvering Limits apply to power increase and **NOT** power decrease
- Fuel Maneuvering Limits are based on Reactor Power and **NOT** Generator Load
- The Reactor Group shall be contacted for any questions that arise concerning Fuel Maneuvering Limits

1.15 Control Rod withdrawal rate is limited by Fuel Maneurvering Limits (Data Book Section 1.3). The rod withdrawal rate for unconditioned fuel above 50% power is limited to 3 steps/hour. Fuel is considered conditioned with respect to rod position once the control rods have been withdrawn to a given position at a given power level.

1.16 During power changes, the following alternate indications for Reactor Power are available:

- Thermal Power Best Estimate (TPBE)
- Tavg, Tcold, NC Loop Delta-T
- Intermediate Range Channels
- Turbine Impulse Pressure, Megawatt output
- CF flowrate

NOTE: This enclosure will affect reactivity of the core and is therefore designated important to Reactivity Management per the guidelines of NSD 703 (Reactivity Management) (R.M.)

2. Initial Conditions

_____ 2.1 Mode 3 with NC System at 557°F and 2235 psig in anticipation of Reactor Startup

OR

_____ 2.2 Mode 2

OR

2K 2.3 Mode 1 in anticipation of power increase

3. Procedure

NOTE: **IF** initial power escalation for a fuel cycle, this procedure will be performed in parallel with Nuclear Engineering procedure PT/0/A/4150/021 (Post Refueling Controlling Procedure for Criticality, Zero Power Physics and Power Escalation Testing).

☑ 3.1 Evaluate all outstanding R&Rs that may impact performance of this procedure.

2K SRO 3.2 Evaluate OP/1/A/6100/SU-19 (Heatup to 557 Degrees F), Enclosure 4.4 (Pre-Startup System Alignments) to determine if additional actions may need to be performed.

2K SRO 3.3 **IF** plant conditions require entering this procedure at some point other than the beginning, perform the following:

☑ 3.3.1 Determine entry step based upon plant conditions.

☑ 3.3.2 Record entry step: 3.30

☑ 3.3.3 Evaluate all steps prior to that recorded in Step 3.3.2 for additional actions that need to be performed.

_____ 3.4 **IF** Zero Power Physics Testing will be performed, maintain the following:

☐ NC System pressure within ± 20 psig of 2235 psig
☐ NC System T_{avg} within ± 1.0°F of 557°F by throttling S/G blowdown

_____ 3.5 **WHEN** NC System temperature has been 557°F for at least 6 hours, configure Loose Parts Monitoring System for at power monitoring per OP/1/B/6150/016 (Loose Parts Monitoring System).

☐ 3.6 Maintain proper NC System parameters by operating Pzr Htr Groups as required per Enclosure 4.6 (Operation of Pzr Heaters).

_____ 3.7 On DCS Workstation Feedpump Overview graphic, ensure operating CF Pump Turbine in auto.

_____ 3.8 Ensure the following S/G CF Cntrl Bypass Valves in auto:

_____ • 1CF-104AB (1A S/G CF Control Bypass)

_____ • 1CF-105AB (1B S/G CF Control Bypass)

_____ • 1CF-106AB (1C S/G CF Control Bypass)

_____ • 1CF-107AB (1D S/G CF Control Bypass)

3.9 Defeat Hi Flux at Shutdown alarms as follows:

_____ 3.9.1 Place "Hi Flux At Shutdown" for Channel N31 to "BLOCK". (SR drawer)

_____ 3.9.2 Place "Hi Flux At Shutdown" for Channel N32 to "BLOCK". (SR drawer)

☐ 3.9.3 Check 1AD-2, D2 (S/R High Flux Alm Blocked) lit.

_____ 3.9.4 Place "Shutdown Monitor A Annun Bypass" to "BYPASS".

_____ 3.9.5 Place "Shutdown Monitor B Annun Bypass" to "BYPASS".

3.10 Within 4 hours prior to achieving criticality, perform the following to check SDM:

NOTE: **IF** the REACT program says "Reactivity Summation is negative! Please perform an ECB". This means that with all rods out the reactor is **NOT** predicted to go critical.

☐ 3.10.1 Check Estimated Critical Rod Position is above COLR insertion limit per OP/0/A/6100/006 (Reactivity Balance Calculation).

☐ 3.10.2 Check all control rods operable.

☐ 3.10.3 Record in PT/1/A/4600/008 (Surveillance Requirements for Unit Heatup).

_____ 3.11 **IF** TV/GV hot calibration was started in OP/1/A/6100/SU-19 (Heatup to 557 Degrees F) **AND** has **NOT** been completed, perform the following:

_____ 3.11.1 Notify IAE to stop/suspend TV/GV hot calibration.

_____ _____/_____
Person Notified Date Time

_____ 3.11.2 **HOLD** until confirmed that IAE is **NOT** performing TV/GV hot calibration.
IAE

_____ 3.12 Ensure a Reactor startup 91-01 briefing has been performed:
SRO

Management Designee: _____

Evolution Coordinator: _____

3.13 Begin Reactor startup to critical as follows:

NOTE:
- Minimum 1 decade overlap required between SR and IR.
- Minimum 1 decade overlap required between IR and PR.
- **IF** positive reactivity addition occurs, Mode 2 can be achieved with all control rods inserted.
- Tech Specs define Mode 2. (Mode 2 may be declared when Control Banks are initially withdrawn from fully inserted position).

_____ SRO _____ RO 3.13.1 **IF** Reactor startup being performed by control rod withdrawal, complete Enclosure 4.3 (Guidelines For Approaching Criticality Via Control Rod Withdrawal) before control bank withdrawal.

☐ 3.13.2 Announce over page, "Commencing Unit 1 Reactor Startup".

☐ 3.13.3 Using "Plant Mode Change & Alarm Look Ahead", change OAC to "Mode 2".

3.13.4 On the DCS Work Station, change the DCS Modal Alarming to "MODE 2" as follows:

☐ 3.13.4.1 Access DCS "PLANT MODE SELECTION" Screen (6012).

☐ 3.13.4.2 Select "MODE 2".

☐ 3.13.4.3 Select "ACCEPT MODE".

☐ 3.13.4.4 Check "MODE 2" is displayed in "CURRENT PLANT MODE".

_____ SRO _____ RO 3.13.5 Notify SRO and RO to continuously monitor the following to determine when the Reactor is supercritical:

- Constant positive SUR without control rod movement or NC System dilution
- Log Power increasing linearly without control rod movement or NC System dilution

3.13.6 Initiate 1/M plot per one of the following:

☐ Nuclear Engineering procedure guidance on initial startup for fuel cycle

OR

☐ PT/0/A/4150/047 (1/M Monitoring During Startup)

_____ 3.13.7 **WHEN** control rods are being withdrawn, perform Table 4.1-1 (Control Rod Bank Parameters).

_____ 3.13.8 Select "HI" on "Nuclear Power (%)" recorder. (1ENBCR9450)

3.13.9 Withdraw control banks per one of the following:

_____ 3.13.9.1 **IF** initial startup for fuel cycle, withdraw control rods per Nuclear Engineering procedure guidance.

OR

3.13.9.2 Perform the following:

_____ A. Place "CRD Bank Select" in "MANUAL".

☐ B. Withdraw control banks in 50 - 60 step increments.

☐ C. Wait until SR counts stabilize. (1 minute)

☐ D. Repeat Steps B - C until Reactor is critical.

