

Facility: H B Robinson		Scenario No.: 1		Op Test No.: N16-1	
Examiners: _____		Operators: _____ (SRO)			
_____		_____ (RO)			
_____		_____ (BOP)			
Initial Conditions:		The plant is at 100% power (MOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.			
Turnover:		The following equipment is Out-Of-Service: The SDAFW Pump is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.7.4 ACTION A. FI-613, CCW System Flow is OOS (I&C Investigating). RTGB Annunciator APP-010-B3, "EDG B START AIR LO PRESS," has failed to the ILLUMINATED condition (I&C is investigating).			
Event No.	Malf. No.	Event Type*	Event Description		
1	1	I-RO N-BOP I(TS)-SRO	Pzr Level Transmitter LT-459 Fails LOW		
2	2	I-BOP I(TS)-SRO	"C" Steam Flow Transmitter FT-494 Fails LOW		
3	3	R-RO N-BOP N-SRO	Tube Leak in Feedwater Heater 4A/Downpower		
4	4	C-BOP C-SRO	CRDM Fan "A" Failure		
5	5	C-RO C-SRO	Continuous Inward Rod Motion		
6	6	M-RO M-BOP M-SRO	"C" Steam Generator Tube Rupture		
7	7	C-BOP	Loss of Off-Site Power		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

H B Robinson 2016 NRC Scenario #1

The plant is at 100% power (MOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

The following equipment is Out-Of-Service: The SDAFW Pump is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.7.4 ACTION A. FI-613, CCW System Flow is OOS (I&C Investigating). RTGB Annunciator APP-010-B3, "EDG B START AIR LO PRESS," has failed to the ILLUMINATED condition (I&C is investigating).

Shortly after taking the watch, Pressurizer Level Transmitter, LT-459 will fail LOW causing normal letdown to isolate, de-energizing of pressurizer control group heaters and charging pump speed to rise for the pump in AUTO. The operator will respond in accordance APP-003-E8, "PZR CONTROL HI/LO LVL," and AOP-025, "RTGB Instrument Failure." The operator will remove the failed instrument from service in accordance with OWP-030, "Pressurizer Level Transmitters." The operator will address Technical Specification LCO 3.3.1, "Reactor Protection System (RPS) Instrumentation."

Following this, the controlling steam flow channel for S/G "C", FT-494, will fail LOW, causing FRV-498 to start to CLOSE. The operator will respond in accordance with AOP-010, "Main Feedwater/Condensate Malfunction," and/or AOP-025, "RTGB Instrument Failure." The operator will remove the failed instrument from service in accordance with OWP-034, "Steam Flow." The operator will address Technical Specification LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation."

Next, a tube leak will develop in Feed Water Heater 4A. The operator will respond in accordance with APP-007-E7, HTR 4A HI/LO LVL, identifying the leak. The operator may enter AOP-010, "Main Feedwater/Condensate Malfunction." Ultimately, the operator will use OP-407, "Heater Drain and Vents," to remove Feedwater Heaters 5A, 4A, and 3A from Service. This will require a power decrease. The operator will use either AOP-038, "Rapid Downpower," or OP-105, "Maneuvering the Plant When > 25% Power," and OP-301, "Chemical and Volume Control System (CVCS)," to lower plant power.

During the downpower, the "A" CRDM Fan will trip. The operator will address APP-010-A6, HVH-5A/B AIR FLOW LOST/OVLD, and manually start the "B" CRDM Fan.

Shortly afterwards, a continuous control rod insertion will occur. The operator will respond in accordance with AOP-001, "Malfunction of Reactor Control System." The operator will be unable to control the rod insertion and will manually trip the reactor.

On the reactor trip, a 500 gpm Steam Generator Tube Rupture will occur (over 10 minutes) on the "C" Steam Generator. The operator will enter EOP-E-0, "Reactor Trip or Safety Injection." After the Immediate Actions are complete, it is likely that the operator will determine that SI is NOT actuated nor required, and transition to EOP-ES-0.1, "Reactor Trip Response." While in this procedure the operator will determine that SI is required, manually actuate SI, and return to EOP-E-0. Upon completion of EOP-E-0, the operator will transition to EOP-E-3, "Steam Generator Tube Rupture," to isolate the flow into and out of the "C" Steam Generator and then conduct a cooldown of the RCS.

Upon transition into EOP-E-3, a Loss of Off-Site Power will occur. Both EDGs will start and re-power Buses E-1 and E-2. With SI previously reset, the operator will need to address a re-

initiation of AFW flow to all Steam Generators, and the restart of the ECCS Pumps. The operator will continue with EOP-E-3 and conduct the RCS cooldown using the “A” and “B” Steam Generator PORVs.

During the RCS depressurization, the Pzr Spray Valves will not be available. The operator will be required to conduct the depressurization using an available Pzr PORV.

The scenario will terminate at Step 23 of EOP-E-3, after the operator has stopped the SI Pumps.

Critical Tasks:

Manually control “C” S/G Narrow Range Level before a Reactor Trip occurs on low S/G level.

Safety Significance: failure to take manual control of the “C” S/G Feed Reg Valve and control Narrow Range S/G level, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection System. Performance of the critical task would stabilize the S/G level transient. A failure to stabilize the S/G level transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS temperature/pressure control.

Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs (EOP-Based)

Safety Significance: Failure to isolate the ruptured SG causes a loss of differential pressure between the ruptured SG and the intact SGs. The fact that the operator allows the differential pressure to dissipate and, as a result, are then forced to transition to a contingency procedure constitutes an incorrect performance that necessitates the operator taking compensating action that would unnecessarily complicate the event mitigation strategy.

While in EOP-E-3, establish/maintain an RCS temperature so that transition from E-3 does not occur because the RCS temperature is in either (1) Too high to maintain 38°F of RCS Subcooling OR (2) below 295°F (RCS Integrity Red Path Limit) (EOP-Based)

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. This failure constitutes an incorrect performance that necessitates the operator taking compensating action that would unnecessarily complicate the event mitigation strategy.

Depressurize the RCS to meet SI termination criteria before Steam Generator Overfill is reached based on Water in the Steam Lines. (EOP-Based)

Safety Significance: Failure to stop reactor coolant leakage into a ruptured SG by depressurizing the RCS (when it is possible to do so) needlessly complicates mitigation of the event. It also constitutes a significant reduction of safety margin beyond that irreparably introduced by the scenario.

Facility: HB Robinson		Scenario No.: 2		Op Test No.: N16-1	
Examiners: _____		Operators: _____		(SRO)	
_____		_____		(RO)	
_____		_____		(BOP)	
Initial Conditions:		The plant is at 75% power (BOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.			
Turnover:		The following equipment is Out-Of-Service: The "A" SI Pump is OOS. The "B" SI Pump has been aligned to 480 VAC ESF Bus E-1. The "C" Charging Pump is also OOS. LI-928, "C" SI Accumulator Level, is OOS (I&C Investigating). RTGB Annunciator APP-009-C3, "AIR SIDE SEAL OIL BU PMP OVLD," has failed to the EXTINGUISHED condition (I&C is investigating). The crew will be directed to raise power to 100%.			
Event No.	Malf. No.	Event Type*	Event Description		
1	-	R-RO N-BOP N-SRO	Raise Power		
2	1	I-RO I-SRO	VCT Level Transmitter LT-115 fails HIGH		
3	2	I-BOP I(TS)-SRO	Turbine 1 st Stage Pressure Transmitter PT-447 fails LOW		
4	3	C-RO C(TS)-SRO	"B" Charging Pump Trip		
5	4	C-BOP C-SRO	"C" FRV Controller fails HIGH in AUTO		
6	5	M-RO M-BOP M-SRO	Cold Leg SBLOCA		
7	6/7	NA	480 VAC Bus E-1 De-energizes		
8	6	C-RO	"C" SI Pump fails to Auto Start		
9	7	C-RO	CV Spray Valves SI-880C and D fail to OPEN Automatically		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

HB Robinson 2016 NRC Scenario #2

The plant is at 75% power (BOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

The following equipment is Out-Of-Service: The "A" SI Pump is OOS. The "B" SI Pump has been aligned to 480 VAC ESF Bus E-1. The "C" Charging Pump is also OOS. LI-928, "C" SI Accumulator Level, is OOS (I&C Investigating). RTGB Annunciator APP-009-C3, "AIR SIDE SEAL OIL BU PMP OVLD," has failed to the EXTINGUISHED condition (I&C is investigating). The crew will be directed to raise power to 100%.

Shortly after taking the watch, the operator will raise power to 100% using OP-105, "Maneuvering the Plant When Greater than 25% Power," and OP-301, "Chemical and Volume Control System (CVCS)."

During the power increase, VCT Level Transmitter LT-115 will fail HIGH causing all letdown to be diverted to the CVCS HUTs. This failure will result in VCT level lowering without automatic makeup. The operator will respond in accordance with AOP-003, "Malfunction of Reactor Makeup Control." After this, the power increase will be suspended.

Next, Turbine 1st Stage Pressure Transmitter PT-447 will fail LOW. The operator will respond in accordance with AOP-025, "RTGB Instrument Failure, and place all Feed Regulating Valves in MANUAL" The operator will remove the failed instrument from service in accordance with OWP-033, "First Stage Pressure (FSP)," and restore the Feed Regulating valves to AUTO control. The operator will address 3.3.1, "Reactor Protection System (RPS) Instrumentation," Technical Specification LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," and Technical Specification LCO 3.3.6, "Containment Ventilation Isolation Instrumentation."

Following this, the "B" Charging Pump will trip. The operator will respond in accordance with APP-003-F5, CHG PMP MOTOR OVLD/TRIP and raise speed of the "A" Charging Pump. The operator may enter AOP-018, "Reactor Coolant Pump Abnormal Conditions." The operator will address 3.4.17, "Chemical and Volume Control System."

Shortly afterwards, the "C" Feed Regulating Valve Controller will fail such that the valve starts to OPEN. The operator will respond in accordance with AOP-010, "Main Feedwater/Condensate Malfunction," and control the "C" S/G level manually.

Subsequently, a Cold Leg Small Break LOCA will occur (over 5 minutes) on the B Loop. The operator will enter AOP-016, "Excessive Primary Plant Leakage." Ultimately, the operator will enter EOP-E-0, "Reactor Trip or Safety Injection." When the reactor trips, the normal supply breaker to Bus E-1 will trip OPEN, and the "A" EDG Output Breaker will fail to CLOSE either automatically or manually; and Train "A" equipment will remain unavailable throughout the event. Additionally, the "C" SI Pump will fail to automatically start on SI, and the operator will be required to manually start this pump.

Upon completion of EOP-E-0, the operator will transition to EOP-E-1, "Loss of Reactor or Secondary Coolant," and the break size will become larger. Eventually, Containment pressure will exceed 10 psig creating an Orange Path condition on the Containment Critical Safety Function. When this occurs, the "B" CV Spray will automatically start on HI-HI Containment Pressure, however, both SI-880C&D ("B" CV Spray Pump Discharge Valves) will fail to open automatically, and the operator will be required to manually open these valves.

The scenario will terminate in EOP-E-1 after Containment Spray has been initiated, or at Step 9 of FRP-J.1, "Response to High Containment Pressure," after the operator has taken all necessary steps to reduce Containment pressure, or upon transition from either EOP-E-1 or FRP-J.1 to FRP-P.1, Response to Imminent Pressurized Thermal Shock (After all Critical Tasks have been completed).

Critical Tasks:

Manually control "C" S/G Narrow Range Level before a Reactor Trip occurs on low S/G level or a Protective Action occurs on high S/G Level.

Safety Significance: failure to take manual control of the "C" S/G Feed Reg Valve and control Narrow Range S/G level, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection/Engineered Safeguards Actuation System. Performance of the critical task would stabilize the S/G level transient. A failure to stabilize the S/G level transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS temperature/pressure control.

Trip all RCPs within 6 minutes of meeting the EOP-E-0/E-1 RCP Trip Criteria (Containment Isolation Phase B - ACTUATED, OR BOTH of the following satisfied: SI Pumps - AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW AND RCS Subcooling based on Core Exit T/Cs - LESS THAN 13°F [32°F]) so that CET temperatures do not become superheated when forced circulation in the RCS stops. (EOP-Based)

Safety Significance: Failure to trip the RCPs under the postulated plant conditions leads to core uncover and to fuel cladding temperatures in excess of 2200°F, which is the limit specified in the ECCS acceptance criteria. Thus, failure to perform the task represents mis-operation or incorrect operator performance in which the operator has failed to prevent degradation of the fuel cladding barrier to fission product release and which leads to a violation of the facility license condition.

Establish flow from at least one high-head SI pump before transition out of E-0. (EOP-Based)

Safety Significance: Failure to manually start at least one high-head SI pump under the postulated conditions constitutes mis-operation or incorrect operator performance in which the operator does not prevent degraded emergency core cooling system (ECCS) capacity. In this case, at least one high-head SI pump can be manually started from the control room. Therefore, failure to manually start a high-head SI pump also represents a failure by the operator to demonstrate the ability to effectively direct or manipulate engineered safety feature (ESF) controls that would prevent a significant reduction of safety margin beyond that irreparably introduced by the scenario. Additionally, failure to manually start a high-head SI pump also represents a failure by the operator to demonstrate the ability to recognize a failure or an incorrect automatic actuation of an ESF system or component. Finally, under the postulated plant conditions, failure to manually start a high-head SI pump (when it is possible to do so) is a violation of the facility license condition.

Manually actuate at least one CV Spray Train before Transitioning to EOP-ES-1.2. (EOP-Based)

Safety Significance: Failure to manually actuate the minimum required complement of containment cooling equipment under the postulated conditions demonstrates the inability of the crew to "recognize a failure or an incorrect automatic actuation of an ESF system or component.

In this case, the minimum required complement of containment cooling equipment can be manually actuated from the control room. Therefore, failure to manually actuate the minimum required complement of containment cooling equipment also represents a failure by the operator to demonstrate the ability to effectively direct or manipulate engineered safety feature (ESF) controls that would prevent (degraded emergency core cooling system (ECCS) capacity). Additionally, under the postulated plant conditions, failure to manually actuate the minimum required complement of containment cooling equipment (when it is possible to do so) results in a failure to prevent a significant reduction of safety margin beyond that irreparably introduced by the scenario.

Facility: H B Robinson		Scenario No.: 3		Op Test No.: N16-1	
Examiners: _____		Operators: _____		(SRO)	
_____		_____		(RO)	
_____		_____		(BOP)	
Initial Conditions:		The plant is at 68% power (EOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.			
Turnover:		The following equipment is Out-Of-Service: The SDAFW Pump is OOS, and has been for 7 days. Technical Specification LCO 3.7.4 ACTION C has just been entered. Maintenance reports that this pump will be OPERABLE in 2 hours, and station management has directed that the initiation of the shutdown be delayed 2 hours. TI-471, PRT Temperature is OOS (I&C Investigating). RTGB Annunciator APP-008-C3, "EMERG OIL PMP OVLD," has failed to the ILLUMINATED condition (I&C is investigating).			
Event No.	Malf. No.	Event Type*	Event Description		
1	1	C-RO C-BOP C(TS)-SRO	Loss of Instrument Bus 3		
2	2	I-BOP I-SRO	"B" Feed Flow Transmitter FT-487 Fails LOW		
3	NA	R-RO N-BOP N-SRO	Load Decrease		
4	3	C-RO C-SRO	Letdown Line Pressure Control Valve Controller fails CLOSED		
5	4	I-RO I(TS)-SRO	PZR Pressure Transmitter PT-444 Fails HIGH/PCV-455C fails to fully CLOSE		
6	5	M-RO M-BOP M-SRO	Inadvertent FWIS		
7	6	C-BOP	Turbine fails to Trip/GV Valves fail to Runback/MSI fails to AUTO Actuate		
8	7	NA	"A" & "B" MDAFW Pump Trip		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

H B Robinson 2016 NRC Scenario #3

The plant is at 68% power (EOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

The following equipment is Out-Of-Service: The SDAFW Pump is OOS, and has been for 7 days. Technical Specification LCO 3.7.4 ACTION C has just been entered. Maintenance reports that this pump will be OPERABLE in 2 hours, and station management has directed that the initiation of the shutdown be delayed 2 hours. TI-471, PRT Temperature is OOS (I&C Investigating). RTGB Annunciator APP-008-C3, "EMERG OIL PMP OVLD," has failed to the ILLUMINATED condition (I&C is investigating).

Shortly after taking the watch, Instrument Bus 3 will de-energize. The operator will respond in accordance with AOP-024, "Loss of Instrument Bus," and restore power to the Bus. The operator will address Technical Specification LCO 3.8.7, "AC Instrument Bus Sources – Operating," and Technical Specification LCO 3.8.9, "Distribution Systems-Operating."

Following this, the controlling feed flow channel for S/G "B", FT-487, will fail LOW, causing FRV-498 to start to OPEN. The operator will respond in accordance with AOP-010, "Main Feedwater/Condensate Malfunction," and/or AOP-025, "RTGB Instrument Failure." The operator will remove the failed instrument from service in accordance with OWP-026, "Feed Flow (FWF)."

Next, the WCCS will call and inform the operator that it has been determined that the SDAFW Pump will not be restored to OPERABLE status within the next two hours as expected, and that station management has directed that the plant be brought to Mode 3 within the next four hours using AOP-038, "Rapid Downpower."

During the downpower, the Letdown Pressure Control Valve (PCV-145) controller will fail such that the valve will fail closed. The operator will respond in accordance with APP-001-D6, LP LTDN LN HI PRESS, and ultimately take manual control of the valve.

Shortly afterwards, PZR Pressure transmitter PT-444 will fail HIGH causing the Pzr Spray valves and Pzr PORV to OPEN. The operator will respond in accordance with AOP-019, "Malfunction of RCS pressure Control," and/or AOP-025, "RTGB Instrument Failure." RCS pressure control will remain in MANUAL for the remainder of the scenario. The operator will address Technical Specification LCO 3.3.4, "Remote Shutdown System," Technical Specification LCO 3.4.1, "RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits," and Technical Specification LCO 3.4.11, "Pressurizer Power Operated Relief Valves (PORVs)."

After the Pressure Transmitter has been removed from service, an inadvertent FWIS will occur. Simultaneously with the Rx Trip, the Turbine will fail to TRIP, the Governor Valves will fail to CLOSE manually, and the Main Steamline Isolation signal will fail to auto actuate. The operator will be required to manually CLOSE the MSIVs. Additionally the "A" and "B" MDAFW Pumps will trip immediately after auto start. The operator will enter EOP-E-0, "Reactor Trip or Safety Injection."

Upon completion of EOP-E-0, the operator will transition to EOP-ES-0.1, "Reactor Trip Response." However, this transition will be delayed due to a RED condition on the Heat Sink CSF. The operator will perform FRP-H.1, "Response to Loss of Secondary Heat Sink." The operator will direct that AFW Pump "C" be placed in service in accordance with OP-402, "Auxiliary Feedwater System," however, the AFW Pump "C" Diesel will fail to start.

The scenario will terminate at Step 7 RNO 2.b of FRP-H.1, after the operator has restored feedwater flow from the Main Feedwater System.

Critical Tasks:

Manually control “B” S/G Narrow Range Level before a Reactor Trip occurs on low S/G level or a Protective Action occurs on high S/G Level.

Safety Significance: failure to take manual control of the “B” S/G Feed Reg Valve and control Narrow Range S/G level, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection/Engineered Safeguards Actuation System. Performance of the critical task would stabilize the S/G level transient. A failure to stabilize the S/G level transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS temperature/pressure control.

Manually close the OPEN Pzr Spray Valve(s) and the Stuck Open PORV Block Valve before the Reactor trips based on low pressurizer pressure.

Safety Significance: failure to close the Spray Valves/PORV Block Valve and stop the pressure transient, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection System. Performance of the critical task would stabilize the pressure transient. A failure to stabilize the pressure transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS pressure control.

Manually Close the MSIVs Before an ORANGE Path Challenge Develops to Either the Subcriticality or the Integrity CSF or Before Transition to ECA-2.1, Whichever Happens First (EOP-Based)

Safety Significance: Failure to trip the main turbine under the postulated plant conditions causes challenges to CSFs beyond those irreparably introduced by the postulated conditions. Additionally, such an omission constitutes a failure by the operator to “demonstrate the ability to take one or more actions that would prevent a challenge to plant safety. The situation described in the plant conditions is effectively a large steamline break downstream of the MSIVs. This “effective steamline break” is also located downstream of the main turbine stop valves, which cannot be closed by manually tripping the turbine. Failure to perform the critical task results in uncontrolled depressurization of all SGs and in uncontrolled cooldown of the RCS, both of which are unnecessary.

Establish Feedwater Flow Into at Least One S/G Before RCS Bleed and Feed is Required (EOP-Based)

Safety Significance: Failure to establish feedwater flow to any SG results in the operator’s having to rely upon the lower-priority action of establishing RCS bleed and feed to minimize core uncover. This constitutes incorrect performance that fails to prevent degradation of any barrier to fission product release.

Facility:	HB Robinson	Scenario No.:	4	Op Test No.:	N16-1
Examiners:	_____	Operators:	_____ (SRO)		
	_____		_____ (RO)		
	_____		_____ (BOP)		
Initial Conditions:		The plant is at 25% power (BOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.			
Turnover:		The following equipment is Out-Of-Service: The "A" SI Pump is OOS. The "B" SI Pump has been aligned to 480 VAC ESF Bus E-1. PI-1616, SW North Header Pressure, is OOS (I&C Investigating). RTGB Annunciator APP-007-C3, "FW PMP A LO FLOW TRIP," has failed to the EXTINGUISHED condition (I&C is investigating). The crew will be directed to raise power to 100%.			
Event No.	Malf. No.	Event Type*	Event Description		
1	1	C-RO C-SRO	"A" Primary Water Pump trips during Dilution		
2	NA	R-RO N-BOP N-SRO	Raise Power		
3	2	C-RO C-SRO	Letdown Temperature Controller TCV-144 fails CLOSED/Divert Valve TCV-143 Fails to DIVERT		
4	3	I-BOP I(TS)-SRO	Main Steam Line "C" Pressure Transmitter Fails LOW		
5	4	N-BOP I(TS)-SRO	Power Range NI-44 Upper Detector fails HIGH		
6	5	C-BOP C-SRO	Low Turbine Oil Pressure/Failure of Auto Turbine Trip		
7	6	M-RO M-BOP M-SRO	Power Range NI-41 Control Power Fuse Blows/ATWS		
8	7	C-BOP	MOV-350 fails to OPEN		
9	8	M-RO M-BOP M-SRO	"B" SG SLB Inside CV		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

HB Robinson 2016 NRC Scenario #4

The plant is at 25% power (BOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

The following equipment is Out-Of-Service: The "A" SI Pump is OOS. The "B" SI Pump has been aligned to 480 VAC ESF Bus E-1. PI-1616, SW North Header Pressure, is OOS (I&C Investigating). RTGB Annunciator APP-007-C3, "FW PMP A LO FLOW TRIP," has failed to the EXTINGUISHED condition (I&C is investigating). The crew will be directed to raise power to 100%.

Shortly after taking the watch, the operator will attempt to raise power to 100% using OP-105, "Maneuvering the Plant When Greater than 25% Power," and OP-301, "Chemical and Volume Control System (CVCS)." During the first dilution, the "A" Primary Water Pump will trip. The operator will respond in accordance with APP-003-E5, "MAKEUP WATER DEV," and/or AOP-003, "Malfunction of Reactor makeup Control." The operator will place the "B" Primary Water Pump in service and continue with the startup.

After this, the operator will raise power to 100% using OP-105, "Maneuvering the Plant When Greater than 25% Power," and OP-301, "Chemical and Volume Control System (CVCS)."

During the power increase Letdown Temperature Controller, TCV-144, will fail CLOSED causing letdown temperature to rise above 135°F. Simultaneously, Divert Valve TCV-143, will fail to divert letdown flow to the VCT. The operator will respond in accordance with APP-001-A6, "LTDN FLOW HI TEMP DEMIN BYPD," divert letdown flow to the VCT, take MANUAL control of TCV-144 to stabilize letdown temperature, and return letdown to the VCT.

Following this, Main Steam Line "C" Pressure Transmitter, PT-495, will fail LOW. The operator will respond in accordance with AOP-025, "RTGB Instrument Failure." The operator will remove the failed instrument from service in accordance with OWP-025, "Steam Generator Pressure (SGP)." The operator will address Technical Specification LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," and Technical Specification LCO 3.3.6, "Containment Ventilation Isolation Instrumentation."

Next, Power Range, NI-44, Upper Detector will fail HIGH. The operator will remove the failed instrument from service in accordance with OWP-011, "Nuclear Instrumentation (NI)." The operator will address Technical Specification LCO 3.3.1, "Reactor Protection System (RPS) Instrumentation."

Shortly afterwards, an oil leak will develop on the Main Turbine. The operator will respond in accordance with various APP-008, SW, CW & TURB GEN AUX, alarms, and ultimately enter AOP-007, "Turbine Trip Below P-8." When the Main Turbine Trips one Turbine Stop Valve and one Turbine Governor Valve will remain OPEN, and the operator will need to manually TRIP the Turbine.

Subsequently, the Control Power fuse for Power Range channel N41 will blow causing an automatic reactor trip signal to be generated, however, the reactor will fail to TRIP both automatically and manually (ATWS). The operator will enter EOP-E-0, "Reactor Trip or Safety Injection," and attempt to manually trip the reactor. When this fails, the operator will enter FRP-S.1, "Response to Nuclear Power Generation- ATWS." While in FRP-S.1, Boric Acid to Charging Pump Suction Valve MOV-350 will fail CLOSED. The operator will direct a local trip of the reactor, drive rods in manually, and align the suction of the Charging Pumps to the RWST.

Upon completion of FRP-S.1, a "B" Steam Line will rupture inside Containment (over 10 minutes), and the operator will re-enter EOP-E-0, "Reactor Trip or Safety Injection." Ultimately, the operator will transition to EOP-E-2, "Faulted Steam Generator Isolation," to isolate the flow into and out of the "B" Steam Generator and then terminate Safety Injection. However, an Orange and/or Red Path will exist on the RCS Critical Safety Function, and the operator will transition to FRP-P.1, Response to Imminent Pressurized Thermal Shock Condition.

The scenario will terminate at Step 12 of FRP-P.1, when the operator stops SI Pumps.

Critical Tasks:

Manually control "C" S/G Narrow Range Level before a Reactor Trip occurs on low S/G level or a Protective Action occurs on high S/G Level.

Safety Significance: failure to take manual control of the "C" S/G Feed Reg Valve and control Narrow Range S/G level, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection/Engineered Safeguards Actuation System. Performance of the critical task would stabilize the S/G level transient. A failure to stabilize the S/G level transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS temperature/pressure control.

Insert Negative Reactivity into the Core by Inserting Control Rods Manually Prior to Locally Tripping the Reactor (EOP-Based)

Safety Significance: Failure to insert negative reactivity, under the postulated plant conditions, results in an unnecessary situation in which the reactor remains critical or returns to a critical condition. Performance of the critical task would make the reactor subcritical and provide sufficient shutdown margin to prevent (or at least minimize the power excursion associated with) any subsequent return to criticality. Failure to insert negative reactivity constitutes mis-operation or incorrect operator performance which fails to prevent incorrect reactivity control. In the scenario postulated by the plant conditions, failure to insert negative reactivity by inserting control rods can result in the needless continuation of an extreme or a severe challenge to the subcriticality CSF. Although the challenge was not initiated by the operator (was not initiated by operator error), continuation of the challenge is a result of the operator's failure to insert negative reactivity.

Isolate Feedwater Flow Into and Steam Flow From the Faulted S/G Before a Transition Out of E-2 Occurs (EOP-Based)

Safety Significance: Failure to isolate a faulted SG that can be isolated causes challenges to CSFs beyond those irreparably introduced by the postulated conditions. Also, depending upon the plant conditions, it could constitute a failure by the operator to demonstrate the ability to recognize a failure or an incorrect automatic actuation of an ESF system or component. Failure to isolate a faulted SG can result in challenges to the Integrity, Subcriticality and Containment CSFs.

Stop the High Head SI Pumps Before a Transition Out of FRP-P.1 Occurs (EOP-Based)

Safety Significance: Failure to stop the high head SI Pumps results in challenges to the Integrity CSF; and could unnecessarily result in a mechanical failure due to Pressurized Thermal Shock.

Facility: H B Robinson		Scenario No.: 5		Op Test No.: N16-1	
Examiners: _____		Operators: _____ (SRO)			
_____		_____ (RO)			
_____		_____ (BOP)			
Initial Conditions:		The plant is at 3-5% power (EOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.			
Turnover:		The following equipment is Out-Of-Service: The "B" Condensate Pump is OOS. LI-1417A, Hotwell Level Indication is OOS (I&C Investigating). RTGB Annunciator APP-006-F7, "PWST HI/LO LVL," has failed to the ILLUMINATED condition (I&C is investigating). The crew will be directed to raise power to 30%.			
Event No.	Malf. No.	Event Type*	Event Description		
1	NA	R-RO N-BOP N-SRO	Roll Turbine		
2	1	C-BOP C-SRO	High Turbine Eccentricity		
3	2	I-BOP I(TS)-SRO	Loss of Compensation Voltage to Intermediate Range N-35		
4	3	I-RO I-SRO	VCT Level transmitter LT-112 fails HIGH		
5	4	C-RO C(TS)-SRO	"B" RCP Thermal Barrier Leak/Flow Control Valve FCV-626 fails to CLOSE		
6	5	M-RO M-BOP M-SRO	Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE		
7	6	C-RO	Failure of Automatic Rx Trip		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

H B Robinson 2016 NRC Scenario #5

The plant is at 3-5% power (EOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

The following equipment is Out-Of-Service: The "B" Condensate Pump is OOS. LI-1417A, Hotwell Level Indication is OOS (I&C Investigating). RTGB Annunciator APP-006-F7, "PWST HI/LO LVL," has failed to the ILLUMINATED condition (I&C is investigating). The crew will be directed to raise power to 30%.

Shortly after taking the watch, the operator will raise power to 5-8% and startup the Turbine using GP-005, "Power Operation."

When the Turbine is rolling, a HIGH Eccentricity condition will develop on the Main Turbine. The operator will respond using AOP-006, "Turbine Eccentricity/Vibration," and place the Turbine startup on HOLD.

Shortly afterwards, the compensating voltage on Intermediate Range Channel N-35 will fail. The operator will remove the instrument from service using OWP-011, "Nuclear Instrumentation (NI)." The failed channel will require that the Source Range instruments be manually re-energized in the subsequent post-trip conditions. The operator will address Technical Specification LCO 3.3.1, "Reactor Protection System (RPS) Instrumentation," and determine to continue with the power increase.

Following this, VCT Level Transmitter LT-112 will fail HIGH causing LCV-115A to divert all letdown flow to the CVCS HUTs and result in an automatic makeup to the VCT. The operator will respond in accordance with AOP-003, "Malfunction of Reactor Makeup Control." After this, the power increase will continue.

Next, a Thermal barrier leak will develop on the "B" RCP and Flow Control Valve FCV-626 will fail to CLOSE. The operator will respond in accordance with APP-001-C1, "RCP THERM BAR COOL WTR HI FLOW," and AOP-014, "Component Cooling Water Malfunction." The operator will address Technical Specification LCO 3.6.1, "Containment," and Technical Specification LCO 3.6.3, "Containment Isolation Valves."

Subsequently, a Steam Rupture will occur downstream of the MSIVs and the MSIVs will fail to CLOSE automatically and manually. Simultaneously, the Reactor will fail to TRIP automatically. The operator will enter EOP-E-0, "Reactor Trip or Safety Injection," and manually trip the reactor.

Upon completion of EOP-E-0, the operator will transition to EOP-E-2, "Faulted Steam Generator Isolation," and then when it is realized that all Steam Generators are faulted, transition to EOP-ECA-2.1, "Uncontrolled Depressurization of All Steam Generators," and lower AFW flow to each Steam Generator to 60 gpm.

While terminating Safety Injection in EOP-ECA-2.1, the "A" MSIV will close and the "A" S/G pressure is expected to rise higher than that of the "B" and "C" S/G's. Since the crew will be in the process of terminating SI in EOP-ECA-2.1, the crew will continue to complete the SI termination steps before transitioning back to EOP-E-2.

The scenario will terminate at Step 4.c of EOP-E-2, after the operator has closed the AFW Discharge valves to the "B" and "C" Steam Generators. Depending on the timing of the actions

taken by the crew when the "A" MSIV is closed, the "A" S/G pressure may not rise significantly higher than that of the "B" and "C" S/Gs, and the crew will remain in EOP-ECA-2.1 past the SI termination steps (i.e. Step 19). If this situation occurs, the scenario will terminate at Step 20 of EOP-ECA-2.1.

Critical Tasks:**Manually trip the reactor from the control room before entry into FRP-S.1**

Safety Significance: Failure to manually trip the reactor causes a challenge to the subcriticality CSF beyond that irreparably introduced by the postulated conditions. Additionally, it constitutes an incorrect performance that necessitates the operator taking compensating action that would complicate the event mitigation strategy and demonstrates the inability of the operator to recognize a failure or an incorrect automatic actuation of an ESF system or component. The ERG Background Document for E-0 states that one function of E-0 is to verify that all required automatic protective actions occur before transitioning the crew to the appropriate ORG. The verification is important because the subsequent ORGs are based on the assumption that protective systems will protect all CSFs while the ORG is implemented. Not tripping the reactor when it is possible to do so (as in the postulated conditions) forces an immediate extreme challenge to the subcriticality CSF. Additionally, the incorrect performance of failing to trip the reactor necessitates the operator taking compensating action that seriously complicates the event mitigation strategy. This mis-operation constitutes a significant reduction of safety margin beyond that irreparably introduced by the scenario.

Control the AFW flow rate to not less than 60 gpm per SG in order to minimize the RCS cooldown rate before an EXTREME (Red Path) challenge develops to the RCS Integrity CSF

Safety Significance: Failure to control the AFW flow rate to the SGs leads to an unnecessary and avoidable extreme challenge to the integrity CSF. Also, failure to perform the critical task increases the challenges to the subcriticality CSF beyond which is irreparably introduced by the postulated plant conditions. Thus, failure to perform the critical task constitutes a demonstrated inability by the operator to take one or more actions that would prevent a challenge to plant safety. It also fails to prevent a significant reduction of safety margin beyond that irreparably introduced by the scenario.

Facility: HB Robinson		Scenario No.: 6		Op Test No.: N16-1	
Examiners: _____		Operators: _____ (SRO)			
_____		_____ (RO)			
_____		_____ (BOP)			
Initial Conditions:		The plant is at 100% power (MOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.			
Turnover:		The following equipment is Out-Of-Service: The "A" EDG is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.8.1 ACTION B.1, B.2, B.3.2.1 and B.3.2.2, and B.4. R-15, Condenser Air Ejector Gas Radiation Monitor is OOS (I&C Investigating). RTGB Annunciator APP-002-F8, "STA AIR HDR LO PRESS," has failed to the ILLUMINATED condition (I&C is investigating). The "B" MFWP has experienced high noise/vibration over the last two hours (Maintenance is investigating).			
Event No.	Malf. No.	Event Type*	Event Description		
1	1	C-BOP C-SRO	Feedwater Heater Bypass Valve fails OPEN		
2	NA	R-RO N-BOP N-SRO	Lower Power		
3	2	C-BOP C(TS)-SRO	"C" Service Water Pump Trips		
4	3	C-RO C(TS)-SRO	DS Bus De-energizes/"C" CCW Pump Trips on Start		
5	4	C-RO C-SRO	"A" RCP Seal Failure		
6	5	M-RO M-BOP M-SRO	Loss of Offsite Power		
7	5	C-BOP	"B" EDG Fails to Start		
8	6	NA	DSDG Trips		
9	7	C-BOP	"D" Service Water Pump fails to Auto Start		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

HB Robinson 2016 NRC Scenario #6

The plant is at 100% power (MOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

The following equipment is Out-Of-Service: The following equipment is Out-Of-Service: The "A" EDG is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.8.1 ACTION B.1, B.2, B.3.2.1 and B.3.2.2, and B.4. R-15, Condenser Air Ejector Gas Radiation Monitor is OOS (I&C Investigating). RTGB Annunciator APP-002-F8, "STA AIR HDR LO PRESS," has failed to the ILLUMINATED condition (I&C is investigating). The "B" MFWP has experienced high noise/vibration over the last two hours (Maintenance is investigating).

Shortly after taking the watch, HCV-1459, Heater Bypass Valve will fail OPEN. The crew will implement AOP-010, "Main Feedwater/Condensate Malfunction," and close the valve.

After the overpower transient is stabilized, the WCCS will call the control room and direct that reactor power be lowered to 50% for the purpose of removing the "B" Main Feedwater Pump from service. The operator will lower power in accordance with AOP-038, "Rapid Downpower."

After the power reduction is in progress, the "C" Service Water Pump will trip on overload. This will cause the running Service Water Booster Pump to trip as well. The operator will respond in accordance with various APP-008 annunciators and start a standby Service Water Pump; and then respond in accordance with APP-002-A through D8, "HVH WTR OUTLET LO FLOW," and restart a Service Water Booster Pump. The operator will address Technical Specification LCO 3.7.7, "Service Water System (SWS)," and Technical Specification LCO 3.6.6, "Containment Spray and Cooling Systems."

Following this, Breaker 52/32A will Trip de-energizing the DS Bus, and stopping the only running Charging Pump and CCW Pump. The operator may address AOP-018, "Reactor Coolant Pump Abnormal Conditions," or various APP's to restore Charging and Seal Injection flow; and then APP-001-F5, CCW PMP LO PRESS, and ensure that the standby CCW Pump started. 10 seconds after the Standby CCW Pumps start, the "C" CCW Pump will trip, and only the "B" CCW will be left running. The operator will address Technical Specification LCO 3.7.6, "Component Cooling Water (CCW) System," and Technical Specification LCO 3.4.17, "Chemical and Volume Control System (CVCS)."

Next, a #1 Seal Failure will occur on the "A" RCP. The crew will implement AOP-018, "Reactor Coolant Pump Abnormal Conditions," trip the reactor, stop the pump, and three minutes after the pump is stopped, CLOSE the Seal Leakoff Valve. The crew will enter EOP-E-0, "Reactor Trip or Safety Injection." Simultaneously, a Loss of Offsite Power will occur on the reactor trip, and the "B" Emergency Diesel Generator will fail to automatically start. Additionally, the DS DG will trip.

Upon entry into EOP-E-0, the operator will determine that both ESF buses are de-energized and transition to EOP-ECA-0.0, "Loss of All AC Power." The operator will subsequently start the "B" EDG by depressing the SI Actuate Pushbutton, restore power to Bus E-2, and transition back to EOP-E-0. When Bus E-2 is re-energized, the "D" Service Water Pump will fail to sequence automatically and will need to be manually started.

Upon transition back to EOP-E-0, the crew will complete the immediate actions of EOP-E-0, and continue with AOP-018.

The scenario will terminate when the crew has terminated Safety Injection and re-established Charging/Seal Injection in Step 6 of ES-1.1.