_____ 3.13.10 **IF** IR Compensating Voltage was adjusted to -40VDC due to improper compensation **OR** IR Detector Replacement, evaluate IR Compensating Voltage adjustments.
IAE

Table 4.1-1. Control Rod Bank Parameters

	Record Bank and step position at each stop point. Initial box after checking each parameter.									
Bank:										
Step:										
Parameter:										
WHEN below ECP lower limit window, a rapid decrease in SUR.										
Proper count rate, SUR and recorder response.										
Proper Bank Overlap between Control Banks per Unit 1 Data Book, Enc 4.3, Sect 1.13										
DRPI vs bank demand counters acceptable.										
1/M plot acceptable.										
$T_{avg} > 551°F$										

_____ 3.13.11 **WHEN** Reactor critical, begin increasing IR power to 1 x 10^{-8} Amps.

☐ 3.13.12 Check at least one decade overlap between SR and IR instrumentation.

_____ 3.13.13 **WHEN** greater than 1 x 10^{-10} Amps, perform the following:

☐ 3.13.13.1 Check lit "P-6 S/R Block Permissive". (1SI-18)

_____ 3.13.13.2 Place both "Source Range Select" to "BLOCK".

3.13.13.3 Check lit on 1SI-18:

☐ SR Train A Trip Blkd Hi Voltage Off
☐ SR Train B Trip Blkd Hi Voltage Off

_____ 3.13.13.4 Select both IR channels on "Nuclear Power (%)" recorder. (1ENBCR9450)

☐ 3.13.14 Maintain Reactor Power at 1 x 10^{-8} Amps.

☐ 3.13.15 Record the following:

- Rod Position Bank _____Steps_____
- T_{avg} _____°F
- Boron Concentration _____ppm
- Time _____
- Xenon worth _____pcm (OAC)
- Samarium difference from equilibrium _____pcm (OAC)

☐ 3.13.16 Record above parameters in Autolog.

_____ 3.13.17 Select "LO" on "Nuclear Power (%)" recorder. (1ENBCR9450)

_____ 3.13.18 **IF** initial power escalation for a fuel cycle:

_____ 3.13.18.1 Perform Zero Power Physics Test as advised by Nuclear Engineering procedure PT/0/A/4150/021 (Post Refueling Controlling Procedure for Criticality, Zero Power Physics and Power Escalation Testing).

_____ 3.13.18.2 **HOLD** until Nuclear Engineering testing complete.

_____ _____/_____
Person Notified Date Time

_____ 3.13.19 Ensure one PR channel selected on "Nuclear Power (%)" recorder. (1ENBCR9450)

_____ 3.14 Begin performance of Enclosure 4.8 (Guidelines For Power Increase).
SRO

3.15 Perform the following to control NC System temperature until Turbine Generator is paralleled to the grid:

NOTE: Steps 3.15.1 - 3.15.2 should be performed concurrently.

3.15.1 Maintain the following by adjusting setpoint on "STM PRESS CONTROLLER":

☐ Tcold 557 - 559°F
☐ SM Pressure 1060 - 1110 psig

NOTE:
- While maintaining Tcold at 557 - 559°F using Steam Dumps, Table 4.1-2 should be used to approximate Tavg for a given Reactor Power level.
- Increasing Reactor Power while Turbine Power remains constant will result in Tavg exceeding Program Tref (557°F). (Turbine Impulse Pressure Channels will **NOT** increase until Turbine Generator is paralleled to the grid.)

☐ 3.15.2 Refer to Table 4.1-2 (Reactor Power / Expected Tavg) for expected Tavg for a given Reactor Power level:

Table 4.1-2 Reactor Power / Expected Tavg

Reactor Power (%)	Expected Tavg (°F)
15	561.215
14	560.934
13	560.653
12	560.372
11	560.091
10	559.810
9	559.529
8	559.248
7	558.967
6	558.686
5	558.405
4	558.124
3	557.843
2	557.562
1	557.281
0	557.000

_____ 3.16 **IF** feedwater flow is aligned to CA nozzles, perform the following:

NOTE: Thermal Power Best Estimate calculations during low power conditions use a weighted (double counted) value for CA Nozzle flow. This results in conservative indication of TPBE. To prevent this, feedwater flow should be swapped to CF Nozzles prior to 20% RTP. {PIP 03-5427}

_____ 3.16.1 Ensure Reactor Power will remain less than 20% RTP.

☐ 3.16.2 Evaluate swapping to CF nozzles per OP/1/A/6250/001 (Condensate and Feedwater System)

_____ 3.17 Ensure in service CF Pump Turbine "LP GOV CNTRL" and "HP GOV CNTRL" in auto.

NOTE: Due to inherent design of BWI S/Gs, S/G WR level will decrease as Reactor Power is increased through 3% RTP.

_____ 3.18 **IF AT ANY TIME** S/G N/R Level decreases to 28% **OR** exceeds 52%, perform the following:

_____ 3.18.1 **IF** individual S/G level control problem, perform the following:

_____ 3.18.1.1 Place affected S/G CF Control Bypass and/or CF Control Valve in manual.

_____ 3.18.1.2 Adjust affected S/G CF Control Bypass or CF Control Valve as required to return affected S/G N/R level to setpoint.

_____ 3.18.1.3 Place affected S/G CF Control Bypass and/or CF Control Valve in auto.

_____ 3.18.2 **IF** all S/G's indicate level control problems, perform the following:

_____ 3.18.2.1 Place operating CF Pump Turbine "LP GOV CNTRL" and "HP GOV CNTRL" in manual.

_____ 3.18.2.2 Use CF Pump Turbine "LP GOV CNTRL" increase/decrease pushbuttons to restore associated S/G NR levels to normal.

_____ 3.18.2.3 **WHEN** S/G NR levels normal, place operating CF Pump Turbine "HP GOV CNTRL" in auto.

_____ 3.18.2.4 **WHEN** in service CF Pump Turbine speed within 50 - 100 rpm of "AUTO SPT" on DCS Feedpump Overview graphic, place "LP GOV CNTRL" in auto.

☐ 3.19 Increase Reactor Power to 2% RTP (2.0 - 2.5%).

_____ 3.20 **HOLD** at 2% RTP (2.0 - 2.5%) for a minimum of 10 minutes.

3.21 Increase Rx Power to 4% RTP (3.5 - 4.0%) as follows:

_____ 3.21.1 **WHEN** greater than 3% RTP, perform the following:

3.21.1.1 Open:

_____ • 1SM-83 (A SM Line Drain)
_____ • 1SM-89 (B SM Line Drain)
_____ • 1SM-95 (C SM Line Drain)
_____ • 1SM-101 (D SM Line Drain)

NOTE: **IF** the Turbine is placed in manual in the following step, 1AD-1, F4 (Turbine in Manual) will alarm. This is an expected alarm.

_____ 3.21.1.2 Ensure Turbine in "MANUAL".

_____ 3.21.1.3 Close Governor Valves using "GV Lower".

NOTE: Mode 1 is entered at 5% RTP.

_____ 3.22 **WHEN** at 4% RTP, perform the following:

_____ 3.22.1 **HOLD** at 4% RTP (3.5 - 4.0%) for a minimum of 10 minutes.

☐ 3.22.2 Using "Plant Mode Change & Alarm Look Ahead", change the OAC to "Mode 1".

3.22.3 On the DCS Work Station, change the DCS Modal Alarming to Mode 1 as follows:

☐ 3.22.3.1 Access DCS "PLANT MODE SELECTION" Screen (6012).

☐ 3.22.3.2 Select "MODE 1".

☐ 3.22.3.3 Select "ACCEPT MODE".

☐ 3.22.3.4 Check "MODE" 1 is displayed in "CURRENT PLANT MODE".

☐ 3.23 Increase Reactor Power to 6% RTP (6.0 - 6.5%).

_____ 3.24 **HOLD** at 6% RTP (6.0 - 6.5%) for a minimum of 10 minutes.

_____ 3.25 **WHEN** any S/G CF Control Bypass Valve indicates between 50 - 60% open, place the associated S/G CF Cntrl Valve in service as follows:

3.25.1 Ensure the following S/G CF Control Bypass valves in auto:

_____ • 1CF-104AB (1A S/G CF Control Bypass)
_____ • 1CF-105AB (1B S/G CF Control Bypass)
_____ • 1CF-106AB (1C S/G CF Control Bypass)
_____ • 1CF-107AB (1D S/G CF Control Bypass)

3.25.2 Place S/G CF Control Valves in service as follows:

NOTE:
- Placing S/G CF Cntrl Vlv's in auto should be performed in a controlled manner, one S/G at a time.
- Allow CF flow and S/G water level to stabilize one S/G at a time.
- S/G CF Control Bypass Valves are expected to modulate when the S/G CF Cntrl Valves are placed in service.
- S/G CF Cntrl Valves can be placed in service in any order.

CAUTION: A greater than 65% demand on the S/G CF Control Bypass Valve sends a 5% minimum open demand signal to the associated S/G CF Control Valve. The CF Bypass Valve has to close to less than 35% to clear the demand signal to the S/G CF Control Valve.

3.25.3 For A S/G, perform the following:

_____ 3.25.3.1 Ensure 1CF-32AB (1A S/G CF Control) in manual and closed.

3.25.3.2 Open the following:

_____ • 1CF-31 (A S/G CF Cntrl Inlet Isol)
_____ • 1CF-33 (A S/G CF Cntrl Outlet Isol)

☐ 3.25.3.3 Check 1CF-104AB (1A S/G CF Control Bypass) output less than 65%.

_____ 3.25.3.4 Place 1CF-32AB (1A S/G CF Control) in auto.

3.25.4 For B S/G, perform the following:

_____ 3.25.4.1 Ensure 1CF-23AB (1B S/G CF Control) in manual and closed.

3.25.4.2 Open the following:

_____ • 1CF-22 (B S/G CF Cntrl Inlet Isol)
_____ • 1CF-24 (B S/G CF Cntrl Outlet Isol)

☐ 3.25.4.3 Check 1CF-105AB (1B S/G CF Control Bypass) output less than 65%.

_____ 3.25.4.4 Place 1CF-23AB (1B S/G CF Control) in auto.

3.25.5 For C S/G, perform the following:

_____ 3.25.5.1 Ensure 1CF-20AB (1C S/G CF Control) in manual and closed.

3.25.5.2 Open the following:

_____ • 1CF-19 (C S/G CF Cntrl Inlet Isol)
_____ • 1CF-21 (C S/G CF Cntrl Outlet Isol)

☐ 3.25.5.3 Check 1CF-106AB (1C S/G CF Control Bypass) output less than 65%.

_____ 3.25.5.4 Place 1CF-20AB (1C S/G CF Control) in auto.

3.25.6 For D S/G, perform the following:

_____ 3.25.6.1 Ensure 1CF-17AB (1D S/G CF Control) in manual and closed.

3.25.6.2 Open the following:

_____ • 1CF-16 (D S/G CF Cntrl Inlet Isol)
_____ • 1CF-18 (D S/G CF Cntrl Outlet Isol

☐ 3.25.6.3 Check 1CF-107AB (1D S/G CF Control Bypass) output less than 65%.

_____ 3.25.6.4 Place 1CF-17AB (1D S/G CF Control) in auto.

☐ 3.26 Increase Rx Power to 8% RTP (8.0 - 8.5%).

_____ 3.27 **WHEN** at 8% RTP (8.0 - 8.5%), perform the following:

_____ 3.27.1 **HOLD** at 8% RTP (8.0 - 8.5%) for a minimum of 10 minutes.

_____ 3.27.2 Notify Secondary Chemistry to verify secondary water chemistry acceptable for operation greater than 15% RTP.

_____ _____/_____
Person Notified Date Time

☐ 3.27.3 Place BB Pump in service per OP/1/A/6250/008 (Steam Generator Blowdown).

_____ 3.27.4 **IF** required for S/G cleanup, adjust the following while maintaining NC System temperature:

_____ • 1BB-123 (A S/G BB Flow Control)
_____ • 1BB-124 (B S/G BB Flow Control)
_____ • 1BB-125 (C S/G BB Flow Control)
_____ • 1BB-126 (D S/G BB Flow Control)

3.28 Increase Reactor Power to 10 - 12% RTP as follows:

☐ 3.28.1 Begin power increase to 10 - 12% RTP.

_____ 3.28.2 **WHEN** Reactor Power reaches 10% RTP, perform the following:

3.28.2.1 Check on 1SI-18:

☐ "P-10 Nuclear at Power" lit
☐ "P-7 Lo Power Reactor Trips Blocked" dark

_____ 3.28.2.2 Block the IR high level trip and rod stop by depressing both "Intermediate Range Block" pushbuttons.

3.28.2.3 Check lit on 1SI-18:

☐ I/R Train A Trip Blocked
☐ I/R Train B Trip Blocked

_____ 3.28.2.4 Block PR low setpoint trip by depressing both "Power Range Block" pushbuttons.

3.28.2.5 Check lit on 1SI-18:

☐ P/R Lo Setpoint Train A Trip Blocked
☐ P/R Lo Setpoint Train B Trip Blocked

_____ 3.28.3 **IF** required for IAE to tune Process Control Systems, perform the following:

_____ 3.28.3.1 **HOLD** at 10 - 12% RTP.

☐ 3.28.3.2 Allow IAE to gather data on Process Control Systems.

_____ 3.28.3.3 **WHEN** IAE data gathering and tuning complete, continue power increase.

3.29 Increase Reactor Power to 12 - 18% RTP as follows:

☐ 3.29.1 Begin power increase to 12 - 15% RTP.

_____ 3.29.2 **HOLD** until Reactor Power is 12 - 15% RTP.

_____ 3.29.3 Ensure proper secondary water chemistry for operation greater than 15% RTP.
CHEM

☐ 3.29.4 Begin power increase to 18% RTP.

☐ 3.29.5 Maintain 12 - 18% RTP.

NOTE: **IF** TV/GV hot calibration was **NOT** started in OP/1/A/6100/SU-19 (Heatup to 557 Degrees F), the following step restores LH to Throttle Valves.

_____ 3.29.6 **IF** TV/GV hot calibration **NOT** complete, notify IAE to begin/resume performing TV/GV hot calibration.

_____ _____/_____
Person Notified Date Time

☐ 3.29.7 Reset Main Turbine per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

NOTE: Steps 3.29.8 - 3.29.10 may be performed in any order or concurrently.

_____ 3.29.8 Calibrate Power Range NIS channels to maintain Power Mismatch (NIs vs BETP) ±1% for each Power Range channel.
IAE

_____ 3.29.9 **IF** required for IAE to tune Process Control Systems, **HOLD** at 12 - 18% RTP until IAE gathers data on Process Control Systems.

☐ 3.29.10 Roll Main Turbine to 1800 rpm per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

NOTE: Engineering will determine if PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test) is to be performed with Turbine Generator at 1800 rpm or at greater than 112 MWE.

_____ 3.29.11 Notify Engineering to determine if and when PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test) will be performed.

_____ _____/_____
Person Notified Date Time

_____ 3.29.12 **IF** PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test) will be performed with Turbine Generator at 1800 rpm, complete the following:

☐ 3.29.12.1 Maintain 12 - 18% RTP.