Critical Tasks:**Energize at Least One AC Emergency Bus Before Defeating the Auto Loading of the Safeguards Equipment in EOP-ECA-0.0**

Safety Significance: Failure to energize an ac emergency bus constitutes mis-operation or incorrect crew performance in which the crew does not prevent degraded emergency power capacity. Failure to perform the critical task also results in needless degradation of any barrier to fission product release, specifically of the RCS barrier at the point of the RCP seals. Additionally, failure to perform the critical task results in the unnecessary continuation of a situation in which RCS inventory is being lost uncontrollably and cannot be replaced. This situation is equivalent to mis-operation or incorrect operator performance in which the operator does not prevent degraded emergency core cooling system (ECCS) capacity at a time when a small-break LOCA is in progress. In this case, at least one ac emergency bus can be energized from the control room. Failure to perform the critical task means that RCS inventory lost through the RCP seals cannot be replaced. It also means that the RCP seals remain without cooling and gradually deteriorate. As the seals deteriorate the rate of RCS inventory loss increases.

Manually Start SW Pump for EDG Cooling within 40 Minutes of starting the “B” EDG

Safety Significance: Failure to manually start the SW pump under the postulated plant conditions means that the EDG is running without SW cooling. Running the EDG without SW cooling leads to a high-temperature condition that can result in EDG failure due to damage caused by engine overheating. Under the postulated plant conditions, the running EDG is the only operable EDG. The calculated maximum time an EDG may operate without cooling to preclude adverse effects is 40 minutes. Since during the first 40 minutes of EDG operation in this scenario there are two procedural cues to check, and if needed, start a SW Pump, it is believed that failure to perform the critical task constitutes mis-operation or incorrect performance in which the crew does not prevent “degraded... emergency power capacity.”

ROBINSON Nuclear Training
Committed to Excellence

OPERATIONS TRAINING

N16-1-1

Initial Licensed Operator Training

Rev 012216

**THIS EXERCISE GUIDE DOES NOT
IMPLEMENT ANY COMMITMENTS**

Developed By:

 CHRISTOPHER McLAMB
Instructor/Developer

Date:

1/22/16

Concurred By:

 JOHN R. LITTLE III
Line Superintendent/Supervisor/SRO

Date:

01/22/16

Approved By:

 J. BACKLEY
Superintendent/Supervisor Training

Date:

1/22/16

PROGRAM: H B Robinson Operations Training

MODULE: Initial License Operator Training Class 15-1

TOPIC: NRC Simulator Exam

Scenario N16-1-1

REFERENCES:

1. Technical Specification LCO 3.7.4, "Auxiliary Feedwater (AFW) System" (Amendment 203)
2. APP-003, "RCS & Makeup Systems" (Rev 54)
3. AOP-025, "RTGB Instrument Failure" (Rev 24)
4. OWP-030, "Pressurizer Level Transmitters (PLT)" (Rev 11)
5. Technical Specification LCO 3.3.1, "Reactor Protection System (RPS) Instrumentation" (Amendment 176)
6. AOP-010, "Main Feedwater/Condensate Malfuction" (Rev 33)
7. OWP-034, "Steam Flow (SF)" (Rev 19)
8. Technical Specification LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation" (Amendment 176)
9. APP-007, "Condensate & Feedwater" (Rev 44)
10. OP-407, "Heater Drain and Vents" (Rev 51)
11. AOP-038, "Rapid Downpower" (Rev 3)
12. OP-105, "Maneuvering the Plant When > 25% Power" (Rev 62)
13. OP-301, "Chemical and Volume Control System (CVCS)" (Rev 112)
14. APP-010, "HVAC-Emerg. Generators & Misc. Systems" (Rev 81)
15. AOP-001, "Malfuction of Reactor Control System" (Rev 33)
16. EOP-E-0, "Reactor Trip or Safety Injection" (Rev 6)
17. EOP-ES-0.1, "Reactor Trip Response" (Rev 7)
18. EOP-E-3, "Steam Generator Tube Rupture" (Rev 7)

Validation Time: 144 minutes

Scenario Event Description
NRC Scenario 1

Facility: H B Robinson		Scenario No.: 1		Op Test No.: N16-1	
Examiners: _____		Operators: _____ (SRO)			
_____		_____ (RO)			
_____		_____ (BOP)			
Initial Conditions:		The plant is at 100% power (MOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.			
Turnover:		The following equipment is Out-Of-Service: The SDAFW Pump is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.7.4 ACTION A. FI-613, CCW System Flow is OOS (I&C Investigating). RTGB Annunciator APP-010-B3, "EDG B START AIR LO PRESS," has failed to the ILLUMINATED condition (I&C is investigating).			
Event No.	Malf. No.	Event Type*	Event Description		
1	1	I-RO N-BOP I(TS)-SRO	Pzr Level Transmitter LT-459 Fails LOW		
2	2	I-BOP I(TS)-SRO	"C" Steam Flow Transmitter FT-494 Fails LOW		
3	3	R-RO N-BOP N-SRO	Tube Leak in Feedwater Heater 4A/Downpower		
4	4	C-BOP C-SRO	CRDM Fan "A" Failure		
5	5	C-RO C-SRO	Continuous Inward Rod Motion		
6	6	M-RO M-BOP M-SRO	"C" Steam Generator Tube Rupture		
7	7	C-BOP	Loss of Off-Site Power		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Scenario Event Description
NRC Scenario 1

H B Robinson 2016 NRC Scenario #1

The plant is at 100% power (MOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

The following equipment is Out-Of-Service: The SDAFW Pump is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.7.4 ACTION A. FI-613, CCW System Flow is OOS (I&C Investigating). RTGB Annunciator APP-010-B3, "EDG B START AIR LO PRESS," has failed to the ILLUMINATED condition (I&C is investigating).

Shortly after taking the watch, Pressurizer Level Transmitter, LT-459 will fail LOW causing normal letdown to isolate, de-energizing of pressurizer control group heaters and charging pump speed to rise for the pump in AUTO. The operator will respond in accordance APP-003-E8, "PZR CONTROL HI/LO LVL," and AOP-025, "RTGB Instrument Failure." The operator will remove the failed instrument from service in accordance with OWP-030, "Pressurizer Level Transmitters." The operator will address Technical Specification LCO 3.3.1, "Reactor Protection System (RPS) Instrumentation."

Following this, the controlling steam flow channel for S/G "C", FT-494, will fail LOW, causing FRV-498 to start to CLOSE. The operator will respond in accordance with AOP-010, "Main Feedwater/Condensate Malfunction," and/or AOP-025, "RTGB Instrument Failure." The operator will remove the failed instrument from service in accordance with OWP-034, "Steam Flow." The operator will address Technical Specification LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation."

Next, a tube leak will develop in Feed Water Heater 4A. The operator will respond in accordance with APP-007-E7, HTR 4A HI/LO LVL, identifying the leak. The operator may enter AOP-010, "Main Feedwater/Condensate Malfunction." Ultimately, the operator will use OP-407, "Heater Drain and Vents," to remove Feedwater Heaters 5A, 4A, and 3A from Service. This will require a power decrease. The operator will use either AOP-038, "Rapid Downpower," or OP-105, "Maneuvering the Plant When > 25% Power," and OP-301, "Chemical and Volume Control System (CVCS)," to lower plant power.

During the downpower, the "A" CRDM Fan will trip. The operator will address APP-010-A6, HVH-5A/B AIR FLOW LOST/OVLD, and manually start the "B" CRDM Fan.

Shortly afterwards, a continuous control rod insertion will occur. The operator will respond in accordance with AOP-001, "Malfunction of Reactor Control System." The operator will be unable to control the rod insertion and will manually trip the reactor.

On the reactor trip, a 500 gpm Steam Generator Tube Rupture will occur (over 10 minutes) on the "C" Steam Generator. The operator will enter EOP-E-0, "Reactor Trip or Safety Injection." After the Immediate Actions are complete, it is likely that the operator will determine that SI is NOT actuated nor required, and transition to EOP-ES-0.1, "Reactor Trip Response." While in this procedure the operator will determine that SI is required, manually actuate SI, and return to EOP-E-0. Upon completion of EOP-E-0, the operator will transition to EOP-E-3, "Steam Generator Tube Rupture," to isolate the flow into and out of the "C" Steam Generator and then conduct a cooldown of the RCS.

Upon transition into EOP-E-3, a Loss of Off-Site Power will occur. Both EDGs will start and re-power Buses E-1 and E-2. With SI previously reset, the operator will need to address a re-

Scenario Event Description
NRC Scenario 1

initiation of AFW flow to all Steam Generators, and the restart of the ECCS Pumps. The operator will continue with EOP-E-3 and conduct the RCS cooldown using the “A” and “B” Steam Generator PORVs.

During the RCS depressurization, the Pzr Spray Valves will not be available. The operator will be required to conduct the depressurization using an available Pzr PORV.

The scenario will terminate at Step 23 of EOP-E-3, after the operator has stopped the SI Pumps.

Critical Tasks:

Manually control “C” S/G Narrow Range Level before a Reactor Trip occurs on low S/G level.

Safety Significance: failure to take manual control of the “C” S/G Feed Reg Valve and control Narrow Range S/G level, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection System. Performance of the critical task would stabilize the S/G level transient. A failure to stabilize the S/G level transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS temperature/pressure control.

Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs (EOP-Based)

Safety Significance: Failure to isolate the ruptured SG causes a loss of differential pressure between the ruptured SG and the intact SGs. The fact that the operator allows the differential pressure to dissipate and, as a result, are then forced to transition to a contingency procedure constitutes an incorrect performance that necessitates the operator taking compensating action that would unnecessarily complicate the event mitigation strategy.

While in EOP-E-3, establish/maintain an RCS temperature so that transition from E-3 does not occur because the RCS temperature is in either (1) Too high to maintain 38°F of RCS Subcooling OR (2) below 295°F (RCS Integrity Red Path Limit) (EOP-Based)

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. This failure constitutes an incorrect performance that necessitates the operator taking compensating action that would unnecessarily complicate the event mitigation strategy.

Depressurize the RCS to meet SI termination criteria before Steam Generator Overfill is reached based on Water in the Steam Lines. (EOP-Based, if above 100% WR level see Simulator Code “thlecell(193)” to determine)

Safety Significance: Failure to stop reactor coolant leakage into a ruptured SG by depressurizing the RCS (when it is possible to do so) needlessly complicates mitigation of the event. It also constitutes a significant reduction of safety margin beyond that irreparably introduced by the scenario.

Scenario Event Description
NRC Scenario 1

SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Sim. Setup	Reset to Temp IC 608	
<input type="checkbox"/>	<p>T = 0 Malfunctions:</p> <p>SDAFW Pump OOS:</p> <ul style="list-style-type: none"> • irf EPSMCC5_189 f:RACK_OUT (V1-8A, "A" S/G supply to SDAFW) • irf EPSMCC6_226 f:RACK_OUT (V1-8B, "B" S/G supply to SDAFW) • irf EPSMCC6_227 f:RACK_OUT (V1-8C, "C" S/G supply to SDAFW) • irf EPSMCC10_262 f:RACK_OUT (V2-14A, SDAFW discharge to "A" S/G) • irf EPSMCC9_254 f:RACK_OUT (V2-14B, SDAFW discharge to "B" S/G) • irf EPSMCC10_267 f:RACK_OUT (V2-14C, SDAFW discharge to "C" S/G) <p>PLACE RED CAPS on the RTGB Control Switches for the Valves ABOVE</p> <p>Place GREEN CAPS on the RTGB Control Switches BELOW (See OMM-048, Attachment 9):</p> <ul style="list-style-type: none"> • "A" MDAFW RTGB Switch • "B" MDAFW RTGB Switch • AFW Valve V2-16A RTGB Switch • AFW Valve V2-16B RTGB Switch • AFW Valve V2-16C RTGB Switch • AFW Valve V2-20A RTGB Switch • AFW Valve V2-20B RTGB Switch • Protected Switchyard <p>FI-613 CCW System Flow OOS</p> <ul style="list-style-type: none"> • IOR aoCCWAOD010B f:0 <p>Place WHITE DOT on FI-613</p> <p>RTGB Annunciator APP-010-B3 failed ON</p> <ul style="list-style-type: none"> • IMF ANN10B03 f:ALARM_ON <p>Place WHITE DOT on APP-010-B3</p> <p>Place the Simulator in RUN and ACKNOWLEDGE all alarms.</p>		
<input type="checkbox"/>	Perform Attachment 2 (Simulator Setup For Exams) of TAP-411.		

Scenario Event Description
NRC Scenario 1

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Crew Briefing 1. Assign Crew Positions based on evaluation requirements 2. Review the Shift Turnover Information with the crew. 3. Provide the crew with the following: <ul style="list-style-type: none"> • OST-947, Operations Reactivity Plan • Copy of Technical Specifications/Basis 4. Direct the crew to Review the Control Boards taking note of present conditions, alarms.		
<input type="checkbox"/>	T-0	Begin Familiarization Period	
<input type="checkbox"/>	At direction of examiner	Execute Lesson Plan for Simulator Scenario N16-1-1.	
<input type="checkbox"/>	At direction of examiner	Event 1 ICO PRSXMTLT_459 r:15 f:0	Pzr Level Transmitter LT-459 Fails LOW
<input type="checkbox"/>	At direction of examiner	Event 2 ICO SGNXMTFT_494 r:01:00 f:0	"C" Steam Flow Transmitter FT-494 Fails LOW
<input type="checkbox"/>	At direction of examiner	Event 3 IMF CFW14G r:02:00 f:800000	Tube Leak in Feedwater Heater 4A/Downpower
<input type="checkbox"/>	At direction of examiner	Event 4 IMF HVA05A f:MOTOR_SHORT	CRDM Fan "A" Failure
<input type="checkbox"/>	At direction of examiner	Event 5 IMF CRF06A IMF CRF06B	Continuous Inward Rod Motion NOTE: This will occur on a Rod Inward signal (\$006_RODS_INCRF07 r:5 f:72)
<input type="checkbox"/>	At direction of examiner	Event 6 IMF SGN02F r:10:00 f:500	"C" Steam Generator Tube Rupture NOTE: The SGTR will occur on Rx Trip (\$006_N16-1-1_SGTR_ON_TRIP)

Scenario Event Description
NRC Scenario 1

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Post-Rx Trip Upon Transition to EOP-E-3	Event 7 IMF EPS13	Loss of Off-Site Power
<input type="checkbox"/>	Terminate the scenario upon direction of Lead Examiner		

Op Test No.: N16-1 Scenario # 1 Event # 1 Page 9 of 70Event Description: **Pzr Level Transmitter LT-459 Fails LOW**

Shortly after taking the watch, Pressurizer Level Transmitter, LT-459 will fail LOW causing normal letdown to isolate, de-energizing of pressurizer control group heaters and charging pump speed to rise for the pump in AUTO. The operator will respond in accordance APP-003-E8, "PZR CONTROL HI/LO LVL," and AOP-025, "RTGB Instrument Failure." The operator will remove the failed instrument from service in accordance with OWP-030, "Pressurizer Level Transmitters." The operator will address Technical Specification LCO 3.3.1, "Reactor Protection System (RPS) Instrumentation."

Booth Operator Instructions: **ICO PRSXMTLT_459**
r:15 f:0

Indications Available:

- RTGB Annunciator APP-003-F4, CHG PMP HI SPEED
- RTGB Annunciator APP-003-E8, PZR CONTROL HI/LO LVL
- PZR Level LI-459A lowering
- PZR Level LI-460/461 stable
- "C" Charging Pump speed rising
- Normal Letdown isolates

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The CRS may enter AOP-025 directly.
APP-003-E8, PZR CONTROL HI/LO LVL			
	RO	(Step 1) IF Letdown is isolated, THEN ensure one Charging Pump running at minimum.	NOTE: The RO will take Charging Pump to MANUAL and adjust to MINIMUM speed.
	CRS	(Step 2) IF a load rejection has occurred, THEN	
	CRS	(Step 3) IF excessive RCS leakage exists, THEN.....	
	RO	(Step 4) IF a level controller has failed, THEN manually adjust Charging and/or Letdown to maintain PZR level	NOTE: The RO will control Charging flow as needed. The RO will adjust Seal Injection flow by controlling HIC-121.

Op Test No.: N16-1 Scenario # 1 Event # 1 Page 10 of 70Event Description: **Pzr Level Transmitter LT-459 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 5) IF a level channel failure has occurred, THEN refer to AOP-025, RTGB Instrument Failure	NOTE: The CRS will transition to AOP-025.
AOP-025, RTGB INSTRUMENT FAILURE			
	CRS	(Step 1) GO TO Appropriate Section For Failed Instrument:	NOTE: The CRS will select Section B of AOP-025.
		<ul style="list-style-type: none"> PZR LEVEL (LT-459, 460, 461) - SECTION B 	
AOP-025, RTGB INSTRUMENT FAILURE SECTION B, PZR LEVEL TRANSMITTER FAILURE			
	RO	(Step 1) CHECK Failed Instrument - FAILED LOW	
	RO	(Step 2) PLACE LCV-460 A&B Control Switch In CLOSE	NOTE: The RO may re-positioned the Control Switch earlier based on Step 5.3.7.5 of OMM-022.
	RO	(Step 3) CHECK Charging Pumps - ONLY ONE PUMP RUNNING IN MANUAL CONTROL	
	RO	(Step 3 RNO) ENSURE only one charging pump is running in manual control.	
	RO	(Step 4) ADJUST Charging Pump Speed To Control PZR LEVEL Between 22% And 53%	NOTE: PZR level will rise, and may exceed TS LCO 3.4.9 (63.3%).
	CRS	(Step 5) NOTIFY Plant Personnel Of Procedure Entry Using PA System	NOTE: The CRS will most likely make this announcement.

Op Test No.: N16-1 Scenario # 1 Event # 1 Page 11 of 70Event Description: **Pzr Level Transmitter LT-459 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 6) CHECK RCP Seal Injection Flow - BETWEEN 8 GPM AND 13 GPM	
	RO	(Step 6 RNO) Locally THROTTLE RCP SEAL WATER FLOW CONTROL VALVE(s) to obtain flow to each RCP between 8 gpm and 13 gpm.	NOTE: The BOP may contact the AO to adjust Seal Injection flows. If so, Booth Instructor acknowledge as AO; and use: IRF CVC030 f: variable IRF CVC031 f: variable IRF CVC032 f: variable
		<ul style="list-style-type: none"> CVC-297A 	
		<ul style="list-style-type: none"> CVC-297B 	
		<ul style="list-style-type: none"> CVC-297C 	
		<ul style="list-style-type: none"> IF required to maintain 8 GPM flow, THEN THROTTLE HIC-121, CHARGING FLOW, while maintaining charging pump discharge pressure less than 2500 psig. 	
		<ul style="list-style-type: none"> REVIEW TS LCO 3.4.17 for applicability. 	
	RO	(Step 7) CHECK Controlling Channel - FAILED	NOTE: LT-459 has failed LOW.
	RO	(Step 8) CHECK LT-461 - OPERABLE	
	RO	(Step 9) PLACE LM-459 In 461 REPL 459	
	RO	(Step 10) PLACE LR-459 In REC 461	
	RO	(Step 11) CHECK Normal Letdown - IN SERVICE	

Op Test No.: N16-1 Scenario # 1 Event # 1 Page 12 of 70Event Description: **Pzr Level Transmitter LT-459 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 11 RNO) IF normal letdown is desired, THEN RESTORE normal letdown using Attachment 1, Restoration of Normal Letdown.	NOTE: The CRS will hand off the restoration of Letdown to the BOP.
AOP-025, RTGB INSTRUMENT FAILURE ATTACHMENT 1, RESTORATION OF NORMAL LETDOWN			
	BOP	(Step 1) ENSURE Normal Charging Flow Through The Regenerative Heat Exchanger Is In Service.	
	BOP	(Step 2) ENSURE Phase A Containment Isolation Signal NOT Present.	
	BOP	(Step 3) NOTIFY RC That Normal Letdown Flow Will Be Restored And The Affected Areas Should Be Monitored For Changing Radiological Conditions.	NOTE: The BOP will call RC to address the potential changing radiological conditions. If so, Booth Instructor acknowledge as RC.
	BOP	(Step 4) ENSURE The Following Valves Are Closed:	
		<ul style="list-style-type: none"> • CVC-204A, LETDOWN LINE ISO • CVC-204B, LETDOWN LINE ISO • LCV-460A, LTDN LINE STOP • LCV-460B, LTDN LINE STOP • CVC-200A, LETDOWN ORFICE ISOLATION • CVC-200B, LETDOWN ORFICE ISOLATION • CVC-200C, LETDOWN ORFICE ISOLATION 	
	BOP	(Step 5) ENSURE HIC-121, CHARGING FLOW, Is Set For Full Open.	

Op Test No.: N16-1 Scenario # 1 Event # 1 Page 13 of 70Event Description: **PZR Level Transmitter LT-459 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 6) ENSURE PZR Level Is Greater Than Or Equal To Program Level.	NOTE: PZR Level will likely be above program.
	BOP	(Step 7) IF Desired, THEN PLACE TCV-143, VCT/DEMIN In The VCT Position.	
	BOP	(Step 8) PLACE PCV-145, PRESSURE, In MAN.	
	BOP	(Step 9) ADJUST PC-145 To Throttle PCV-145 To 45% To 55% Open.	
	BOP	(Step 10) OPEN The Following:	
		<ul style="list-style-type: none"> CVC-204A, LETDOWN LINE ISO 	
		<ul style="list-style-type: none"> CVC-204B, LETDOWN LINE ISO 	
	BOP	(Step 11) OPEN LCV-460A&B:	
		<ul style="list-style-type: none"> PLACE LTDN LINE STOP LCV-460 A&B switch to OPEN. 	
		<ul style="list-style-type: none"> PLACE LTDN LINE STOP LCV-460 A&B switch to AUTO. 	
	BOP	(Step 12) ESTABLISH Cooling To NON-REGEN HX:	
		<ul style="list-style-type: none"> PLACE TC-144, NON-REGEN HX OUTLET TEMP in MANUAL. 	
		<ul style="list-style-type: none"> ADJUST TC-144 NON-REGEN HX OUTLET TEMP as necessary to ensure letdown temperature does not rise above 127°F when letdown is reestablished. 	

Op Test No.: N16-1 Scenario # 1 Event # 1 Page 14 of 70Event Description: **Pzr Level Transmitter LT-459 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 13) While MAINTAINING Charging Pump Discharge Pressure As Indicated On PI-121 Less Than 2500 psig, ADJUST Charging Pump Speed To The Expected Letdown Flow To Be Established In The Next Step.	
	BOP	(Step 14) OPEN One LTDN ORIFICE Valve:	NOTE: PZR Level will likely be above program, and the BOP may place a 60 gpm orifice in service.
		<ul style="list-style-type: none"> CVC-200A, LETDOWN ORFICE ISOLATION 	
		<ul style="list-style-type: none"> CVC-200B, LETDOWN ORFICE ISOLATION 	
		<ul style="list-style-type: none"> CVC-200C, LETDOWN ORFICE ISOLATION 	
	BOP	(Step 15) PLACE PC-145 In AUTO And CHECK Letdown Pressure As Indicated On PI-145, LOW PRESS LTDN PRESS, Is Being Maintained Between 300 Psig And 320 Psig.	
	BOP	(Step 16) PLACE TC-144, NON-REGEN HX OUTLET TEMP, In AUTO.	
	BOP	(Step 17) IF TCV-143 Was Selected To VCT, THEN POSITION TCV-143 As Directed By The CRS/SM.	

Op Test No.: N16-1 Scenario # 1 Event # 1 Page 15 of 70Event Description: **PZR Level Transmitter LT-459 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 18) IF Charging Flow Is Changed, THEN ESTABLISH RCP Seal injection Flow Between 8 GPM and 13 GPM By Throttling The Following: <ul style="list-style-type: none"> CVC-297A, RCP A SEAL WATER FLOW CONTROL VALVE CVC-297B, RCP B SEAL WATER FLOW CONTROL VALVE CVC-297C, RCP C SEAL WATER FLOW CONTROL VALVE 	NOTE: The BOP may contact the AO to adjust Seal Injection flows. If so, Booth Instructor acknowledge as AO; and use: IRF CVC030 f: variable IRF CVC031 f: variable IRF CVC032 f: variable
	BOP	(Step 19) IF Additional Letdown Flow Is Desired,....	NOTE: PZR Level will likely be above program, and the BOP may discuss with the CRS/RO about additional Letdown flow.
	BOP	(Step 20) NOTIFY Chemistry That Normal Letdown Has Been Restored.	NOTE: The BOP will call Chemistry to notify that normal letdown is back in service. If so, Booth Instructor acknowledge as Chemistry.
AOP-025, RTGB INSTRUMENT FAILURE SECTION B, PZR LEVEL TRANSMITTER FAILURE			
	RO	(Step 12) RESTORE PZR Level Control To Automatic:	Examiner Note: PZR Level may require additional adjustment prior to restoring the controller to AUTO. The crew may complete the event with Level control still in MANUAL.
		<ul style="list-style-type: none"> CHECK PZR level - WITHIN $\pm 1\%$ OF PROGRAMMED REFERENCE LEVEL 	
		<ul style="list-style-type: none"> RESTORE PZR level control to automatic 	
	RO	(Step 13) RESET PZR Heaters:	

Op Test No.: N16-1 Scenario # 1 Event # 1 Page 16 of 70Event Description: **Pzr Level Transmitter LT-459 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> PLACE PZR HTR CONTROL GROUP control switch in OFF and return to ON 	
		<ul style="list-style-type: none"> PLACE PZR HTR BACK-UP GROUP A control switch in OFF and return to AUTO or ON as desired 	
		<ul style="list-style-type: none"> PLACE PZR HTR BACK-UP GROUP B control switch in OFF and return to AUTO or ON as desired 	
	RO	(Step 14) CHECK RCP Seal Injection Flow - BETWEEN 8 GPM AND 13 GPM	
	RO	(Step 14 RNO) Locally THROTTLE RCP SEAL WATER FLOW CONTROL VALVE(s) to obtain flow to each RCP between 8 gpm and 13 gpm:	NOTE: The BOP may contact the AO to adjust Seal Injection flows. If so, Booth Instructor acknowledge as AO; and use: IRF CVC030 f: variable IRF CVC031 f: variable IRF CVC032 f: variable
		<ul style="list-style-type: none"> CVC-297A 	
		<ul style="list-style-type: none"> CVC-297B 	
		<ul style="list-style-type: none"> CVC-297C 	
	CRS	(Step 15) REMOVE Failed Transmitter From Service Using OWP-030	NOTE: The CRS will address OWP-030.
OWP-030, PRESSURIZER LEVEL TRANSMITTERS (PLT) PLT-1, PRESSURIZER LEVEL TRANSMITTER LT-459			
	CRS	Address PLT-1	

Op Test No.: N16-1 Scenario # 1 Event # 1 Page 17 of 70Event Description: **Pzr Level Transmitter LT-459 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	Insert Trip Signals	NOTE: The BOP will enter the Simulator Booth (Simulating the Hagan Room). Booth Instructor coordinate with BOP to insert Trip Signals: OPEN Protection Racks Door: IRF BST101 f:D_OPEN <ul style="list-style-type: none"> • BST058 TRIP • BST001 TRIP CLOSE Protection Racks Door: IRF BST101 f:D_CLOSED
		<ul style="list-style-type: none"> • B/S 459A-1, Hagan Rack #2 (PZR Hi Level) 	NOTE: B/S Status Light Przr Hi Level LC-459A-1 will ILLUMINATE.
		<ul style="list-style-type: none"> • B/S 459A-2, Hagan Rack #2 (PZR Lo Level) 	NOTE: B/S Status Light Przr Lo Level LC-459A-2 will ILLUMINATE.
AOP-025, RTGB INSTRUMENT FAILURE SECTION B, PZR LEVEL TRANSMITTER FAILURE			
	CRS	(Step 16) GO TO Procedure Main Body, Step 2	NOTE: The CRS will address Technical Specifications.
AOP-025, RTGB INSTRUMENT FAILURE			
	CRS	(Step 2) IMPLEMENT EALs	NOTE: The CRS may ask SM to address. If so, Floor Instructor acknowledge as SM.
	CRS	(Step 3) RETURN TO Procedure And Step In Effect	
TECHNICAL SPECIFICATION 3.3.1, REACTOR PROTECTION SYSTEM (RPS) INSTRUMENTATION			

Op Test No.: N16-1 Scenario # 1 Event # 1 Page 18 of 70Event Description: **Pzr Level Transmitter LT-459 Fails LOW**

Time	Pos.	Expected Actions/Behavior			Comments
	CRS	LCO 3.3.1 The RPS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.			
	CRS	APPLICABILITY: According to Table 3.3.1-1.			
	CRS	ACTIONS			
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that Function 8, Pressurizer Water Level – High, is affected and that Action M.1 or M.2 must be entered.
		M. One channel inoperable.	M.1 Place channel in trip. OR M.2 Reduce THERMAL POWER to < P-7.	6 hours 12 hours	
TECHNICAL SPECIFICATION 3.4.9, PRESSURIZER					
	CRS	LCO 3.4.9 The pressurizer shall be OPERABLE with:			
		a. Pressurizer water level \leq 63.3% in MODE 1;			
		b. Pressurizer water level \leq 92% in MODES 2 and 3; and			
		c. Pressurizer heaters OPERABLE with a capacity of \geq 125 kW and capable of being powered from an emergency power supply.			
	CRS	APPLICABILITY: MODES 1, 2, and 3.			
	CRS	ACTIONS			

Op Test No.: N16-1 Scenario # 1 Event # 1 Page 19 of 70

Event Description: **Pzr Level Transmitter LT-459 Fails LOW**

Time	Pos.	Expected Actions/Behavior			Comments
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: Due to the loss of Letdown PZR level will continue to rise until normal Letdown is restored. Consequently the crew is expected to be logged in, and then out of TS LCO 3.4.9
		A. Pressurizer water level not within limit.	A.1 Be in MODE 3 with reactor trip breakers open. AND A.2 Be in MODE 4.	6 hours 12 hours	
					NOTE: The CRS will likely conduct an Alignment Brief.
At the discretion of the Lead Examiner move to Event #2.					

Op Test No.: N16-1 Scenario # 1 Event # 2 Page 20 of 70Event Description: **"C" Steam Flow Transmitter FT-494 Fails LOW**

Following this, the controlling steam flow channel for S/G "C", FT-494, will fail LOW, causing FRV-498 to start to CLOSE. The operator will respond in accordance with AOP-010, "Main Feedwater/Condensate Malfuction," and/or AOP-025, "RTGB Instrument Failure." The operator will remove the failed instrument from service in accordance with OWP-034, "Steam Flow." The operator will address Technical Specification LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation."

Booth Operator Instructions: **ICO SGNXMTFT_494**
r:01:00 f:0

Indications Available:

- RTGB Annunciator APP-006-C3, S/G C LVL DEV
- Lowering demand on FCV-498 ("C" S/G Feedwater Reg Valve)
- Narrow Range Level in "C" S/G lowering
- FR-498 indicates that the gap between Feedwater and Steam flow to and from "C" S/G is rising

Time	Pos.	Expected Actions/Behavior	Comments
			Examiner Note: It is most likely that the CRS will respond to the symptoms and enter AOP-010 first. However, the crew may recognize the failure and respond by entering AOP-025 first. If so, proceed to AOP-025 section below.
AOP-010, MAIN FEEDWATER/CONDENSATE MALFUNCTION			
	BOP	(Step 1) CHECK FRVs - OPERATING PROPERLY (MANUAL OR AUTO):	Immediate Action NOTE: The BOP will control FCV-498 in MANUAL.
		• FCV-478	
		• FCV-488	
		• FCV-498	
	RO/ BOP	(Step 2) CHECK Reactor Trip Setpoint - BEING APPROACHED	NOTE: A Power Limit Warning is possible during this event which will require a reduction in power.

Op Test No.: N16-1 Scenario # 1 Event # 2 Page 21 of 70Event Description: **"C" Steam Flow Transmitter FT-494 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 2 RNO) IF a reactor trip setpoint is approached, THEN....	
		GO TO Step 4.	
	RO	(Step 4) CHECK Reactor Power - LESS THAN OR EQUAL TO 100%	
<u>Critical Task:</u> Manually control "C" S/G Narrow Range Level before a Reactor Trip occurs on low S/G level. Safety Significance: failure to take manual control of the "C" S/G Feed Reg Valve and control Narrow Range S/G level, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection System. Performance of the critical task would stabilize the S/G level transient. A failure to stabilize the S/G level transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS temperature/pressure control.			
	CRS	(Step 5) NOTIFY Plant Personnel Of Procedure Entry Using Plant Page System	NOTE: The CRS will most likely make this announcement.
	CRS	(Step 6) GO TO Appropriate Step From Table Below:	
		FRV Failure To Control - OBSERVE NOTE 58	
	BOP	(Step 58) CHECK S/G Level - AT OR TRENDING TO PROGRAM	NOTE: The CRS will likely transition to AOP-025 based on the Note prior to Step 58.
AOP-025, RTGB INSTRUMENT FAILURE			
	CRS	(Step 1) GO TO Appropriate Section For Failed Instrument:	NOTE: The CRS will select Section D of AOP-025.

Op Test No.: N16-1 Scenario # 1 Event # 2 Page 22 of 70Event Description: **"C" Steam Flow Transmitter FT-494 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> S/G Steam Flow (FT-476, 477, 484, 485, 494, 495) - SECTION D 	
AOP-025, RTGB INSTRUMENT FAILURE SECTION D, S/G FEED FLOW, STEAM FLOW OR STEAM PRESSURE TRANSMITTER FAILURE			
	BOP	(Step 1) CHECK Affected FRV In MAN:	Immediate Action NOTE: The BOP will control FCV-498 in MANUAL.
		<ul style="list-style-type: none"> FCV-478 (FRV "A") 	
		<ul style="list-style-type: none"> FCV-488 (FRV "B") 	
		<ul style="list-style-type: none"> FCV-498 (FRV "C") 	
	BOP	(Step 2) RESTORE Affected S/G Level To Program	Immediate Action
<u>Critical Tasks:</u> Manually control "C" S/G Narrow Range Level before a Reactor Trip occurs on low S/G level. Safety Significance: failure to take manual control of the "C" S/G Feed Reg Valve and control Narrow Range S/G level, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection System. Performance of the critical task would stabilize the S/G level transient. A failure to stabilize the S/G level transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS temperature/pressure control.			
	BOP	(Step 3) CHECK Reactor Trip Setpoint - BEING APPROACHED	
	CRS	(Step 3 RNO) IF a reactor trip setpoint is approached, THEN....	NOTE: This is a Continuous Action. The CRS will make both board operators aware.
		GO TO Step 5.	

Op Test No.: N16-1 Scenario # 1 Event # 2 Page 23 of 70Event Description: **"C" Steam Flow Transmitter FT-494 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 5) NOTIFY Plant Personnel Of Procedure Entry Using PA System	NOTE: The CRS will most likely make this announcement.
	BOP	(Step 6) CHECK Failure - FEED FLOW INSTRUMENT FAILURE	
	CRS	(Step 6 RNO) IF failure was a steam flow instrument, THEN GO TO Step 12.	
	BOP	(Step 12) PLACE Affected S/G Steam Flow Selector Switch To The Alternate Channel:	
		<ul style="list-style-type: none"> S/G "C" STEAM FLOW - FR-498 	
		<ul style="list-style-type: none"> Failed Channel FT-494 – Position CH495 	
	BOP	(Step 13) RESTORE Affected Controller To Automatic:	
		<ul style="list-style-type: none"> CHECK S/G level - WITHIN $\pm 1\%$ OF PROGRAMMED LEVEL 	
		<ul style="list-style-type: none"> PLACE affected controller in AUTO 	
	BOP	(Step 14) REMOVE Affected Transmitter From Service Using OWP-034:	NOTE: The CRS will address OWP-034.
		Channel FT-494 – OWP SF-5	
OWP-034, STEAM FLOW (SF) SF-5, STEAM FLOW TRANSMITTER FT-494			
	CRS	Address SF-5	
	BOP	DELETE INPUT FT-494 (MSF0445A) FROM CALO PROCESSING IAW OMM-007.	

Op Test No.: N16-1 Scenario # 1 Event # 2 Page 24 of 70Event Description: **"C" Steam Flow Transmitter FT-494 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	Insert Trip Signals	NOTE: The BOP will enter the Simulator Booth (Simulating the Hagan Room). Booth Instructor coordinate with BOP to insert Trip Signals: OPEN Protection Racks Door: IRF BST101 f:D_OPEN • BST020 TRIP CLOSE Protection Racks Door: IRF BST101 f:D_CLOSED
		<ul style="list-style-type: none"> B/S 494, HAGAN RACK #16 (LOOP 3 HI STM FLOW) 	NOTE: B/S STATUS LIGHT LOOP 3 HI STM FLOW FC-494, and APP-036-L1, APP-006-F4, and APP-006-C2 will ILLUMINATE.
AOP-025, RTGB INSTRUMENT FAILURE SECTION D, S/G FEED FLOW, STEAM FLOW OR STEAM PRESSURE TRANSMITTER FAILURE			
	CRS	(Step 15) REVIEW TS LCOs for applicability:	
		<ul style="list-style-type: none"> TS LCO 3.3.1 	
		<ul style="list-style-type: none"> TS LCO 3.3.2 	
	CRS	(Step 16) GO TO Procedure Main Body, Step 2	
AOP-025, RTGB INSTRUMENT FAILURE			
	CRS	(Step 2) IMPLEMENT EALs	NOTE: The CRS may ask SM to address. If so, Floor Instructor acknowledge as SM.
	CRS	(Step 3) RETURN TO Procedure And Step In Effect	

Op Test No.: N16-1 Scenario # 1 Event # 2 Page 25 of 70Event Description: **"C" Steam Flow Transmitter FT-494 Fails LOW**

Time	Pos.	Expected Actions/Behavior			Comments
TECHNICAL SPECIFICATION 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION					
	CRS	LCO 3.3.2 The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE.			
	CRS	APPLICABILITY: According to Table 3.3.2-1.			
	CRS	ACTIONS			
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that Functions 1.f (SI-High Steam Flow in Two Steam Lines), 1.g (SI- High Steam Flow in Two Steam Lines Coincident with Steam Line Pressure Low), 4.d (MSI - High Steam Flow in Two Steam Lines Coincident with Tavg LOW) and 4.e (MSI - High Steam Flow in Two Steam Lines Coincident with Steam Line Pressure Low), are affected; and that Action D.1 of D2.1 and D.2.2 must be entered
		D. One channel inoperable	NOTE For Function 4.c, a channel may be taken out of the trip condition for 6 hours for maintenance.	6 hours	
			D.1 Place channel in trip.	12 hour	
			OR D.2.1 Be in MODE 3.	18 hours	
			AND D.2.2 Be in MODE 4.		
At the discretion of the Lead Examiner move to Event #3.					