☐ 3.29.12.2 Perform PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test).

_____ 3.29.12.3 **WHEN** PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test) complete, perform TV/GV Transfer and place Voltage Regulator in service per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

_____ 3.29.13 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing, complete the following:

_____ 3.29.13.1 **IF** performed, **HOLD** until Step 3.29.12 complete.

_____ 3.29.13.2 Ensure TV/GV Transfer complete and Voltage Regulator placed in service per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

_____ 3.29.13.3 **HOLD** until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

_____ 3.29.14 **IF** required to perform Main Generator Flux Mapping, notity Maintenance Main Generator Team to perform mapping.

_____ _____/_____
Person Notified Date Time

_____ 3.29.15 **HOLD** until Step 3.29.13 complete.

_____ 3.29.16 Ensure TV/GV Transfer complete and Voltage Regulator placed in service per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

☐ 3.29.17 Close Generator MODs per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

☐ 3.29.18 Synchronize Generator and load Generator to 120 MWE per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

_____ 3.29.19 **WHEN** Main Generator Breakers closed, record the following values and notify System Engineer:

☐ 1A Main Generator Breaker Air Compressor Pilot Valve Counter
_____

☐ 1B Main Generator Breaker Air Compressor Pilot Valve Counter
_____

☐ Date/Time 1A Main Generator Breaker Closed ____/____

☐ Date/Time 1B Main Generator Breaker Closed ____/____

_____ _____/_____
Person Notified Date Time

_____ 3.29.20 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing on line at 15% RTP, **HOLD** until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

NOTE:
- **IF** Turbine Generator holds for 2 hours at 112 MWE for PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test), Reactor Core Flux Mapping may be performed during the hold.
- **IF** Turbine Generator holds for 2 hours at 112 MWE for PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test), Generator / Automatic Voltage Regulator (AVR) testing may be performed during the hold.

_____ 3.29.21 **IF** PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test) to be performed following load increase to greater than 112 MWe, perform the following:

☐ 3.29.21.1 Maintain 12 - 18% RTP.

_____ 3.29.21.2 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing, **HOLD** until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

_____ 3.29.21.3 **IF** required to perform 15% RTP Reactor Core Flux Mapping during 2 hour hold at greater than 112 MWE, perform flux mapping.

_____ 3.29.21.4 **IF** required to perform Main Generator Flux Mapping, notity Maintenance Main Generator Team to perform mapping.

_____ _____/_____
Person Notified Date Time

_____ 3.29.21.5 **HOLD** until Steps 3.29.21.2 and 3.29.21.3 complete.

☐ 3.29.21.6 Shutdown Generator per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

☐ 3.29.21.7 Perform PT/1/A/4250/004 C (Turbine OPC and Mechanical Overspeed Trip Test).

☐ 3.29.21.8 Startup Turbine and parallel Generator per OP/1/A/6300/001 (Turbine Generator Startup/Shutdown).

_____ 3.29.22 **WHEN** steam dumps close, perform the following:

_____ 3.29.22.1 **IF** "C-7A Loss of Load Intlk Cond Dump" on 1SI-18 lit, perform the following:

_____ A. Momentarily place "Steam Dump Select" to C-7A Reset".

☐ B. Check "C-7A Loss of Load Intlk Cond Dump" dark.

_____ 3.29.22.2 Place "Steam Dump Select" to "T-AVG".

_____ 3.29.22.3 Place "STM PRESS CONTROLLER" to auto.

_____ 3.29.22.4 Set "STM PRESS CONTROLLER" setpoint at 1092 psig (1090 - 1095).

3.29.23 Perform the following:

3.29.23.1 Monitor the following while opening 1SP-1 (SM to CF Pump 1A Isol) and 1SP-2 (SM to CF Pump 1B Isol): (PIP 09-6340)

☐ M1A0723 (U1 H/P Steam to 1A CFPT Press)
☐ M1A0729 (U1 H/P Steam to 1B CFPT Press)

NOTE: 1SP-1 (SM to CF Pump 1A Isol) and 1SP-2 (SM to CF Pump 1B Isol) are physically located such that verifying the position is difficult. {PIP 09-6340}

3.29.23.2 Open:

_____ CV _____ • 1SP-1 (SM to CF Pump 1A Isol)

_____ CV _____ • 1SP-2 (SM to CF Pump 1B Isol)

3.29.23.3 Check the following for corresponding increase in steam pressure with 1SP-1 (SM to CF Pump 1A Isol) and 1SP-2 (SM to CF Pump 1B Isol) open: (PIP 09-6340)

☐ M1A0723 (U1 H/P Steam to 1A CFPT Press)
☐ M1A0729 (U1 H/P Steam to 1B CFPT Press)

☐ 3.29.24 Check operating CF Pump greater than 3600 rpm and in auto per OP/1/A/6250/001 (Condensate and Feedwater System).

_____ 3.29.25 **IF** 15% RTP Reactor Core Flux Map performed, notify Nuclear Engineering to perform the following:

☐ 3.29.25.1 Evaluate flux mapping data.

☐ 3.29.25.2 Determine allowed power increase.

☐ 3.29.25.3 Record limiting power level per Nuclear Engineering procedure: _____ % RTP

_____ _____/_____
Person Notified Date Time

_____ 3.29.26 Ensure TV/GV hot calibrations complete (Step 3.29.6).
IAE

_____ 3.29.27 **HOLD** at 12 - 18% RTP until Step 3.29.25 completed.

_____ 3.29.28 Complete Enclosure 4.8 (Guidelines For Power Increase).
SRO

3.30 Increase Reactor Power to 30% RTP as follows:

JK 3.30.1 Notify IAE to stand by for periodic adjustments of Power Range NI channels.

Monty Champion ____/____
Person Notified Date Time

____ 3.30.2 **IF AT ANY TIME** "Power Mismatch %" (Excore/Thermal Power Mismatch) indicates greater than 4% during power increase, perform the following:

☐ 3.30.2.1 Stop power increase.

____ 3.30.2.2 Have IAE calibrate each Power Range NI Channel to ±1% Power Mismatch (NIs vs BETP).

____ 3.30.2.3 **WHEN** calibration complete, continue with power increase.

☐ 3.30.3 Begin power increase to 30% RTP.

☐ 3.30.4 Load turbine per OP/1/A/6300/001 A (Turbine-Generator Load Change).

NOTE: **IF** OAC out of service, monitoring 1A and 1B XFMR Oil Temps may be performed at local gauges.

____ 3.30.5 **WHEN** M1A0913 (1A XFMR Oil Temp) indicates greater than 45°C, ensure cooling groups energized on 1A Main Transformer:

____ • Circuit 1
____ • Circuit 2
____ • Circuit 3
____ • Circuit 4
____ • Circuit 5
____ • Circuit 6
____ • Circuit 7
____ • Circuit 8

_____ 3.30.6 **WHEN** M1A0925 (1B XFMR Oil Temp) indicates greater than 45°C, ensure cooling groups energized on 1B Main Transformer:

- _____ Circuit 1
- _____ Circuit 2
- _____ Circuit 3
- _____ Circuit 4
- _____ Circuit 5
- _____ Circuit 6
- _____ Circuit 7
- _____ Circuit 8

_____ 3.30.7 Place "Exh Hood Spray" in "MAN".

_____ 3.30.8 **WHEN** "C-5 Lo Turb Impulse Press Rod Block" dark, CRD Bank Select may be placed in "AUTO".

_____ 3.30.9 **WHEN** Turbine Imp Press greater than 75 psig, check "P-13 Turbine Not At Power" dark. (1SI-18)

_____ 3.30.10 Prior to 20% RTP, ensure Main Feedwater flow to all S/Gs through CF nozzles per OP/1/A/6250/001 (Condensate and Feedwater System).

NOTE:
- At approximately 18% CF flow, each S/G will transition from "LOW POWER" mode to "HIGH POWER" mode.
- S/G "HIGH POWER" mode includes validated steam flow, validated feedwater flow, validated N/R level, and N/R level setpoint to calculate the feedwater flow demand for that S/G.
- CF Flow, in percent flow, is indicated on DCS Feedwater Overview Graphic for all four S/G's.

_____ 3.30.11 **AFTER** exceeding 18% CF flow, check each S/G in "HIGH POWER" mode as follows:

☐ 3.30.11.1 On DCS Workstation, select Steam Generator A Level graphic

☐ 3.30.11.2 On Steam Generator A Level graphic, check "HIGH POWER" lit.

☐ 3.30.11.3 On DCS Workstation, select Steam Generator B Level graphic

☐ 3.30.11.4 On Steam Generator B Level graphic, check "HIGH POWER" lit.

☐ 3.30.11.5 On DCS Workstation, select Steam Generator C Level graphic

☐ 3.30.11.6 On Steam Generator C Level graphic, check "HIGH POWER" lit.

☐ 3.30.11.7 On DCS Workstation, select Steam Generator D Level graphic

☐ 3.30.11.8 On Steam Generator D Level graphic, check "HIGH POWER" lit.

_____ 3.30.12 Ensure BB Pump in service per OP/1/A/6250/008 (Steam Generator Blowdown).

3.30.13 Initiate maximum BB flow for S/G cleanup while maintaining NC System temperature by throttling the following:

_____ • 1BB-123 (A S/G BB Flow Control)
_____ • 1BB-124 (B S/G BB Flow Control)
_____ • 1BB-125 (C S/G BB Flow Control)
_____ • 1BB-126 (D S/G BB Flow Control)

☐ 3.30.14 Adjust letdown to desired flow per OP/1/A/6200/001 A (Chemical and Volume Control System Letdown).

CAUTION: IF 1AS-11 (SM to AS Header Control) is to supply AS Header, anticipate an increase in Reactor Power or a decrease in NC System temperature when opening 1AS-12 (SM to AS).

3.30.15 Align AS as follows:

_____ 3.30.15.1 Slowly open 1AS-12 (Main Steam to Aux Steam).

_____ 3.30.15.2 Open 1AS-9 (C Htr Bleed to Aux Steam).

_____ 3.30.15.3 IF Aux Electric Boilers no longer required, perform following:

_____ A. Close 1AS-120 (Aux Elec Blr A & B to AS Isol).

☐ B. Shutdown Aux Electric Boilers per OP/1/B/6250/007 B (Auxiliary Electric Boiler).

NOTE: Steam Seal Supply should remain on AS for improved efficiency.

_____ 3.30.16 IF conditions require, transfer Steam Seal Supply to SM as follows:

_____ 3.30.16.1 Slowly open 1TL-3 (SM to Steam Seal Isol).

_____ 3.30.16.2 Close 1TL-21 (AS to Steam Seal Isol).

_____ 3.30.17 WHEN Turbine impulse pressure is greater than 200 psig:

_____ 3.30.17.1 Ensure "Turb Drn Vlvs Cntrl" in "AUTO".

☐ 3.30.17.2 Check all turbine drain valves closed.

_____ 3.30.18 Ensure second Hotwell Pump operating.

_____ 3.30.19 Ensure standby Hotwell Pump in "AUTO".

_____ 3.30.20 Ensure second CM Booster Pump operating.

_____ 3.30.21 Ensure standby CM Booster Pump in "AUTO".

☐ 3.30.22 Close valves per OP/1/B/6250/004 (Feedwater Heater Vents, Drains and Bleed System), Enclosure 4.4 (Startup Vent Valve Checklist).

NOTE:
- At approximately 30% steam flow, all S/G CF Bypass Valves will go closed and S/G level will be controlled by S/G CF Valves and CF Pump Turbine speed demand.
- SM Flow, in percent flow, is indicated on DCS Feedwater Overview Graphic for all four S/G's.

3.30.23 At greater than 30% steam flow from each S/G, check the following valves in auto and closed:

- ☐ 1CF-104AB (1A S/G CF Contrl Bypass)
- ☐ 1CF-105AB (1B S/G CF Contrl Bypass)
- ☐ 1CF-106AB (1C S/G CF Contrl Bypass)
- ☐ 1CF-107AB (1D S/G CF Contrl Bypass)

☐ 3.30.24 Check S/G levels stable and at program for current power level.

_____ 3.30.25 **HOLD** at 30% RTP and concurrently perform the following:

_____ (IAE) 3.30.25.1 **IF** required to tune Process Control Systems, perform the following:

_____ A. **HOLD** at 30% RTP

☐ B. Allow IAE to gather data on Process Control Systems.

_____ 3.30.25.2 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing at 30% RTP, **HOLD** until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

_____ 3.30.25.3 **IF** 30% RTP Reactor Core Flux Map to be performed, notify Nuclear Engineering to perform the following:

☐ A. Perform flux mapping.

☐ B. Evaluate flux mapping data.

☐ C. Determine allowed power increase.

☐ D. Record limiting power level per Nuclear Engineering procedure: _____ % RTP

_____ _____/_____
Person Notified Date Time

3.31 Increase power to 50% RTP as follows:

_____ 3.31.1 Notify Secondary Chemistry to verify secondary water chemistry acceptable for operation greater than 50% RTP

_____ _____/_____
Person Notified Date Time

☐ 3.31.2 Maintain control rods within insertion and withdrawal limits per COLR.

NOTE: Maintaining AFD within Nuclear Engineering recommended limits prevents AFD exceeding Tech Spec Limits (Limit and Precaution 1.8).

☐ 3.31.3 Maintain AFD within target band per OP/1/A/6100/022 (Unit 1 Data Book), Enclosure 4.3, Graph(s) 1.1.

_____ 3.31.4 **IF** initial startup following refueling outage, check Bank D Control Rods greater than or equal to 200 steps withdrawn.

_____ 3.31.5 Notify IAE to stand by for periodic adjustments of Power Range NI channels.

_____ _____/_____
Person Notified Date Time

_____ 3.31.6 **IF AT ANY TIME** "Power Mismatch %" (Excore/Thermal Power Mismatch) indicates greater than 4% during power increase, perform the following:

☐ 3.31.6.1 Stop power increase.

_____ 3.31.6.2 Have IAE calibrate each Power Range NI Channel to ±1% Power Mismatch (NIs vs BETP).

_____ 3.31.6.3 **WHEN** calibration complete, continue with power increase.

☐ 3.31.7 Begin power increase to 50% RTP.

☐ 3.31.8 Maintain one pen selected to PR channel on "Nuclear Power (%)" recorder. (1ENBCR9450)

☐ 3.31.9 Maintain other pen as desired on "Nuclear Power (%)" recorder. (1ENBCR9450)

NOTE: To prevent tripping BB Pump on low BB Tank level, 1BB-238 (S/G BB Demineralizers) and 1BB-44 (Blowdown Blowoff Recirc Control) must be allowed time to reposition while positioning flow control valves in substeps of 3.31.10.