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 26 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Next, a tube leak will develop in Feed Water Heater 4A. The operator will respond in accordance with APP-007-E7, HTR 4A HI/LO LVL, identifying the leak. The operator may enter AOP-010, "Main Feedwater/Condensate Malfunction." Ultimately, the operator will use OP-407, "Heater Drain and Vents," to remove Feedwater Heaters 5A, 4A, and 3A from Service. This will require a power decrease. The operator will use either AOP-038, "Rapid Downpower," or OP-105, "Maneuvering the Plant When > 25% Power," and OP-301, "Chemical and Volume Control System (CVCS)," to lower plant power.

Booth Operator Instructions: **IMF CFW14G**
r:02:00 f:800000

(NOTE: This Malfunction requires 3 minutes to generate APP-007-E7)

Indications Available:

- RTGB Annunciator APP-007-E7, HTR 4A HI/LO LVL
- Feed Flow lowering on all three S/Gs
- Narrow Range Level lowering on all three S/Gs

Time	Pos.	Expected Actions/Behavior	Comments
			Examiner Note: When this alarm occurs the crew may address AOP-010 or use APP-007 E7 to direct entry into OP-407. If the crew uses APP-007-E7 , continue below. If the crew enters AOP-010 , proceed to Step 1 on Page 27 .
APP-007-E7, HTR 4A HI/LO LVL			
	CRS	(Step 1) IF level alarm is due to low power maneuvering, THEN.....	
	BOP	(Step 2) IF required, THEN dispatch an Operator to check:	NOTE: The CRS will dispatch an AO. If so, Booth Instructor acknowledge as AO, and report after 1 minute that the 4A FWH sightglass is FULL and the LCVs are FULL OPEN.
		<ul style="list-style-type: none"> • Sightglass level 	

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 27 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Level Control Valve position 	
	BOP/ CRS	(Step 3) IF a level control valve has malfunctioned, THEN....	
	CRS	(Step 4) IF tube leakage is occurring, THEN bypass the affected string of Heaters for repair of defective tubes using OP-407, Heater Drains and Vents	Examiner NOTE: The CRS will transition to OP-407 to remove Heaters 5A, 4A and 3A from service. If so, proceed to OP-407 actions on Page 30 .
			NOTE: During the transient there is a possibility that TS LCO 3.4.1 (DNB) will be entered.
AOP-010, MAIN FEEDWATER/CONDENSATE MALFUNCTION			
	BOP	(Step 1) CHECK FRVs - OPERATING PROPERLY (MANUAL OR AUTO):	Immediate Action
		<ul style="list-style-type: none"> FCV-478 	
		<ul style="list-style-type: none"> FCV-488 	
		<ul style="list-style-type: none"> FCV-498 	
	RO/ BOP	(Step 2) CHECK Reactor Trip Setpoint - BEING APPROACHED	
	CRS	(Step 2 RNO) IF a reactor trip setpoint is approached, THEN....	
		GO TO Step 4.	
	RO	(Step 4) CHECK Reactor Power - LESS THAN OR EQUAL TO 100%	

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 28 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 5) NOTIFY Plant Personnel Of Procedure Entry Using Plant Page System	NOTE: The CRS will most likely make this announcement.
	CRS	(Step 6) GO TO Appropriate Step From Table Below:	NOTE: The CRS go to Step 33 based on a known tube leak in the A Train FWHS, or Step 35 based on other malfunctions
		Known Leak - 33	
		Other - 35	
	BOP	(Step 33) REDUCE Turbine Load Using Attachment 1 To Match Feedwater And Steam Flows WHILE CONTINUING WITH This Procedure	NOTE: The CRS may address Step 33 of AOP-010. Steam flow and Feed flow are matched.
	CRS	(Step 34) OBSERVE NOTE Prior To Step 41 And GO TO Step 41	NOTE: If the CRS entered at Step 33 of AOP-010, they will move forward to Step 41.
	CRS	(Step 35) REDUCE Turbine Load Using Attachment 1 To Match Feedwater And Steam Flows WHILE CONTINUING WITH This Procedure	NOTE: The CRS may address Step 35 of AOP-010. Steam flow and Feed flow are matched.
	CRS/ BOP	(Step 36) DISPATCH An Operator To Observe Valve Positions:	NOTE: The CRS will dispatch an AO. If so, Booth Instructor acknowledge as AO, and report after 1 minute that the both valves are operating properly.
		<ul style="list-style-type: none"> LCV-1530A, HDT LEVEL CONTROL VALVE 	
		<ul style="list-style-type: none"> LCV-1530B, HEATER DRAIN PUMPS SUCTION DUMP TO CONDENSER 	

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 29 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 37) DETERMINE If A Heater Drain Tank Level Control Valve Has Failed:	
		<ul style="list-style-type: none"> CHECK HDT level control valve or controller - HAS MALFUNCTIONED 	
	CRS	(Step 37.a RNO) IF HDT Level is controlling correctly, THEN OBSERVE NOTE prior to Step 40 and GO TO Step 40.	
	CRS	(Step 40) CHECK For Leak - CAUSING FW TRANSIENT	NOTE: The crew may determine that a FWH Tube Leak exists and that the Train A FWH string must be bypassed/isolated.
		<ul style="list-style-type: none"> Visual indication of leak 	
		<ul style="list-style-type: none"> FW Heater level alarms FW Heater normal and alternate drain valve positions level dump valve positions 	
		<ul style="list-style-type: none"> FW Heater #1 & #2 emergency dump valve positions 	
		<ul style="list-style-type: none"> Gland Steam Condenser abnormal indications/alarms 	
	CRS	(Step 41) ISOLATE Leak:	
		CONSULT with Operations to determine leak isolation strategy	
		<ul style="list-style-type: none"> Isolate in current plant condition 	
		OR	
		<ul style="list-style-type: none"> Repair on-line 	
		OR	
		<ul style="list-style-type: none"> Shutdown to repair 	
		OR	
		<ul style="list-style-type: none"> Trip Unit 	

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 30 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Time	Pos.	Expected Actions/Behavior	Comments
			Examiner NOTE: The crew should address OP-407 to remove the 5A, 4A, and 3A FWHs from service.
OP-407, HEATER DRAINS AND VENTS SECTION 6.4.5 REMOVING HEATERS 5A, 4A, AND 3A FROM SERVICE			
	CRS	(Step 1) To remove Heater 4A from service, perform the following:	
		<ul style="list-style-type: none"> Ensure power is reduced to 659 Mwe gross (maximum of 20% power reduction) 	Examiner NOTE: The CRS conduct a downpower to 659 MWe using AOP-038 or OP-105. If AOP-038 is selected, continue below. If OP-105 is selected, proceed to Page 35 .
AOP-038, RAPID DOWNPOWER			
	CRS	(Step 1) NOTIFY Plant Personnel Of Procedure Entry Using The Plant Page System	NOTE: The CRS will most likely make this announcement.
	RO	(Step 2) DETERMINE Corrected Boration And Target Rod Height For Target Power Level Using Most Recently Performed OST-947, OPERATIONS REACTIVITY PLAN	
		<ul style="list-style-type: none"> Target Load Reduction Rate ___%/min 	
		<ul style="list-style-type: none"> Target Power Level ___ 	
		<ul style="list-style-type: none"> Target Rod Height ___ 	NOTE: The RO will determine approximately 185 Steps.
		<ul style="list-style-type: none"> Corrected Boration ___ 	NOTE: The RO will determine approximately 70 gallons.

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 31 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 3) PERFORM Brief Of Control Room Personnel To Include The Following:	
		<ul style="list-style-type: none"> Reason for downpower 	
		<ul style="list-style-type: none"> Target Power Level 	
		<ul style="list-style-type: none"> Target Rod Height 	
		<ul style="list-style-type: none"> Rate of load reduction 	
		<ul style="list-style-type: none"> Amount of boric acid addition 	
	RO	(Step 4) CHECK Required Power Reduction Rate - LESS THAN OR EQUAL TO 5%/MINUTE	
	RO	(Step 5) ENERGIZE All Available PZR Heaters	
		<ul style="list-style-type: none"> PZR HTR CONTROL GROUP 	
		<ul style="list-style-type: none"> PZR HTR BACK-UP GROUP A 	
		<ul style="list-style-type: none"> PZR HTR BACK-UP GROUP B 	
	RO	(Step 6) CHECK Rod Control - IN AUTO	
	RO	(Step 7) INITIATE Boration Using Attachment 1, RCS Boration, While Continuing With This Procedure	
			<p>Examiner NOTE: The CRS will assign the RO to perform this action.</p> <p>RO Examiner follow actions of Attachment 1.</p> <p>Other Examiners follow AOP-038 Actions, Step 8, on Page 32.</p>
AOP-038, RAPID DOWNPOWER ATTACHMENT 1, RCS BORATION			

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 32 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 1) PLACE The RCS MAKEUP MODE Selector Switch In BORATE	
	RO	(Step 2) IF Frequent Boric Acid Transfer Pump Starts Are Anticipated, THEN PLACE Boric Acid Transfer Pump Switch Aligned To BLEND To ON.	
	RO	(Step 3) SET YIC-113, BORIC ACID TOTALIZER to amount determined in Main Body Step 2	
	RO	(Step 4) Momentarily PLACE the RCS MAKEUP SYSTEM switch to START	
	RO	(Step 5) IF Boric Acid flow is NOT achieving the desired effect, THEN PLACE FCV-113A, BORIC ACID FLOW, in MAN AND manually Adjust controller FCV-113A, BORIC ACID FLOW, using the UP and DOWN pushbuttons	
	RO	(Step 6) WHEN the desired amount of Boric Acid has been added to the RCS OR the RCS MAKEUP SYSTEM Switch is placed in STOP, THEN ENSURE the following:	
		<ul style="list-style-type: none"> FCV-113A, BA TO BLENDER, closes. 	
		<ul style="list-style-type: none"> FCV-113B, BLENDED MU TO CHG SUCT, closes. 	
		<ul style="list-style-type: none"> IF in AUTO, THEN operating Boric Acid Pump stops. 	
		<ul style="list-style-type: none"> RCS MAKEUP SYSTEM is OFF. 	
AOP-038, RAPID DOWNPOWER			
			Examiner NOTE: Examiners following the CRS/BOP continue HERE .

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 33 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 8) INITIATE Turbine Load Reduction While Continuing With This Procedure	
		<ul style="list-style-type: none"> CHECK EH Turbine Control - IN OPER AUTO 	
		<ul style="list-style-type: none"> PREPARE For Turbine Load Reduction As Follows: 	
		<ul style="list-style-type: none"> CHECK IMP IN - ILLUMINATED 	
		<ul style="list-style-type: none"> SELECT the desired Load Rate 	
		<ul style="list-style-type: none"> DEPRESS the GO pushbutton to initiate Turbine Load reduction 	
	BOP	(Step 9) ADJUST Turbine Load To Control Tavg Within 5°F Of Tref Using One Of The Following:	
		<ul style="list-style-type: none"> ADJUST Load Rate 	
		OR	
		<ul style="list-style-type: none"> DEPRESS GO and HOLD pushbuttons 	
	CRS/ BOP	(Step 10) INITIATE Notification of The Following:	NOTE: The CRS may ask SM/WCC/Communicator to address. If so, Floor Instructor acknowledge.
		<ul style="list-style-type: none"> Load Dispatcher of load reduction 	
		<ul style="list-style-type: none"> E&C to control secondary chemistry 	
		<ul style="list-style-type: none"> RC for elevated radiation levels in CV Pump Bays and Pipe Alley 	
		<ul style="list-style-type: none"> On-call Duty Manager to activate the Event Response Team 	
		<ul style="list-style-type: none"> E&C for impending 15% power change for I-131 sampling within 2 to 6 hours 	
		<ul style="list-style-type: none"> E&C for impending power reduction greater than 20% terminate zinc injection 	
		<ul style="list-style-type: none"> NRC within 4 hours 	

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 34 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 11) CHECK Auxiliary Boilers - AT LEAST ONE OPERATING	
	BOP	(Step 11 RNO) IF Plant Shutdown is required, THEN NOTIFY AO to start at least one Auxiliary Boiler per OP-401, AUXILIARY HEATING SYSTEM.	NOTE: The BOP will dispatch an AO. Booth Instructor acknowledge as AO.
	RO	(Step 12) CHECK Tavg - WITHIN 5°F OF Tref	
	RO	(Step 13) CHECK Axial Flux Distribution - WITHIN TARGET BAND	
	BOP	(Step 14) CHECK APP-006-F5, STEAM DUMP ARMED - EXTINGUISHED	
	RO	(Step 15) CHECK Any Of The Following Conditions - MET:	NOTE: This is a Continuous Action. The CRS will make both board operators aware.
		<ul style="list-style-type: none"> Target load/power has been reached 	
		<ul style="list-style-type: none"> Load reduction is no longer required 	
		<ul style="list-style-type: none"> CRS/SM directs termination of load reduction 	
		<ul style="list-style-type: none"> STOP Rapid Downpower using Attachment 3, Termination Of Rapid Downpower 	
	CRS	(Step 15 RNO) WHEN any of the following conditions are met:	
		<ul style="list-style-type: none"> Target load/power has been reached 	NOTE: The target load is 659 MWe.
		<ul style="list-style-type: none"> Load reduction is no longer required 	
		<ul style="list-style-type: none"> CRS/SM directs termination of load reduction 	

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 35 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> THEN STOP Rapid Downpower using Attachment 3, Termination Of Rapid Downpower. 	
	CRS	<ul style="list-style-type: none"> GO TO Step 16. 	
	RO	(Step 16) CHECK Reactor Power - LESS THAN 85%	
	BOP	(Step 17) CHECK Heater Drain Pumps - TWO RUNNING	
		<ul style="list-style-type: none"> STOP one Heater Drain Pump 	
	RO	(Step 18) CHECK Reactor Power - LESS THAN 70%	
			Examiner NOTE: If the crew has used AOP-038 to downpower, Lead Examiner move to Event #4.
			Examiner NOTE: If the crew decides to reduce power using OP-105, Examiners continue HERE .
OP-105, MANEUVERING THE PLANT WHEN GREATER THAN 25% POWER			
	CRS	(Step 6.1.1.1) Check that an EOOS Risk Assessment has been performed	
	CRS	(Step 6.1.1.2) IF an EOOS Risk Assessment has NOT been performed for this Power Reduction, THEN perform one of the following actions:	
		<ul style="list-style-type: none"> Direct the STA or the Work Week Coordinator (WWC) to perform an EOOS Risk Assessment 	NOTE: The CRS may ask STA to address. If so, Floor Instructor acknowledge as STA.
		OR	

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 36 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Perform a qualitative Risk Assessment per OMM-048, Work Coordination and Risk Assessment 	
	BOP	(Step 6.1.1.3) Notify the Load Dispatcher that unit load will be reduced.	NOTE: The BOP will call Load Dispatcher. If so, Booth Instructor acknowledge as Load Dispatcher
	BOP	(Step 6.1.1.4) Notify RC that higher radiation levels should be expected in the CV Pump Bays and in Pipe Alley due to normal shutdown crud bursts	NOTE: The BOP will call RC. If so, Booth Instructor acknowledge as RC
	BOP	(Step 6.1.1.5) IF this is a Power Reduction greater than 20%, THEN notify Chemistry to shutdown the RCS Zinc Injection Skid	NOTE: The BOP may call Chemistry. If so, Booth Instructor acknowledge as Chemistry
	RO	(Step 6.1.1.6) Monitor the highest operable Power Range Channel and the highest operable Intermediate Range Channel on NR-45	
	CRS	(Step 6.1.1.7) IF this will be a planned power reduction of greater than 10% power, THEN.....	
	CRS/ BOP	(Step 6.1.1.8) IF Reactor Engineering has NOT provided technical guidance, THEN use the most recent OST-947, Operations Reactivity Plan data to determine the reactivity change required	
	RO	(Step 6.1.2.1) IF additional letdown flow is desired, THEN perform the following:	NOTE: The RO may place additional Letdown in service.

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 37 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Start additional Charging Pumps per OP-301, Chemical and Volume Control System 	
		<ul style="list-style-type: none"> Place additional letdown orifice in service per OP-301 	
	RO	(Step 6.1.2.2) IF a significant change in RCS Boron concentration is expected or occurs (10 ppm or more), THEN energize additional PZR heaters	
	RO	(Step 6.1.2.3) Maintain Tave within 5°F of Tref using a combination of Control Rods and Boron Concentration changes.	<p>NOTE: The RO will start a boration per Section 8.2.8 of OP-301.</p> <p>Examiner Note:</p> <p>RO Examiner follow actions of OP-301.</p> <p>CRS/BOP Examiners follow OP-105 Actions, Step 6.1.2.4, on Page 39.</p>
OP-301, CHEMICAL AND VOLUME CONTROL SYSTEM (CVCS)			
	RO	(Step 8.2.8.1) This revision has been verified to be the latest revision available.	
	RO	(Step 8.2.8.2) DETERMINE the amount of Boric Acid to add to the RCS and if applicable, the expected change in RCS temperature AND Reactor Power	<p>NOTE: The RO will use Attachment 10.4 of OST-947 and determine that the Target Rod Height is 191 and 53.76 gallons of BA will need to be added.</p>
	RO	(Step 8.2.8.3) OBTAIN an independent check of the volume of Boric Acid required.	

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 38 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 8.2.8.4) OBTAIN permission from the CRS OR SM to add the amount of boric acid previously determined, including the expected change in RCS temperature AND Reactor Power.	
	RO	(Step 8.2.8.5) PLACE the RCS MAKEUP MODE selector switch in the BORATE position.	
	RO	(Step 8.2.8.6) SET YIC-113, BORIC ACID TOTALIZER to the desired quantity.	
	RO	(Step 8.2.8.7) IF desired, THEN PLACE FCV-113A, BORIC ACID FLOW, in MAN AND ADJUST controller FCV-113A, BORIC ACID FLOW, using the UP and DOWN pushbuttons flow rate.	
	RO	(Step 8.2.8.8) Momentarily PLACE the RCS MAKEUP SYSTEM switch to the START position.	
	RO	(Step 8.2.8.9) IF any of the below conditions occur, THEN momentarily place the RCS MAKEUP SYSTEM switch in the STOP position:	
		<ul style="list-style-type: none"> Rod Motion is blocked 	
		<ul style="list-style-type: none"> Rod Motion is in the wrong direction 	
		<ul style="list-style-type: none"> Tavg goes up 	
		<ul style="list-style-type: none"> Boric Acid addition exceeds the desired value 	
	RO	(Step 8.2.8.10) WHEN the desired amount of Boric Acid has been added to the RCS, THEN ENSURE the following:	
		<ul style="list-style-type: none"> FCV-113A, BA TO BLENDER, closes. 	

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 39 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> FCV-113B, BLENDED MU TO CHG SUCT, closes. 	
		<ul style="list-style-type: none"> IF in Auto, THEN the operating Boric Acid Pump stops. 	
		<ul style="list-style-type: none"> The RCS MAKEUP SYSTEM is OFF. 	
	RO	(Step 8.2.8.11) IF desired, THEN FLUSH the Boric Acid flow.....	
	RO	(Step 8.2.8.12) RETURN the RCS Makeup System to automatic as follows:	
		ENSURE FCV-114A, PRIMARY WTR FLOW DILUTE MODE is in AUTO.	
		PLACE FCV-114B, BLENDED MU TO VCT to the AUTO position.	
		PLACE the RCS MAKEUP MODE switch in the AUTO position.	
		ENSURE FCV-113A, BORIC ACID FLOW, is in AUTO.	
		Momentarily PLACE the RCS MAKEUP SYSTEM switch in the START position.	
	RO	(Step 8.2.8.13) RECORD, in AUTO LOG, as indicated by PRIMARY WATER TOTALIZER, YIC-114 AND Boric Acid TOTALIZER, YIC 113 the total amount of Primary Water AND Boric Acid added during the boration.	
	RO	(Step 8.2.8.14) MONITOR parameters for the expected change in reactivity AND inform the CRS OR SM the results of the boration.	Examiner NOTE: If AOP-038 was used to downpower the plant, move forward to Event 4.
			Examiner NOTE: Examiners following the CRS/BOP continue HERE .
OP-105, MANEUVERING THE PLANT WHEN GREATER THAN 25% POWER			

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 40 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 6.1.2.4) IF EH Turbine Control is in OPER AUTO, THEN reduce turbine load as follows:	
		Ensure the EH Turbine Impulse Pressure Control in the desired position using Attachment 6, Transferring Control Mode Between IMP-IN and IMP-OUT:	NOTE: The BOP will use Attachment 6 of OP-105 to transfer Turbine Control Mode from IMP OUT to IMP IN
		• IMP IN (preferred)	
		OR	
		• IMP OUT (if required for plant conditions)	
OP-105, MANEUVERING THE PLANT WHEN GREATER THAN 25% POWER ATTACHMENT 6, TRANSFERRING CONTROL MODE BETWEEN IMP-IN AND IMP-OUT			
	BOP	(Step 1) Record the Valve Position Limit reading:	
	BOP	(Step 2) Lower the limiter setting until the turbine is on the limiter	
	BOP	(Step 3) Check that the Tracking Meter indicates a nulled condition. (approximately zero)	
	BOP	(Step 4) Press the appropriate pushbutton to change sensing modes:	
		IMP IN (preferred for load changes)	
		OR	
		IMP Out (preferred for steady state)	
	BOP	(Step 5) Wait for the Tracking Meter to indicate a nulled condition	

Op Test No.: N16-1 Scenario # 1 Event # 3 Page 41 of 70Event Description: **Tube Leak in Feedwater Heater 4A/Downpower**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 6) Return the limiter setting to the value recorded in Step 1 or as directed by CRS/SM.	
OP-105, MANEUVERING THE PLANT WHEN GREATER THAN 25% POWER			
	BOP	(Step 6.1.2.4) IF EH Turbine Control is in OPER AUTO, THEN reduce turbine load as follows:	
		<ul style="list-style-type: none"> Set the desired load in the SETTER 	
		<ul style="list-style-type: none"> Select the desired Load Rate 	NOTE: The BOP will select 1-2%/Minute
		<ul style="list-style-type: none"> Depress the GO pushbutton 	
	BOP	(Step 6.1.2.5) IF EH Turbine Control is in TURB MANUAL, THEN....	NOTE: The Turbine is in OPER AUTO.
	BOP	(Step 6.1.2.6) Maintain Gland Seal Steam Header Pressure (PI-4004, PI-1382 or ERFIS Point GSP2095A) in the normal operating band (3 to 6 psig)	
	RO	(Step 6.1.2.7) WHEN Reactor Power is less than 90% as indicated on NR-45, THEN check that APP-005-D6 is received.	
After a load reduction of 15-20 MWe, or at the discretion of the Lead Examiner move to Event #4.			

Op Test No.: N16-1 Scenario # 1 Event # 4 Page 42 of 70Event Description: **CRDM Fan "A" Failure**

During the downpower, the "A" CRDM Fan will trip. The operator will address APP-010-A6, HVH-5A/B AIR FLOW LOST/OVLD, and manually start the "B" CRDM Fan.

Booth Operator Instructions: **IMF HVA05A f:MOTOR_SHORT**

Indications Available:

- RTGB Annunciator, APP-009-E7, 480V GRD FAULT
- RTGB Annunciator, APP-010-A6, HVH-5A/B AIR FLOW LOST/OVLD
- CRDM Fan HVH-5A Green status light LIT, Red status light OFF

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The BOP may check APP-009-E7 prior to APP-010-A6.
APP-010-A6, HVH-5A/B AIR FLOW LOST/OVLD			
	BOP	(Step 1) EVALUATE CRDM indicating lights to determine affected fan:	
		<ul style="list-style-type: none"> • HVH-5A, CRDM COOLING FAN 	
		<ul style="list-style-type: none"> • HVH-5B, CRDM COOLING FAN 	
	BOP	(Step 2) MONITOR the following ERFIS points to determine if a single-phase open circuit is present:	
		<ul style="list-style-type: none"> • ERFIS point ELV3020A, BUS E1 VOLTAGE. 	
		<ul style="list-style-type: none"> • ERFIS point ELV3021A, BUS E2 VOLTAGE. 	
	CRS	(Step 3) IF a single-phase open circuit condition is suspected, THEN GO TO AOP-026, Grid Instability	NOTE: This will require additional assessment.
	BOP	(Step 4) IF a CRDM COOLING FAN has tripped, THEN ENSURE the Standby CRDM COOLING FAN is running.	NOTE: The BOP will start HVH-5B.

Op Test No.: N16-1 Scenario # 1 Event # 4 Page 43 of 70Event Description: **CRDM Fan "A" Failure**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 5) DISPATCH Operator to evaluate affected CRDM COOLING FAN supply breaker status:	NOTE: The CRS will dispatch an AO. If so, Booth Instructor acknowledge as AO, and report after 1 minute that there was no apparent reason for the Fan failure.
		<ul style="list-style-type: none"> Breaker MCC-5(5M), CONTROL ROD DRIVE MECHANISM COOLING FAN, HVH-5A. 	
		<ul style="list-style-type: none"> Breaker MCC-6(4M), CONTROL ROD DRIVE MECHANISM COOLING FAN, HVH-5B. 	
	CRS	(Step 6) INITIATE a Work Request to investigate the cause of the affected CRDM COOLING FAN alarm.	NOTE: The CRS may call WCC to address the Fan failure. If so, Booth Instructor acknowledge as WCC.
	CRS	(Step 7) IF RCS temperature is greater than or equal to 350°F AND both CRDM COOLING FANs are unavailable, THEN.....	NOTE: The HVH-5B Fan is running.
At the discretion of the Lead Examiner move to Event #5.			

Op Test No.: N16-1 Scenario # 1 Event # 5 Page 44 of 70Event Description: **Continuous Inward Rod Motion**

Shortly afterwards, a continuous control rod insertion will occur. The operator will respond in accordance with AOP-001, "Malfunction of Reactor Control System." The operator will be unable to control the rod insertion and will manually trip the reactor.

Booth Operator Instructions: **IMF CRF06A**
IMF CRF06B

Indications Available:

- Rod Inward Arrow Indicating Light is LIT
- The Tavq-Tref deviation is inconsistent with the control rod movement
- Group Steps Counters and IRPI indication inward control rod motion

Time	Pos.	Expected Actions/Behavior	Comments
AOP-001, MALFUNCTION OF REACTOR CONTROL SYSTEM			
	RO	(Step 1) Check Unexpected Rod Motion - IN PROGRESS	Immediate Action
	RO	(Step 2) Check Reactor Power - GREATER THAN 15%	Immediate Action
	BOP	(Step 3) Check Turbine Load -	Immediate Action
		• CONTROL RODS STEPPING IN	
		AND	
		• UNEXPECTED LOAD REDUCTION IN PROGRESS	
		OR	
		• UNEXPECTED LOAD REDUCTION HAS OCCURRED	
	RO	(Step 3 RNO) Attempt To Stop Rod Motion As Follows:	Immediate Action
		• IF ROD BANK SELECTOR Switch position in A (AUTO), THEN Place the ROD BANK SELECTOR Switch in M (Manual)	NOTE: When the RO places control rods in MANUAL, the rod motion will continue.

Op Test No.: N16-1 Scenario # 1 Event # 5 Page 45 of 70Event Description: **Continuous Inward Rod Motion**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none">IF ROD BANK SELECTOR Switch in M (Manual) OR Individual Bank Select, THEN Place the ROD BANK SELECTOR Switch in A (Auto).	NOTE: Although control rods are expected to be in AUTO, if the control rods are in MANUAL the RO will take this action.
		<ul style="list-style-type: none">IF Rod Motion does NOT stop, THEN Trip the Reactor and Go To EOP-E-0, Reactor Trip or Safety Injection.	
			NOTE: The CRS will enter EOP-E-0
Upon Rx Trip, move to Events #6-7.			

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 46 of 70Event Description: **“C” Steam Generator Tube Rupture/Loss of Off-Site Power**

On the reactor trip, a 500 gpm Steam Generator Tube Rupture will occur (over 10 minutes) on the “C” Steam Generator. The operator will enter EOP-E-0, “Reactor Trip or Safety Injection.” After the Immediate Actions are complete, it is likely that the operator will determine that SI is NOT actuated nor required, and transition to EOP-ES-0.1, “Reactor Trip Response.” While in this procedure the operator will determine that SI is required, manually actuate SI, and return to EOP-E-0. Upon completion of EOP-E-0, the operator will transition to EOP-E-3, “Steam Generator Tube Rupture,” to isolate the flow into and out of the “C” Steam Generator and then conduct a cooldown of the RCS. Upon transition into EOP-E-3, a Loss of Off-Site Power will occur. Both EDGs will start and re-power Buses E-1 and E-2. With SI previously reset, the operator will need to address a re-initiation of AFW flow to all Steam Generators, and the restart of the ECCS Pumps. The operator will continue with EOP-E-3 and conduct the RCS cooldown using the “A” and “B” Steam Generator PORVs. During the RCS depressurization, the Pzr Spray Valves will not be available. The operator will be required to conduct the depressurization using an available Pzr PORV. The scenario will terminate at Step 23 of EOP-E-3, after the operator has stopped the SI Pumps.

Booth Operator Instructions: **IMF SGN02F****r:10:00 f:500****Indications Available:**

- All control rods on the bottom
- RCS pressure is lowering
- RCS Tavg is trending to no load
- RTGB Annunciator APP-036-C7, R24 MONITOR HIGH
- R24 Leakage Recorder indicating S/G leakage greater than TS Limit

Time	Pos.	Expected Actions/Behavior	Comments
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO	(Step 1) CHECK Reactor Trip:	Immediate Action
		<ul style="list-style-type: none"> • Reactor Trip AND Bypass Breakers - OPEN 	
		<ul style="list-style-type: none"> • Rod position indicators - FULLY INSERTED 	
		<ul style="list-style-type: none"> • Rod Bottom Lights - ILLUMINATED 	
		<ul style="list-style-type: none"> • Neutron Flux - LOWERING 	
	BOP	(Step 2) CHECK Turbine Trip:	Immediate Action

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 47 of 70Event Description: **"C" Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Both Turbine Stop Valves - CLOSED 	
		<ul style="list-style-type: none"> All MSR Purge AND Shutoff Valves - CLOSED 	
	BOP	(Step 3) CHECK Power To AC EMERGENCY BUSES:	Immediate Action
		<ul style="list-style-type: none"> CHECK Bus E-1 OR E-2 - AT LEAST ONE ENERGIZED 	
		<ul style="list-style-type: none"> CHECK Bus E-1 AND E-2 - BOTH ENERGIZED 	
	RO	(Step 4) CHECK SI Status:	Immediate Action
		CHECK if SI is actuated:	
		<ul style="list-style-type: none"> SI annunciators - ANY ILLUMINATED 	
		OR	
		<ul style="list-style-type: none"> SI equipment - AUTO STARTED 	
	RO	(Step 4.a RNO) CHECK if SI is required:	Immediate Action
		<ul style="list-style-type: none"> PZR pressure LESS THAN 1715 PSIG 	
		OR	
		<ul style="list-style-type: none"> Containment pressure GREATER THAN 4 PSIG 	
		OR	
		<ul style="list-style-type: none"> Steam Line ΔP bistables ILLUMINATED 	
		OR	
		<ul style="list-style-type: none"> High Steam Flow with Low Tavg OR Low Steam Pressure bistables ILLUMINATED 	
		IF SI is required, THEN manually ACTUATE BOTH Trains of SI.	
		IF SI is NOT required, THEN PERFORM the following:	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 48 of 70Event Description: **"C" Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> RESET SPDS AND INITIATE monitoring of Critical Safety Functions Status Trees. 	
	CRS	<ul style="list-style-type: none"> GO TO EOP-ES-0.1, Reactor Trip Response, Step 1. 	
			<p>NOTE: It is expected that SI will not be required, and the CRS will transition to EOP-ES-0.1</p> <p>NOTE: The CRS will likely conduct an Alignment Brief.</p>
EOP-ES-0.1, REACTOR TRIP RESPONSE			
			<p>Examiner NOTE: A large SGTR is occurring. It is expected that the crew will transition back to EOP-E-0. Because of this, only 5 steps are scripted.</p> <p>When the crew re-enters EOP-E-0, move forward to EOP-E-0 steps on Page 50.</p>
	RO/ BOP	Foldout Page	
		SI ACTUATION CRITERIA	<p>NOTE: The crew will subsequently transition back to EOP-E-0 based on this criteria.</p>
		LOSS OF POWER CRITERIA	
		AFW SUPPLY SWITCHOVER CRITERIA	
		DC BUS, INSTRUMENT BUS, OR MCC-5 FAILURE CRITERIA	
		LOSS OF ULTIMATE HEAT SINK CRITERIA	
	RO	(Step 1) CHECK RCS Temperature Control:	
		<ul style="list-style-type: none"> CHECK RCPs - ANY RUNNING 	
		<ul style="list-style-type: none"> CHECK RCS temperatures: 	
		<ul style="list-style-type: none"> With ANY RCP running, CHECK RCS Average temperature - STABLE AT OR TRENDING TO 547°F 	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 49 of 70Event Description: **“C” Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 2) CHECK Feedwater Status:	
		<ul style="list-style-type: none"> CHECK RCS average temperatures - LESS THAN 554°F 	
		<ul style="list-style-type: none"> CHECK Main Feedwater Reg Valves - CLOSED 	
		<ul style="list-style-type: none"> CHECK Total feed flow to S/Gs - GREATER THAN 300 gpm (0.2x106 PPH) 	
	BOP	(Step 3.a) CHECK S/G Levels:	
		<ul style="list-style-type: none"> CHECK S/G Narrow Range levels - GREATER THAN 9% 	
	BOP	(Step 3.a RNO) MAINTAIN total feed flow GREATER THAN 300 gpm AFW OR 0.2x106 pph Main Feedwater UNTIL S/G Narrow Range level is GREATER THAN 9% in at least one S/G.	
	BOP	(Step 3.b) CONTROL feed flow to maintain S/G Narrow Range levels BETWEEN 9% AND 50%	
	BOP	(Step 4) CHECK All AC Busses - ENERGIZED BY OFFSITE POWER	
	RO	(Step 5) CHECK PZR Level Control:	
		<ul style="list-style-type: none"> CHECK PZR level - GREATER THAN 14% 	
	RO	(Step 5 RNO) PERFORM the following:	
		ISOLATE Letdown by closing the following valves:	
		<ul style="list-style-type: none"> CLOSE LCV-460 A & B, LETDOWN LINE STOP Valves. 	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 50 of 70Event Description: **“C” Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
		CLOSE LTDN LINE ISO Valves:	
		• CVC-204A	
		• CVC-204B	
		CLOSE LTDN ORIFICE Valves:	
		• CVC-200A - 45 gpm	
		• CVC-200B - 60 gpm	
		• CVC-200C - 60 gpm	
		CLOSE CVC-387, EXCESS LETDOWN STOP Valve.	
		TURN OFF ALL PZR Heaters.	
		WHEN charging is available, THEN CONTROL charging to restore PZR level to GREATER THAN 14%.	NOTE: The crew will likely manual actuate SI and the CRS will transition to EOP-E-0.
			Examiner NOTE: If the crew proceeds past Step 5 of EOP-ES-0.1, wait here until the crew decides to re-enter EOP-E-0.
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO	(Step 1) CHECK Reactor Trip:	Immediate Action
		• Reactor Trip AND Bypass Breakers - OPEN	
		• Rod position indicators - FULLY INSERTED	
		• Rod Bottom Lights - ILLUMINATED	
		• Neutron Flux - LOWERING	
	BOP	(Step 2) CHECK Turbine Trip:	Immediate Action
		• Both Turbine Stop Valves - CLOSED	
		• All MSR Purge AND Shutoff Valves - CLOSED	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 51 of 70Event Description: **“C” Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3) CHECK Power To AC EMERGENCY BUSSES:	Immediate Action
		<ul style="list-style-type: none"> CHECK Bus E-1 OR E-2 - AT LEAST ONE ENERGIZED 	
		<ul style="list-style-type: none"> CHECK Bus E-1 AND E-2 - BOTH ENERGIZED 	
	RO	(Step 4) CHECK SI Status:	Immediate Action
		CHECK if SI is actuated:	
		<ul style="list-style-type: none"> SI annunciators - ANY ILLUMINATED 	
		OR	
		<ul style="list-style-type: none"> SI equipment - AUTO STARTED 	
		CHECK BOTH trains of SI actuated:	
		<ul style="list-style-type: none"> SI Pumps - TWO RUNNING 	
		<ul style="list-style-type: none"> RHR Pumps - BOTH RUNNING 	
	RO/ BOP	Foldout Page:	
		RCP TRIP CRITERIA	
		FAULTED S/G AFW ISOLATION CRITERIA	
		AFW SUPPLY SWITCHOVER CRITERIA	
		DC BUS, INSTRUMENT BUS, OR MCC-5 FAILURE CRITERIA	
		SPENT FUEL POOL COOLING CRITERIA	
	CRS	(Step 5) PERFORM Attachment 1, Auto Action Verification, While CONTINUING WITH This Procedure	
			<p>Examiner NOTE: The CRS will likely assign the BOP to perform this action.</p> <p>If so, BOP Examiner follow actions of Attachment 1.</p> <p>CRS/RO follow E-0 Actions, Step 6, on Page 55.</p>

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 52 of 70Event Description: **"C" Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION ATTACHMENT 1, AUTO ACTION VERIFICATION			
	BOP	(Step 1) CHECK ECCS Pumps Running:	
		• SI Pumps - TWO RUNNING	
		• RHR Pumps - BOTH RUNNING	
	BOP	(Step 2) CHECK ECCS Valves In Proper Emergency Alignment	
	BOP	(Step 3) CHECK CCW Pumps - AT LEAST ONE RUNNING	
	BOP	(Step 4) CHECK Containment Isolation Phase A:	
		• CHECK Containment Isolation Phase A - ACTUATED	
		• CHECK Containment Isolation Phase A Valves - CLOSED	
		• CHECK Excess Letdown - ISOLATED	
		• CVC-387, EXCESS LTDN STOP VALVE - CLOSED	
		• HIC-137, EXCESS LTDN FLOW CONTROLLER - AT 0% DEMAND	
	BOP	(Step 5) CHECK Feedwater Isolation:	
		• CHECK Main Feed Pumps - BOTH TRIPPED	
		• CHECK Main Feedwater isolated:	
		• Feedwater Reg Valves - CLOSED	
		• Feedwater Reg Bypass Valves - CLOSED	
		• Feedwater Header Section Valves - CLOSED	
	BOP	(Step 6) CHECK If Main Steam Lines Should Be Isolated:	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 53 of 70Event Description: **“C” Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK Main Steam Line Isolation - REQUIRED 	
		<ul style="list-style-type: none"> CHECK Containment pressure - GREATER THAN 10 PSIG 	
		OR	
		<ul style="list-style-type: none"> High steam flow with: 	
		<ul style="list-style-type: none"> S/G pressure - LESS THAN 614 PSIG 	
		OR	
		<ul style="list-style-type: none"> Tavg - LESS THAN 543°F 	
	BOP	(Step 6.a RNO) GO TO Step 7.	
	BOP	(Step 7) CHECK Proper Service Water System Operation:	
		<ul style="list-style-type: none"> CHECK SW Pumps - ALL RUNNING 	
		<ul style="list-style-type: none"> CHECK SW Booster Pumps - BOTH RUNNING 	
		<ul style="list-style-type: none"> CHECK Both SW Header Low Pressure Alarms - EXTINGUISHED 	
		<ul style="list-style-type: none"> APP-008-F7,SOUTH SW HDR LO PRESS 	
		<ul style="list-style-type: none"> APP-008-F8,NORTH SW HDR LO PRESS 	
	BOP	(Step 8) CHECK BOTH EDGs - RUNNING	
	BOP	(Step 9) CHECK ECCS Flow:	
		<ul style="list-style-type: none"> CHECK RCS pressure - LESS THAN 1650 PSIG [1725 PSIG] 	
	BOP	(Step 9.a RNO) GO TO Step 10.	
	BOP	(Step 10) CHECK CV Recirculation Fans - ALL RUNNING	
	BOP	(Step 11) CHECK IVSW System Actuated:	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 54 of 70Event Description: **“C” Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> PCV-1922A, AUTOMATIC HEADER PRESSURE CONTROL VALVE - OPEN 	
		<ul style="list-style-type: none"> PCV-1922B, AUTOMATIC HEADER PRESSURE CONTROL VALVE - OPEN 	
	BOP	(Step 12) CHECK CV Ventilation Isolation:	
		<ul style="list-style-type: none"> CV Ventilation Isolation Valves - CLOSED 	
	BOP	(Step 13) CHECK Control Room Ventilation Aligned For Pressurization Mode:	
		<ul style="list-style-type: none"> HVA-1A OR HVA-1B, CONTROL ROOM AIR HANDLING FAN - RUNNING 	
		<ul style="list-style-type: none"> HVE-19A OR HVE-19B, CONTROL ROOM AIR CLEANING FAN - RUNNING 	
		<ul style="list-style-type: none"> HVE-16, CONTROL ROOM AIR EXHAUST FAN - STOPPED 	
		<ul style="list-style-type: none"> Control Room HVAC Outside Air Damper A OR B - OPEN 	
		<ul style="list-style-type: none"> CR-D1A-SA, CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER - CLOSED 	
		<ul style="list-style-type: none"> CR-D1B-SB, CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER - CLOSED 	
	BOP	(Step 14) CHECK DS Bus - ENERGIZED	
	BOP	(Step 15) CHECK Battery Chargers ENERGIZED:	
		<ul style="list-style-type: none"> APP-036-D1, BATT CHARGER A/A-1 TROUBLE Alarm - EXTINGUISHED 	
		<ul style="list-style-type: none"> APP-036-D2, BATT CHARGER B/B-1 TROUBLE Alarm - EXTINGUISHED 	
	BOP	(Step 16) STOP R-11/12 Sample Pump	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 55 of 70Event Description: **“C” Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 17) Locally RESET AND LOAD Instrument Air Compressor(s) As Necessary (38 KW each):	NOTE: The BOP may (If the LOOP has occurred) contact the Inside AO. If so, Booth Instructor: as AO, acknowledge IRF EPSMCC5_ 187 f: RACK_IN IRF EPSMCC6_ 218 f: RACK_IN
		• Compressor A (MCC-5 CMPT 7M)	
		• Compressor B (MCC-6 CMPT 3G)	
	BOP	(Step 18) PERFORM Crew Update To Include The Following:	
		• Attachment completion	
		• Manual actions taken	
		• Failed equipment status	
		• SW status per Step 7.c	
		• If applicable, PERFORM Supplement M, Component Alignment For Loss Of SW To Turbine Building, as time permits	
			Examiner NOTE: Examiners following the CRS/RO continue HERE .
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO	(Step 6) CHECK AFW Pumps Running:	
		• CHECK Motor Driven AFW Pumps - BOTH RUNNING	
		• CHECK S/G Narrow Range levels - TWO S/Gs LESS THAN 16%	
		• CHECK Steam Driven AFW Pump - RUNNING	NOTE: The SDAFW Pump is OOS.

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 56 of 70Event Description: **“C” Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 7) CHECK AFW Valves In Proper Emergency Alignment:	NOTE: The RO/BOP may take a Prudent Action (OMM-22) to throttle AFW flow to the “C” S/G and control Narrow Range level between 9-50%.
		• AFW Header Discharge Valves - FULL OPEN	
		• AFW Header Section Valves - FULL OPEN	
		• Steam Driven AFW Pump Discharge Valves - FULL OPEN IF PUMP RUNNING	
	RO	(Step 8) CHECK Total AFW Flow:	
		• RESET SI	NOTE: This action may have been previously performed to allow the RO/BOP to throttle AFW flow to the “C” S/G.
		• CONTROL AFW flow to maintain Intact S/G Narrow Range level between 9%[18%] AND 50%	
		• CHECK total AFW flow - GREATER THAN 300 GPM	
	RO	(Step 9) CHECK CV Spray NOT Required:	
		• CHECK Containment Pressure - HAS REMAINED LESS THAN 10 PSIG	
		• CHECK CV Spray - NOT ACTUATED	
	RO	(Step 10) CHECK RCP Seal Cooling:	
		• CCW flow to RCP(s) Thermal Barriers - NORMAL	
		• APP-001-C1,RCP THERM BAR COOL WTR HI FLOW ALARM - EXTINGUISHED	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 57 of 70Event Description: **“C” Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> APP-001-D1,RCP THERM BAR COOL WTR LO FLOW alarm - EXTINGUISHED 	
		OR	
		<ul style="list-style-type: none"> Seal Injection flow - ADEQUATE 	
		<ul style="list-style-type: none"> Seal Injection flow - GREATER THAN 6 GPM PER RCP 	
		OR	
		<ul style="list-style-type: none"> Thermal Barrier ΔPs - GREATER THAN 5 INCHES WATER PER RCP 	
	RO	(Step 11) CHECK RCS Temperatures:	
		<ul style="list-style-type: none"> With ANY RCP running, RCS average temperature - STABLE AT OR TRENDING TO 547°F 	
		OR	
		<ul style="list-style-type: none"> With NO RCPs running, RCS Cold Leg temperatures - STABLE AT OR TRENDING TO 547°F 	
	RO	(Step 12) CHECK PZR PORVs AND Spray Valves:	
		<ul style="list-style-type: none"> CHECK PZR PORVs - CLOSED 	
		<ul style="list-style-type: none"> CHECK Normal PZR Spray Valves - CLOSED 	
		<ul style="list-style-type: none"> CHECK Aux PZR Spray Valve - CLOSED 	
	RO	(Step 13) CHECK If RCPs Should Be Stopped:	
		<ul style="list-style-type: none"> CHECK RCPs - ANY RUNNING 	
		<ul style="list-style-type: none"> CHECK SI Pumps - AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW 	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 58 of 70Event Description: **"C" Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK RCS Subcooling based on Core Exit T/Cs - LESS THAN 13°F[32°F] 	
	CRS	(Step 13.c RNO) GO TO Step 14.	
	RO	(Step 14) CHECK If S/G Secondary Pressure Boundaries Are Intact:	
		<ul style="list-style-type: none"> NONE LOWERING IN AN UNCONTROLLED MANNER 	
		<ul style="list-style-type: none"> NONE COMPLETELY DEPRESSURIZED 	
	RO	(Step 15) CHECK If S/G Tubes Are Intact:	
		<ul style="list-style-type: none"> Secondary Radiation Monitors - HAVE REMAINED NORMAL 	
		<ul style="list-style-type: none"> R- 15, CONDENSER AIR EJECTOR GAS 	
		<ul style="list-style-type: none"> R- 19s, S/G Blowdown Radiation 	
		<ul style="list-style-type: none"> R- 31s, STEAMLINE RADIATION MONITORs 	
		<ul style="list-style-type: none"> S/G levels - NONE RISING IN AN UNCONTROLLED MANNER 	
	CRS	(Step 15 RNO) PERFORM the following:	NOTE: The CRS will transition to EOP-E-3.
		<ul style="list-style-type: none"> RESET SPDS AND INITIATE monitoring of Critical Safety Functions Status Trees. 	
		<ul style="list-style-type: none"> GO TO EOP-E-3, Steam Generator Tube Rupture, Step 1. 	

Booth Instructor: Upon transition to EOP-E-3, IMF EPS13 (Loss of Offsite Power)

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 59 of 70Event Description: **“C” Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
			Examiner NOTE: The LOOP will cause the AFW valves to fully open and re-initiate AFW flow to all S/Gs. Additionally, the RO will need to restore ECCS Pumps that did not restart if SI has been reset.
EOP-E-3, STEAM GENERATOR TUBE RUPTURE			
	RO/ BOP	(Foldout Page)	
		SI REINITIATION CRITERIA	
		SECONDARY INTEGRITY CRITERIA	
		MULTIPLE TUBE RUPTURE CRITERIA	
		COLD LEG RECIRCULATION SWITCHOVER CRITERIA	
		AFW SUPPLY SWITCHOVER CRITERIA	
	RO	(Step 1) CHECK If RCPs Should Be Stopped:	NOTE: The RCPs will NOT be running.
		<ul style="list-style-type: none"> CHECK RCPs - ANY RUNNING 	
	CRS	(Step 1 RNO) GO TO Step 2.	
	BOP	(Step 2) IDENTIFY Ruptured S/G(s):	NOTE: The crew will identify the “C” S/G as the ruptured S/G.
		<ul style="list-style-type: none"> CHECK for ANY of the following indications: 	
		<ul style="list-style-type: none"> Unexpected rise in ANY S/G Narrow Range level 	
		OR	
		<ul style="list-style-type: none"> R-31s Steamline Radiation Monitors - ANY INDICATE HIGH RADIATION 	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 60 of 70Event Description: **"C" Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
		OR	
		<ul style="list-style-type: none"> R- 19s SG Blowdown Radiation - ANY INDICATE HIGH RADIATION 	
		OR	
		<ul style="list-style-type: none"> High radiation reported from ANY S/G sample 	
		<ul style="list-style-type: none"> CONTACT Chemistry to periodically sample ALL S/Gs for activity. 	NOTE: The CRS may call WCC/Chemistry to address the samples. If so, Booth Instructor acknowledge as WCC/Chemistry.
	BOP	(Step 3) ISOLATE Flow From Ruptured S/G(s):	
		<ul style="list-style-type: none"> ADJUST Ruptured S/G(s) Steam Line PORV Controller to 1060 psig 	
		<ul style="list-style-type: none"> CHECK Ruptured S/G(s) Steam Line PORV - CLOSED 	
		<ul style="list-style-type: none"> RV1-3 	NOTE: The crew will ensure that the "C" S/G PORV is CLOSED.
		<ul style="list-style-type: none"> CLOSE Ruptured S/G(s) Steam Driven AFW Pump Steam Shutoff Valves: 	
		<ul style="list-style-type: none"> V1-8C 	NOTE: Since the SDAFW Pump is OOS, this valve will already be CLOSED.
		<ul style="list-style-type: none"> Locally CLOSE Ruptured S/G(s) Bypass Drn AND Warmup Line To AFW Pump Valve(s) While CONTINUING WITH this procedure: 	
		<ul style="list-style-type: none"> MS-38 (S/G C) (Pipe Jungle above/right of V1-8C) 	NOTE: The CRS will dispatch an AO. Booth Instructor acknowledge as AO, and report after 5 minutes that the MS-38 is CLOSED. IRF MSS051 f:0
		<ul style="list-style-type: none"> CHECK Ruptured S/G(s) S/G Blowdown AND Blowdown Sample Valves - CLOSED 	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 61 of 70Event Description: **"C" Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CLOSE Ruptured S/G(s) MSIV AND MSIV Bypass Valves: 	
		<ul style="list-style-type: none"> S/G C: 	
		<ul style="list-style-type: none"> V1-3C 	
		<ul style="list-style-type: none"> MS-353C 	
	CRS	(Caution prior to Step 4) If ANY Ruptured S/G is Faulted, feed flow to that S/G should remain isolated during subsequent recovery actions UNLESS needed for RCS cooldown.	
	BOP	(Step 4) CHECK Ruptured S/G	
		<ul style="list-style-type: none"> CHECK Ruptured S/G - FAULTED 	
	CRS	(Step 4 RNO) GO TO Step 5.	
	CRS	(Caution prior to Step 5) If Offsite Power is lost AFTER SI reset, manual action may be required to restart safeguards equipment.	
	BOP	(Step 5) CHECK Ruptured S/G(s) Level:	
		<ul style="list-style-type: none"> CHECK S/G Narrow Range level - GREATER THAN 9% [18%] 	
	RO	<ul style="list-style-type: none"> RESET SI 	
		<ul style="list-style-type: none"> STOP feed Flow to ruptured S/G(s): 	
		<ul style="list-style-type: none"> CLOSE Steam Driven AFW Pump Discharge Valve(s): 	
		<ul style="list-style-type: none"> V2-14C 	NOTE: Since the SDAFW Pump is OOS, this valve will already be CLOSED.
		<ul style="list-style-type: none"> CLOSE AFW Header Discharge Valve(s): 	
		<ul style="list-style-type: none"> V2-16C 	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 62 of 70Event Description: **“C” Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> PERFORM Supplement D, Deenergizing AFW Valves For AFFECTED S/G 	<p>NOTE: The BOP will use Attachment D, and call AO for local Actions.</p> <p>Booth Instructor acknowledge as AO, and report after 10 minutes that actions are complete.</p> <p>IRF EPSMCC9_256 f:0 (Other breakers are already Racked Out)</p>
<p><u>Critical Task:</u></p> <p>Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs</p> <p>Safety Significance: Failure to isolate the ruptured SG causes a loss of differential pressure between the ruptured SG and the intact SGs. The fact that the operator allows the differential pressure to dissipate and, as a result, are then forced to transition to a contingency procedure constitutes an incorrect performance that necessitates the operator taking compensating action that would unnecessarily complicate the event mitigation strategy.</p>			
	BOP	(Step 6) CHECK Ruptured S/G(s) Pressure - GREATER THAN 500 PSIG	
	BOP	(Step 7) CHECK The Following Valves For Ruptured S/G- CLOSED	
		<ul style="list-style-type: none"> MSIVs 	
		<ul style="list-style-type: none"> MSIV Bypass Valves 	
		<ul style="list-style-type: none"> S/G Steam Line PORVs 	
		<ul style="list-style-type: none"> Steam Driven AFW Pump Steam Shutoff Valves 	
	CRS	(Caution prior to Step 8) If RCPs are NOT running, the following steps may cause a false CSF-4, Integrity Status Tree, indication for the Ruptured Loop. Disregard the Ruptured Loop T-cold indication UNTIL after performing Step 31.	<p>NOTE: An Orange and/or Red Path on RCS Integrity will occur during this event. Based on this caution the CRS will NOT address FRP-P.1.</p>

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 63 of 70Event Description: **“C” Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 8) INITIATE RCS Cooldown:	
		<ul style="list-style-type: none"> DETERMINE required Core Exit temperature: 	NOTE: The CRS will determine the Target temperature to 519°F.
		<ul style="list-style-type: none"> DUMP steam to Condenser from intact S/G(s) at MAXIMUM rate: 	
		<ul style="list-style-type: none"> CHECK Condenser - AVAILABLE 	
	BOP	(Step 8.b RNO) DUMP steam at MAXIMUM rate from Intact S/G(s) using S/G Steam Line PORV(s).	NOTE: The crew will dump steam using the “A” and the “B” S/G PORVs.
		<ul style="list-style-type: none"> IF S/G Steam Line PORV(s) can NOT be opened from the Control Room, THEN.... 	
		<ul style="list-style-type: none"> IF NO intact S/G available, THEN... 	
	BOP	(Step 8.c-f) CHECK RCS Tavg - LESS THAN 543°F	
		Momentarily PLACE STEAM DUMP MODE Control Switch to BYPASS TAVG INTLK position	
		CHECK APP-006-F5, STEAM DUMP ARMED alarm - ILLUMINATED	NOTE: This Annunciator is extinguished (Steam Dumps not available).
		CHECK Core Exit T/Cs - LESS THAN REQUIRED TEMPERATURE	
	BOP	(Step 8.f RNO) WHEN Core Exit T/Cs are LESS THAN required temperature, THEN PERFORM Steps 8.g and 8.h.	
	CRS	CONTINUE WITH Step 9.	
	BOP	(Step 9) CHECK Intact S/G Levels:	
		<ul style="list-style-type: none"> CHECK S/G Narrow Range levels - GREATER THAN 9%[18%] 	NOTE: Narrow Range levels may be greater than 9%. If so, perform Step 9.b.

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 64 of 70Event Description: **“C” Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 9.a RNO) MAINTAIN total feed flow GREATER THAN 300 gpm UNTIL S/G Narrow Range level is GREATER THAN 9% [18%] in at least one S/G.	
	BOP	(Step 9.b) CONTROL feed flow to maintain S/G Narrow Range levels - BETWEEN 21% [21%] AND 50%	
	RO	(Step 10) CHECK PZR PORVs AND Block Valves:	
		<ul style="list-style-type: none"> CHECK Power to PZR PORV Block Valves - AVAILABLE 	
		<ul style="list-style-type: none"> CHECK PZR PORVs - CLOSED 	
		<ul style="list-style-type: none"> CHECK PZR PORV Block valves - AT LEAST ONE OPEN 	
	RO	(Step 11) RESET SI	
	RO	(Step 12) RESET Containment Isolation Phase A	
	RO	(Step 13) ESTABLISH Instrument Air To CV:	
		<ul style="list-style-type: none"> CHECK APP-002-F7, INSTR AIR HDR LO PRESS alarm - EXTINGUISHED 	
	RO	(Step 13 RNO) PERFORM the following:	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 65 of 70Event Description: **"C" Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Locally RESET AND LOAD Instrument Air Compressor(s) as necessary (38 KW each): 	NOTE: If not already done, the BOP will contact the Inside AO. Booth Instructor: as AO, acknowledge IRF EPSMCC5_187 f: RACK_IN IRF EPSMCC6_218 f: RACK_IN
		<ul style="list-style-type: none"> Compressor A (MCC-5 CMPT 7M) 	
		<ul style="list-style-type: none"> Compressor B (MCC-6 CMPT 3G) 	
		<ul style="list-style-type: none"> WHEN Instrument Air is established, THEN PERFORM Steps 13.b AND 13.c. 	
	CRS	<ul style="list-style-type: none"> CONTINUE WITH Step 14. 	
	RO	(Step 13.b-c) RESET IA PCV-1716, INSTRUMENT AIR ISOLATION TO CV	
		<ul style="list-style-type: none"> CHECK IA PCV-1716 - OPEN 	
	RO	(Step 14) CHECK If RHR Pumps Should Be Stopped:	
		<ul style="list-style-type: none"> CHECK RHR Pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST 	
		<ul style="list-style-type: none"> CHECK RCS pressure: 	
		<ul style="list-style-type: none"> Pressure - GREATER THAN 275 PSIG [325 PSIG] 	
		<ul style="list-style-type: none"> Pressure - STABLE OR RISING 	
		<ul style="list-style-type: none"> STOP RHR Pumps 	
		<ul style="list-style-type: none"> CHECK RCS pressure remains GREATER THAN 275 PSIG [325 PSIG] 	
	RO	(Step 15) ESTABLISH Charging Flow:	
		<ul style="list-style-type: none"> CHECK Charging Pumps - AT LEAST ONE RUNNING 	NOTE: One Charging Pump may be running. If so, proceed to Step 15.b.

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 66 of 70Event Description: **“C” Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 15.a RNO) IF CCW flow to RCP(s) Thermal Barrier is lost, THEN GO TO Step 16.	NOTE: CCW flow was momentarily lost on the LOOP, but exists now.
	RO	(Step 15.b) ALIGN Charging Pump suction to RWST:	
		<ul style="list-style-type: none"> OPEN LCV-115B, EMERG MU TO CHG SUCTION 	
		<ul style="list-style-type: none"> CLOSE LCV-115C, VCT OUTLET Valve 	
		<ul style="list-style-type: none"> PLACE RCS MAKEUP SYSTEM Control Switch to STOP 	
		ESTABLISH MAXIMUM charging flow:	
		<ul style="list-style-type: none"> START additional Charging Pump(s) as necessary 	
		<ul style="list-style-type: none"> ADJUST the following as necessary to maintain proper Seal Injection AND MAXIMUM Charging flow: 	
		<ul style="list-style-type: none"> Charging Pump Speed Controller(s) 	
		<ul style="list-style-type: none"> HIC-121, CHARGING FLOW Controller 	
		<ul style="list-style-type: none"> Seal Water Flow Control Valves 	NOTE: The BOP may contact the AO to adjust Seal Injection flows. If so, Booth Instructor acknowledge as AO; and use: IRF CVC030 f: variable IRF CVC031 f: variable IRF CVC032 f: variable
		MAINTAIN Seal Injection flow between 6 gpm AND 20 gpm per RCP UNLESS Seal Injection isolated	
	BOP	(Step 16) CHECK If RCS Cooldown Should Be Stopped:	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 67 of 70Event Description: **"C" Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK Core Exit T/Cs - LESS THAN REQUIRED CORE EXIT T/C TEMPERATURE FROM STEP 8 	
		<ul style="list-style-type: none"> STOP RCS cooldown 	
		<ul style="list-style-type: none"> MAINTAIN Core Exit T/Cs - LESS THAN REQUIRED TEMPERATURE 	
<u>Critical Task:</u> While in EOP-E-3, establish/maintain an RCS temperature so that transition from E-3 does not occur because the RCS temperature is in either (1) Too high to maintain 38°F of RCS Subcooling OR (2) below 295°F (RCS Integrity Red path Limit) 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. This failure constitutes an incorrect performance that necessitates the operator taking compensating action that would unnecessarily complicate the event mitigation strategy.			
	BOP	(Step 17) CHECK Ruptured S/G(s) Pressure - STABLE OR RISING	
	RO	(Step 18) CHECK RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 38°F [57°F]	
	RO	(Step 19) DEPRESSURIZE RCS To MINIMIZE Break Flow AND Refill PZR:	
		<ul style="list-style-type: none"> CHECK Normal PZR Spray - AVAILABLE 	
	CRS	(Step 19.a RNO) OBSERVE CAUTIONS and NOTE prior to Step 20 AND GO TO Step 20.	
	RO/ BOP	(Step 20) DEPRESSURIZE RCS Using PZR PORV To Minimize Break Flow AND Refill PZR:	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 68 of 70Event Description: **"C" Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK PZR PORV - AT LEAST ONE AVAILABLE 	
		<ul style="list-style-type: none"> OPEN one PZR PORV until ANY of the following conditions satisfied: 	
		<ul style="list-style-type: none"> BOTH of the following: 	
		<ul style="list-style-type: none"> RCS pressure - LESS THAN RUPTURED S/G(s) PRESSURE 	
		<ul style="list-style-type: none"> PZR level - GREATER THAN 14% [31%] 	
		OR	
		<ul style="list-style-type: none"> PZR level - GREATER THAN 73% [66%] 	
		OR	
		<ul style="list-style-type: none"> RCS Subcooling based on Core Exit T/Cs - LESS THAN 18°F [37°F] 	
		<ul style="list-style-type: none"> CLOSE PZR PORV 	
	RO	(Step 21) CHECK RCS Pressure - RISING	
	RO/ BOP	(Step 22) CHECK If ECCS Flow Should Be Terminated:	
		<ul style="list-style-type: none"> CHECK RCS Subcooling based on Core Exit T/Cs - GREATER THAN 18°F [37°F] 	
		<ul style="list-style-type: none"> CHECK Secondary Heat Sink: 	
		<ul style="list-style-type: none"> Total feed flow to S/G(s) - GREATER THAN 300 GPM AVAILABLE 	
		OR	
		<ul style="list-style-type: none"> S/G Narrow Range level in at least one Intact S/G - GREATER THAN 9% [18%] 	
		<ul style="list-style-type: none"> CHECK RCS pressure - STABLE OR RISING 	

Op Test No.: N16-1 Scenario # 1 Event # 6 & 7 Page 69 of 70Event Description: **"C" Steam Generator Tube Rupture/Loss of Off-Site Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK PZR level - GREATER THAN 14% [31%] 	
	RO	(Step 23) STOP SI Pumps	

Critical Task:

Depressurize the RCS to meet SI termination criteria before Steam Generator Overfill is reached based on Water in the Steam Lines. (If above 100% WR level see Simulator Code "thlecell(193)" to determine)

Safety Significance: Failure to stop reactor coolant leakage into a ruptured SG by depressurizing the RCS (when it is possible to do so) needlessly complicates mitigation of the event. It also constitutes a significant reduction of safety margin beyond that irreparably introduced by the scenario.

At the discretion of the Lead Examiner terminate the exam.			

NRC SCENARIO N16 1-1 TURNOVER SHEET

1. INITIAL CONDITIONS

- a) Time in Core Life: MOL
- b) Reactor Power: 100% Mode 1
- c) Turbine Load: 770 MWe
- d) Boron Concentration: 853 ppm
- e) Rod Height: 218 CB 'D'
- f) RCS Pressure: 2235 psig
- g) PZR Level: 53.3 %
- h) Xenon: Equilibrium

2. TECHNICAL SPECIFICATION LCO ACTIONS STATEMENTS IN EFFECT

<u>T.S. #</u>	<u>Description</u>
LCO 3.7.4 A	Restore AFW pump or flow path(s) to OPERABLE status within 7 days AND 8 days from discovery of failure to meet the LCO

3. CLEARANCES IN EFFECT

- a) SDAFW Pump

4. CAUTION CAPS IN EFFECT

- a) None

5. PROTECTED EQUIPMENT

- a) "A" MDAFW Pump and flowpath
- b) "B" MDAFW Pump and flowpath
- c) "C" AFW Pump

6. DEGRADED EQUIPMENT

- a) FI-613, CCW System Flow is OOS (I&C Investigating).
- b) RTGB Annunciator APP-010-B3, "EDG B START AIR LO PRESS," has failed to the ILLUMINATED condition (I&C is investigating).

7. SWITCHYARD ACCESS

- a) PROTECTED

8. PLANNED EVOLUTIONS

- a) Maintain Steady-State conditions
- b) Monitor the completion of Maintenance of the SDAFW Pump

9. TURNOVER INFORMATION

- a) The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

10. REACTIVITY INFORMATION

- a) Review the OST-947 MOL charts for BA and PW additions

11. RISK

- a) GREEN

ROBINSON Nuclear Training
Committed to Excellence

OPERATIONS TRAINING

N16-1-2

Initial Licensed Operator Training

Rev 011516

**THIS EXERCISE GUIDE DOES NOT
IMPLEMENT ANY COMMITMENTS**


Developed By:

 CHRISTOPHER McOMBER
Instructor/Developer

Date:

1/20/16

Concurred By:

 JOHN R. LITTLE III
Line Superintendent/Supervisor/SRO

Date:

01/22/16

Approved By:

 J. RACKLEY
Superintendent/Supervisor Training

Date:

1/23/16

PROGRAM: H B Robinson Operations Training

MODULE: Initial License Operator Training Class 15-1

TOPIC: NRC Simulator Exam

Scenario N16-1-2

REFERENCES:

1. Technical Specification LCO 3.5.2, "ECCS - Operating" (Amendment 176)
2. OP-105, "Maneuvering the Plant When Greater than 25% Power" (Rev 62)
3. OP-301, "Chemical and Volume Control System (CVCS)" (Rev 112)
4. AOP-003, "Malfunction of Reactor Makeup Control" (Rev 20)
5. AOP-010, "Main Feedwater/Condensate Malfunction" (Rev 33)
6. APP-003, "RCS & Makeup Systems" (Rev 54)
7. APP-001, "Miscellaneous NSSS" (Rev 60)
8. AOP-018, "Reactor Coolant Pump Abnormal Conditions" (Rev 31)
9. Technical Specification LCO 3.4.17, "Chemical and Volume Control System (CVCS)" (Amendment 223)
10. AOP-025, "RTGB Instrument Failure" (Rev 24)
11. OWP-033, "First Stage Pressure (FSP)" (Rev 13)
12. Technical Specification LCO 3.3.1, "Reactor Protection System (RPS) Instrumentation" (Amendment 176)
13. Technical Specification LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation" (Amendment 176)
14. Technical Specification LCO 3.3.6, "Containment Ventilation Isolation Instrumentation" (Amendment 176)
15. EOP-E-0, "Reactor Trip or Safety Injection" (Rev 6)
16. CSFST, "Critical Safety Function Status Trees" (Rev 7)
17. EOP-E-1, "Loss of Reactor or Secondary Coolant" (Rev 4)
18. FRP-J.1, "Response to High Containment Pressure" (Rev 10)

Validation Time: 89 minutes

Scenario Event Description
NRC Scenario 2

Facility:	HB Robinson	Scenario No.:	2	Op Test No.:	N16-1
Examiners:	_____	Operators:	_____	(SRO)	
	_____		_____	(RO)	
	_____		_____	(BOP)	
Initial Conditions:		The plant is at 75% power (BOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.			
Turnover:		The following equipment is Out-Of-Service: The "A" SI Pump is OOS. The "B" SI Pump has been aligned to 480 VAC ESF Bus E-1. The "C" Charging Pump is also OOS. LI-928, "C" SI Accumulator Level, is OOS (I&C Investigating). RTGB Annunciator APP-009-C3, "AIR SIDE SEAL OIL BU PMP OVLD," has failed to the EXTINGUISHED condition (I&C is investigating). The crew will be directed to raise power to 100%.			
Event No.	Malf. No.	Event Type*	Event Description		
1	-	R-RO N-BOP N-SRO	Raise Power		
2	1	I-RO I-SRO	VCT Level Transmitter LT-115 fails HIGH		
3	2	I-BOP I(TS)-SRO	Turbine 1 st Stage Pressure Transmitter PT-447 fails LOW		
4	3	C-RO C(TS)-SRO	"B" Charging Pump Trip		
5	4	C-BOP C-SRO	"C" FRV Controller fails HIGH in AUTO		
6	5	M-RO M-BOP M-SRO	Cold Leg SBLOCA		
7	6/7	NA	480 VAC Bus E-1 De-energizes		
8	6	C-RO	"C" SI Pump fails to Auto Start		
9	7	C-RO	CV Spray Valves SI-880C and D fail to OPEN Automatically		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Scenario Event Description
NRC Scenario 2

HB Robinson 2016 NRC Scenario #2

The plant is at 75% power (BOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

The following equipment is Out-Of-Service: The "A" SI Pump is OOS. The "B" SI Pump has been aligned to 480 VAC ESF Bus E-1. The "C" Charging Pump is also OOS. LI-928, "C" SI Accumulator Level, is OOS (I&C Investigating). RTGB Annunciator APP-009-C3, "AIR SIDE SEAL OIL BU PMP OVLD," has failed to the EXTINGUISHED condition (I&C is investigating). The crew will be directed to raise power to 100%.

Shortly after taking the watch, the operator will raise power to 100% using OP-105, "Maneuvering the Plant When Greater than 25% Power," and OP-301, "Chemical and Volume Control System (CVCS)."

During the power increase, VCT Level Transmitter LT-115 will fail HIGH causing all letdown to be diverted to the CVCS HUTs. This failure will result in VCT level lowering without automatic makeup. The operator will respond in accordance with AOP-003, "Malfunction of Reactor Makeup Control." After this, the power increase will be suspended.

Next, Turbine 1st Stage Pressure Transmitter PT-447 will fail LOW. The operator will respond in accordance with AOP-025, "RTGB Instrument Failure, and place all Feed Regulating Valves in MANUAL" The operator will remove the failed instrument from service in accordance with OWP-033, "First Stage Pressure (FSP)," and restore the Feed Regulating valves to AUTO control. The operator will address 3.3.1, "Reactor Protection System (RPS) Instrumentation," Technical Specification LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," and Technical Specification LCO 3.3.6, "Containment Ventilation Isolation Instrumentation."

Following this, the "B" Charging Pump will trip. The operator will respond in accordance with APP-003-F5, CHG PMP MOTOR OVLD/TRIP and raise speed of the "A" Charging Pump. The operator may enter AOP-018, "Reactor Coolant Pump Abnormal Conditions." The operator will address 3.4.17, "Chemical and Volume Control System."

Shortly afterwards, the "C" Feed Regulating Valve Controller will fail such that the valve starts to OPEN. The operator will respond in accordance with AOP-010, "Main Feedwater/Condensate Malfunction," and control the "C" S/G level manually.

Subsequently, a Cold Leg Small Break LOCA will occur (over 5 minutes) on the B Loop. The operator will enter AOP-016, "Excessive Primary Plant Leakage." Ultimately, the operator will enter EOP-E-0, "Reactor Trip or Safety Injection." When the reactor trips, the normal supply breaker to Bus E-1 will trip OPEN, and the "A" EDG Output Breaker will fail to CLOSE either automatically or manually; and Train "A" equipment will remain unavailable throughout the event. Additionally, the "C" SI Pump will fail to automatically start on SI, and the operator will be required to manually start this pump.

Upon completion of EOP-E-0, the operator will transition to EOP-E-1, "Loss of Reactor or Secondary Coolant," and the break size will become larger. Eventually, Containment pressure will exceed 10 psig creating an Orange Path condition on the Containment Critical Safety Function. When this occurs, the "B" CV Spray will automatically start on HI-HI Containment

Scenario Event Description
NRC Scenario 2

Pressure, however, both SI-880C&D ("B" CV Spray Pump Discharge Valves) will fail to open automatically, and the operator will be required to manually open these valves.

The scenario will terminate in EOP-E-1 after Containment Spray has been initiated, or at Step 9 of FRP-J.1, "Response to High Containment Pressure," after the operator has taken all necessary steps to reduce Containment pressure, or upon transition from either EOP-E-1 or FRP-J.1 to FRP-P.1, Response to Imminent Pressurized Thermal Shock (After all Critical Tasks have been completed).

Critical Tasks:

Manually control "C" S/G Narrow Range Level before a Reactor Trip occurs on low S/G level or a Protective Action occurs on high S/G Level.

Safety Significance: failure to take manual control of the "C" S/G Feed Reg Valve and control Narrow Range S/G level, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection/Engineered Safeguards Actuation System. Performance of the critical task would stabilize the S/G level transient. A failure to stabilize the S/G level transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS temperature/pressure control.

Trip all RCPs within 6 minutes of meeting the EOP-E-0/E-1 RCP Trip Criteria (Containment Isolation Phase B - ACTUATED, OR BOTH of the following satisfied: SI Pumps - AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW AND RCS Subcooling based on Core Exit T/Cs - LESS THAN 13°F [32°F]) so that CET temperatures do not become superheated when forced circulation in the RCS stops. (EOP-Based)

Safety Significance: Failure to trip the RCPs under the postulated plant conditions leads to core uncover and to fuel cladding temperatures in excess of 2200°F, which is the limit specified in the ECCS acceptance criteria. Thus, failure to perform the task represents mis-operation or incorrect operator performance in which the operator has failed to prevent degradation of the fuel cladding barrier to fission product release and which leads to a violation of the facility license condition.

Establish flow from at least one high-head SI pump before transition out of E-0. (EOP-Based)

Safety Significance: Failure to manually start at least one high-head SI pump under the postulated conditions constitutes mis-operation or incorrect operator performance in which the operator does not prevent degraded emergency core cooling system (ECCS) capacity. In this case, at least one high-head SI pump can be manually started from the control room. Therefore, failure to manually start a high-head SI pump also represents a failure by the operator to demonstrate the ability to effectively direct or manipulate engineered safety feature (ESF) controls that would prevent a significant reduction of safety margin beyond that irreparably introduced by the scenario. Additionally, failure to manually start a high-head SI pump also represents a failure by the operator to demonstrate the ability to recognize a failure or an incorrect automatic actuation of an ESF system or component. Finally, under the postulated plant conditions, failure to manually start a high-head SI pump (when it is possible to do so) is a violation of the facility license condition.

Manually actuate at least one CV Spray Train before Transitioning to EOP-ES-1.2. (EOP-Based)

Safety Significance: Failure to manually actuate the minimum required complement of containment cooling equipment under the postulated conditions demonstrates the inability of the crew to “recognize a failure or an incorrect automatic actuation of an ESF system or component. In this case, the minimum required complement of containment cooling equipment can be manually actuated from the control room. Therefore, failure to manually actuate the minimum required complement of containment cooling equipment also represents a failure by the operator to demonstrate the ability to effectively direct or manipulate engineered safety feature (ESF) controls that would prevent (degraded emergency core cooling system (ECCS) capacity). Additionally, under the postulated plant conditions, failure to manually actuate the minimum required complement of containment cooling equipment (when it is possible to do so) results in a failure to prevent a significant reduction of safety margin beyond that irreparably introduced by the scenario.

Scenario Event Description
NRC Scenario 2

SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Sim. Setup	Reset to Temp IC 615	
<input type="checkbox"/>	<p>T = 0 Malfunctions:</p> <p>“A” SI Pump OOS:</p> <ul style="list-style-type: none"> IRF EPS480E1_130 f: RACK_OUT (“A” SI Pump OOS) IRF EPS480E1_124 f: RACK_IN (“B” SI Pump Racked IN to E-1) <p>PLACE Red Cap over “A” SI Pump Control Switch</p> <p>“C” Charging Pump OOS:</p> <ul style="list-style-type: none"> IRF EPSV480E2_152 f: RACK_OUT <p>PLACE Red Cap over “C” Charging Pump Control Switch PLACE Green Cap over “A” and “B” Charging Pump Control Switch</p> <p>LI-928 “C” SI Accumulator Level indication OOS</p> <ul style="list-style-type: none"> IOR aoSISAOD021A f:0 <p>Place WHITE DOT on LI-928</p> <p>RTGB Annunciator APP-009-C3 failed OFF</p> <ul style="list-style-type: none"> IMF ANN09C03 f:ALARM_OFF <p>Place WHITE DOT on APP-009-C3</p> <p>Insert the following:</p> <ul style="list-style-type: none"> IRF SIS029 f: NO_AUTO (“C” SI Pumps fails to AUTO start) IRF CNS010 f: NO-AUTO (SI-880C fails to OPEN in AUTO) IRF CNS011 f: NO-AUTO (SI-880C fails to OPEN in AUTO) \$006_RTA_TRIP IMF EPS05A (Normal Supply Breaker to E-1 trips on Rx Trip) \$006_RTA_TRIP IMF EDG03A (Diesel Output Breaker to E-1 fails to CLOSE) <p>Place the Simulator in RUN and ACKNOWLEDGE all alarms.</p> <p>Adjust Steam Dump Potentiometer to 7.28 (Per OP-105)</p> <p>Ensure “B” Charging Pump operating AUTO, “A” Charging Pump operating in MANUAL</p>		
<input type="checkbox"/>	Perform Attachment 2 (Simulator Setup For Exams) of TAP-411.		