_____ 3.31.10 **WHEN** plant conditions permit, swap Blowdown Blowoff Tank Vent from the Condenser to D Heater Extraction as follows:

☐ 3.31.10.1 Record the following:

☐ 1BB-123 (A S/G BB Flow Control)_____ lbs m/hr
☐ 1BB-124 (B S/G BB Flow Control)_____ lbs m/hr
☐ 1BB-125 (C S/G BB Flow Control)_____ lbs m/hr
☐ 1BB-126 (D S/G BB Flow Control)_____ lbs m/hr

3.31.10.2 Throttle the following to minimum flow (2000 – 7000 lbs m/hr) over 15 minutes:

_____ • 1BB-123 (A S/G BB Flow Control)
_____ • 1BB-124 (B S/G BB Flow Control)
_____ • 1BB-125 (C S/G BB Flow Control)
_____ • 1BB-126 (D S/G BB Flow Control)

_____ 3.31.10.3 Place "1BB-98 & 100 BB Tank Vent D Htr/Cond" to "D HTR".

☐ 3.31.10.4 Check open 1BB-98 (Blowdown Blowoff Tank Vent to D Heater Extraction Isol).

☐ 3.31.10.5 Check closed 1BB-100 (Blowdown Blowoff Tank Vent to Condenser).

3.31.10.6 Throttle the following to positions recorded in Step 3.31.10.1 or as directed by Secondary Chemistry over 15 minutes:

_____ • 1BB-123 (A S/G BB Flow Control)
_____ • 1BB-124 (B S/G BB Flow Control)
_____ • 1BB-125 (C S/G BB Flow Control)
_____ • 1BB-126 (D S/G BB Flow Control)

NOTE: Power increase may continue while performing Step 3.31.11.

_____ 3.31.11 **WHEN** 35% RTP, transfer to GV Sequential Valve Mode as follows:

_____ 3.31.11.1 Ensure "MW OUT" lit.

_____ 3.31.11.2 Ensure "IMP IN" lit.

_____ 3.31.11.3 Depress "SINGLE/SEQUENTIAL".

NOTE:
- A digital clock will appear on the DEH OIU Graphic 200 and indicate the amount of time left in the Single Valve / Sequential Valve Transfer.
- Speed Loop will be automatically removed from service at intiation of transfer and will be automatically placed back in service following transfer.

_____ 3.31.11.4 Depress "START/HALT" to begin transfer.

_____ 3.31.11.5 Ensure "SPEED OUT" lit.

_____ 3.31.11.6 **WHEN** transfer is complete, perform the following:

_____ A. Ensure "SPEED IN" lit.

_____ B. Place Turbine in "MANUAL".

_____ C. Ensure "IMP OUT" lit.

_____ D. Place Turbine in "OPERATOR AUTO".

_____ E. Select "MW IN".

3.31.12 Ensure the following valves greater than 25% open and controlling S/G levels at program level:

_____ • 1CF-32AB (1A S/G CF Control)
_____ • 1CF-23AB (1B S/G CF Control)
_____ • 1CF-20AB (1C S/G CF Control)
_____ • 1CF-17AB (1D S/G CF Control)

☐ 3.31.13 Adjust Turbine load per OP/1/A/6300/001 A (Turbine-Generator Load Change).

3.31.14 Perform the following to start the third Hotwell Pump:

_____ 3.31.14.1 Notify Secondary Chemistry of the following:

- Third Hotwell Pump is about to be started
- Check Polishing Demineralizers bypassed or isolated {PIP M99-2044}
- Monitor Polishing Demineralizers for signs of pressure induced damage after Hotwell Pump start {PIP M99-1828}

_____ _____/_____
Person Notified Date Time

☐ 3.31.14.2 Place third Hotwell Pump in service per OP/1/A/6250/001 (Condensate and Feedwater System).

NOTE: AMSAC will automatically "UNBLOCK" when Turbine Impulse Pressure increases to 290 psig.

_____ 3.31.15 Prior to 40% Turbine load (290 psig Impulse Pressure), check all "AMSAC S/G Low Flow" status lights dark. (1SI-4)

_____ 3.31.16 **WHEN** Turbine load greater than 40% (290 psig Impulse Pressure), begin aligning MSRs per OP/1/B/6250/011 (Moisture Separator Reheater Operation).

_____ 3.31.17 **WHEN** Turbine Impulse Pressure 295 - 305 psig, check "AMSAC ACTUATION BLOCK/UNBLOCK" as follows:

_____ 3.31.17.1 **IF** "UNBLOCK" dark, reset as follows:

☐ A. Check all "AMSAC S/G LOW FLOW" status lights dark.

☐ B. Check "S/G PATH CLSD >30 SEC" dark.

_____ C. Depress "UNBLOCK" for "AMSAC ACTUATION BLOCK/UNBLOCK".

☐ 3.31.17.2 Check "UNBLOCK" lit.

_____ 3.31.18 **WHEN** 40% RTP, perform the following:

NOTE: Steps 3.31.18.1 and 3.31.18.2 can be performed concurrently.

_____ 3.31.18.1 Notify RP to adjust setpoints for the following: {PIP 99-5073}

- 1EMF-71 (S/G A Leakage Hi Rad)
- 1EMF-72 (S/G B Leakage Hi Rad)
- 1EMF-73 (S/G C Leakage Hi Rad)
- 1EMF-74 (S/G D Leakage Hi Rad)

_____ _____/_____
Person Notified Date Time

_____ 3.31.18.2 **IF** 1HM-95 (AS to A & B CF Pumps) is open, close by concurrently performing the following:

☐ A. Check operating CF Pump in auto.

B. Monitor OAC Graphic for operating CF Pump:

☐ 1A CF PUMP DETAIL
☐ 1B CF PUMP DETAIL

_____ C. On operating CF Pump Turbine, monitor "LP GOV CNTRL"and "HP GOV CNTRL" positions.

NOTE:
- 1HM-95 will almost be closed before an effect is seen. (approximately 90% closed)
- On operating CF Pump, LP Gov. demand will be 100% before HP Gov begins to open.

_____ D. Slowly pulse 1HM-95 (AS to A & B CF Pumps) closed. (R.M.)

E. Monitor the following on CF Pump graphic:

☐ LP Gov position
☐ HP Gov position
☐ Decrease in LP Steam Supply Pressure

_____ F. **IF** any of the following occur, perform the following:

- Operating CF Pump speed decreases
- Operating CF Pump discharge pressure decrease

_____ 1. Stop closing 1HM-95.

_____ 2. Place operating CF Pump Turbine "LP GOV CNTRL" and "HP GOV CNTRL" in manual.

☐ 3. Stabilize operating CF Pump speed / discharge pressure.

_____ 4. Continue to close 1HM-95 while maintaining operating CF Pump speed / discharge pressure.

_____ 5. **WHEN** 1HM-95 closed, place operating CF Pump governors in auto per OP/1/A/6250/001 (Condensate and Feedwater System).

CAUTION: Generator / Automatic Voltage Regulator (AVR) testing must be performed prior to reactor power exceeding permissive P-8.

_____ 3.31.19 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing at 45% RTP, perform the following:

_____ 3.31.19.1 **HOLD** at 45% RTP until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

_____ 3.31.19.2 **WHEN** Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup, begin power increase to 50% RTP.

_____ 3.31.20 **IF** performing Generator Reactive Limits Verification testing at 45 - 50% RTP, perform the following:

☐ 3.31.20.1 Perform applicable sections of PT/1/B/4350/001 C (Generator Reactive Limits Verification Test).

_____ 3.31.20.2 **HOLD** until Testing Personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

NOTE: Steps 3.31.21 and 3.31.22 may be performed concurrently as long as conditions for both steps are met. {PIP 08-2768}

_____ 3.31.21 **WHEN** 48 - 56% RTP, place second CF Pump in service as follows:

☐ 3.31.21.1 Maintain constant Reactor Power.