Scenario Event Description
NRC Scenario 2

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Crew Briefing 1. Assign Crew Positions based on evaluation requirements 2. Review the Shift Turnover Information with the crew. 3. Provide the crew with the following: <ul style="list-style-type: none"> • Copy of OP-105 marked up for power increase • Copy of Section 8.2.7 of OP-301 • Copy of Technical Specifications/Basis 4. Direct the crew to Review the Control Boards taking note of present conditions, alarms.		
<input type="checkbox"/>	T-0	Begin Familiarization Period	
<input type="checkbox"/>	At direction of examiner	Execute Lesson Plan for Simulator Scenario N16-1-2.	
<input type="checkbox"/>	At direction of examiner	Event 1	Raise Power
<input type="checkbox"/>	At direction of examiner	Event 2 ICO CVCXMTLT_115 r:00:30 f:60	VCT Level Transmitter LT-115 fails HIGH
<input type="checkbox"/>	At direction of examiner	Event 3 ICO TURXMTPT_447 r:30 f:0	Turbine 1 st Stage Pressure Transmitter PT-447 fails LOW
<input type="checkbox"/>	At direction of examiner	Event 4 IMF CVC05B	"B" Charging Pump Trip
<input type="checkbox"/>	At direction of examiner	Event 5 IMF CFW17C r:45 f:100	"C" FRV Controller fails HIGH in AUTO
<input type="checkbox"/>	At direction of examiner	Event 6 IMF RCS01C r:5:00 f:1000	Cold Leg SBLOCA

Scenario Event Description
NRC Scenario 2

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Post-Rx Trip	Event 7 IMF EPS05A IMF EDG03A	480 VAC Bus E-1 De-energizes NOTE: E-1 will de-energize on Rx Trip \$006_RTA_TRIP IMF EPS05A (Normal Supply Breaker to E-1 trips on Rx Trip) \$006_RTA_TRIP IMF EDG03A (Diesel Output Breaker to E-1 fails to CLOSE)
<input type="checkbox"/>	Post-Rx Trip	Event 8 IRF SIS029 f:NO_AUTO	"C" SI Pump fails to Auto Start NOTE: Failure is inserted at T=0
<input type="checkbox"/>	Post-Rx Trip	Event 9 IRF CNS010 f:NO_AUTO IRF CNS011 f:NO_AUTO	CV Spray Valves SI-880C and D fail to OPEN Automatically NOTE: Failure is inserted at T=0
<input type="checkbox"/>	Terminate the scenario upon direction of Lead Examiner		

Op Test No.: N16-1 Scenario # 2 Event # 1 Page 10 of 60Event Description: **Raise Power**

Shortly after taking the watch, the operator will raise power to 100% using OP-105, "Maneuvering the Plant When Greater than 25% Power," and OP-301, "Chemical and Volume Control System (CVCS)."

Booth Operator Instructions: **NA**

Indications Available: **NA**

Time	Pos.	Expected Actions/Behavior	Comments
OP-105, MANEUVERING THE PLANT WHEN GREATER THAN 25% POWER			
	RO	(Step 5) Maintain Tave within 5°F of Tref using a combination of Control Rods and Boron Concentration changes.	NOTE: The RO may withdrawal control rods.
OP-301, CHEMICAL AND VOLUME CONTROL SYSTEM (CVCS) SECTION 8.2.7, RCS QUICK DILUTION CHECKLIST			
	RO	(Step 1) This revision has been verified to be the latest revision available.	
	RO	(Step 2) DETERMINE the amount of water to add to the RCS and if applicable, the expected change in RCS temperature AND Reactor Power.	
	RO	(Step 3) OBTAIN an independent check of the volume of water required.	
	RO	(Step 4) OBTAIN permission from the CRS OR the SM to add the amount of water previously determined, including the expected change in RCS temperature AND Reactor Power.	

Op Test No.: N16-1 Scenario # 2 Event # 1 Page 11 of 60Event Description: **Raise Power**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 5) IF flow adjustment is desired, THEN adjust FCV-114A, PRIMARY WTR FLOW DILUTE MODE, potentiometer to obtain desired flow rate.	
	RO	(Step 6) PLACE the RCS MAKEUP MODE selector switch in the DILUTE position.	
	RO	(Step 7) SET YIC-114, PRIMARY WTR TOTALIZER to the desired quantity.	
	RO	(Step 8) IF two letdown orifices are in service and it is desired to divert flow to the HUT, THEN...	
	RO	(Step 9) Momentarily PLACE the RCS MAKEUP SYSTEM switch to the START position.	
	RO	(Step 10) IF LCV-115A is in AUTO, THEN ENSURE proper operation of LCV-115A, VCT/HLDP TK DIV valve.	
	RO	(Step 11) IF any of the following conditions occur, THEN momentarily PLACE the RCS MAKEUP SYSTEM switch in the STOP position:	
		<ul style="list-style-type: none"> Unanticipated Rod Motion 	
		<ul style="list-style-type: none"> Primary Water addition exceeds the desired value 	
	RO	(Step 12) WHEN the desired amount of Primary Water has been added to the RCS, THEN ENSURE the following:	
		<ul style="list-style-type: none"> FCV-114A, PW TO BLENDER, closes. 	
		<ul style="list-style-type: none"> FCV-114B, BLENDED MU TO VCT, closes. 	

Op Test No.: N16-1 Scenario # 2 Event # 1 Page 12 of 60Event Description: **Raise Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> IF in Auto, THEN the operating Primary Water Pump stops. 	
		<ul style="list-style-type: none"> The RCS MAKEUP SYSTEM is OFF. 	
		<ul style="list-style-type: none"> IF desired, THEN ENSURE LCV-115A, VCT/HLDP TK DIV valve control switch in AUTO. 	
	RO	(Step 13) RETURN the RCS Makeup System to automatic as follows:	
		<ul style="list-style-type: none"> ENSURE FCV-114A, PRIMARY WTR FLOW DILUTE MODE is in AUTO. 	
		<ul style="list-style-type: none"> PLACE the RCS MAKEUP MODE switch in the AUTO position. 	
		<ul style="list-style-type: none"> Momentarily PLACE the RCS MAKEUP SYSTEM switch in the START position. 	
	RO	(Step 14) RECORD, in AUTO LOG, as indicated by PRIMARY WATER TOTALIZER, YIC-114 total amount of Primary Water added during the dilution.	
	RO	(Step 15) MONITOR parameters for the expected change in reactivity AND inform the CRS OR the SM the results of the dilution.	
OP-105, MANEUVERING THE PLANT WHEN GREATER THAN 25% POWER			
	BOP	(Step 6) IF EH Turbine Control is in OPER AUTO, THEN raise turbine load as follows:	NOTE: Since power is stabilized at 75%, the BOP will perform Step 6 to initiate the load increase. The next applicable Step in Section 6.2.2 of OP-105 is Step 22.
		<ul style="list-style-type: none"> Adjust the SETTER indication using the REF ▼ or REF ▲ pushbuttons to the desired load. 	

Op Test No.: N16-1 Scenario # 2 Event # 1 Page 13 of 60Event Description: **Raise Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none">Use the GO, HOLD, REF ▼, and REF ▲ pushbuttons as necessary to continue the rise in load.	
	BOP	(Step 22) WHEN average Reactor Power crosses greater than 90% by Power Range Indications, THEN check that APP-005-D6 is received.	NOTE: The Turbine is in OPER AUTO.
After the 1st Dilution and MWe raised by 15-20 MWe, and at the discretion of the Lead Examiner move to Event #2.			

Op Test No.: N16-1 Scenario # 2 Event # 2 Page 14 of 60Event Description: **VCT Level Transmitter LT-115 fails HIGH**

During the power increase, VCT Level Transmitter LT-115 will fail HIGH causing all letdown to be diverted to the CVCS HUTs. This failure will result in VCT level lowering without automatic makeup. The operator will respond in accordance with AOP-003, "Malfunction of Reactor Makeup Control." After this, the power increase will be suspended.

Booth Operator Instructions: **ICO CVCXMTLT_115**
r:00:30 f:60

Indications Available:

- RTGB Annunciator APP-003-E3, VCT HI/LO LVL
- VCT Level LI-115 indicates HIGH
- LCV-115 diverting to CVCS HUT
- VCT Level LI-112 on ERFIS indicates lowering VCT Level

Time	Pos.	Expected Actions/Behavior	Comments
AOP-003, MALFUNCTION OF REACTOR MAKEUP CONTROL			
			NOTE: The crew could refer to APP-003-E3 before entering AOP-003.
	RO	(Step 1) Check For Failure Of A Level Transmitter As Follows:	
		<ul style="list-style-type: none"> • Obtain a VCT level for LT-115 using ERFIS 	
		<ul style="list-style-type: none"> • PT ID CHL0115A 	
		<ul style="list-style-type: none"> • Obtain a VCT level for LT-112 using ERFIS 	
		<ul style="list-style-type: none"> • PT ID CHL0112A 	
		<ul style="list-style-type: none"> • Check VCT level indicators - OSCILLATING LEVEL DEVIATION OBSERVED 	
	CRS	(Step 1.c RNO) Go To Step 1.e	
	RO	(Step 1.e) Check VCT level deviation between LT-112 and LT-115 – GREATER THAN 8 INCHES (13%)	NOTE: LT-115 has failed HIGH.

Op Test No.: N16-1 Scenario # 2 Event # 2 Page 15 of 60Event Description: **VCT Level Transmitter LT-115 fails HIGH**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 3) Stabilize The RCS Makeup System As Follows:	
		<ul style="list-style-type: none"> Check LT-115 - FAILED HIGH 	
		<ul style="list-style-type: none"> Place LCV-115A, VCT/HLDP TK DIV, Control Switch to VCT 	
		<ul style="list-style-type: none"> Obtain Hagan Racks Key number 10 	
		<ul style="list-style-type: none"> Place VCT Level Transmitter Selector Switch located in Hagan Rack #19, IN LT-112 POSITION 	NOTE: The CRS will dispatch the BOP to the Hagan Racks. Booth Instructor: use IRF CVC 067 f:LT-112.
		<ul style="list-style-type: none"> Check LT-115 - FAILED HIGH 	
		<ul style="list-style-type: none"> Place the LCV-115A Control Switch to AUTO 	
	CRS	<ul style="list-style-type: none"> Contact I&C to repair the failed channel 	NOTE: The CRS may call WCC/I&C to address the VCT Transmitter failure. If so, Booth Instructor acknowledge as WCC.
	CRS	<ul style="list-style-type: none"> Go To Step 6 	
	CRS	(Step 6) Make PA Announcement For Procedure Entry	NOTE: The CRS will most likely make this announcement.
	CRS	(Step 7) Implement The EALs	NOTE: The CRS may ask SM to address. If so, Floor Instructor acknowledge as SM.
	RO	(Step 8) Check VCT Level - LESS THAN 12.5 INCHES (21%)	
	RO	(Step 8 RNO) IF VCT level lowers to less than 12.5 inches (21%), THEN perform Steps 9 and 10.	NOTE: This is a Continuous Action. The CRS will make both board operators aware.
	CRS	Go To Step 11.	

Op Test No.: N16-1 Scenario # 2 Event # 2 Page 16 of 60Event Description: **VCT Level Transmitter LT-115 fails HIGH**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 11) Check VCT Level - LESS THAN 20 INCHES (33%)	
	CRS	(Step 11 RNO) Go To Step 21.	
	RO	(Step 21) Check VCT Level - LESS THAN 51.5 INCHES (86%)	
	RO	(Step 22) Verify Charging And Letdown Flows Are Normal For Plant Conditions	
	RO	(Step 23) Check APP-003-D5, BA FLOW DEV - ILLUMINATED	
	CRS	(Step 23 RNO) Go To Step 28.	
	RO	(Step 28) Check APP-003-E5, MAKEUP WATER DEV - ILLUMINATED	
	CRS	(Step 28 RNO) Go To Step 34.	
	RO	(Step 34) Check Boration - REQUIRED	
	CRS	(Step 34 RNO) Go To Step 37.	
	RO	(Step 37) Check Dilution - REQUIRED	
	CRS	(Step 37 RNO) Go To Step 40.	
	CRS	(Step 40) Check Technical Specifications, Section 3.4.17, Chemical and Volume Control System (CVCS), For Applicable LCO	NOTE: Technical Specification LCO 3.4.17 is MET.

Op Test No.: N16-1 Scenario # 2 Event # 2 Page 17 of 60Event Description: **VCT Level Transmitter LT-115 fails HIGH**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 41) Return To Procedure And Step In Effect	
			NOTE: The CRS will likely conduct an Alignment Brief. Floor Instructor: As SM, direct CRS to place the plant Startup on HOLD.
At the discretion of the Lead Examiner move to Event #3.			

Op Test No.: N16-1 Scenario # 2 Event # 3 Page 18 of 60Event Description: **Turbine 1st Stage Pressure Transmitter PT-447 fails LOW**

Next, Turbine 1st Stage Pressure Transmitter PT-447 will fail LOW. The operator will respond in accordance with AOP-025, "RTGB Instrument Failure, and place all Feed Regulating Valves in MANUAL" The operator will remove the failed instrument from service in accordance with OWP-033, "First Stage Pressure (FSP)," and restore the Feed Regulating valves to AUTO control. The operator will address 3.3.1, "Reactor Protection System (RPS) Instrumentation," Technical Specification LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," and Technical Specification LCO 3.3.6, "Containment Ventilation Isolation Instrumentation."

Booth Operator Instructions: **ICO TURXMTPT_447**
r:30 f:0

Indications Available:

- RTGB Annunciator APP-005-F5, AMSAC TROUB/BYPD
- PT-447, 1st Stage Pressure starts to lower
- PT-446, 1st Stage Pressure remains constant
- S/G Narrow Range levels will lower

Time	Pos.	Expected Actions/Behavior	Comments
AOP-025, RTGB INSTRUMENT FAILURE			
	CRS	(Step 1) GO TO Appropriate Section For Failed Instrument:	NOTE: The CRS will select Section E of AOP-025.
		<ul style="list-style-type: none"> • TURBINE FIRST STAGE PRESSURE, (PT-446, 447) - SECTION E 	
AOP-025, RTGB INSTRUMENT FAILURE			
SECTION E, TURBINE FIRST STAGE PRESSURE TRANSMITTER FAILURE			
	BOP	(Step 1) CHECK Turbine Load Rejection -	Immediate Action
		<ul style="list-style-type: none"> • IN PROGRESS 	
		OR	
		<ul style="list-style-type: none"> • HAS OCCURRED 	
	CRS	(Step 1 RNO) GO TO Step 3.	Immediate Action

Op Test No.: N16-1 Scenario # 2 Event # 3 Page 19 of 60Event Description: **Turbine 1st Stage Pressure Transmitter PT-447 fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3) CHECK S/G Level Trend - CONTROLLING IN AUTO TO 39%	Immediate Action
	RO	(Step 4) CONTROL Reactor Power:	Immediate Action
		<ul style="list-style-type: none"> PLACE rod bank selector switch in M (Manual) 	
		<ul style="list-style-type: none"> OPERATE rods to maintain reactor power less than or equal to 100% 	
	CRS	(Step 5) NOTIFY Plant Personnel Of Procedure Entry Using PA System	NOTE: The CRS will most likely make this announcement.
	BOP	(Step 6) PERFORM The Following:	
		<ul style="list-style-type: none"> CHECK S/G Level - STABILIZED BETWEEN 39% AND 52% 	
	BOP	(Step 6.a RNO) WHEN S/G level is stabilized between 39% and 52%, THEN CONTINUE WITH Step 6.b.	
	BOP	(Step 6.b) CHECK FRV Controllers - ALL IN MAN:	NOTE: All FRV controllers are expected to be in AUTO.
		<ul style="list-style-type: none"> FCV-478 	
		<ul style="list-style-type: none"> FCV-488 	
		<ul style="list-style-type: none"> FCV-498 	
	BOP	(Step 6.b RNO) PLACE all FRV controllers in MAN.	NOTE: The BOP will place all FRVs in MANUAL.
	BOP	(Step 7) SELECT Alternate Channel For 1st Stage Pressure Input:	
		<ul style="list-style-type: none"> Failed Channel – PT-447, Alternate Channel – PT-446 	

Op Test No.: N16-1 Scenario # 2 Event # 3 Page 20 of 60Event Description: **Turbine 1st Stage Pressure Transmitter PT-447 fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 8) ADJUST Each S/G Level To Program Level	NOTE: The BOP will need to restore S/G levels to 52%.
	RO	(Step 9) ADJUST Tavg To Within -1.5 TO +1.5°F Of Tref	NOTE: The RO may need to adjust control rods and/or boron concentration to restore Tavg-Tref deviation.
	RO	(Step 10) CHECK Reactor Power - GREATER THAN OR EQUAL TO 15%	
	BOP	(Step 11) RESTORE Each S/G FRV To Automatic:	NOTE: The BOP will need to restore S/G levels to 52%.
		<ul style="list-style-type: none"> CHECK S/G level - WITHIN $\pm 1\%$ OF PROGRAMMED LEVEL 	
	BOP	(Step 11 RNO) WHEN S/G level is within $\pm 1\%$ of programmed level, THEN PLACE affected controller in AUTO.	NOTE: The BOP will place all FRVs in AUTO.
	CRS	<ul style="list-style-type: none"> GO TO Step 12. 	
	RO	(Step 12) RESTORE Rod Control To Automatic:	NOTE: Since the power increase is suspended, the RO/CRS may discuss placing the control rods back in AUTO, if not already there.
		<ul style="list-style-type: none"> CHECK Tavg - WITHIN -0.5 to +0.5°F OF Tref. 	
		<ul style="list-style-type: none"> Place Rod Control Selector Switch in AUTO 	
	CRS	(Step 13) REMOVE Affected Transmitter From Service Using OWP-033:	
		<ul style="list-style-type: none"> Channel – PT-447, OWP-FSP-2 	
			NOTE: The CRS will address OWP-033.

Op Test No.: N16-1 Scenario # 2 Event # 3 Page 21 of 60Event Description: **Turbine 1st Stage Pressure Transmitter PT-447 fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
OWP-033, FIRST STAGE PRESSURE (FSP) FSP-2, FIRST STAGE PRESSURE TRANSMITTER PT-447			
	CRS	Address FSP-2	
	RO	Place the STEAM DUMP MODE SELECTOR SWITCH in the STEAM PRESSURE CONTROL position.	NOTE: APP-006-F5 STEAM DUMP ARMED will alarm.
	BOP	Place the 1ST STAGE PRESSURE SELECTOR SWITCH 446/447 in the "446" position.	
	BOP	Insert Trip Signals	NOTE: The CRS will dispatch the BOP to the Hagan Racks. Booth Instructor coordinate with BOP to insert Trip Signals: OPEN Protection Racks Door: IRF BST101 f:D_OPEN <ul style="list-style-type: none"> • IRF BST100 f:TRIP • IRF BST092 f:TRIP • IRF BST017 f:TRIP • IRF BST019 f:TRIP • IRF BST021 f:TRIP CLOSE Protection Racks Door: IRF BST101 f:D_CLOSED
		<ul style="list-style-type: none"> • B/S 447-2 HAGAN RACK #25 (70% TURBINE LOAD LIMIT) 	NOTE: B/S STATUS LIGHT TURB POW LOAD LIMIT PC-447-E2 will ILLUMINATE.
		<ul style="list-style-type: none"> • B/S 447-1 HAGAN RACK #25 (PERMISSIVE P-7) 	NOTE: B/S STATUS LIGHT TURBINE POWER P-7 PC-447-E1 will ILLUMINATE.
		<ul style="list-style-type: none"> • B/S 475, HAGAN RACK #24 (LOOP 1 HI STM FLOW) 	NOTE: B/S STATUS LIGHT LOOP 1 HI STM FLOW FC-475 will ILLUMINATE.
		<ul style="list-style-type: none"> • B/S 485 HAGAN RACK #25 (LOOP 2 HI STM FLOW) 	NOTE: B/S STATUS LIGHT LOOP 2 HI STM FLOW FC-485 will ILLUMINATE.

Op Test No.: N16-1 Scenario # 2 Event # 3 Page 22 of 60Event Description: **Turbine 1st Stage Pressure Transmitter PT-447 fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> B/S 495 HAGAN RACK #25 (LOOP 3 HI STM FLOW) 	NOTE: B/S STATUS LIGHT LOOP 3 HI STM FLOW FC-495 will ILLUMINATE.
	BOP	Place AMSAC Bypass Switch POWER 2, PROCESSOR "A", and AMSAC Bypass Switch POWER 2, PROCESSOR "B" in the BYPASSED position.	NOTE: The CRS will dispatch the BOP. Booth Instructor: Coordinate with BOP to re-position switches using: IRF RPS012 f:BYPASS NOTE: APP-005-F5, AMSAC TROUB/BYPD will ILLUMINATE.
AOP-025, RTGB INSTRUMENT FAILURE SECTION E, TURBINE FIRST STAGE PRESSURE TRANSMITTER FAILURE			
	CRS	(Step 14) CHECK TS LCO 3.3.1 And 3.3.2 For Applicability	NOTE: The CRS will address Technical Specifications.
	CRS	(Step 15) GO TO Procedure Main Body, Step 2	
TECHNICAL SPECIFICATION 3.3.1, REACTOR PROTECTION SYSTEM (RPS) INSTRUMENTATION			
	CRS	LCO 3.3.1 The RPS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.	
	CRS	APPLICABILITY: According to Table 3.3.1-1.	
	CRS	ACTIONS	

Op Test No.: N16-1 Scenario # 2 Event # 3 Page 23 of 60Event Description: **Turbine 1st Stage Pressure Transmitter PT-447 fails LOW**

Time	Pos.	Expected Actions/Behavior			Comments	
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that Function 17.e (Turbine Impulse Pressure, P-7 Input is affected; and that Action T.1 or T.2 is required.	
		T. One channel inoperable	T.1 Verify interlock is in required state for existing unit conditions. OR T.2 Be in MODE 2.	1 hour 7 hours		
TECHNICAL SPECIFICATION 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION						
	CRS	LCO 3.3.2 The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE.				
	CRS	APPLICABILITY: According to Table 3.3.2-1.				
	CRS	ACTIONS				
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that Functions 1.f (SI-High Steam Flow in Two Steam Lines), 1.g (SI- High Steam Flow in Two Steam Lines Coincident with Steam Line Pressure Low), 4.d (MSI - High Steam Flow in Two Steam Lines Coincident with Tavg LOW) and 4.e (MSI - High Steam Flow in Two Steam Lines Coincident with Steam Line Pressure Low), are affected; and that Actions D.1, or D.2.1 and D.2.2.	
		D. One channel inoperable	NOTE For Function 4.c, a channel may be taken out of the trip condition for 6 hours for maintenance. D.1 Place channel in trip. OR D.2.1 Be in MODE 3. AND D.2.2 Be in MODE 4.	6 hours 12 hour 18 hours		

Op Test No.: N16-1 Scenario # 2 Event # 3 Page 24 of 60Event Description: **Turbine 1st Stage Pressure Transmitter PT-447 fails LOW**

Time	Pos.	Expected Actions/Behavior			Comments
TECHNICAL SPECIFICATION 3.3.6, CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION					
	CRS	The Containment Ventilation Isolation instrumentation for each Function in Table 3.3.6-1 shall be OPERABLE.			
	CRS	APPLICABILITY: According to Table 3.3.6-1.			
	CRS	ACTIONS			
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that Function 4 (Safety Injection), is affected, which requires the Action of LCO 3.3.2.
			Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 1, for all initiation functions and requirements.		
					NOTE: The CRS will likely conduct an Alignment Brief.
At the discretion of the Lead Examiner, move to Event #4.					

Op Test No.: N16-1 Scenario # 2 Event # 4 Page 25 of 60Event Description: **"B" Charging Pump Trip**

Following this, the "B" Charging Pump will trip. The operator will respond in accordance with APP-003-F5, CHG PMP MOTOR OVLD/TRIP and raise speed of the "A" Charging Pump. The operator may enter AOP-018, "Reactor Coolant Pump Abnormal Conditions." The operator will address 3.4.17, "Chemical and Volume Control System."

Booth Operator Instructions: **IMF CVC05B**

Indications Available:

- RTGB Annunciator APP-003-F5, CHG PMP MOTOR OVLD/TRIP
- RTGB Annunciator APP-001-B4, RCP SEAL INJ HI/LO FLOW
- "B" Charging Pump Green status light LIT
- FR-124 RCP Seal Injection Flow has lowered to less than Tech Spec value

Time	Pos.	Expected Actions/Behavior	Comments
APP-003-F5, CHG PMP MOTOR OVLD/TRIP			
	RO	(Step 1) Ensure at least one Charging Pump running supplying adequate RCP Seal Injection flow.	NOTE: The RO will raise the speed of the "A" Charging Pump.
	CRS	(Step 2) Dispatch Operator to check the Charging Pump breaker(s):	NOTE: The CRS will dispatch an AO. Booth Instructor: as AO, acknowledge and report within 1 minute that "there is an acrid odor at E-1."
		<ul style="list-style-type: none"> Dispatch Operator to check the Charging Pump(s). 	
	CRS	(Step 3) Dispatch Operator to check the Charging Pump(s).	NOTE: The CRS will dispatch an AO. Booth Instructor: as AO, acknowledge and report within 1 minute that "the "A" Charging Pump is operating normally."
	RO	(Step 4) IF Seal Injection is lost to any RCP, THEN.....	

Op Test No.: N16-1 Scenario # 2 Event # 4 Page 26 of 60Event Description: **"B" Charging Pump Trip**

Time	Pos.	Expected Actions/Behavior			Comments
	RO	(Step 5) IF a single-phase open circuit condition is suspected, THEN.....			
					NOTE: The CRS will address the Technical Specifications.
					NOTE: The CRS may call WCC/I&C to address the Charging Pump Trip. If so, Booth Instructor acknowledge as WCC. If asked, report that the “C” Charging Pump will be restored in 12 hours.
TECHNICAL SPECIFICATION 3.4.17, CHEMICAL AND VOLUME CONTROL SYSTEM (CVCS)					
	CRS	LCO 3.4.17 Reactor Coolant Pump (RCP) seal injection shall be OPERABLE with:			NOTE: TS LCO will NOT be met if Seal Injection flow is < 6 gpm to each RCP.
		Two Charging Pumps shall be OPERABLE; and			
		Two makeup water pathways from the Refueling Water Storage Tank (RWST) shall be OPERABLE.			
	CRS	APPLICABILITY: Modes 1, 2, 3 and 4			
	CRS	ACTIONS			
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that the “B” Charging Pump is one of the two required to be OPERABLE, and enter Condition A.
		A. One required charging pump inoperable.	A.1 Restore required charging pump to OPERABLE status.	24 hours	
					NOTE: The CRS will likely conduct an Alignment Brief.
At the discretion of the Lead Examiner move to Event #5.					

Op Test No.: N16-1 Scenario # 2 Event # 5 Page 27 of 60Event Description: **"C" FRV Controller fails HIGH in AUTO**

Shortly afterwards, the "C" Feed Regulating Valve Controller will fail such that the valve starts to OPEN. The operator will respond in accordance with AOP-010, "Main Feedwater/Condensate Malfunction," and control the "C" S/G level manually.

Booth Operator Instructions: **IMF CFW17C**
r:45 f:100

Indications Available:

- "C" S/G Narrow Range level is rising on FR-498
- "C" S/G Feed Flow level is rising on FR-498
- FCV-498 Controller Output is rising
- RTGB Annunciator APP-006-C1, S/G C FW > STM FLOW

Time	Pos.	Expected Actions/Behavior	Comments
AOP-010, MAIN FEEDWATER/CONDENSATE MALFUNCTION			
	BOP	(Step 1) CHECK FRVs - OPERATING PROPERLY (MANUAL OR AUTO):	Immediate Action NOTE: FCV-498 in NOT operating properly in AUTO.
		<ul style="list-style-type: none"> • FCV-478 	
		<ul style="list-style-type: none"> • FCV-488 	
		<ul style="list-style-type: none"> • FCV-498 	
	BOP	(Step 1 RNO) PERFORM the following:	Immediate Action NOTE: The BOP will control FCV-498 in MANUAL.
		<ul style="list-style-type: none"> • ENSURE FRV for affected S/G(s) in manual control. 	
		<ul style="list-style-type: none"> • ATTEMPT to stabilize S/G level using FRV and/or FRV Bypass Valves by matching steam flow with feed flow. 	
		<ul style="list-style-type: none"> • STOP any load change in progress. 	
		<ul style="list-style-type: none"> • If unable to control S/G level, THEN..... 	

Op Test No.: N16-1 Scenario # 2 Event # 5 Page 28 of 60Event Description: **"C" FRV Controller fails HIGH in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
Critical Task:			
Manually control "C" S/G Narrow Range Level before a Reactor Trip occurs on low S/G level or a Protective Action occurs on high S/G Level.			
Safety Significance: failure to take manual control of the "C" S/G Feed Reg Valve and control Narrow Range S/G level, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection/Engineered Safeguards Actuation System. Performance of the critical task would stabilize the S/G level transient. A failure to stabilize the S/G level transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS temperature/pressure control.			
	RO/ BOP	(Step 2) CHECK Reactor Trip Setpoint - BEING APPROACHED	
	CRS	(Step 2 RNO) IF a reactor trip setpoint is approached, THEN....	NOTE: This is a Continuous Action. The CRS will make both board operators aware.
		GO TO Step 4.	
	RO	(Step 4) CHECK Reactor Power - LESS THAN OR EQUAL TO 100%	
	CRS	(Step 5) NOTIFY Plant Personnel Of Procedure Entry Using Plant Page System	NOTE: The CRS will most likely make this announcement.
	CRS	(Step 6) GO TO Appropriate Step From Table Below:	
		FRV Failure To Control - OBSERVE NOTE 58	
	BOP	(Step 58) CHECK S/G Level - AT OR TRENDING TO PROGRAM	
	RO	(Step 59) CHECK Tavg - AT OR TRENDING TO Tref	

Op Test No.: N16-1 Scenario # 2 Event # 5 Page 29 of 60Event Description: **"C" FRV Controller fails HIGH in AUTO**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 60) CONTACT Maintenance To Troubleshoot And Correct The Feedwater Problem	NOTE: The CRS may call WCC/I&C to address the FRV Controller failure. If so, Booth Instructor acknowledge as WCC.
	CRS	(Step 61) IMPLEMENT EALs	NOTE: The CRS may ask SM to address. If so, Floor Instructor acknowledge as SM.
	CRS	(Step 62) CHECK Total Reactor Power Change - LESS THAN 15%	NOTE: The power change associated with the FRV Failure is less than 15%.
	RO	(Step 63) CHECK APP-005-B5, ROD BANKS A/B/C/D LO LIMIT - EXTINGUISHED	
	RO	(Step 64) MONITOR Axial Flux Difference To Ensure Compliance With TS 3.2.3	
	BOP	(Step 65) NOTIFY Load Dispatcher Of Unit's Load Capability	NOTE: The CRS/BOP will contact the Load Dispatcher. Booth Instructor acknowledge as Load Dispatcher.
	CRS	(Step 66) RETURN TO Procedure And Step In Effect	
			NOTE: The CRS will likely conduct an Alignment Brief.
At the discretion of the Lead Examiner move to Events #6-9.			

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 30 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Subsequently, a Cold Leg Small Break LOCA will occur (over 5 minutes) on the B Loop. The operator will enter AOP-016, "Excessive Primary Plant Leakage." Ultimately, the operator will enter EOP-E-0, "Reactor Trip or Safety Injection." When the reactor trips, the normal supply breaker to Bus E-1 will trip OPEN, and the "A" EDG Output Breaker will fail to CLOSE either automatically or manually; and Train "A" equipment will remain unavailable throughout the event. Additionally, the "C" SI Pump will fail to automatically start on SI, and the operator will be required to manually start this pump. Upon completion of EOP-E-0, the operator will transition to EOP-E-1, "Loss of Reactor or Secondary Coolant," and the break size will become larger. Eventually, Containment pressure will exceed 10 psig creating an Orange Path condition on the Containment Critical Safety Function. When this occurs, the "B" CV Spray will automatically start on HI-HI Containment Pressure, however, both SI-880C&D ("B" CV Spray Pump Discharge Valves) will fail to open automatically, and the operator will be required to manually open these valves. The scenario will terminate in EOP-E-1 after Containment pressure has been lowered to less than 10 psig, or at Step 9 of FRP-J.1, "Response to High Containment Pressure," after the operator has taken all necessary steps to reduce Containment pressure.

Booth Operator Instructions:**IMF RCS01C
r:5:00 f:1000****Indications Available:**

- Pressurizer level is lowering
- Pressurizer pressure is lowering
- Charging Pump speed is rising
- Containment pressure is rising

Time	Pos.	Expected Actions/Behavior	Comments
			Examiner NOTE: If a reactor trip occurs move forward to EOP-E-0 actions on Page 34 .
AOP-016, EXCESSIVE PRIMARY PLANT LEAKAGE			
	RO	(Step 1) DETERMINE If Reactor Trip Needed As Follows:	
		<ul style="list-style-type: none"> • CHECK RCS Pressure - GREATER THAN 1000 PSIG 	
		<ul style="list-style-type: none"> • CHECK the following: 	
		<ul style="list-style-type: none"> • PZR Level - LESS THAN 14% AND LOWERING IN AN UNCONTROLLED MANNER 	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 31 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		OR	
		<ul style="list-style-type: none"> RCS Subcooling - LESS THAN 18°F 	
	RO	(Step 1.b RNO) IF PZR Level can NOT be maintained greater than 14% OR Subcooling can NOT be maintained greater than 18°F, THEN trip the Reactor and GO TO EOP-E-0, Reactor Trip or Safety Injection.	NOTE: This is a Continuous Action. The CRS will make both board operators aware.
	CRS	<ul style="list-style-type: none"> GO TO Step 2. 	
	CRS	(Step 2) NOTIFY Plant Personnel Of Procedure Entry Using Plant Page System	NOTE: The CRS will most likely make this announcement.
	RO	(Step 3 RNO) CONTROL Charging Flow To Maintain Desired RCS Level.	NOTE: The "A" Charging Pump is running at maximum speed.
	RO	(Step 4) CHECK VCT Level - LESS THAN 12.5 INCHES	
	RO	(Step 4 RNO) IF VCT level lowers to less than 12.5 inches, THEN OBSERVE the Note prior to Step 5 AND PERFORM Step 5.	NOTE: This is a Continuous Action. The CRS will make both board operators aware.
	CRS	<ul style="list-style-type: none"> GO TO Step 6. 	
	RO	(Step 6) CHECK Charging Pump Status - LESS THAN TWO RUNNING	NOTE: Only one Charging Pump is available.
	RO	(Step 7) CHECK Charging Pump Status - NONE RUNNING	
	RO	(Step 7 RNO) IF an additional Charging Pump is available, THEN....	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 32 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	<ul style="list-style-type: none"> GO TO Step 11. 	
	RO	(Step 11) PLACE Running Charging Pump Speed Controller(s) In MAN AND ADJUST Output To Maximum	
	RO	(Step 12) CHECK RCS Level - LOWERING IN AN UNCONTROLLED MANNER	
	RO	(Step 13) CHECK Any Letdown - IN SERVICE	
	RO	(Step 14) ENSURE All Letdown Flowpaths Isolated As Follows:	
		<ul style="list-style-type: none"> LCV-460A & B, LTDN LINE STOP Valves - CLOSED 	
		<ul style="list-style-type: none"> HIC-142, PURIFICATION FLOW Controller - ADJUSTED TO 0% 	
		<ul style="list-style-type: none"> HIC-137, EXCESS LTDN FLOW Controller - ADJUSTED TO 0% 	
		<ul style="list-style-type: none"> CVC-387, EXCESS LTDN STOP - CLOSED 	
	RO	(Step 15) CHECK RCS Level - LOWERING IN AN UNCONTROLLED MANNER	NOTE: By this time it is likely that Przr level is lowering uncontrollably.
	RO	(Step 16) CHECK RCS Pressure - GREATER THAN 1000 PSIG	
	RO/ CRS	(Step 17) TRIP The Reactor AND GO TO EOP-E-0, Reactor Trip or Safety Injection	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 33 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO	(Step 1) CHECK Reactor Trip:	Immediate Action
		<ul style="list-style-type: none"> Reactor Trip AND Bypass Breakers - OPEN 	
		<ul style="list-style-type: none"> Rod position indicators - FULLY INSERTED 	
		<ul style="list-style-type: none"> Rod Bottom Lights - ILLUMINATED 	
		<ul style="list-style-type: none"> Neutron Flux - LOWERING 	
	BOP	(Step 2) CHECK Turbine Trip:	Immediate Action
		<ul style="list-style-type: none"> Both Turbine Stop Valves - CLOSED 	
		<ul style="list-style-type: none"> All MSR Purge AND Shutoff Valves - CLOSED 	
	BOP	(Step 3) CHECK Power To AC EMERGENCY BUSSES:	Immediate Action NOTE: Bus E-1 is NOT energized.
		<ul style="list-style-type: none"> CHECK Bus E-1 OR E-2 - AT LEAST ONE ENERGIZED 	
		<ul style="list-style-type: none"> CHECK Bus E-1 AND E-2 - BOTH ENERGIZED 	
	BOP	(Step 3) WHEN time permits, THEN TRY to restore power to deenergized AC Emergency Bus.	Immediate Action
	RO	(Step 4) CHECK SI Status:	Immediate Action
		CHECK if SI is actuated:	
		<ul style="list-style-type: none"> SI annunciators - ANY ILLUMINATED 	
		OR	
		<ul style="list-style-type: none"> SI equipment - AUTO STARTED 	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 34 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		CHECK BOTH trains of SI actuated:	
		<ul style="list-style-type: none"> SI Pumps - TWO RUNNING 	NOTE: The operator has to manually start the "C" SI Pump.
		<ul style="list-style-type: none"> RHR Pumps - BOTH RUNNING 	
	RO/ BOP	Foldout Page:	
		RCP TRIP CRITERIA	NOTE: The RCP Trip Criteria will apply in this event.
		FAULTED S/G AFW ISOLATION CRITERIA	
		AFW SUPPLY SWITCHOVER CRITERIA	
		DC BUS, INSTRUMENT BUS, OR MCC-5 FAILURE CRITERIA	NOTE: The Instrument Bus/MCC-5 Criteria will apply in this event requiring performance of Attachment 2, and will likely be performed prior to Attachment 1.
		SPENT FUEL POOL COOLING CRITERIA	
			Examiner NOTE: The CRS will likely assign the BOP to perform Attachment 2 with the AO, and then perform Attachment 1. If so, BOP Examiner follow actions of Attachment 2 and 1. CRS/RO follow E-0 Actions, Step 6 , on Page 42 .
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION ATTACHMENT 2, DC BUS OR INSTRUMENT BUS FAILURE			
	BOP	(Step 1) IF DC Bus Failure Has Occurred, THEN...	NOTE: A DC Bus failure has NOT occurred.

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 35 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 2) IF MCC-5 Is NOT Energized, THEN PERFORM The Following:	NOTE: The CRS will dispatch an AO, and direct that the AO perform Step 2 of Attachment 2 of EOP-E-0. If so, Booth Instructor acknowledge as AO, and report after 2 minutes that this action is complete. IRF EPSL005 f:SHDN_BUS IRF EPMSMCC5_187 f: RACK_IN
		<ul style="list-style-type: none"> ENSURE DS Bus is ENERGIZED 	
		<ul style="list-style-type: none"> TRANSFER power source to DS Bus using the posted instructions at the Kirk Key Interlocked Breakers 	
		<ul style="list-style-type: none"> Locally RESET AND LOAD Instrument Air Compressor A (MCC-5 CMPT 7M) 	
	BOP	(Step 3) IF Instrument Bus Failure Has Occurred,.....	NOTE: The failure of Instrument Bus 1 will be resolved with the restoration of power to MCC-5 (Step 2).
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION			
	CRS	(Step 5) PERFORM Attachment 1, Auto Action Verification, While CONTINUING WITH This Procedure	
			Examiner NOTE: The CRS will likely assign the BOP to perform this action. If so, BOP Examiner follow actions of Attachment 1. CRS/RO follow E-0 Actions, Step 6 , on Page 42 .
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION ATTACHMENT 1, AUTO ACTION VERIFICATION			

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 36 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 1) CHECK ECCS Pumps Running:	
		• SI Pumps - TWO RUNNING	
		• RHR Pumps - BOTH RUNNING	
	BOP	(Step 1 RNO) Manually START pump(s) as necessary.	NOTE: There is no power to the "A" SI Pump, and the "C" SI had to be started manually.
Critical Task: Establish flow from at least one high-head SI pump before transition out of E-0 <p>Safety Significance: Failure to manually start at least one high-head SI pump under the postulated conditions constitutes mis-operation or incorrect operator performance in which the operator does not prevent degraded emergency core cooling system (ECCS) capacity. In this case, at least one high-head SI pump can be manually started from the control room. Therefore, failure to manually start a high-head SI pump also represents a failure by the operator to demonstrate the ability to effectively direct or manipulate engineered safety feature (ESF) controls that would prevent a significant reduction of safety margin beyond that irreparably introduced by the scenario. Additionally, failure to manually start a high-head SI pump also represents a failure by the operator to demonstrate the ability to recognize a failure or an incorrect automatic actuation of an ESF system or component. Finally, under the postulated plant conditions, failure to manually start a high-head SI pump (when it is possible to do so) is a violation of the facility license condition.</p>			
	BOP	(Step 2) CHECK ECCS Valves In Proper Emergency Alignment	
	BOP	(Step 3) CHECK CCW Pumps - AT LEAST ONE RUNNING	
	BOP	(Step 4) CHECK Containment Isolation Phase A:	
		• CHECK Containment Isolation Phase A - ACTUATED	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 37 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK Containment Isolation Phase A Valves - CLOSED 	NOTE: Some valves may not have power if this is performed prior to Attachment 2. The BOP may dispatch an AO. If so, Booth Instructor acknowledge as AO.
	BOP	(Step 4.b RNO) Manually CLOSE valve(s) as necessary.	NOTE: Some valves will NOT have power to CLOSE, however all CV penetrations will be isolated.
		<ul style="list-style-type: none"> IF ANY Containment penetration can NOT be isolated, THEN... 	
	BOP	<ul style="list-style-type: none"> CHECK Excess Letdown - ISOLATED 	
		<ul style="list-style-type: none"> CVC-387, EXCESS LTDN STOP VALVE - CLOSED 	
		<ul style="list-style-type: none"> HIC-137, EXCESS LTDN FLOW CONTROLLER - AT 0% DEMAND 	
	BOP	(Step 5) CHECK Feedwater Isolation:	
		<ul style="list-style-type: none"> CHECK Main Feed Pumps - BOTH TRIPPED 	
		<ul style="list-style-type: none"> CHECK Main Feedwater isolated: 	
		<ul style="list-style-type: none"> Feedwater Reg Valves - CLOSED 	
		<ul style="list-style-type: none"> Feedwater Reg Bypass Valves - CLOSED 	
		<ul style="list-style-type: none"> Feedwater Header Section Valves - CLOSED 	
	BOP	(Step 6) CHECK If Main Steam Lines Should Be Isolated:	
		<ul style="list-style-type: none"> CHECK Main Steam Line Isolation - REQUIRED 	
		<ul style="list-style-type: none"> CHECK Containment pressure - GREATER THAN 10 PSIG 	
		OR	
		<ul style="list-style-type: none"> High steam flow with: 	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 38 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> S/G pressure - LESS THAN 614 PSIG 	
		OR	
		<ul style="list-style-type: none"> Tavg - LESS THAN 543°F 	
	BOP	(Step 6.b) CHECK MSIVs AND MSIV Bypass Valves - CLOSED	
	BOP	(Step 7) CHECK Proper Service Water System Operation:	
		<ul style="list-style-type: none"> CHECK SW Pumps - ALL RUNNING 	
	BOP	(Step 7.a RNO) Manually START pump(s) as necessary.	NOTE: The "C" and "D" SW Pumps will be running. The "A" and "B" SW Pumps do NOT have power.
	BOP	(Step 7.b) CHECK SW Booster Pumps - BOTH RUNNING	
	BOP	(Step 7.b RNO) Manually START pump(s) as necessary.	NOTE: The "B" SW Booster Pump will be running. The "A" SW Pump does NOT have power.
	BOP	(Step 7.c) CHECK Both SW Header Low Pressure Alarms - EXTINGUISHED	
		<ul style="list-style-type: none"> APP-008-F7,SOUTH SW HDR LO PRESS 	
		<ul style="list-style-type: none"> APP-008-F8,NORTH SW HDR LO PRESS 	
	BOP	(Step 8) CHECK BOTH EDGs - RUNNING	NOTE: BOTH EDGs are running however, the "A" EDG Output Breaker cannot be CLOSED.
	BOP	(Step 9) CHECK ECCS Flow:	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 39 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK RCS pressure - LESS THAN 1650 PSIG [1725 PSIG] 	
		<ul style="list-style-type: none"> CHECK SI Pumps – FLOW INDICATED 	
		<ul style="list-style-type: none"> CHECK RCS pressure – LESS THAN 275 PSIG [325 PSIG] 	
	BOP	(Step 9.c RNO) GO TO Step 10.	
	BOP	(Step 10) CHECK CV Recirculation Fans - ALL RUNNING	NOTE: The "3" and "4" CV Recirc Fans will be running. The "1" and "2" CV Fans do NOT have power.
	BOP	(Step 11) CHECK IVSW System Actuated:	
		<ul style="list-style-type: none"> PCV-1922A, AUTOMATIC HEADER PRESSURE CONTROL VALVE - OPEN 	
		<ul style="list-style-type: none"> PCV-1922B, AUTOMATIC HEADER PRESSURE CONTROL VALVE - OPEN 	
	BOP	(Step 12) CHECK CV Ventilation Isolation:	
		<ul style="list-style-type: none"> CV Ventilation Isolation Valves - CLOSED 	
	BOP	(Step 12 RNO) DEPRESS H.V. OFF on R-11 OR R-12 to initiate Containment Ventilation Isolation.	
		<ul style="list-style-type: none"> IF ANY Containment Ventilation Isolation valve does NOT close, THEN manually OR locally ISOLATE AFFECTED penetration outside Containment while CONTINUING WITH this procedure. 	NOTE: The BOP may contact an AO to locally close valves. If so, Booth Instructor acknowledge as AO, and report after 5 minutes that all valves are CLOSED.

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 40 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 13) CHECK Control Room Ventilation Aligned For Pressurization Mode:	NOTE: If the AO has restored power to Instrument Bus 1 (Via restoration of MCC-5), each of these valves will be CLOSED.
		<ul style="list-style-type: none"> HVA-1A OR HVA-1B, CONTROL ROOM AIR HANDLING FAN - RUNNING 	
		<ul style="list-style-type: none"> HVE-19A OR HVE-19B, CONTROL ROOM AIR CLEANING FAN - RUNNING 	
		<ul style="list-style-type: none"> HVE-16, CONTROL ROOM AIR EXHAUST FAN - STOPPED 	
		<ul style="list-style-type: none"> Control Room HVAC Outside Air Damper A OR B - OPEN 	
		<ul style="list-style-type: none"> CR-D1A-SA, CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER - CLOSED 	
		<ul style="list-style-type: none"> CR-D1B-SB, CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER - CLOSED 	
	BOP	(Step 14) CHECK DS Bus - ENERGIZED	
	BOP	(Step 15) CHECK Battery Chargers ENERGIZED:	NOTE: If the AO has restored power to MCC-5, each of these will be extinguished.
		<ul style="list-style-type: none"> APP-036-D1, BATT CHARGER A/A-1 TROUBLE Alarm - EXTINGUISHED 	
		<ul style="list-style-type: none"> APP-036-D2, BATT CHARGER B/B-1 TROUBLE Alarm - EXTINGUISHED 	
	BOP	(Step 16) STOP R-11/12 Sample Pump	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 41 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 17) Locally RESET AND LOAD Instrument Air Compressor(s) As Necessary (38 KW each):	NOTE: The BOP may contact the Inside AO. Booth Instructor: as AO , acknowledge and report that the "B" IA Compressor is running, and the "A" IA Compressor is NOT running.
		<ul style="list-style-type: none"> Compressor A (MCC-5 CMPT 7M) 	
		<ul style="list-style-type: none"> Compressor B (MCC-6 CMPT 3G) 	
	BOP	(Step 18) PERFORM Crew Update To Include The Following:	
		<ul style="list-style-type: none"> Attachment completion 	
		<ul style="list-style-type: none"> Manual actions taken 	
		<ul style="list-style-type: none"> Failed equipment status 	
		<ul style="list-style-type: none"> SW status per Step 7.c 	
		<ul style="list-style-type: none"> If applicable, PERFORM Supplement M, Component Alignment For Loss Of SW To Turbine Building, as time permits 	
			Examiner NOTE: Examiners following the CRS/RO continue HERE .
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION			
			Examiner NOTE: RCS Subcooling will be lost on this event. The six minute Clock to stop the RCPs will start WHEN subcooling is 13°F and the "C" SI Pump is running. Record Time: _____
	RO	(Step 6) CHECK AFW Pumps Running:	
		<ul style="list-style-type: none"> CHECK Motor Driven AFW Pumps - BOTH RUNNING 	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 42 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		(Step 6.a) Manually START pump(s).	NOTE: The "B" MDAFW Pump will be running. The "A" MDAFW Pump does NOT have power.
		<ul style="list-style-type: none"> CHECK S/G Narrow Range levels - TWO S/Gs LESS THAN 16% 	
		<ul style="list-style-type: none"> CHECK Steam Driven AFW Pump - RUNNING 	NOTE: The SDAFW Pump is running.
	RO	(Step 7) CHECK AFW Valves In Proper Emergency Alignment:	
		<ul style="list-style-type: none"> AFW Header Discharge Valves - FULL OPEN 	
		<ul style="list-style-type: none"> AFW Header Section Valves - FULL OPEN 	
		<ul style="list-style-type: none"> Steam Driven AFW Pump Discharge Valves - FULL OPEN IF PUMP RUNNING 	NOTE: The "A" and "C" valves are CLOSED, the "B" Valve is OPEN.
	RO	(Step 8) CHECK Total AFW Flow:	
		<ul style="list-style-type: none"> RESET SI 	
		<ul style="list-style-type: none"> CONTROL AFW flow to maintain Intact S/G Narrow Range level between 9%[18%] AND 50% 	
		<ul style="list-style-type: none"> CHECK total AFW flow - GREATER THAN 300 GPM 	
	RO	(Step 9) CHECK CV Spray NOT Required:	
		<ul style="list-style-type: none"> CHECK Containment Pressure - HAS REMAINED LESS THAN 10 PSIG 	NOTE: Containment pressure has remained < 10 psig.
		<ul style="list-style-type: none"> CHECK CV Spray - NOT ACTUATED 	
	RO	(Step 10) CHECK RCP Seal Cooling:	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 43 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CCW flow to RCP(s) Thermal Barriers - NORMAL 	
		<ul style="list-style-type: none"> APP-001-C1,RCP THERM BAR COOL WTR HI FLOW ALARM - EXTINGUISHED 	
		<ul style="list-style-type: none"> APP-001-D1,RCP THERM BAR COOL WTR LO FLOW alarm - EXTINGUISHED 	
		OR	
		<ul style="list-style-type: none"> Seal Injection flow - ADEQUATE 	
		<ul style="list-style-type: none"> Seal Injection flow - GREATER THAN 6 GPM PER RCP 	
		OR	
		<ul style="list-style-type: none"> Thermal Barrier ΔPs - GREATER THAN 5 INCHES WATER PER RCP 	
	RO	(Step 11) CHECK RCS Temperatures:	NOTE: The LOCA may be causing a cooldown. If so, the RNO will be performed. Otherwise proceed to Step 12.
		<ul style="list-style-type: none"> With ANY RCP running, RCS average temperature - STABLE AT OR TRENDING TO 547°F 	
		OR	
		<ul style="list-style-type: none"> With NO RCPs running, RCS Cold Leg temperatures - STABLE AT OR TRENDING TO 547°F 	
	RO	(Step 11 RNO) IF temperature is LESS THAN 547°F AND lowering, THEN PERFORM the following:	
		<ul style="list-style-type: none"> STOP dumping steam. 	
		<ul style="list-style-type: none"> IF RCS cooldown continues, THEN REDUCE total AFW flow to minimum for decay heat removal. 	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 44 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> MAINTAIN total AFW flow GREATER THAN 300 gpm UNTIL S/G Narrow Range level is GREATER THAN 9%[18%] in at least one S/G. 	
		<ul style="list-style-type: none"> IF RCS cooldown continues, THEN CLOSE MSIVs AND MSIV Bypass Valves. 	
	RO	(Step 12) CHECK PZR PORVs AND Spray Valves:	
		<ul style="list-style-type: none"> CHECK PZR PORVs - CLOSED 	
		<ul style="list-style-type: none"> CHECK Normal PZR Spray Valves - CLOSED 	
		<ul style="list-style-type: none"> CHECK Aux PZR Spray Valve - CLOSED 	
	RO	(Step 13) CHECK If RCPs Should Be Stopped:	
		<ul style="list-style-type: none"> CHECK RCPs - ANY RUNNING 	
		<ul style="list-style-type: none"> CHECK SI Pumps - AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW 	
		<ul style="list-style-type: none"> CHECK RCS Subcooling based on Core Exit T/Cs - LESS THAN 13°F[32°F] 	.
		<ul style="list-style-type: none"> STOP ALL RCPs 	<p>NOTE: Depending on the timing of mitigation actions, the RCP trip criteria may or may not be met.</p> <p>If the criteria is NOT met here, the leak degrades after entry into EOP-E-1.</p>

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 45 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
<u>Critical Task:</u>			
<p>Trip all RCPs within 6 minutes of meeting the EOP-E-0/E-1 RCP Trip Criteria (Containment Isolation Phase B - ACTUATED, OR BOTH of the following satisfied: SI Pumps - AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW AND RCS Subcooling based on Core Exit T/Cs - LESS THAN 13°F [32°F]) so that CET temperatures do not become superheated when forced circulation in the RCS stops.</p> <p>Safety Significance: Failure to trip the RCPs under the postulated plant conditions leads to core uncover and to fuel cladding temperatures in excess of 2200°F, which is the limit specified in the ECCS acceptance criteria. Thus, failure to perform the task represents mis-operation or incorrect operator performance in which the operator has failed to prevent degradation of the fuel cladding barrier to fission product release and which leads to a violation of the facility license condition.</p> <p>Record Pump Stop Time: _____</p> <p>Subtract time recorded at time of the SI Pump running/loss SCM on Page 42 _____ = _____ minutes.</p>			
	RO	(Step 14) CHECK If S/G Secondary Pressure Boundaries Are Intact:	
		<ul style="list-style-type: none"> NONE LOWERING IN AN UNCONTROLLED MANNER 	
		<ul style="list-style-type: none"> NONE COMPLETELY DEPRESSURIZED 	
	RO	(Step 15) CHECK If S/G Tubes Are Intact:	
		<ul style="list-style-type: none"> Secondary Radiation Monitors - HAVE REMAINED NORMAL 	
		<ul style="list-style-type: none"> R-15, CONDENSER AIR EJECTOR GAS 	
		<ul style="list-style-type: none"> R-19s, S/G Blowdown Radiation 	
		<ul style="list-style-type: none"> R-31s, STEAMLINE RADIATION MONITORS 	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 46 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> S/G levels - NONE RISING IN AN UNCONTROLLED MANNER 	
	CRS	(Step 16) PERFORM the following:	
		<ul style="list-style-type: none"> CHECK If RCS Is Intact: 	
		<ul style="list-style-type: none"> CV radiation - NORMAL 	
		<ul style="list-style-type: none"> R-2, CV AREA 	
		<ul style="list-style-type: none"> R-32A, CV HIGH RANGE 	
		<ul style="list-style-type: none"> R-32B, CV HIGH RANGE 	
		<ul style="list-style-type: none"> CV pressure - NORMAL 	
		<ul style="list-style-type: none"> CV Sump level - NORMAL 	NOTE: The CRS will transition to EOP-E-1.
Booth Instructor: The Cold Leg break will degrade IMF RCS01C r:2:00 f:3			
			<p>Examiner NOTE: Shortly after entry into EOP-E-1, it is expected that an Orange path will occur on the Containment CSFST.</p> <p>When this occurs, the CRS may transition to FRP-J.1, or remain in EOP-E-1 and take the continuous actions of EOP-E-0 to initiate CV Spray.</p> <p>If the CRS transitions to FRP-J.1, move forward to Page 55.</p> <p>If the CRS remains in EOP-E-1 continue below.</p>
EOP-E-1, LOSS OF REACTOR OR SECONDARY COOLANT			
	RO/ BOP	FOLDOUT PAGE:	
		RCP TRIP CRITERIA	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 47 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		SI TERMINATION CRITERIA	
		SI REINITIATION CRITERIA	
		SECONDARY INTEGRITY CRITERIA	
		EOP-E-3 TRANSITION CRITERIA	
		COLD LEG RECIRCULATION SWITCHOVER CRITERIA	
		AFW SUPPLY SWITCHOVER CRITERIA	
	RO	(Step 1) CHECK If RCPs Should Be Stopped:	Examiner NOTE: The RCPs are likely OFF. If they are not, and stopped here, record the time on Critical Task on Page 46.
		CHECK RCPs - ANY RUNNING	
	CRS	(Step 1.a RNO) GO TO Step 2.	
	BOP	(Step 2) CHECK If S/G Secondary Pressure Boundaries Are Intact:	
		<ul style="list-style-type: none"> NONE LOWERING IN AN UNCONTROLLED MANNER 	
		<ul style="list-style-type: none"> NONE COMPLETELY DEPRESSURIZED 	
	BOP	(Step 3) CHECK Intact S/G Levels:	NOTE: Adverse Containment Numbers will be required when CV pressure rises to greater than 4 psig.
		CHECK S/G Narrow Range levels - GREATER THAN 9% [18%]	
		CONTROL feed flow to maintain S/G Narrow Range levels - BETWEEN 9% [18%] AND 50%	
	RO	(Step 4) RESET SI	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 48 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 5) RESET Containment Isolation Phase A	
			Examiner NOTE: The CRS may transition to FRP-J.1 when the Orange path on the Containment CSF occurs. If so, move forward to Page 55 .
	BOP	(Step 6) CHECK Secondary Radiation:	
		<ul style="list-style-type: none"> CHECK Secondary Radiation Monitors - HAVE REMAINED NORMAL 	
		<ul style="list-style-type: none"> R-15, CONDENSER AIR EJECTOR GAS 	
		<ul style="list-style-type: none"> R-19s, S/G Blowdown Radiation 	
		<ul style="list-style-type: none"> R-31s, STEAMLINE RADIATION MONITORS 	
		<ul style="list-style-type: none"> PERFORM the following: 	NOTE: The CRS may call Chemistry to address the samples. If so, Booth Instructor acknowledge as Chemistry.
		<ul style="list-style-type: none"> REQUEST Chemistry periodically sample ALL S/Gs for activity. 	
		<ul style="list-style-type: none"> Secondary sample results - NORMAL (WHEN RESULTS AVAILABLE) 	
	RO	(Step 7) CHECK PZR PORVs AND Block Valves:	
		<ul style="list-style-type: none"> CHECK Power to PZR PORV Block Valves - AVAILABLE 	
		<ul style="list-style-type: none"> CHECK PZR PORVs - CLOSED 	
		<ul style="list-style-type: none"> CHECK PZR PORV Block valves - AT LEAST ONE OPEN 	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 49 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 8) ESTABLISH Instrument Air To CV:	
		<ul style="list-style-type: none"> CHECK APP-002-F7, INSTR AIR HDR LO PRESS alarm - EXTINGUISHED 	
		<ul style="list-style-type: none"> RESET IA PCV-1716, INSTRUMENT AIR ISOLATION TO CV 	
		<ul style="list-style-type: none"> CHECK IA PCV-1716 - OPEN 	
	BOP	(Step 9) CHECK Power Supply To Charging Pumps - OFFSITE POWER AVAILABLE	
	RO	(Step 10) CHECK If Charging Flow Has Been Established:	
		<ul style="list-style-type: none"> CHECK Charging Pumps - AT LEAST ONE RUNNING 	NOTE: The "A" Charging Pump is the only Charging Pump available.
		<ul style="list-style-type: none"> ESTABLISH desired Charging flow: 	
		<ul style="list-style-type: none"> START additional Charging Pump(s) as necessary 	
		<ul style="list-style-type: none"> ADJUST the following as necessary to maintain proper Seal Injection AND desired Charging flow: 	
		<ul style="list-style-type: none"> Charging Pump Speed Controller(s) 	
		<ul style="list-style-type: none"> HIC-121, CHARGING FLOW Controller 	
		<ul style="list-style-type: none"> Seal Water Flow Control Valves 	NOTE: The BOP may contact the AO to adjust Seal Injection flows. If so, Booth Instructor acknowledge as AO; and use: IRF CVC030 f: variable IRF CVC031 f: variable IRF CVC032 f: variable
		<ul style="list-style-type: none"> MAINTAIN Seal Injection flow between 6 gpm AND 20 gpm per RCP UNLESS Seal Injection isolated 	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 50 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 11) CHECK If ECCS Flow Should Be Terminated:	
		<ul style="list-style-type: none"> CHECK RCS Subcooling based on Core Exit T/Cs - GREATER THAN 18°F [37°F] 	NOTE: Adverse Containment Numbers will be required.
	CRS	(Step 11 RNO) GO TO Step 12.	
	RO	(Step 12) CHECK If Containment Spray Should Be Stopped:	
		<ul style="list-style-type: none"> CHECK CV Spray Pumps - ANY RUNNING 	
		<ul style="list-style-type: none"> CHECK Containment pressure - LESS THAN 4 PSIG 	NOTE: CV pressure will likely be lowering, and may be below 4 psig. If so, move forward to Step 13.
	CRS	(Step 12.b) WHEN Containment pressure is LESS THAN 4 psig, THEN PERFORM Steps 12.e.	NOTE: This is a Continuous Action. The CRS will make both board operators aware.
		<ul style="list-style-type: none"> OBSERVE CAUTION prior to Step 13 AND CONTINUE WITH Step 13. 	
	RO	(Step 13) CHECK If RHR Pumps Should Be Stopped:	NOTE: This is a Continuous Action. The CRS will make both board operators aware.
		<ul style="list-style-type: none"> CHECK RCS pressure: 	
		<ul style="list-style-type: none"> Pressure - GREATER THAN 275 PSIG [325 PSIG] 	NOTE: Adverse Containment Numbers will be required.
	CRS	(Step 13.a RNO) GO TO Step 15.	
	BOP	(Step 15) CHECK If Diesel Generators Should Be Stopped:	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 51 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK AC Emergency Busses - ENERGIZED BY OFFSITE POWER 	
		<ul style="list-style-type: none"> Bus E-1,BKR 52/18B CLOSED 	NOTE: Bus E-1 is de-energized. The CRS may stop here and address the possibility of restoring power to Bus E-1.
		<ul style="list-style-type: none"> Bus E-2,BKR 52/28B CLOSED 	
		<ul style="list-style-type: none"> CHECK Emergency Diesel Generator(s) Starting Air annunciators - EXTINGUISHED 	
		<ul style="list-style-type: none"> APP-010-B2, EDG A START AIR LO PRESS 	
		<ul style="list-style-type: none"> APP-010-B3, EDG B START AIR LO PRESS 	
		<ul style="list-style-type: none"> STOP ANY unloaded Emergency Diesel Generator(s) 	
	CRS	(Step 16) INITIATE Evaluation Of Plant Status:	
		<ul style="list-style-type: none"> CHECK Cold Leg Recirculation capability: 	
		<ul style="list-style-type: none"> Train A: 	
		<ul style="list-style-type: none"> CHECK the following pumps - AVAILABLE 	
		<ul style="list-style-type: none"> RHR Pump A 	
		<ul style="list-style-type: none"> ANY CCW Pump 	
		<ul style="list-style-type: none"> ANY two SW Pumps 	
		<ul style="list-style-type: none"> CHECK the following valves - AVAILABLE 	
		<ul style="list-style-type: none"> SI-860A, CV SUMP TO RHR 	
		<ul style="list-style-type: none"> SI-861A, CV SUMP TO RHR 	
		<ul style="list-style-type: none"> SI-862A, RWST TO RHR 	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 52 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CC-749A, CCW FROM RHR HX 	
		<ul style="list-style-type: none"> Train B: 	
		<ul style="list-style-type: none"> CHECK the following pumps - AVAILABLE 	
		<ul style="list-style-type: none"> RHR Pump B 	
		<ul style="list-style-type: none"> ANY CCW Pump 	
		<ul style="list-style-type: none"> ANY two SW Pumps 	
		<ul style="list-style-type: none"> CHECK the following valves - AVAILABLE 	
		<ul style="list-style-type: none"> SI-860B, CV SUMP TO RHR 	
		<ul style="list-style-type: none"> SI-861B, CV SUMP TO RHR 	
		<ul style="list-style-type: none"> SI-862B, RWST TO RHR 	
		<ul style="list-style-type: none"> CC-749B, CCW FROM RHR HX 	
		<ul style="list-style-type: none"> CHECK Auxiliary Building Conditions - NORMAL 	
		<ul style="list-style-type: none"> R-3, PASS PANEL AREA 	
		<ul style="list-style-type: none"> R-4, CHARGING PUMP ROOM 	
		<ul style="list-style-type: none"> R-6, SAMPLING ROOM 	
		<ul style="list-style-type: none"> RI-14C, Plant Effluent NG-LO 	
		<ul style="list-style-type: none"> LI-615A, RHR PIT "A" LEVEL INDICATOR 	
		<ul style="list-style-type: none"> LI-615B, RHR PIT "B" LEVEL INDICATOR 	
		<ul style="list-style-type: none"> Aux Bldg Sump Tank "A" level 	
		<ul style="list-style-type: none"> Aux Bldg Sump Tank "B" level 	
		<ul style="list-style-type: none"> OBTAIN samples: 	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 53 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CONTACT Chemistry to obtain the following samples: 	NOTE: The CRS may call WCC/Chemistry to address the sampling requirements. If so, Booth Instructor acknowledge as WCC/Chemistry.
		<ul style="list-style-type: none"> RCS boron concentration 	
		<ul style="list-style-type: none"> RCS activity 	
		<ul style="list-style-type: none"> CV atmosphere 	
		<ul style="list-style-type: none"> CONSULT Plant Operations Staff as necessary to assess additional sampling requirements for fuel damage 	NOTE: The CRS may call WCC/Plant Management to address the sampling requirements. If so, Booth Instructor acknowledge as WCC/ Plant Management.
		<ul style="list-style-type: none"> EVALUATE plant equipment to support long term recovery: 	
		<ul style="list-style-type: none"> RHR Pumps 	
		<ul style="list-style-type: none"> SI Pumps 	
		<ul style="list-style-type: none"> CV Spray Pumps 	
		<ul style="list-style-type: none"> CV Fans 	
		<ul style="list-style-type: none"> AFW Pumps 	
		<ul style="list-style-type: none"> SW System 	
		<ul style="list-style-type: none"> CCW System 	
		<ul style="list-style-type: none"> IVSW System 	
		<ul style="list-style-type: none"> EDG Fuel and Auxiliaries 	
		<ul style="list-style-type: none"> START additional plant equipment to assist in recovery as necessary: 	
		<ul style="list-style-type: none"> Aux Boiler 	NOTE: The CRS will dispatch an AO to start the Aux Boiler. If so, Booth Instructor acknowledge as AO.

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 54 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Other plant equipment needed during RCS cooldown to Cold Shutdown 	
	RO	(Step 17) CHECK If RCS Cooldown AND Depressurization Is Required:	
		<ul style="list-style-type: none"> CHECK RCS pressure - GREATER THAN 275 PSIG [325 PSIG] 	NOTE: Adverse Containment Numbers will be required.
	RO	(Step 17.a RNO) IF RHR Pump flow is GREATER THAN 1500 gpm, THEN ...	
		<ul style="list-style-type: none"> IF RHR Pump flow is LESS THAN 1500 gpm, THEN PERFORM the following: 	
		<ul style="list-style-type: none"> RESET SPDS. 	
		<ul style="list-style-type: none"> GO TO EOP-ES-1.2, Post LOCA Cooldown And Depressurization, Step 1. 	
			Examiner NOTE: If the CRS enters FRP-J.1, continue HERE.
FRP-J.1, RESPONSE TO HIGH CONTAINMENT PRESSURE			
	CRS	(Step 1) CHECK CV Spray Operation - CONTROLLED BY EOP-ECA-1.1, Loss Of Emergency Coolant Recirculation	
	CRS	(Step 1 RNO) GO TO Step 2.	
	RO	(Step 2.a) CHECK Containment Spray Status:	NOTE: The "A" CV Spray Pump has no power.
		<ul style="list-style-type: none"> CHECK CV Spray pumps - BOTH RUNNING 	
	RO	(Step 2.a RNO) PERFORM the following:	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 55 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> ENSURE CV Spray Pump Inlet Valves are OPEN: 	
		<ul style="list-style-type: none"> SI-844A 	
		<ul style="list-style-type: none"> SI-844B 	
		<ul style="list-style-type: none"> Manually START CV Spray Pump(s). 	NOTE: The "A" CV Spray Pump has no power.
	RO	(Step 2.b.1) CHECK CV Spray System - PROPER VALVE ALIGNMENT	
		<ul style="list-style-type: none"> CHECK CV Spray Pump Discharge valves - OPEN 	
		<ul style="list-style-type: none"> SI-880A 	NOTE: SI-880A and B may be opened, however the "A" CV Spray Pump has no power.
		<ul style="list-style-type: none"> SI-880B 	NOTE: If the crew attempts to close SI-880A and B due the "A" CV Spray Pump not running, the valves will not close until CV Spray and Phase B CV Isolation is reset.
		<ul style="list-style-type: none"> SI-880C 	NOTE: SI-880C and D have failed to Auto Open.
		<ul style="list-style-type: none"> SI-880D 	
	RO	(Step 2.b.1 RNO) Manually OPEN valve(s) as necessary.	
	RO	(Step 2.b.2) CHECK CV Spray Additive Tank Discharge Valves - OPEN	
		<ul style="list-style-type: none"> SI-845A 	
		<ul style="list-style-type: none"> SI-845B 	
	RO	(Step 2.b.3) CHECK Spray Additive Tank flow - APPROXIMATELY 12 GPM	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 56 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 2.b.3 RNO) IF Spray Additive Tank level is GREATER THAN 0%, THEN ADJUST SI-845C, SAT THROTTLING VALVE, as necessary.	NOTE: SI-845C will be adjusted such that flow is 12 gpm.
<u>Critical Task:</u> Manually actuate at least one CV Spray Train before Transitioning to EOP-ES-1.2 <p>Safety Significance: Failure to manually actuate the minimum required complement of containment cooling equipment under the postulated conditions demonstrates the inability of the crew to "recognize a failure or an incorrect automatic actuation of an ESF system or component. In this case, the minimum required complement of containment cooling equipment can be manually actuated from the control room. Therefore, failure to manually actuate the minimum required complement of containment cooling equipment also represents a failure by the operator to demonstrate the ability to effectively direct or manipulate engineered safety feature (ESF) controls that would prevent (degraded emergency core cooling system (ECCS) capacity). Additionally, under the postulated plant conditions, failure to manually actuate the minimum required complement of containment cooling equipment (when it is possible to do so) results in a failure to prevent a significant reduction of safety margin beyond that irreparably introduced by the scenario.</p>			
			Examiner NOTE: An Orange/Red Path may occur on RCS Integrity causing the CRS to transition to FRP-P.1. If so, and all Critical Tasks have been completed, terminate the exam.
	RO	(Step 2.c) CHECK Containment Isolation Phase B Valves - CLOSED	NOTE: Some valves will NOT have power.
	RO	(Step 2.c RNO) Manually CLOSE valve(s) as necessary.	NOTE: The RO may dispatch an AO to locally check the position of the "A" Train valves. If so, Booth Instructor acknowledge as AO.

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 57 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> IF ANY Containment Isolation Phase B valve can NOT be closed, THEN locally ISOLATE AFFECTED penetration outside Containment while CONTINUING WITH this procedure. 	
	RO	(Step 2.d) STOP ALL RCPs	
	RO	(Step 3) MONITOR Spray Additive Tank level - GREATER THAN 0%	
	BOP	(Step 4) CHECK MSIVs AND MSIV Bypass Valves - CLOSE	NOTE: depending on the timing of mitigation actions, the MSIVs may be open or closed. If the MSIVs are OPEN, the BOP will perform the Step 4 RNO.
	BOP	(Step 4 RNO) Manually CLOSE valve(s) as necessary.	
	RO	(Step 5) CHECK Containment Isolation Phase A Valves - CLOSED	NOTE: Some valves will NOT have power to CLOSE, however all CV penetrations will either be isolated, or in the process of being isolated from the performance of Attachment 1 of EOP-E-0.
	RO	(Step 5 RNO) IF valve(s) are NOT CLOSED AND associated flow path(s) are NOT necessary, THEN manually CLOSE AFFECTED valve(s).	
		<ul style="list-style-type: none"> IF AFFECTED valve(s) can NOT be CLOSED, THEN locally ISOLATE affected penetration outside Containment while CONTINUING WITH this procedure. 	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 58 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 6) CHECK CV Ventilation Isolation - VALVES CLOSED	NOTE: Some valves will NOT have power.
	BOP	(Step 6 RNO) DEPRESS H.V. OFF on R-11 OR R-12 to initiate Containment Ventilation Isolation.	
		<ul style="list-style-type: none"> IF ANY Containment Ventilation Isolation Valve does NOT CLOSE, THEN manually OR locally ISOLATE AFFECTED penetration outside Containment while CONTINUING WITH this procedure. 	NOTE: The BOP may dispatch an AO to locally check the position of the "A" Train valves. If so, Booth Instructor acknowledge as AO.
	RO	(Step 7) CHECK CV Recirculation Fans - ALL RUNNING	NOTE: The "A" Train HVH Fans do not have power.
	RO	(Step 7 RNO) Manually START fan(s) as necessary.	
	BOP	(Step 8) CHECK If Feed Flow Should Be Isolated To ANY S/G:	
		<ul style="list-style-type: none"> CHECK pressures in ALL S/Gs: 	
		<ul style="list-style-type: none"> ANY S/G pressure lowering in an uncontrolled manner 	
		OR	
		<ul style="list-style-type: none"> ANY S/G completely depressurized 	
	CRS	(Step 8 RNO) GO TO Step 9.	
	CRS	(Step 9) PERFORM The Following:	
		<ul style="list-style-type: none"> RESET SPDS 	

Op Test No.: N16-1 Scenario # 2 Event # 6, 7, 8 & 9 Page 59 of 60Event Description: **Cold Leg SBLOCA/480 VAC Bus E-1 De-energizes /"C" SI Pump fails to Auto Start/ CV Spray Valves SI-880C and D fail to OPEN Automatically**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none">RETURN TO Procedure AND Step In Effect	Examiner NOTE: The CRS will transition back to EOP-E-1 (Go to step that was in effect at the time that FRP-J.1 was entered).
At the discretion of the Lead Examiner terminate the exam.			

NRC SCENARIO N16 1-2 TURNOVER SHEET

1. INITIAL CONDITIONS

- | | |
|-------------------------|-------------|
| a) Time in Core Life: | BOL |
| b) Reactor Power: | 75% |
| c) Turbine Load: | 543 MWe |
| d) Boron Concentration: | 1248 ppm |
| e) Rod Height: | 177 CB 'D' |
| f) RCS Pressure: | 2235 psig |
| g) PZR Level: | 44.2% |
| h) Xenon: | Equilibrium |

2. TECHNICAL SPECIFICATION LCO ACTIONS STATEMENTS IN EFFECT

<u>T.S. #</u>	<u>Description</u>
None	

3. CLEARANCES IN EFFECT

- a) The "A" SI Pump is OOS. The "B" SI Pump has been aligned to 480 VAC ESF Bus E-1.
- b) The "C" Charging Pump is also OOS.

4. CAUTION CAPS IN EFFECT

- a) None

5. PROTECTED EQUIPMENT

- a) "A" Charging Pump
- b) "B" Charging Pump

6. DEGRADED EQUIPMENT

- a) LI-928, "C" SI Accumulator Level, is OOS (I&C Investigating).
- b) RTGB Annunciator APP-009-C3, "AIR SIDE SEAL OIL BU PMP OVLD," has failed to the EXTINGUISHED (i.e. OFF) condition (I&C is investigating).