☐ 3.31.21.2 Check CF Pump supplying CF Header in auto.

☐ 3.31.21.3 Start second CF Pump per OP/1/A/6250/001 (Condensate and Feedwater System), Enclosure 4.17 (CF Pump Reset / Startup), Section 3.4 (1A CF Pump Startup) or Section 3.5 (1B CF Pump Startup).

_____ 3.31.21.4 **WHEN** CF Pump operation stabilized, continue power increase.

CAUTION: Reactor Power ramp rate is limited by Fuel Maneurvering Limits (Data Book Section 1.3). The recommended load rate for unconditioned fuel above 50% power is 3% / hour, but shall never exceed 4% / hour, 7% / 2 hours, 10% / 3 hours or a 3% step change. {PIP 08-2768}

3.31.22 Prior to 50% RTP, perform the following concurrently:

_____ 3.31.22.1 Ensure proper secondary water chemistry for operation greater than 50% RTP.
CHM

☐ 3.31.22.2 Evaluate air ejector off gas and nozzle operation per OP/1/B/6300/006 (Main Vacuum and Vacuum Priming System).

☐ 3.31.22.3 Record highest value:

- 1A Main Generator Breaker Air Compressor Pilot Valve Counter _____
- 1B Main Generator Breaker Air Compressor Pilot Valve Counter _____
- Date/Time of counter readings ____/____

_____ 3.31.22.4 Notify System Engineer to calculate Main Generator Breaker air leakage using counter readings from Step 3.29.19 and Step 3.31.22.3.

_____ _____/_____
Person Notified Date Time

_____ 3.31.22.5 Notify TCC (Transmission Control Center) (382-9401 or 382-9402) to check amperage output balanced on both busses to switchyard.

_____ _____/_____
Person Notified Date Time

NOTE: Maintaining AFD within Nuclear Engineering recommended limits prevents AFD exceeding Tech Spec Limits (Limit and Precaution 1.8).

☐ 3.31.22.6 Maintain AFD within target band per OP/1/A/6100/022 (Unit 1 Data Book), Enclosure 4.3, Graph(s) 1.1.

_____ 3.31.22.7 **IF** Power Range detectors have been replaced **AND** startup is **NOT** an Initial Cycle Startup, check the following:
IAE

☐ New detector current data inserted
☐ Power Range High Flux (High Range) setpoints at 109%

_____ 3.31.22.8 **IF** Initial Cycle Startup, perform the following:

_____ A. Notify Reactor Engineering to determine if Power Range NI calibration is required prior to 50% RTP.

_____ _____/_____
Person Notified Date Time

_____ B. **IF** Power Range NI calibration is required prior to 50% RTP, perform the following:

☐ 1. Stop power increase.

_____ 2. Have IAE calibrate desired Power Range NI Channel(s).

_____ 3. **WHEN** calibration complete, continue power increase.

NOTE: Quadrant Power Tilt Ratio (QPTR) is **NOT** applicable until calibration of the Power Range NIs is completed subsequent to refueling. (TS 3.2.4)

_____ C. Check QPTR less than or equal to 1.02.

_____ 3.31.22.9 **IF NOT** Initial Cycle Startup, check QPTR less than or equal to 1.02.

☐ 3.31.22.10 Check "P-8 Hi Pwr Lo Flo Reactor Trip Blocked" dark. (1SI-18)

3.32 Increase power to 95% RTP as follows:

☐ 3.32.1 Maintain control rods within insertion and withdrawal limits per COLR.

NOTE: Maintaining AFD within Nuclear Engineering recommended limits prevents AFD exceeding Tech Spec Limits (Limit and Precaution 1.8).

☐ 3.32.2 Maintain AFD within target band per OP/1/A/6100/022 (Unit 1 Data Book), Enclosure 4.3, Graph(s) 1.1.

_____ 3.32.3 Notify IAE to stand by for periodic adjustments of Power Range NI channels.

_____ _____/_____
Person Notified Date Time

_____ 3.32.4 **IF AT ANY TIME** "Power Mismatch %" (Excore/Thermal Power Mismatch) indicates greater than 4% during power increase, perform the following:

☐ 3.32.4.1 Stop power increase.

_____ 3.32.4.2 Have IAE calibrate each Power Range NI Channel to ±1% Power Mismatch (NIs vs BETP).

_____ 3.32.4.3 **WHEN** calibration complete, continue power increase.

☐ 3.32.5 Begin power increase to 95% RTP

3.32.6 Prior to exceeding 56% Main Turbine power, perform the following:

_____ 3.32.6.1 Notify System Engineer to determine if Main Generator Breakers air leakage has been calculated, based on Engineering review.

_____ _____/_____
Person Notified Date Time

_____ 3.32.6.2 **IF** System Engineer desires cycling 1A Main Generator Breaker, perform the following:

_____ A. Ensure Main Turbine power less than 56%.

☐ B. Maintain Main Turbine power less than 56%.

_____ C. Open 1A Main Generator Breaker.

_____ D. Close 1A Main Generator Breaker.

_____ 3.32.6.3 **IF** System Engineer desires cycling 1B Main Generator Breaker, perform the following:

_____ A. Ensure Main Turbine power less than 56%.

☐ B. Maintain Main Turbine power less than 56%.

_____ C. Open 1B Main Generator Breaker.

_____ D. Close 1B Main Generator Breaker.

3.32.7 At 70% RTP or as directed by Secondary Chemistry, perform the following:

☐ 3.32.7.1 Begin placing C HDT Pumps in service per OP/1/B/6250/004 (Feedwater Heater Vents, Drains, and Bleed System).

_____ 3.32.7.2 **WHEN** C HDT Pumps are in service, stop one Hotwell Pump per OP/1/A/6250/001 (Condensate and Feedwater System).

3.32.8 At 77-80% RTP, enable OTDT DCS alarming as follows:

☐ 3.32.8.1 On DCS graphics, select "MAINTENANCE MENU".

☐ 3.32.8.2 Select "TAVG, DELTA T INPUTS & ALARM CHECKING" graphic.

3.32.8.3 Select "ON" for the following:

☐ NCAA 5422
☐ NCAA 5462
☐ NCAA 5502
☐ NCAA 5542
☐ OTDELTAT-FAIL

_____ 3.32.9 **IF** initial startup, perform the following:

_____ 3.32.9.1 Notify Nuclear Engineering to evaluate power increase to 78% RTP.

_____ _____/_____
Person Notified Date Time

☐ 3.32.9.2 Record limiting power level per Nuclear Engineering procedure: _____ % RTP

☐ 3.32.9.3 Begin power increase to desired power level.

_____ 3.32.9.4 **HOLD** at desired power level until Reactor Core Flux Mapping completed.

_____ 3.32.9.5 Notify Nuclear Engineering to evaluate allowed power increase.

_____ _____/_____
Person Notified Date Time

☐ 3.32.9.6 Record desired power level. _____ % RTP

_____ 3.32.10 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing at 78% RTP, **HOLD** until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

☐ 3.32.11 Continue power increase to 95% RTP.

CAUTION: IF CF Feed Reg Valves modulate less than 25%, potential exists to activate AMSAC. Power increase may continue at OSM's discretion.

NOTE:
- At approximately 85% steam flow from each S/G, all S/G CF Bypass valves will ramp open (approximately 2 minute ramp) to 100% open position. S/G CF Valves will modulate to control S/G level.
- S/G SM Flow, in percent, can be monitored on DCS Feedwater Overview Graphic for all four S/G's.