7. SWITCHYARD ACCESS

- a) Unrestricted

8. PLANNED EVOLUTIONS

- a) Raise power to 100% in accordance with Reactivity Plan

9. TURNOVER INFORMATION

- a) The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

10. REACTIVITY INFORMATION

- a) The Reactor Engineer (RE) will be available in the Control Room
- b) The RE recommends a 2100 gallon dilution, made in several 200-300 gallon batch dilutions using Section 8.2.7, RCS Quick Dilution Checklist, of OP-301.
- c) The RE recommends that Control Bank D be approximately 200 steps upon achieving 100% power

11. RISK

- a) Yellow (Planned Power Increase)

ROBINSON Nuclear Training
Committed to Excellence

OPERATIONS TRAINING

N16-1-3

Initial Licensed Operator Training

Rev 012216

**THIS EXERCISE GUIDE DOES NOT
IMPLEMENT ANY COMMITMENTS**

Developed By:

 CHRISTOPHER MCINTIRE
Instructor/Developer

Date:

1/22/16


Concurred By:

 JOHN R. LITTLE
Line Superintendent/Supervisor/SRO

Date:

01/22/16

Approved By:

 J. BACKLEY
Superintendent/Supervisor Training

Date:

1/23/16

PROGRAM: H B Robinson Operations Training

MODULE: Initial License Operator Training Class 15-1

TOPIC: NRC Simulator Exam

Scenario N16-1-3

REFERENCES:

1. Technical Specification LCO 3.7.4, "Auxiliary Feedwater (AFW) System" (Amendment 203)
2. AOP-024, "Loss of Instrument Bus" (Rev 41)
3. Technical Specification LCO 3.8.7, "AC Instrument Bus Sources – Operating" (Amendment 176)
4. Technical Specification LCO 3.8.9, "Distribution System - Operating" (Amendment 176)
5. AOP-010, "Main Feedwater/Condensate Malfunction" (Rev 33)
6. AOP-025, "RTGB Instrument Failure" (Rev 24)
7. OWP-026, "Feed Flow (FWF)" (Rev 14)
8. AOP-038, "Rapid Downpower" (Rev 3)
9. APP-001 "Miscellaneous NSSS" (Rev 60)
10. AOP-019, "Malfunction of RCS Pressure Control" (Rev 20)
11. Technical Specification LCO 3.3.4, "Remote Shutdown System" (Amendment 203)
12. Technical Specification LCO 3.4.1, "RCS Pressure, Temperature and Flow Departure From Nucleate Boiling (DNB) Limits" (Amendment 176)
13. Technical Specification LCO 3.4.11, "Pressurizer Power Operated Relief Valve (PORVs)" (Amendment 203)
14. EOP-E-0, "Reactor Trip or Safety Injection" (Rev 6)
15. EOP-ES-0.1, "Reactor Trip Response" (Rev 7)
16. CSFST, "Critical Safety Function Status Trees" (Rev 7)
17. FRP-H.1, "Response to Loss of Secondary Heat Sink" (Rev 29)
18. OP-402, "Auxiliary Feedwater System" (Rev 96)

Validation Time: 92 minutes

Scenario Event Description
NRC Scenario 3

Facility: H B Robinson		Scenario No.: 3		Op Test No.: N16-1	
Examiners: _____		Operators: _____		(SRO)	
_____		_____		(RO)	
_____		_____		(BOP)	
Initial Conditions:		The plant is at 68% power (EOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.			
Turnover:		The following equipment is Out-Of-Service: The SDAFW Pump is OOS, and has been for 7 days. Technical Specification LCO 3.7.4 ACTION C has just been entered. Maintenance reports that this pump will be OPERABLE in 2 hours, and station management has directed that the initiation of the shutdown be delayed 2 hours. TI-471, PRT Temperature is OOS (I&C Investigating). RTGB Annunciator APP-008-C3, "EMERG OIL PMP OVLD," has failed to the ILLUMINATED condition (I&C is investigating).			
Event No.	Malf. No.	Event Type*	Event Description		
1	1	C-RO C-BOP C(TS)-SRO	Loss of Instrument Bus 3		
2	2	I-BOP I-SRO	"B" Feed Flow Transmitter FT-487 Fails LOW		
3	NA	R-RO N-BOP N-SRO	Load Decrease		
4	3	C-RO C-SRO	Letdown Line Pressure Control Valve Controller fails CLOSED		
5	4	I-RO I(TS)-SRO	PZR Pressure Transmitter PT-444 Fails HIGH/PCV-455C fails to fully CLOSE		
6	5	M-RO M-BOP M-SRO	Inadvertent FWIS		
7	6	C-BOP	Turbine fails to Trip/GV Valves fail to Runback/MSI fails to AUTO Actuate		
8	7	NA	"A" & "B" MDAFW Pump Trip		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Scenario Event Description
NRC Scenario 3

H B Robinson 2016 NRC Scenario #3

The plant is at 68% power (EOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

The following equipment is Out-Of-Service: The SDAFW Pump is OOS, and has been for 7 days. Technical Specification LCO 3.7.4 ACTION C has just been entered. Maintenance reports that this pump will be OPERABLE in 2 hours, and station management has directed that the initiation of the shutdown be delayed 2 hours. TI-471, PRT Temperature is OOS (I&C Investigating). RTGB Annunciator APP-008-C3, "EMERG OIL PMP OVLD," has failed to the ILLUMINATED condition (I&C is investigating).

Shortly after taking the watch, Instrument Bus 3 will de-energize. The operator will respond in accordance with AOP-024, "Loss of Instrument Bus," and restore power to the Bus. The operator will address Technical Specification LCO 3.8.7, "AC Instrument Bus Sources – Operating," and Technical Specification LCO 3.8.9, "Distribution Systems-Operating."

Following this, the controlling feed flow channel for S/G "B", FT-487, will fail LOW, causing FRV-498 to start to OPEN. The operator will respond in accordance with AOP-010, "Main Feedwater/Condensate Malfuction," and/or AOP-025, "RTGB Instrument Failure." The operator will remove the failed instrument from service in accordance with OWP-026, "Feed Flow (FWF)."

Next, the WCCS will call and inform the operator that it has been determined that the SDAFW Pump will not be restored to OPERABLE status within the next two hours as expected, and that station management has directed that the plant be brought to Mode 3 within the next four hours using AOP-038, "Rapid Downpower."

During the downpower, the Letdown Pressure Control Valve (PCV-145) controller will fail such that the valve will fail closed. The operator will respond in accordance with APP-001-D6, LP LTDN LN HI PRESS, and ultimately take manual control of the valve.

Shortly afterwards, PZR Pressure transmitter PT-444 will fail HIGH causing the Pzr Spray valves and Pzr PORV to OPEN. The operator will respond in accordance with AOP-019, "Malfunction of RCS pressure Control," and/or AOP-025, "RTGB Instrument Failure." RCS pressure control will remain in MANUAL for the remainder of the scenario. The operator will address Technical Specification LCO 3.3.4, "Remote Shutdown System," Technical Specification LCO 3.4.1, "RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits," and Technical Specification LCO 3.4.11, "Pressurizer Power Operated Relief Valves (PORVs)."

After the Pressure Transmitter has been removed from service, an inadvertent FWIS will occur. Simultaneously with the Rx Trip, the Turbine will fail to TRIP, the Governor Valves will fail to CLOSE manually, and the Main Steamline Isolation signal will fail to auto actuate. The operator will be required to manually CLOSE the MSIVs. Additionally the "A" and "B" MDAFW Pumps will trip immediately after auto start. The operator will enter EOP-E-0, "Reactor Trip or Safety Injection."

Upon completion of EOP-E-0, the operator will transition to EOP-ES-0.1, "Reactor Trip Response." However, this transition will be delayed due to a RED condition on the Heat Sink CSF. The operator will perform FRP-H.1, "Response to Loss of Secondary Heat Sink." The

Scenario Event Description
NRC Scenario 3

operator will direct that AFW Pump "C" be placed in service in accordance with OP-402, "Auxiliary Feedwater System," however, the AFW Pump "C" Diesel will fail to start.

The scenario will terminate at Step 7 RNO 2.b of FRP-H.1, after the operator has restored feedwater flow from the Main Feedwater System.

Critical Tasks:

Manually control "B" S/G Narrow Range Level before a Reactor Trip occurs on low S/G level or a Protective Action occurs on high S/G Level.

Safety Significance: failure to take manual control of the "B" S/G Feed Reg Valve and control Narrow Range S/G level, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection/Engineered Safeguards Actuation System. Performance of the critical task would stabilize the S/G level transient. A failure to stabilize the S/G level transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS temperature/pressure control.

Manually close the OPEN Pzr Spray Valve(s) and the Block Valve for the Stuck Open PORV before the Reactor trips based on low pressurizer pressure.

Safety Significance: failure to close the Spray Valves/PORV Block Valve and stop the pressure transient, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection System. Performance of the critical task would stabilize the pressure transient. A failure to stabilize the pressure transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS pressure control.

Manually Close the MSIVs Before an ORANGE Path Challenge Develops to Either the Subcriticality or the Integrity CSF or Before Transition to ECA-2.1, Whichever Happens First (EOP-Based)

Safety Significance: Failure to trip the main turbine under the postulated plant conditions causes challenges to CSFs beyond those irreparably introduced by the postulated conditions. Additionally, such an omission constitutes a failure by the operator to "demonstrate the ability to take one or more actions that would prevent a challenge to plant safety. The situation described in the plant conditions is effectively a large steamline break downstream of the MSIVs. This "effective steamline break" is also located downstream of the main turbine stop valves, which cannot be closed by manually tripping the turbine. Failure to perform the critical task results in uncontrolled depressurization of all SGs and in uncontrolled cooldown of the RCS, both of which are unnecessary.

Establish Feedwater Flow Into at Least One S/G Before RCS Bleed and Feed is Required (EOP-Based)

Safety Significance: Failure to establish feedwater flow to any SG results in the operator's having to rely upon the lower-priority action of establishing RCS bleed and feed to minimize core uncover. This constitutes incorrect performance that fails to prevent degradation of any barrier to fission product release.

Scenario Event Description
NRC Scenario 3

SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Sim. Setup	Reset to Temp IC 610	
<input type="checkbox"/>	<p>T = 0 Malfunctions:</p> <p>SDAFW Pump OOS:</p> <ul style="list-style-type: none"> • irf EPSMCC5_189 f: RACK_OUT (V1-8A, A S/G supply to SDAFW) • irf EPSMCC6_226 f: RACK_OUT (V1-8B, B S/G supply to SDAFW) • irf EPSMCC6_227 f: RACK_OUT (V1-8C, C S/G supply to SDAFW) • irf EPSMCC10_262 f: RACK_OUT (V2-14A, SDAFW discharge to A S/G) • irf EPSMCC9_254 f: RACK_OUT (V2-14B, SDAFW discharge to B S/G) • irf EPSMCC10_267 f: RACK_OUT (V2-14C, SDAFW discharge to C S/G) <p>PLACE RED CAPS on the RTGB Control Switches for the Valves ABOVE</p> <p>Place GREEN CAPS on the RTGB Control Switches BELOW (See OMM-048, Attachment 9):</p> <ul style="list-style-type: none"> • A MDAFW RTGB Switch • B MDAFW RTGB Switch • AFW Valve V2-16A RTGB Switch • AFW Valve V2-16B RTGB Switch • AFW Valve V2-16C RTGB Switch • AFW Valve V2-20A RTGB Switch • AFW Valve V2-20B RTGB Switch • Protected Switchyard <p>TI-471 PRT Temperature indication OOS</p> <ul style="list-style-type: none"> • IOR aoPRTAOD30A f:50 <p>Place WHITE DOT on TI-471</p> <p>RTGB Annunciator APP-008-C3 failed on</p> <ul style="list-style-type: none"> • IMF ANN08C03 f:ALARM_ON <p>Place WHITE DOT on APP-008-C3</p> <p>Insert the following:</p> <ul style="list-style-type: none"> • IMF TUR02A (Turbine fails to AUTO Trip) • IMF TUR02B (Turbine fails to AUTO Trip) • IMF TUR02C (Turbine fails to AUTO Trip) • \$006_RTA_TRIP IOR diTUREHI029 f:AS-IS (Turbine Fails to Runback on Reactor Trip) • IRF SGN023 f:NO_AUTO (Auto MSI Fails) • IRF SGN024 f:NO_AUTO (Auto MSI Fails) • IRF SGN025 f:NO_AUTO (Auto MSI Fails) • \$006_RTA_TRIP IMF CFW1A d:45 (A MDAFW Pump Trips after Auto Start) • \$006_RTA_TRIP IMF CFW1B d:45 (B MDAFW Pump Trips after Auto Start) <p>Place the Simulator in RUN and ACKNOWLEDGE all alarms.</p>		
<input type="checkbox"/>	Perform Attachment 2 (Simulator Setup For Exams) of TAP-411.		

Scenario Event Description
NRC Scenario 3

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Crew Briefing 1. Assign Crew Positions based on evaluation requirements 2. Review the Shift Turnover Information with the crew. 3. Provide the crew with the following: <ul style="list-style-type: none"> • OST-947, Operations Reactivity Plan • Copy of Technical Specifications/Basis 4. Direct the crew to Review the Control Boards taking note of present conditions, alarms.		
<input type="checkbox"/>	T-0	Begin Familiarization Period	
<input type="checkbox"/>	At direction of examiner	Execute Lesson Plan for Simulator Scenario N16-1-3.	
<input type="checkbox"/>	At direction of examiner	Event 1 IRF EPSIB3_600 f:OPEN	Loss of Instrument Bus 3
<input type="checkbox"/>	At direction of examiner	Event 2 ICO CFWXMTFT_487 r:00:30 f:0	"B" Feed Flow Transmitter FT-487 Fails LOW
<input type="checkbox"/>	At direction of examiner	Event 3 NA	Load Decrease NOTE: to initiate this event, the WCCS will call and inform the operator that "It has been determined that the SDAFW Pump will not be restored to OPERABLE status within the next two hours as expected, and that station management has directed that the plant be brought to Mode 3 within the next four hours using AOP-038, "Rapid Downpower."
<input type="checkbox"/>	At direction of examiner	Event 4 IMF CVC07 r:2:00 f:100 IOR aoCVCAAD046A r:2:00 f:100 \$006_PCV-145_MAN DMF CVC07 \$006_PCV-145_MAN DOR aoCVCAAD046A	Letdown Line Pressure Control Valve Controller fails CLOSED

Scenario Event Description
NRC Scenario 3

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	At direction of examiner	Event 5 ICO RPSXMTPT_444 r:01:00 f:2500 IMF PRS03D f:10 when \$006_PCV-455C_OPEN	PZR Pressure transmitter PT-444 Fails HIGH/PCV-455C fails to fully CLOSE
<input type="checkbox"/>	At direction of examiner	Event 6 IMF CFW20A c:20 IMF CFW20B c:20 IMF CFW20C c:20	Inadvertent FWIS
<input type="checkbox"/>	Post-Rx Trip	Event 7	Turbine fails to Trip/GV Valves fail to Runback/MSI fails to AUTO Actuate NOTE: Failure is inserted at T=0
<input type="checkbox"/>	Post-Rx Trip	Event 8	A & B MDAFW Pump Trip NOTE: Failure is inserted at T=0
<input type="checkbox"/>	Terminate the scenario upon direction of Lead Examiner		

Op Test No.: N16-1 Scenario # 3 Event # 1 Page 9 of 46Event Description: **Loss of Instrument Bus 3**

Shortly after taking the watch, Instrument Bus 3 will de-energize. The operator will respond in accordance with AOP-024, "Loss of Instrument Bus," and restore power to the Bus. The operator will address Technical Specification LCO 3.8.7, "AC Instrument Bus Sources – Operating," and Technical Specification LCO 3.8.9, "Distribution Systems-Operating."

Booth Operator Instructions: **IRF EPSIB3_600**
f:OPEN

Indications Available:

- "C" Feed Regulating Valve Controller in MANUAL
- FR-498 Stem/Feed Flow Recorder for "C" S/G is de-energized
- Bistable Panel "A" is de-energized
- PT-445, Pzr Pressure has failed LOW

Time	Pos.	Expected Actions/Behavior	Comments
AOP-024, LOSS OF INSTRUMENT BUS			
	BOP	(Step 1) Place The Main Turbine in Manual	Immediate Action
	BOP	(Step 2) Verify S/G(s) Maintained At Program Level	Immediate Action
	RO	(Step 3) Place Rods in M (Manual)	Immediate Action
	RO	(Step 4) Maintain Reactor Power Less Than OR Equal To 100%	
	RO	(Step 5) Determine If RCS Makeup Needs To Be Stopped:	
		<ul style="list-style-type: none"> • Check Auto Makeup, Boration OR Dilution - IN PROGRESS 	
		OR	
		<ul style="list-style-type: none"> • Check Instrument Bus 2 AND Instrument Bus 7 - DE-ENERGIZED 	
	RO	(Step 5 RNO) IF Auto Makeup is received, THEN Check Auto Makeup, Boration	

Op Test No.: N16-1 Scenario # 3 Event # 1 Page 10 of 46Event Description: **Loss of Instrument Bus 3**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	<ul style="list-style-type: none"> Go To Step 7 	
	RO	(Step 7) Control PZR Heaters And Sprays To Restore RCS Pressure To The Desired Control Band	
	CRS	(Step 8) Make PA Announcement For Procedure Entry	NOTE: The CRS will most likely make this announcement.
	RO	(Step 9) Control Charging And Letdown Flow To Maintain PZR Level	
	RO	(Step 10) Check RCP Seal Injection Flow Between 8 GPM and 13 GPM	
	BOP	(Step 11) Determine Failed Instrument Bus (IB) From Any Of The Following:	
		<ul style="list-style-type: none"> Available indications 	
		OR	
		<ul style="list-style-type: none"> Table Below 	
		<ul style="list-style-type: none"> 3, FR-498, "C" S/G Level 	
	BOP	(Step 12) Check Emergency Busses E - 1 AND E - 2 - ENERGIZED FROM THE 4160V BUSES	
	RO/ BOP	(Step 13) Check Affected Instrument Bus - ENERGIZED	
	CRS	(Step 13 RNO) WHEN affected Instrument Bus is Energized, THEN observe the NOTE prior to Step 14 and perform Step 14	NOTE: Step 14 will be performed when power to IB-3 is restored.
	CRS	<ul style="list-style-type: none"> Go To Step 15. 	

Op Test No.: N16-1 Scenario # 3 Event # 1 Page 11 of 46Event Description: **Loss of Instrument Bus 3**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Note prior to Step 14) When a manual/auto control station is reenergized, 15 to 20 sec. is needed for the AUTO light to go out and the manual/auto station to revert to the manual mode.	
	BOP	(Step 14) Restore Affected Controllers On The RTGB To AUTO Mode As Follows:	NOTE: This step will be performed AFTER IB-3 is re-energized.
		<ul style="list-style-type: none"> Check the affected controller - REVERTED TO MANUAL 	
		<ul style="list-style-type: none"> Depress and release the AUTO pushbutton on the affected controller. 	NOTE: The BOP may need to manually control S/G levels, and the RO/BOP will need to reset the Steam Dump controller.
	RO	(Step 15) Check LCV-460A & B, LTDN LINE STOP - CLOSED	
	CRS	(Step 15 RNO) IF Instrument Bus 9 is Failed, THEN Go To Step 16.	NOTE: Instrument Bus 9 is energized.
		Observe the NOTE prior to Step 19 and Go To Step 19.	
	RO/ BOP	(Step 19) Check Affected Instrument Bus - ENERGIZED	
	RO/ BOP	(Step 19 RNO) Locally perform the applicable step below:	NOTE: The CRS will dispatch an AO. Booth Instructor acknowledge as AO , and report after 1 minute that the IB-3 Feeder breaker was tripped inadvertently due to Building Maintenance personnel cleaning in the area.
		<ul style="list-style-type: none"> IB-1 through IB-4 	

Op Test No.: N16-1 Scenario # 3 Event # 1 Page 12 of 46Event Description: **Loss of Instrument Bus 3**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> IF the cause is known OR NOT a fault OR suspected damage, THEN attempt to reset and close the open 	NOTE: The CRS will direct the AO to attempt to re-close the IB-3 Feeder Breaker. Booth Instructor acknowledge as AO , use: IRF EPSIB3_600 f:CLOSE and report after 1 minute that the IB-3 is re-energized.
	BOP	(Step 20) Stop All Radioactive Batch Releases	
	CRS	(Step 21) Check Status Of Local Actions:	
		<ul style="list-style-type: none"> Check Local Actions Of Step 19 RNO - REQUIRED 	
		<ul style="list-style-type: none"> Check Local Actions Of Step 19 RNO - ATTEMPTED 	
	RO/ BOP	(Step 22) Check Affected Instrument Bus - ENERGIZED	NOTE: IB-3 is energized.
	RO	(Step 23) Restore RCS Makeup Control To AUTO	
		<ul style="list-style-type: none"> Place the RCS MAKEUP SYSTEM Switch in STOP 	
		<ul style="list-style-type: none"> Verify the RCS MAKEUP MODE Switch in AUTO 	
		<ul style="list-style-type: none"> Momentarily place the RCS MAKEUP SYSTEM Switch to START 	
	RO	(Step 24) Restore Rod Control To Automatic As Follows:	
		<ul style="list-style-type: none"> Check Power - GREATER THAN 15% 	
		<ul style="list-style-type: none"> Check Automatic Rod Control - AVAILABLE 	
		<ul style="list-style-type: none"> Check Tavg - WITHIN -1.5 TO +1.5°F OF TREF 	

Op Test No.: N16-1 Scenario # 3 Event # 1 Page 13 of 46Event Description: **Loss of Instrument Bus 3**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Place the Rod Control Selector Switch to A (Automatic) 	
	BOP	(Step 25) Check Emergency Busses E-1 AND E-2 - ENERGIZED	
	BOP	(Step 26) Check Emergency Busses E-1 AND E-2 - ENERGIZED FROM THEIR 4160V BUSSES	
	CRS	(Step 27) Implement The EALs	NOTE: The CRS may ask SM to address. If so, Floor Instructor acknowledge as SM.
	RO/ BOP	(Step 28) Check Status Of Instrument Bus 4 - ENERGIZED:	
	BOP	(Step 29) Place Turbine Controls In Automatic	
	RO	(Step 30) Determine CCW Pump Status As Follows:	
		<ul style="list-style-type: none"> Check CCW Pumps - MORE THAN ONE RUNNING 	
		<ul style="list-style-type: none"> Check CCW Pumps - MORE THAN ONE REQUIRED 	
		<ul style="list-style-type: none"> Stop CCW Pumps as necessary using OP-306 Section, Operating CCW Pumps, to obtain desired CCW pump status 	
	BOP	(Step 31) Check RMS-1, RMS-2, RMS-3, AND RMS-4 - ALL OPEN	

Op Test No.: N16-1 Scenario # 3 Event # 1 Page 14 of 46Event Description: **Loss of Instrument Bus 3**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 32) Check Affected Instrument Bus - ENERGIZED	
	RO	(Step 33) Check PZR Heater Status - DEENERGIZED	
	RO	(Step 33 RNO) Go To Step 35.	
	RO	(Step 35) Check Normal Letdown - ISOLATED	
	CRS	(Step 35 RNO) Go To Step 37.	
	BOP	(Step 37) Check All Radiation Monitor Alarms - EXTINGUISHED	NOTE: The BOP may implement AOP-005 as time permits, and affect whether or not the RNO is performed.
	BOP	(Step 37 RNO) Reset Radiation Monitor alarms that are illuminated due to loss of Instrument Bus as follows:	
		<ul style="list-style-type: none"> For RMS 11-12, 15-18, OR 20-31, momentarily depress ALARM/RESET Pushbutton. 	
		<ul style="list-style-type: none"> For RMS 1-9 OR 33, momentarily depress the RESET Pushbutton. 	

Op Test No.: N16-1 Scenario # 3 Event # 1 Page 15 of 46Event Description: **Loss of Instrument Bus 3**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> For RMS 14 OR 19, contact E&C personnel to reset the monitor(s). 	NOTE: The CRS may call WCC/Chemistry to address resetting R-14s. If so, Booth Instructor acknowledge as WCC/Chemistry and use: IRF RMS067 f:RESET IRF RMS068 f:RESET IRF RMS069 f:RESET And report that the R-14 monitors have been reset.
		<ul style="list-style-type: none"> For RMS-32, momentarily depress SAFE/RESET Pushbutton. 	
	BOP	(Step 38) Check R-11 OR R-12 - IN SERVICE	
		<ul style="list-style-type: none"> RMS-1, RMS-2, RMS-3, and RMS-4 - OPEN 	
		AND	
		<ul style="list-style-type: none"> R-11 and R-12 Vacuum Pump Operating 	
	BOP	(Step 39) Check R-20, Fuel Handling Bldg Lower Level Low Range - IN SERVICE	
	BOP	(Step 40) Check R-21, Fuel Handling Bldg Upper Level - IN SERVICE	
	BOP	(Step 41) Check Control Room Ventilation - ALIGNED FOR PRESSURIZATION MODE	
	CRS	(Step 41 RNO) Go To Step 43.	
	RO	(Step 43) Check PZR PRV Safety Acoustic Monitor Lights - ILLUMINATED	

Op Test No.: N16-1 Scenario # 3 Event # 1 Page 16 of 46Event Description: **Loss of Instrument Bus 3**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 43 RNO) Go To Step 45.	
	RO/ BOP	(Step 45) Check Instrument Busses 1, 2, 3, AND 4 - ENERGIZED FROM THEIR NORMAL SOURCE (As Indicated Below):	
		<ul style="list-style-type: none"> IB-1: MCC-5 (Via E-1) 	
		<ul style="list-style-type: none"> IB-2: INVERTER A 	
		<ul style="list-style-type: none"> IB-3: INVERTER B 	
		<ul style="list-style-type: none"> IB-4: MCC-6 	
	BOP	(Step 46) Check Status of EDGs - START SIGNAL RECEIVED	
	CRS	(Step 46 RNO) Observe the NOTE prior to Step 65 and Go To Step 65.	
	BOP	(Step 65) Check ALL Safety Related Electrical Buses - ENERGIZED	
	CRS	(Step 66) Check Technical Specifications For Applicable LCOs	NOTE: The CRS will address the Technical Specifications.
		<ul style="list-style-type: none"> ITS LCO 3.8.1, AC Sources - Operating 	
		<ul style="list-style-type: none"> ITS LCO 3.8.7, AC Instrument Bus Sources - Operating 	
		<ul style="list-style-type: none"> ITS LCO 3.8.9, Distribution Systems - Operating 	
	RO	(Step 67) Check Annunciator APP-005-A3, PR DROP ROD - ILLUMINATED	
	RO	(Step 68) Reset Dropped Rod Alarm By Performing The Following:	

Op Test No.: N16-1 Scenario # 3 Event # 1 Page 17 of 46Event Description: **Loss of Instrument Bus 3**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Place DROPPED ROD MODE switch for the affected Power Range Drawer to RESET Position 	
		<ul style="list-style-type: none"> Place DROPPED ROD MODE switch for the affected Power Range Drawer to NORMAL Position 	
		<ul style="list-style-type: none"> Check Annunciator APP-005-A3, PR DROP ROD - EXTINGUISHED 	
	RO	(Step 69) Check APP-006-F5, STEAM DUMP ARMED - ILLUMINATED	
	CRS	(Step 69 RNO) Go To Step 71	
	RO	(Step 71) Check APP-005-F5, AMSAC TROUB/BYPD - ILLUMINATED	
	BOP	(Step 72) Reset AMSAC TROUB/BYPD Alarm By Depressing The SYSTEM RESET Pushbutton On AMSAC Front Panel.	NOTE: The CRS will dispatch an AO. Booth Instructor use: IRF RPS005 f:RESET
		(Step 73) Return To Procedure And Step In Effect	
TECHNICAL SPECIFICATION 3.8.7, AC INSTRUMENT BUS SOURCES - OPERATING			
	CRS	LCO 3.8.7 The following AC Instrument Bus Power Sources shall be OPERABLE: <ul style="list-style-type: none"> Inverters A and B, and Constant Voltage Transformers (CVT) 1 and 2. 	
	CRS	APPLICABILITY: MODES 1, 2, 3, and 4.	

Op Test No.: N16-1 Scenario # 3 Event # 1 Page 18 of 46Event Description: **Loss of Instrument Bus 3**

Time	Pos.	Expected Actions/Behavior			Comments
	CRS	ACTIONS			
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that ACTION A.1 is required (When Inverter is NOT powering IB-3).
		A. One AC Instrument Bus power source inoperable.	NOTE: Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with any instrument bus de-energized. A.1 Restore AC Instrument Bus Power Source to OPERABLE status.	24 hours	
TECHNICAL SPECIFICATION 3.8.9, DISTRIBUTION SYSTEMS - OPERATING					
	CRS	LCO 3.8.9 Train A and Train B AC, DC, and AC instrument bus electrical power distribution subsystems shall be OPERABLE.			
	CRS	APPLICABILITY: MODES 1, 2, 3, and 4.			
	CRS	ACTIONS			
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that ACTION B.1 is required (When IB-3 is de-energized).
		B. One AC instrument bus subsystem inoperable.	B.1 Restore AC instrument bus subsystem to OPERABLE status.	2 hours AND 16 hour from discovery of failure to meet LCO	
At the discretion of the Lead Examiner move to Event #2.					

Op Test No.: N16-1 Scenario # 3 Event # 2 Page 19 of 46Event Description: **"B" Feed Flow Transmitter FT-487 Fails LOW**

Following this, the controlling feed flow channel for S/G "B", FT-487, will fail LOW, causing FRV-498 to start to OPEN. The operator will respond in accordance with AOP-010, Main Feedwater/Condensate Malfuction," and/or AOP-025, "RTGB Instrument Failure." The operator will remove the failed instrument from service in accordance with OWP-026, "Feed Flow (FWF)."

Booth Operator Instructions: **ICO CFWXMTFT_487**
r:00:30 f:0

Indications Available:

- RTGB Annunciator APP-006-B1, S/G B FW > STM FLOW
- RTGB Annunciator APP-006-B2, S/G B STM > FW FLOW
- "B" S/G Feed flow lower than Steam flow on FR-488
- FRV-488 controller output at 100%
- FRV-488 Red status light is LIT, Green status light is OFF

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: It is likely that the CRS will place the Turbine in HOLD.
			Examiner Note: It is possible that the CRS will respond to the symptoms and enter AOP-010 first. However, the crew may recognize the failure and respond by entering AOP-025 first. If so, proceed to AOP-025 section below.
AOP-010, MAIN FEEDWATER/CONDENSATE MALFUNCTION			
			NOTE: The BOP will take Immediate Actions to control FCV-488 in MANUAL prior to procedure implementation.
	BOP	(Step 1) CHECK FRVs - OPERATING PROPERLY (MANUAL OR AUTO):	Immediate Action NOTE: The BOP will control FCV-488 in MANUAL.
		• FCV-478	
		• FCV-488	
		• FCV-498	

Op Test No.: N16-1 Scenario # 3 Event # 2 Page 20 of 46Event Description: **"B" Feed Flow Transmitter FT-487 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 1 RNO) PERFORM the following:	Immediate Action
		<ul style="list-style-type: none"> ENSURE FRV for affected S/G(s) in manual control. 	
		<ul style="list-style-type: none"> ATTEMPT to stabilize S/G level using FRV and/or FRV Bypass Valves by matching steam flow with feed flow. 	
		<ul style="list-style-type: none"> STOP any load change in progress. 	
		<ul style="list-style-type: none"> If unable to control S/G level, THEN..... 	
<u>Critical Task:</u> Manually control "B" S/G Narrow Range Level before a Reactor Trip occurs on low S/G level or a Protective Action occurs on high S/G Level. Safety Significance: failure to take manual control of the "B" S/G Feed Reg Valve and control Narrow Range S/G level, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection/Engineered Safeguards Actuation System. Performance of the critical task would stabilize the S/G level transient. A failure to stabilize the S/G level transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS temperature/pressure control.			
	RO/ BOP	(Step 2) CHECK Reactor Trip Setpoint - BEING APPROACHED	
	CRS	(Step 2 RNO) IF a Reactor Trip Setpoint is approached, THEN....	
		GO TO Step 4.	
	RO	(Step 4) CHECK Reactor Power - LESS THAN OR EQUAL TO 100%	
	CRS	(Step 5) NOTIFY Plant Personnel Of Procedure Entry Using Plant Page System	NOTE: The CRS will most likely make this announcement.

Op Test No.: N16-1 Scenario # 3 Event # 2 Page 21 of 46Event Description: **"B" Feed Flow Transmitter FT-487 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 6) GO TO Appropriate Step From Table Below:	
		FRV Failure To Control - OBSERVE NOTE 58	
	BOP	(Step 58) CHECK S/G Level - AT OR TRENDING TO PROGRAM	NOTE: The CRS will likely transition to AOP-025 based on the Note prior to Step 58.
AOP-025, RTGB INSTRUMENT FAILURE			
			NOTE: The BOP will take Immediate Actions to control FCV-488 in MANUAL prior to procedure implementation.
	CRS	(Step 1) GO TO Appropriate Section For Failed Instrument:	NOTE: The CRS will select Section D of AOP-025.
		<ul style="list-style-type: none"> S/G Feed Flow (FT-487) - SECTION D 	
		(Step 2) IMPLEMENT EALs	NOTE: The CRS may ask SM to address. If so, Floor Instructor acknowledge as SM.
		(Step 3) RETURN TO Procedure and Step in Effect	
AOP-025, RTGB INSTRUMENT FAILURE SECTION D, S/G FEED FLOW, STEAM FLOW OR STEAM PRESSURE TRANSMITTER FAILURE			
	BOP	(Step 1) CHECK Affected FRV In MAN:	Immediate Action NOTE: The BOP will control FCV-488 in MANUAL.
		<ul style="list-style-type: none"> FCV-488 (FRV "B") 	

Op Test No.: N16-1 Scenario # 3 Event # 2 Page 22 of 46Event Description: **"B" Feed Flow Transmitter FT-487 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 1 RNO) PLACE affected FRV in manual.	Immediate Action
	BOP	(Step 2) RESTORE Affected S/G Level To Program	Immediate Action
<u>Critical Task:</u> Manually control "B" S/G Narrow Range Level before a Reactor Trip occurs on low S/G level or a Protective Action occurs on high S/G Level. Safety Significance: failure to take manual control of the "B" S/G Feed Reg Valve and control Narrow Range S/G level, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection/Engineered Safeguards Actuation System. Performance of the critical task would stabilize the S/G level transient. A failure to stabilize the S/G level transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS temperature/pressure control.			
	BOP	(Step 3) CHECK Reactor Trip Setpoint - BEING APPROACHED	
	CRS	(Step 3 RNO) IF a reactor trip setpoint is approached, THEN TRIP the reactor, Reactor Trip or Safety Injection.	NOTE: This is a Continuous Action. The CRS will make both board operators aware.
		GO TO Step 5.	
	CRS	(Step 5) NOTIFY Plant Personnel Of Procedure Entry Using PA System	NOTE: The CRS will most likely make this announcement.
	BOP	(Step 6) CHECK Failure - FEED FLOW INSTRUMENT FAILURE	
	CRS	(Step 7) PLACE Affected S/G Feed Flow Selector Switch to the Alternate Channel:	
		<ul style="list-style-type: none"> S/G "B" FEED FLOW – FR-488 	

Op Test No.: N16-1 Scenario # 3 Event # 2 Page 23 of 46Event Description: **"B" Feed Flow Transmitter FT-487 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Failed Channel FT-487 – Position CH486 	
	BOP	(Step 8) RESTORE Affected Controller to Automatic:	
		<ul style="list-style-type: none"> CHECK S/G level – WITHIN $\pm 1\%$ OF PROGRAMMED LEVEL 	NOTE: The BOP may not have S/G level at programmed, and perform the RNO (Placing affected controller in AUTO when at programmed level).
		<ul style="list-style-type: none"> PLACE affected controller in AUTO. 	
	BOP	(Step 9) REMOVE Affected Transmitter from Servicing Using OWP-026:	NOTE: The CRS will address OWP-026.
		<ul style="list-style-type: none"> CHANNEL FT-487 – OWP FWF-4 	
OWP-026, FEEDWATER FLOW (FWF) FWF-4, STEAM GENERATOR "B" FEEDWATER FLOW TRANSMITTER FT-487			
	CRS	Address FWF-4	
	BOP	FR-488 FEEDWATER FLOW SELECTOR SWITCH – Selected to 486	
	BOP	DELETE INPUT FT-487 FROM CALO PROCESSING. (FWF0424A)	
			NOTE: The CRS will return to AOP-025, Section D.
AOP-025, RTGB INSTRUMENT FAILURE SECTION D, S/G FEED FLOW, STEAM FLOW OR STEAM PRESSURE TRANSMITTER FAILURE			
	BOP	(Step 10) REVIEW TS LCOs for applicability:	
		<ul style="list-style-type: none"> TS LCO 3.3.1 	
		<ul style="list-style-type: none"> TS LCO 3.3.2 	

Op Test No.: N16-1 Scenario # 3 Event # 2 Page 24 of 46

Event Description: **"B" Feed Flow Transmitter FT-487 Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 11) GO TO Procedure Main Body, Step 2	
			NOTE: The CRS will return to the main body of AOP-025.
AOP-025, RTGB INSTRUMENT FAILURE			
	CRS	(Step 2) IMPLEMENT EALs	NOTE: The CRS may ask SM to address. If so, Floor Instructor acknowledge as SM.
	CRS	(Step 3) RETURN TO Procedure And Step In Effect	NOTE: The CRS will likely conduct an Alignment Brief.
At the discretion of the Lead Examiner move to Event #3.			

Op Test No.: N16-1 Scenario # 3 Event # 3 Page 25 of 46Event Description: **Load Decrease**

Next, the WCCS will call and inform the operator that it has been determined that the SDAFW Pump will not be restored to OPERABLE status within the next two hours as expected, and that station management has directed that the plant be brought to Mode 3 within the next four hours using AOP-038, "Rapid Downpower."

Booth Operator Instructions:

Call as the WCCS and state "It has been determined that the SDAFW Pump will not be restored to OPERABLE status within the next two hours as expected, and station management has directed that the plant be brought to Mode 3 within the next four hours using AOP-038, "Rapid Downpower.""

Indications Available:**NA**

Time	Pos.	Expected Actions/Behavior	Comments
AOP-038, RAPID DOWNPOWER			
	BOP	(Step 1) NOTIFY Plant Personnel Of Procedure Entry Using The Plant Page System	
	RO	(Step 2) DETERMINE Corrected Boration And Target Rod Height For Target Power Level Using Most Recently Performed OST-947, OPERATIONS REACTIVITY PLAN	
		• Target Load Reduction Rate ___%/min	
		• Target Power Level ___	
		• Target Rod Height ___	NOTE: The RO will determine approximately 130 Steps.
		• Corrected Boration ___	NOTE: The RO will determine approximately 350 gallons.
	RO	(Step 3) CHECK Required Power Reduction Rate - LESS THAN OR EQUAL TO 5%/MINUTE	
	CRS	(Step 4) PERFORM Brief Of Control Room Personnel To Include The Following:	

Op Test No.: N16-1 Scenario # 3 Event # 3 Page 26 of 46Event Description: **Load Decrease**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Reason for downpower 	
		<ul style="list-style-type: none"> Target Power Level 	
		<ul style="list-style-type: none"> Target Rod Height 	
		<ul style="list-style-type: none"> Rate of load reduction 	
		<ul style="list-style-type: none"> Amount of boric acid addition 	
	RO	(Step 5) ENERGIZE All Available PZR Heaters	
		<ul style="list-style-type: none"> PZR HTR CONTROL GROUP 	
		<ul style="list-style-type: none"> PZR HTR BACK-UP GROUP A 	
		<ul style="list-style-type: none"> PZR HTR BACK-UP GROUP B 	
	RO	(Step 6) CHECK Rod Control - IN AUTO	
	RO	(Step 7) INITIATE Boration Using Attachment 1, RCS Boration, While Continuing With This Procedure	
			<p>Examiner NOTE: The CRS will assign the RO to perform this action.</p> <p>RO Examiner follow actions of Attachment 1.</p> <p>Other Examiners follow AOP-038 Actions, Step 8, on Page 27.</p>
AOP-038, RAPID DOWNPOWER ATTACHMENT 1, RCS BORATION			
	RO	(Step 1) PLACE The RCS MAKEUP MODE Selector Switch In BORATE	
	RO	(Step 2) IF Frequent Boric Acid Transfer Pump Starts Are Anticipated, THEN PLACE Boric Acid Transfer Pump Switch Aligned To BLEND To ON.	