3.32.12 At greater than 85% steam flow from each S/G, ensure the following valves in auto and open:

_____ • 1CF-104AB (1A S/G CF Cntrl Vlv Bypass)
_____ • 1CF-105AB (1B S/G CF Cntrl Vlv Bypass)
_____ • 1CF-106AB (1C S/G CF Cntrl Vlv Bypass)
_____ • 1CF-107AB (1D S/G CF Cntrl Vlv Bypass)

_____ 3.32.13 **WHEN** at 976 MWE, check AS supply transferred from SM to C Heater Bleed by checking 1AS-11 (SM Supply to Aux Steam Control) closed.

_____ 3.32.14 **IF** 1AS-11 failed to close, coordinate with SRO to establish required setpoint on 1AS-11 controller to allow valve to close.

_____ 3.32.15 **WHEN** 85% RTP, place G Htr Drn Tank Pumps in service per OP/1/B/6250/004 (Feedwater Heater Vents, Drains, and Bleed System).

_____ 3.32.16 **IF** startup is from a trip, shutdown, or load reduction to less than 90% RTP, perform the following:

_____ 3.32.16.1 **HOLD** at 90% RTP.

_____ 3.32.16.2 Notify Nuclear Engineering to evaluate performing PT/0/A/4150/006 (Thermal Power Output Calculation).

_____ _____/_____
Person Notified Date Time

_____ 3.32.16.3 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing at 90% RTP, **HOLD** until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

_____ 3.32.17 Notify IAE to stand by for periodic adjustments of Power Range NI channels.

_____ _____/_____
Person Notified Date Time

NOTE: Step 3.31.19 is applicable for operation greater than 90% RTP.

_____ 3.32.18 **IF AT ANY TIME** "Power Mismatch %" (Excore/Thermal Power Mismatch) indicates greater than 1.5% during power increase, perform the following:

☐ 3.32.18.1 Stop power increase.

CAUTION: Allowing NC System temperature to change while calibrating NI's can result in a non-conservative adjustment which can result in exceeding 100% RTP. {PIP 03-2117}

☐ 3.32.18.2 Maintain steady state power and temperature.

_____ 3.32.18.3 Have IAE calibrate each Power Range NI Channel to ±1% Power Mismatch (NIs vs BETP).

_____ 3.32.18.4 **WHEN** calibration complete, continue power increase.

NOTE: Nuclear Engineering may perform PT/0/A/4150/003 (Thermal Power Output Measurement) between 85 - 95% RTP.

_____ 3.32.19 **IF** startup is from a refueling outage, perform the following:

_____ 3.32.19.1 **HOLD** at 95% RTP.

_____ 3.32.19.2 Ensure PT/0/A/4150/003 (Thermal Power Output Measurement) completed.
RX ENG

_____ 3.32.19.3 **IF** performing Generator / Automatic Voltage Regulator (AVR) testing at 95% RTP, **HOLD** until Generator / AVR personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

_____ 3.32.20 Notify Maintenance to remove "Limited Access" signs used for startup per Model Work Order 0433323.

_____ _____/_____
Person Notified Date Time

_____ 3.32.21 **WHEN** 95% RTP, perform the following:

3.32.21.1 Ensure cooling groups energized on 1A Main Transformer:

_____ • Circuit 1
_____ • Circuit 2
_____ • Circuit 3
_____ • Circuit 4
_____ • Circuit 5
_____ • Circuit 6
_____ • Circuit 7
_____ • Circuit 8

3.32.21.2 Ensure cooling groups energized on 1B Main Transformer:

_____ • Circuit 1
_____ • Circuit 2
_____ • Circuit 3
_____ • Circuit 4
_____ • Circuit 5
_____ • Circuit 6
_____ • Circuit 7
_____ • Circuit 8

3.33 Increase power to 100% RTP as follows:

☐ 3.33.1 Begin power increase to 100% RTP.

_____ 3.33.2 **IF AT ANY TIME** 1AD-6, E10 (Loop D/T Deviation) is received, perform the following:

_____ 3.33.2.1 Notify Reactor Engineering to evaluate.

_____ _____/_____
Person Notified Date Time

_____ 3.33.2.2 Determine impact on power escalation.
CRS

_____ 3.33.2.3 **IF** power escalation **CANNOT** commence due to alarms, notify IAE to calibrate D/T channels.

_____ _____/_____
Person Notified Date Time

☐ 3.33.3 Maintain control rods within insertion and withdrawal limits per COLR.

NOTE: Maintaining AFD within Nuclear Engineering recommended limits prevents AFD exceeding Tech Spec Limits (Limit and Precaution 1.8).

☐ 3.33.4 Maintain AFD within target band per OP/1/A/6100/022 (Unit 1 Data Book), Enclosure 4.3, Graph(s) 1.1.

NOTE: Dilution rates for reaching and maintaining 100% power may change significantly based on change in Xenon worth.

☐ 3.33.5 Generate Xenon Prediction printout per OAC or REACT to determine expected changes in dilution rates. {PIP-99-0669}

_____ 3.33.6 **WHEN** 98% RTP, perform the following:

_____ 3.33.6.1 Depress "MW IN/MW OUT".

_____ 3.33.6.2 Ensure lit "MW OUT".

☐ 3.33.6.3 Adjust Turbine load per OP/1/A/6300/001 A (Turbine-Generator Load Change).

_____ 3.33.7 **IF** performing Generator Reactive Limits Verification testing at 98% RTP, perform the following:

☐ 3.33.7.1 Perform applicable sections of PT/1/B/4350/001 C (Generator Reactive Limits Verification Test).

_____ 3.33.7.2 **HOLD** until Testing Personnel are ready for Operations to continue with Unit 1 Turbine Generator startup.

NOTE: The intent of the following hold step is to allow a more controlled final approach to 100% power.

_____ 3.33.8 **WHEN** 99.5% RTP, perform the following: {PIP 06-0754}

_____ 3.33.8.1 **HOLD** power escalation for at least 10 minutes to allow for Xenon and AFD oscillations to be seen.

_____ 3.33.8.2 **WHEN** at least 10 minutes have elapsed, continue power increase.

_____ 3.33.9 **WHEN** 100% RTP, perform the following:

CAUTION: Maximum #4 Governor Valve position is 45% with feedback loops out of service to ensure valve maintained within its controlling band.

_____ 3.33.9.1 Ensure #4 Governor Valve less than 45% open unless advised by System Engineer.

☐ 3.33.9.2 Check 100% RTP at 3411 MWT. (M1P1355)

_____ 3.33.9.3 **IF** necessary, have IAE calibrate each Power Range NI channel to ±1% Power Mismatch (NIs vs BETP).

☐ 3.33.9.4 Suspend logging Fuel Maneuvering Limit on RO Turnover Checklist.

☐ 3.33.9.5 Remove Pzr Htr Groups A, B and D from service per Enclosure 4.6 (Operation of Pzr Heaters).

_____ 3.33.10 **WHEN** Nuclear Power (PR) instruments indicate 100%, perform the following:

3.33.10.1 Check the following between $10^{1.75}$ - $10^{2.25}$%: {PIP-98-2017}

☐ 1A W/R Neutron Flux (%) (1ENBPI9510)
☐ 1B W/R Neutron Flux (%) (1ENBPI9520)

_____ 3.33.10.2 **IF** outside of range, notify IAE to perform IP/0/A/3207/006 A (Gamma-Metrics Neutron Flux Monitor Calorimetric Adjustments).
SRO

_____ _____/_____
Person Notified Date Time

☐ 3.33.11 Maintain proper NC System parameters by operating Pzr Htr Groups as required per Enclosure 4.6 (Operation of Pzr Heaters).

End of Enclosure