Op Test No.: N16-1 Scenario # 3 Event # 3 Page 27 of 46Event Description: **Load Decrease**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 3) SET YIC-113, BORIC ACID TOTALIZER to amount determined in Main Body Step 2	
	RO	(Step 4) Momentarily PLACE the RCS MAKEUP SYSTEM switch to START	
	RO	(Step 5) IF Boric Acid flow is NOT achieving the desired effect, THEN PLACE FCV-113A, BORIC ACID FLOW, in MAN AND manually Adjust controller FCV-113A, BORIC ACID FLOW, using the UP and DOWN pushbuttons	
	RO	(Step 6) WHEN the desired amount of Boric Acid has been added to the RCS OR the RCS MAKEUP SYSTEM Switch is placed in STOP, THEN ENSURE the following:	
		<ul style="list-style-type: none"> FCV-113A, BA TO BLENDER, closes. 	
		<ul style="list-style-type: none"> FCV-113B, BLENDED MU TO CHG SUCT, closes. 	
		<ul style="list-style-type: none"> IF in AUTO, THEN operating Boric Acid Pump stops. 	
		<ul style="list-style-type: none"> RCS MAKEUP SYSTEM is OFF. 	
AOP-038, RAPID DOWNPOWER			
			Examiner NOTE: Examiners following the CRS/BOP continue HERE .
	BOP	(Step 8) INITIATE Turbine Load Reduction While Continuing With This Procedure	
		<ul style="list-style-type: none"> CHECK EH Turbine Control - IN OPER AUTO 	
		<ul style="list-style-type: none"> PREPARE For Turbine Load Reduction As Follows: 	
		<ul style="list-style-type: none"> CHECK IMP IN - ILLUMINATED 	

Op Test No.: N16-1 Scenario # 3 Event # 3 Page 28 of 46Event Description: **Load Decrease**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 8.b.1 RNO 1) IF Turbine Load reduction is available using IMP IN, THEN PERFORM the following:	
		<ul style="list-style-type: none"> DEPRESS IMP IN pushbutton 	
		<ul style="list-style-type: none"> CHECK IMP IN light illuminated 	
		<ul style="list-style-type: none"> CHECK IMP OUT light extinguished 	
	BOP	(Step 8.b) SET desired load in the SETTER	
		<ul style="list-style-type: none"> SELECT the desired Load Rate 	
		<ul style="list-style-type: none"> DEPRESS the GO pushbutton to initiate Turbine Load reduction 	
	BOP	(Step 9) ADJUST Turbine Load To Control Tavg Within 5°F Of Tref Using One Of The Following:	
		<ul style="list-style-type: none"> ADJUST Load Rate 	
		OR	
		<ul style="list-style-type: none"> DEPRESS GO and HOLD pushbuttons 	
	CRS/ BOP	(Step 10) INITIATE Notification of The Following:	NOTE: The CRS may ask SM/WCC/Communicator to address. If so, Floor Instructor acknowledge.
		<ul style="list-style-type: none"> Load Dispatcher of load reduction 	
		<ul style="list-style-type: none"> E&C to control secondary chemistry 	
		<ul style="list-style-type: none"> RC for elevated radiation levels in CV Pump Bays and Pipe Alley 	
		<ul style="list-style-type: none"> On-call Duty Manager to activate the Event Response Team 	
		<ul style="list-style-type: none"> E&C for impending 15% power change for I-131 sampling within 2 to 6 hours 	
		<ul style="list-style-type: none"> E&C for impending power reduction greater than 20% terminate zinc injection 	

Op Test No.: N16-1 Scenario # 3 Event # 3 Page 29 of 46Event Description: **Load Decrease**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> NRC within 4 hours 	
	BOP	(Step 11) CHECK Auxiliary Boilers - AT LEAST ONE OPERATING	
	BOP	(Step 11 RNO) IF Plant Shutdown is required, THEN NOTIFY AO to start at least one Auxiliary Boiler per OP-401, AUXILIARY HEATING SYSTEM.	NOTE: The BOP will dispatch an AO. Booth Instructor acknowledge as AO.
	RO	(Step 12) CHECK Tavg - WITHIN 5°F OF Tref	
	RO	(Step 13) CHECK Axial Flux Distribution - WITHIN TARGET BAND	
	BOP	(Step 14) CHECK APP-006-F5, STEAM DUMP ARMED - EXTINGUISHED	
	RO	(Step 15) CHECK Any Of The Following Conditions - MET:	
		<ul style="list-style-type: none"> Target load/power has been reached 	
		<ul style="list-style-type: none"> Load reduction is no longer required 	
		<ul style="list-style-type: none"> CRS/SM directs termination of load reduction 	
		<ul style="list-style-type: none"> STOP Rapid Downpower using Attachment 3, Termination Of Rapid Downpower 	

At the discretion of the Lead Examiner move to Event #4.

Op Test No.: N16-1 Scenario # 3 Event # 4 Page 30 of 46Event Description: **Letdown Line Pressure Control Valve Controller fails CLOSED**

During the downpower, the Letdown Pressure Control Valve (PCV-145) controller will fail such that the valve will fail closed. The operator will respond in accordance with APP-001-D6, LP LTDN LN HI PRESS, and ultimately take manual control of the valve.

Booth Operator Instructions:

IMF CVC07 r:2:00 f:100

IOR aoCVCAAD046A r:2:00 f:100

\$006_PCV-145_MAN DMF CVC07

\$006_PCV-145_MAN DOR aoCVCAAD046A

Indications Available:

- RTGB Annunciator APP-001-D6, LP LTDN LN HI PRESS
- RTGB Annunciator APP-001-E6, LP LTDN RELIEF HI TEMP (Subsequent)
- PCV-145 CLOSING
- Normal Letdown flow indicates "0"

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: It is likely that the CRS will place the Turbine in HOLD.
APP-001-D6, LP LTDN LN HI PRESS			
	RO	(Step 1) IF controller PC-145 has malfunctioned, THEN TAKE manual control of PC-145.	NOTE: The RO will take Manual control of PC-145 and control letdown pressure manually.
	RO	(Step 2) IF PT-145 has failed, THEN	NOTE: PT-145 has NOT failed.
	RO	(Step 3) IF PCV-145 failed, THEN	NOTE: PCV-145 has NOT failed.
	RO	(Step 4) IF Letdown is required AND PCV-145 failed, THEN	NOTE: PCV-145 has NOT failed.
	RO	(Step 5) IF too many orifices are in service, THEN	
			NOTE: The CRS will likely conduct an Alignment Brief.
At the discretion of the Lead Examiner move to Event #5.			

Op Test No.: N16-1 Scenario # 3 Event # 5 Page 31 of 46Event Description: **PZR Pressure Transmitter PT-444 Fails HIGH/PCV-455C fails to fully CLOSE**

Shortly afterwards, PZR Pressure transmitter PT-444 will fail HIGH causing the PZR Spray valves and PZR PORV to OPEN. The operator will respond in accordance with AOP-019, "Malfunction of RCS pressure Control," and/or AOP-025, "RTGB Instrument Failure." RCS pressure control will remain in MANUAL for the remainder of the scenario. The operator will address Technical Specification LCO 3.3.4, "Remote Shutdown System," Technical Specification LCO 3.4.1, "RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits," and Technical Specification LCO 3.4.11, "Pressurizer Power Operated Relief Valves (PORVs)."

Booth Operator Instructions: **ICO RPSXMTPT_444**
r:01:00 f:2500

IMF PRS03D f:10 when
\$006_PCV-455C_OPEN

Indications Available:

- RTGB Annunciator APP-003-C7, PZR PRESS CONTROLLER HI OUTPUT
- Narrow Range Pressurizer Pressure rising on PR-444
- Master Pressure controller PC-444J demand rising to 100%
- Both Pressurizer Spray valves indicate fully OPEN
- Pressurizer PORV PCV-455C Red status light is LIT

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: It is likely that the CRS will place the Turbine in HOLD.
			Examiner Note: It is possible that the CRS will respond to the symptoms and enter AOP-019 first. However, the crew may recognize the failure and respond by entering AOP-025 first. If so, proceed to AOP-025 , Step 1 , actions on Page 33 .
			NOTE: The RO will likely take action, including closing the PORV Block before the CRS enters the procedure.
AOP-019, MALFUNCTION OF RCS PRESSURE CONTROL			

Op Test No.: N16-1 Scenario # 3 Event # 5 Page 32 of 46Event Description: **PZR Pressure Transmitter PT-444 Fails HIGH/PCV-455C fails to fully CLOSE**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 1) CHECK Both LTOPP Arming Switches Selected to NORMAL	Immediate Action
	RO	(Step 2) Determine If PZR PORVs should be closed:	Immediate Action
		<ul style="list-style-type: none"> Check PZR pressure – LESS THAN 2335 PSIG 	
		<ul style="list-style-type: none"> ENSURE both PZR PORVs - CLOSED 	
	RO	(Step2b RNO) IF any PZR PORV can NOT be closed THEN close its PORV BLOCK Valve.	Immediate Action NOTE: PCV-455C will OPEN in about 1 minute.
	RO	(Step 3) Control the Normal PZR Spray Valves AND PZR Heaters to Restore RCS Pressure to the desired control Band.	Immediate Action
	CRS	(Step 4) Make PA Announcement for Procedure Entry	NOTE: The CRS will most likely make this announcement.
	RO	(Step 5) Check PZR Pressure – UNDER OPERATOR CONTROL	

Critical Task:

Manually close the OPEN PZR Spray Valve(s) and the Block Valve for the Stuck Open PORV before the Reactor trips based on low pressurizer pressure.

Safety Significance: failure to close the Spray Valves/PORV Block Valve and stop the pressure transient, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection System. Performance of the critical task would stabilize the pressure transient. A failure to stabilize the pressure transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS pressure control.

--	--	--	--

Op Test No.: N16-1 Scenario # 3 Event # 5 Page 33 of 46Event Description: **PZR Pressure Transmitter PT-444 Fails HIGH/PCV-455C fails to fully CLOSE**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 6) Check Pressurizer Pressure Transmitter PT-444 OR PT-445 – FAILED.	
	CRS	(Step 7) Go To AOP-025, RTGB Instrument Failure	NOTE: The CRS will transition to AOP-025.
			Examiner Note: If the CRS addresses AOP-025 rather than AOP-019, follow actions here.
AOP-025, RTGB INSTRUMENT FAILURE			
	CRS	(Step 1) GO TO Appropriate Section For Failed Instrument:	
		<ul style="list-style-type: none"> PZR PRESSURE (PT-444) – Section C 	NOTE: The CRS will transition to Section C of AOP-025.
AOP-025, RTGB INSTRUMENT FAILURE SECTION C, PZR PRESSURE TRANSMITTER FAILURE			
	RO	(Step 1) CHECK Both LTOPP Arming Switches – SELECTED TO NORMAL	Immediate Action
	RO	(Step 2) DETERMINE If PZR PORVs should be closed:	Immediate Action
		<ul style="list-style-type: none"> CHECK PZR pressure – LESS THAN 2335 PSIG 	
		<ul style="list-style-type: none"> CHECK both PZR PORVs CLOSED 	
	RO	(Step 2b RNO) IF any PZR PORV can NOT be closed, THEN CLOSE associated PORV BLOCK valve.	Immediate Action
			NOTE: The RO will have previously determined that PCV-455C has failed to CLOSE, and Close the Block Valve.

Op Test No.: N16-1 Scenario # 3 Event # 5 Page 34 of 46Event Description: **PZR Pressure Transmitter PT-444 Fails HIGH/PCV-455C fails to fully CLOSE**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 3) CONTROL PZR Heaters and Spray to restore RCS Pressure to desired Control Band	Immediate Action
	CRS	(Step 4) NOTIFY Plant Personnel of Procedure Entry Using PA System	NOTE: The CRS will most likely make this announcement.
	RO	(Step 5) CHECK PT-445 - FAILED	
	RO	(Step 5 RNO) PERFORM the following:	
		<ul style="list-style-type: none"> ENSURE PC-444J in MAN. 	
		<ul style="list-style-type: none"> ENSURE PZR SPRAY VALVES are in AUTO. 	
		<ul style="list-style-type: none"> CONTROL PZR pressure with PC-444J. 	

Critical Task:

Manually close the OPEN PZR Spray Valve(s) and the Block Valve for the Stuck Open PORV before the Reactor trips based on low pressurizer pressure.

Safety Significance: failure to close the Spray Valves/PORV Block Valve and stop the pressure transient, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection System. Performance of the critical task would stabilize the pressure transient. A failure to stabilize the pressure transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS pressure control.

	RO	(Step 6) CHECK Selector Switch PM-444 – SELECTED TO THE OPERABLE CHANNEL	
		<ul style="list-style-type: none"> REC 445 	
	RO	(Step 6 RNO) SELECT operable channel	

Op Test No.: N16-1 Scenario # 3 Event # 5 Page 35 of 46Event Description: **PZR Pressure Transmitter PT-444 Fails HIGH/PCV-455C fails to fully CLOSE**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 7) REVIEW TS LCOs for applicability:	NOTE: The CRS may call WCC/I&C to address the instrument failure. <i>If so, Booth Instructor acknowledge as WCC/I&C.</i>
		• TS LCO 3.3.4	
		• TS LCO 3.4.1	
		• TS LCO 3.4.11	
	CRS	(Step 8) GO TO Procedure Main Body, Step 2	NOTE: The CRS will return to the main body of AOP-025.
AOP-025, RTGB INSTRUMENT FAILURE			
	CRS	(Step 2) IMPLEMENT EALs	NOTE: The CRS may ask SM to address. <i>If so, Floor Instructor acknowledge as SM.</i>
	CRS	(Step 3) RETURN TO Procedure and Step in Effect	
			NOTE: The CRS will address Technical Specifications.
TECHNICAL SPECIFICATION 3.3.4, REMOTE SHUTDOWN SYSTEM			
	CRS	LCO 3.3.4 The Remote Shutdown System Function shall be OPERABLE.	
	CRS	APPLICABILITY: MODES 1, 2, and 3.	NOTE: The CRS will determine that only one Pressurizer Pressure instrument is required, and that the other channel is OPERABLE.

Op Test No.: N16-1 Scenario # 3 Event # 5 Page 36 of 46Event Description: **PZR Pressure Transmitter PT-444 Fails HIGH/PCV-455C fails to fully CLOSE**

Time	Pos.	Expected Actions/Behavior			Comments
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 below: <ul style="list-style-type: none">Pressurizer Pressure ≥2205 psig			
	CRS	APPLICABILITY: Mode 1			
	CRS	ACTIONS			
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: If RCS pressure lowered to less than 2205 psig, the CRS will determine that ACTION A.1 is required. If so, the operator will likely conduct a boration of ≈ 100 gallons, followed by a flush of 15 gallons.
		A.One or more RCS DNB parameters not within limits.	B.A.1 Restore RCS DNB parameter(s) to within limit.	2 hours	
TECHNICAL SPECIFICATION 3.4.11, PRESSURIZER POWER OPERATED RELIEF VALVES (PORVS)					
	CRS	LCO 3.4.11 Each PORV and associated block valve shall be OPERABLE			
	CRS	APPLICABILITY: MODES 1, 2 and 3.			
	CRS	ACTIONS			

Op Test No.: N16-1 Scenario # 3 Event # 5 Page 37 of 46Event Description: **PZR Pressure Transmitter PT-444 Fails HIGH/PCV-455C fails to fully CLOSE**

Time	Pos.	Expected Actions/Behavior			Comments
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that ACTION B.1, B.2 and B.3 is required.
		C. One PORV inoperable and not capable of being manually cycled.	B.1 Close associated block valve.	1 hour	
			AND B.2 Remove power from associated bock valves.	1 hour	
			AND B.3 Restore PORV to OPERABLE status.	72 hours	
					NOTE: The CRS will likely conduct an Alignment Brief.
At the discretion of the Lead Examiner, move to Events #6-8.					

Op Test No.: N16-1 Scenario # 3 Event # 6, 7 & 8 Page 38 of 46Event Description: **Inadvertent FWIS/ Turbine fails to Trip/GV Valves fail to Runback/MSI fails to AUTO Actuate/ A & B MDAFW Pump Trip**

After the Pressure Transmitter has been removed from service, an inadvertent FWIS will occur. Simultaneously with the Rx Trip, the Turbine will fail to TRIP, the Governor Valves will fail to CLOSE manually, and the Main Steamline Isolation signal will fail to auto actuate. The operator will be required to manually CLOSE the MSIVs. Additionally the "A" and "B" MDAFW Pumps will trip immediately after auto start. The operator will enter EOP-E-0, "Reactor Trip or Safety Injection." Upon completion of EOP-E-0, the operator will transition to EOP-ES-0.1, "Reactor Trip Response." However, this transition will be delayed due to a RED condition on the Heat Sink CSF. The operator will perform FRP-H.1, "Response to Loss of Secondary Heat Sink." The operator will direct that AFW Pump "C" be placed in service in accordance with OP-402, "Auxiliary Feedwater System," however, the AFW Pump "C" Diesel will fail to start. The scenario will terminate at Step 7 RNO 2.b of FRP-H.1, after the operator has restored feedwater flow from the Main Feedwater System.

Booth Operator Instructions:

IMF CFW20A c:20
IMF CFW20B c:20
IMF CFW20C c:20

Indications Available:

- All Feed Regulating Valves have CLOSED
- The "A" and "B" Main Feedwater Pumps have tripped
- The AFW Pumps have started

Time	Pos.	Expected Actions/Behavior	Comments
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO	(Step 1) CHECK Reactor Trip:	Immediate Action
		<ul style="list-style-type: none"> • Reactor Trip AND Bypass Breakers – OPEN 	
		<ul style="list-style-type: none"> • Rod position indicators – FULLY INSERTED 	
		<ul style="list-style-type: none"> • Rod Bottom Lights - ILLUMINATED 	
		<ul style="list-style-type: none"> • Neutron Flux - LOWERING 	
	BOP	(Step 2) CHECK Turbine Trip:	Immediate Action
		<ul style="list-style-type: none"> • Both Turbine Stop Valves - CLOSED 	
	BOP	(Step 2a RNO) Manually TRIP Turbine.	Immediate Action

Op Test No.: N16-1 Scenario # 3 Event # 6, 7 & 8 Page 39 of 46Event Description: **Inadvertent FWIS/ Turbine fails to Trip/GV Valves fail to Runback/MSI fails to AUTO Actuate/ A & B MDAFW Pump Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> IF Turbine will NOT trip, THEN manually RUNBACK Turbine at maximum rate UNTIL ALL Governor valves are CLOSED. 	
		<ul style="list-style-type: none"> IF Turbine can NOT be runback, THEN manually CLOSE MSIVs AND MSIV Bypass Valves. 	
	BOP	(Step 2.b) All MSR Purge AND Shutoff Valves - CLOSED	
Critical Task: Manually Close the MSIVs Before an ORANGE Path Challenge Develops to Either the Subcriticality or the Integrity CSF or Before Transition to ECA-2.1, Whichever Happens First Safety Significance: Failure to trip the main turbine under the postulated plant conditions causes challenges to CSFs beyond those irreparably introduced by the postulated conditions. Additionally, such an omission constitutes a failure by the operator to “demonstrate the ability to take one or more actions that would prevent a challenge to plant safety. The situation described in the plant conditions is effectively a large steamline break downstream of the MSIVs. This “effective steamline break” is also located downstream of the main turbine stop valves, which cannot be closed by manually tripping the turbine. Failure to perform the critical task results in uncontrolled depressurization of all SGs and in uncontrolled cooldown of the RCS, both of which are unnecessary.			
	BOP	(Step 3) CHECK Power to AC EMERGENCY BUSES:	Immediate Action
		<ul style="list-style-type: none"> CHECK Bus E-1 OR E-2 – AT LEAST ONE ENERGIZED 	
		<ul style="list-style-type: none"> CHECK Bus E-1 AND E-2 – BOTH ENERGIZED 	
	RO/ BOP	(Step 4) CHECK SI Status:	Immediate Action
		<ul style="list-style-type: none"> CHECK if SI is actuated: 	

Op Test No.: N16-1 Scenario # 3 Event # 6, 7 & 8 Page 40 of 46Event Description: **Inadvertent FWIS/ Turbine fails to Trip/GV Valves fail to Runback/MSI fails to AUTO Actuate/ A & B MDAFW Pump Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> SI annunciator – ANY ILLUMINATED 	
		OR	
		<ul style="list-style-type: none"> SI equipment – AUTO STARTED 	
		(Step 4a RNO) CHECK if SI is required:	Immediate Action
		<ul style="list-style-type: none"> PZR pressure LESS THAN 1715 PSIG 	
		OR	
		<ul style="list-style-type: none"> Containment pressure GREATER THAN 4 PSIG 	
		OR	
		<ul style="list-style-type: none"> Steam Line ΔP bistables ILLUMINATED 	
		OR	
		<ul style="list-style-type: none"> High Steam Flow with Low Tavg OR Low Steam Pressure bistables ILLUMINATED 	
		<ul style="list-style-type: none"> IF SI is required, THEN manually ACUTATE BOTH Trains of SI. 	
		<ul style="list-style-type: none"> IF SI is NOT required, THEN PERFORM the following: 	
		<ul style="list-style-type: none"> RESET SPDS AND INITIATE monitoring of Critical Safety Function Status Trees. 	
		<ul style="list-style-type: none"> GO TO EOP-ES-0.1, Reactor Trip Response, Step 1. 	NOTE: The CRS will transition to FRP-H.1 due to the Red Path on Heat Sink.
FRP-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK			
	RO/ BOP	(Step 1) CHECK If Secondary Heat Sink is required:	
		<ul style="list-style-type: none"> CHECK RCS pressure – GREATER THAN ANY NON-FAULTED S/G PRESSURE 	
		<ul style="list-style-type: none"> CHECK RCS Hot Leg temperatures – GREATER THAN 350°F 	

Op Test No.: N16-1 Scenario # 3 Event # 6, 7 & 8 Page 41 of 46Event Description: **Inadvertent FWIS/ Turbine fails to Trip/GV Valves fail to Runback/MSI fails to AUTO Actuate/ A & B MDAFW Pump Trip**

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	(Step 2) CHECK If RCS Bleed AND Feed is required:	
		<ul style="list-style-type: none"> CHECK S/G Wide Range level in ANY TWO S/Gs –LESS THAN 13% [16%] 	
	CRS	(Step 2a RNO) OBSERVE CAUTION prior to Step 3 AND GO TO Step 3.	
	BOP	(Step 3) TRY to establish AFW Flow to at least one S/G:	
		<ul style="list-style-type: none"> CHECK S/G(s) Blowdown AND Blowdown Sample Valves - CLOSED 	
		<ul style="list-style-type: none"> CHECK Control Room indications for cause of AFW failure: 	
		<ul style="list-style-type: none"> CST level 	
		<ul style="list-style-type: none"> Steam Driven AFW pump, Steam Shutoff valves 	
		<ul style="list-style-type: none"> Motor Driven AFW pump 	
		<ul style="list-style-type: none"> AFW valve alignment 	
	BOP	(Step 3.c) TRY to restore AFW flow:	
		<ul style="list-style-type: none"> CHECK CST level – AVAILABLE AND GREATER THAN 13% 	
		<ul style="list-style-type: none"> CHECK Steam Driven AFW Pump - RUNNING 	NOTE: The CRS will dispatch an AO. If so, Booth Instructor acknowledge as AO. The SDAFW Pump will NOT be restored. Provide cues as required.
	BOP	(Step 3.c.2 RNO) Manually OPEN Steam Driven AFW Pump Steam Shutoff valve(s):	
		<ul style="list-style-type: none"> V1-8A 	
		<ul style="list-style-type: none"> V1-8B 	

Op Test No.: N16-1 Scenario # 3 Event # 6, 7 & 8 Page 42 of 46Event Description: **Inadvertent FWIS/ Turbine fails to Trip/GV Valves fail to Runback/MSI fails to AUTO Actuate/ A & B MDAFW Pump Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> V1-8C 	
		If Steam Driven AFW Pump Steam Shutoff valves can NOT be opened manually, THEN locally OPEN valves while CONTINUING WITH this procedure.	
	BOP	(Step 3.c.3) CHECK Motor Driven AFW Pump(s) - RUNNING	
	BOP	(Step 3.c.3 RNO) IF power is available, THEN PERFORM the following:	
		<ul style="list-style-type: none"> RESET SI. 	
		<ul style="list-style-type: none"> IF SI will NOT RESET, THEN... 	NOTE: SI will RESET.
		<ul style="list-style-type: none"> PLACE available Motor Driven AFW Pump control switch(es) to STOP. 	
		<ul style="list-style-type: none"> START available Motor Driven AFW Pump(s). 	
		<ul style="list-style-type: none"> IF available Motor Driven AFW Pump(s) is NOT running, THEN DISPATCH Operator to perform Attachment 2, Local Start of Motor Driven AFW Pump. 	NOTE: The CRS will dispatch an AO. If so, Booth Instructor acknowledge as AO. The MDAFW Pump will NOT be restored. Provide cues as required.
		<ul style="list-style-type: none"> IF pump(s) NOT available, THEN TRY to restore Motor Driven AFW Pump(s) while CONTINUING WITH this procedure. 	
	BOP	(Step 3.c.4) CHECK AFW Valves – PROPER EMERGENCY ALIGNMENT	
		<ul style="list-style-type: none"> AFW Header Discharge valves – FULL OPEN 	
		<ul style="list-style-type: none"> AFW Header Section valves – FULL OPEN 	
		<ul style="list-style-type: none"> Steam Driven AFW pump Discharge valves – FULL OPEN IF PUMP RUNNING 	

Op Test No.: N16-1 Scenario # 3 Event # 6, 7 & 8 Page 43 of 46Event Description: **Inadvertent FWIS/ Turbine fails to Trip/GV Valves fail to Runback/MSI fails to AUTO Actuate/ A & B MDAFW Pump Trip**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3.c.5) CHECK total feed flow to S/Gs – GREATER THAN 300 GPM	
	CRS	(Step 3.c.5 RNO) GO TO Step 3.c.7	
	CRS/ BOP	(Step 3.c.7) PLACE AFW Train C in service using OP-402, Auxiliary Feedwater System, Section titled Rapid Alignment of AFW Pump C as Directed by FRP-H.1	NOTE: The CRS will dispatch an AO. If so, Booth Instructor acknowledge as AO. Wait 5 minutes and report that the Train C AFW Diesel Generator will <u>NOT</u> start.
	BOP	(Step 3.d) CHECK total feed flow to S/Gs – GREATER THAN 300 GPM	
	BOP	(Step 3.d RNO) IF ANY feed flow to at least one S/G is verified, THEN....	
	CRS	IF feed flow is NOT verified, THEN GO TO Step 4.	
	RO	(Step 4) STOP ALL RCPs	
	RO	(Step 5) ESTABLISH Instrument Air to CV:	
		<ul style="list-style-type: none"> CHECK APP-002-F7, INSTR AIR HDR LO PRESS alarm - EXTINGUISHED 	
		<ul style="list-style-type: none"> RESET IA PCV-1716, INSTRUMENT AIR ISO TO CV 	
		<ul style="list-style-type: none"> CHECK IA PCV-1716 - OPEN 	
	BOP	(Step 6) TRY to establish Main Feedwater Flow to at least one S/G:	
		<ul style="list-style-type: none"> CHECK Condensate System – IN SERVICE 	

Op Test No.: N16-1 Scenario # 3 Event # 6, 7 & 8 Page 44 of 46Event Description: **Inadvertent FWIS/ Turbine fails to Trip/GV Valves fail to Runback/MSI fails to AUTO Actuate/ A & B MDAFW Pump Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK Feed Reg Bypass Valves - OPEN 	
		<ul style="list-style-type: none"> FCV-479 	
		<ul style="list-style-type: none"> FCV-489 	
		<ul style="list-style-type: none"> FCV-499 	
	BOP	(Step 6.b RNO) PERFORM the following:	
		<ul style="list-style-type: none"> RESET Feedwater Isolation: 	
		<ul style="list-style-type: none"> RESET SI. 	NOTE: SI will RESET.
		<ul style="list-style-type: none"> IF SI will NOT RESET, THEN... 	
		<ul style="list-style-type: none"> PLACE ALL Feedwater Isolation Key Switches to OVRD/RESET. 	
		<ul style="list-style-type: none"> OPEN Feed Reg Bypass Valves: 	
		<ul style="list-style-type: none"> FCV-479 	
		<ul style="list-style-type: none"> FCV-489 	
		<ul style="list-style-type: none"> FCV-499 	
	BOP	(Step 6.c) ESTABLISH Main Feedwater flow:	
		<ul style="list-style-type: none"> CHECK FW HDR SECTION valves - CLOSED 	
		<ul style="list-style-type: none"> V2-6A 	
		<ul style="list-style-type: none"> V2-6B 	
		<ul style="list-style-type: none"> V2-6C 	
	BOP	(Step 6.c.1 RNO) Manually CLOSE valve(s) as necessary.	
	BOP	(Step 6.c.2) START one Main Feedwater Pump	
		<ul style="list-style-type: none"> CHECK Feedwater Flow – ESTABLISHED TO AT LEAST ONE S/G 	

Op Test No.: N16-1 Scenario # 3 Event # 6, 7 & 8 Page 45 of 46Event Description: **Inadvertent FWIS/ Turbine fails to Trip/GV Valves fail to Runback/MSI fails to AUTO Actuate/ A & B MDAFW Pump Trip**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 7) CHECK S/G Levels:	
		<ul style="list-style-type: none"> CHECK S/G Narrow Range level in at least one S/G – GREATER THAN 9% [18%] 	
	BOP	(Step 7.a RNO) IF feed flow to at least on S/G is established, THEN PERFORM the following:	
		<ul style="list-style-type: none"> MAINTAIN feed flow to restore S/G Narrow Range level to GREATER THAN 9% [18%]. 	
		<ul style="list-style-type: none"> PERFORM the following: 	
		<ul style="list-style-type: none"> RESET SPDS. 	
		<ul style="list-style-type: none"> RETURN TO procedure AND step in effect. 	
Critical Task: Establish Feedwater Flow Into at Least One S/G Before RCS Bleed and Feed is Required Safety Significance: Failure to establish feedwater flow to any SG results in the operator's having to rely upon the lower-priority action of establishing RCS bleed and feed to minimize core uncover. This constitutes incorrect performance that fails to prevent degradation of any barrier to fission product release.			
At the discretion of the Lead Examiner terminate the exam.			

NRC SCENARIO N16-1-3 TURNOVER SHEET

1. INITIAL CONDITIONS

- | | |
|-------------------------|---------------------------|
| a) Time in Core Life: | EOL |
| b) Reactor Power: | 68% for the past 13 hours |
| c) Turbine Load: | 502 MWe |
| d) Boron Concentration: | 144 ppm |
| e) Rod Height: | 135 CB 'D' |
| f) RCS Pressure: | 2235 psig |
| g) PZR Level: | 41.8% |
| h) Xenon: | Peak |

2. TECHNICAL SPECIFICATION LCO ACTIONS STATEMENTS IN EFFECT

<u>T.S. #</u>	<u>Description</u>
LCO 3.7.4	Condition C

3. CLEARANCES IN EFFECT

- a) The SDAFW Pump is OOS. Maintenance reports that this pump will be OPERABLE in 2 hours, and station management has directed that the initiation of the shutdown be delayed 2 hours.

4. CAUTION CAPS IN EFFECT

- a) None

5. PROTECTED EQUIPMENT

- a) "A" & "B" MDAFW pump

6. DEGRADED EQUIPMENT

- a) TI-471, PRT Temperature is OOS (I&C Investigating).
- b) RTGB Annunciator APP-008-C3, "EMERG OIL PMP OVLD," has failed to the ILLUMINATED condition (I&C is investigating).

7. SWITCHYARD ACCESS

- a) PROTECTED

8. PLANNED EVOLUTIONS

- a) Maintain Steady-State conditions
- b) Monitor the completion of Maintenance of the SDAFW Pump

9. TURNOVER INFORMATION

- a) The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

10. REACTIVITY INFORMATION

- a) IAW OST-947 data

11. RISK

- a) GREEN

ROBINSON Nuclear Training
Committed to Excellence

OPERATIONS TRAINING

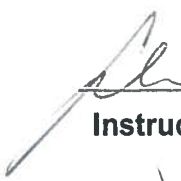
N16-1-4

Initial Licensed Operator Training

Rev 011516

THIS EXERCISE GUIDE DOES NOT
IMPLEMENT ANY COMMITMENTS

Developed By:

 CHRISTOPHER McCOMBS

Date:

1/20/16

Instructor/Developer

Concurred By:

 JOHN R. LITTLE III

Date:

01/22/16

Line Superintendent/Supervisor/SRO

Approved By:

 J. RACKLEY

Date:

1/23/16

Superintendent/Supervisor Training

PROGRAM: Robinson Operations Training

MODULE: Initial License Operator Training Class 15-1

TOPIC: NRC Simulator Exam

Scenario N16-1-4

REFERENCES:

1. APP-003, "RCS & Makeup Systems" (Rev 54)
2. AOP-003, "Malfunction of Reactor Makeup Control" (Rev 20)
3. OP-105, "Maneuvering the Plant When Greater than 25% Power" (Rev 62)
4. OP-301, "Chemical and Volume Control System (CVCS)" (Rev 112)
5. APP-001, "Miscellaneous NSSS" (Rev 60)
6. AOP-025, "RTGB Instrument Failure" (Rev 24)
7. OWP-025, "Steam Generator Pressure (SGP)" (Rev 15)
8. Technical Specification LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation" (Amendment 176)
9. Technical Specification LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation" (Amendment 203)
10. Technical Specification LCO 3.3.6, "Containment Ventilation Isolation Instrumentation" (Amendment 176)
11. OWP-011, "Nuclear Instrumentation (NI)" (Rev 24)
12. Technical Specification LCO 3.3.1, "Reactor Protection System (RPS) Instrumentation" (Amendment 176)
13. AOP-007, "Turbine Trip Below P-8" (Rev 16)
14. EOP-E-0, "Reactor Trip or Safety Injection" (Rev 6)
15. CSFST, "Critical Safety Function Status Trees" (Rev 7)
16. FRP-S.1, "Response to Nuclear Power generation- ATWS" (Rev 22)
17. EOP-E-2, "Faulted Steam Generator Isolation" (Rev 3)
18. FRP-P.1, "Response to Imminent Pressurized Thermal Shock" (Rev 19)

Validation Time: 105 minutes

Scenario Event Description
NRC Scenario 4

Facility: HB Robinson		Scenario No.: 4		Op Test No.: N16-1	
Examiners: _____		Operators: _____		(SRO)	
_____		_____		(RO)	
_____		_____		(BOP)	
Initial Conditions:		The plant is at 25% power (BOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.			
Turnover:		The following equipment is Out-Of-Service: The "A" SI Pump is OOS. The "B" SI Pump has been aligned to 480 VAC ESF Bus E-1. PI-1616, SW North Header Pressure, is OOS (I&C Investigating). RTGB Annunciator APP-007-C3, "FW PMP A LO FLOW TRIP," has failed to the EXTINGUISHED condition (I&C is investigating). The crew will be directed to raise power to 100%.			
Event No.	Malf. No.	Event Type*	Event Description		
1	1	C-RO C-SRO	"A" Primary Water Pump trips during Dilution		
2	NA	R-RO N-BOP N-SRO	Raise Power		
3	2	C-RO C-SRO	Letdown Temperature Controller TCV-144 fails CLOSED/Divert Valve TCV-143 Fails to DIVERT		
4	3	I-BOP I(TS)-SRO	Main Steam Line "C" Pressure Transmitter Fails LOW		
5	4	N-BOP I(TS)-SRO	Power Range NI-44 Upper Detector fails HIGH		
6	5	C-BOP C-SRO	Low Turbine Oil Pressure/Failure of Auto Turbine Trip		
7	6	M-RO M-BOP M-SRO	Power Range NI-41 Control Power Fuse Blows/ATWS		
8	7	C-BOP	MOV-350 fails to OPEN		
9	8	M-RO M-BOP M-SRO	"B" SG SLB Inside CV		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Scenario Event Description
NRC Scenario 4

HB Robinson 2016 NRC Scenario #4

The plant is at 25% power (BOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

The following equipment is Out-Of-Service: The "A" SI Pump is OOS. The "B" SI Pump has been aligned to 480 VAC ESF Bus E-1. PI-1616, SW North Header Pressure, is OOS (I&C Investigating). RTGB Annunciator APP-007-C3, "FW PMP A LO FLOW TRIP," has failed to the EXTINGUISHED condition (I&C is investigating). The crew will be directed to raise power to 100%.

Shortly after taking the watch, the operator will attempt to raise power to 100% using OP-105, "Maneuvering the Plant When Greater than 25% Power," and OP-301, "Chemical and Volume Control System (CVCS)." During the first dilution, the "A" Primary Water Pump will trip. The operator will respond in accordance with APP-003-E5, "MAKEUP WATER DEV," and/or AOP-003, "Malfunction of Reactor makeup Control." The operator will place the "B" Primary Water Pump in service and continue with the startup.

After this, the operator will raise power to 100% using OP-105, "Maneuvering the Plant When Greater than 25% Power," and OP-301, "Chemical and Volume Control System (CVCS)."

During the power increase Letdown Temperature Controller, TCV-144, will fail CLOSED causing letdown temperature to rise above 135°F. Simultaneously, Divert Valve TCV-143, will fail to divert letdown flow to the VCT. The operator will respond in accordance with APP-001-A6, "LTDN FLOW HI TEMP DEMIN BYPD," divert letdown flow to the VCT, take MANUAL control of TCV-144 to stabilize letdown temperature, and return letdown to the VCT.

Following this, Main Steam Line "C" Pressure Transmitter, PT-495, will fail LOW. The operator will respond in accordance with AOP-025, "RTGB Instrument Failure." The operator will remove the failed instrument from service in accordance with OWP-025, "Steam Generator Pressure (SGP)." The operator will address Technical Specification LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," and Technical Specification LCO 3.3.6, "Containment Ventilation Isolation Instrumentation."

Next, Power Range, NI-44, Upper Detector will fail HIGH. The operator will remove the failed instrument from service in accordance with OWP-011, "Nuclear Instrumentation (NI)." The operator will address Technical Specification LCO 3.3.1, "Reactor Protection System (RPS) Instrumentation."

Shortly afterwards, an oil leak will develop on the Main Turbine. The operator will respond in accordance with various APP-008, SW, CW & TURB GEN AUX, alarms, and ultimately enter AOP-007, "Turbine Trip Below P-8." When the Main Turbine Trips one Turbine Stop Valve and one Turbine Governor Valve will remain OPEN, and the operator will need to manually TRIP the Turbine.

Subsequently, the Control Power fuse for Power Range channel N41 will blow causing an automatic reactor trip signal to be generated, however, the reactor will fail to TRIP both automatically and manually (ATWS). The operator will enter EOP-E-0, "Reactor Trip or Safety Injection," and attempt to manually trip the reactor. When this fails, the operator will enter FRP-S.1, "Response to Nuclear Power Generation- ATWS." While in FRP-S.1, Boric Acid to

Scenario Event Description
NRC Scenario 4

Charging Pump Suction Valve MOV-350 will fail CLOSED. The operator will direct a local trip of the reactor, drive rods in manually, and align the suction of the Charging Pumps to the RWST.

Upon completion of FRP-S.1, a "B" Steam Line will rupture inside Containment (over 10 minutes), and the operator will re-enter EOP-E-0, "Reactor Trip or Safety Injection." Ultimately, the operator will transition to EOP-E-2, "Faulted Steam Generator Isolation," to isolate the flow into and out of the "B" Steam Generator and then terminate Safety Injection. However, an Orange and/or Red Path will exist on the RCS Critical Safety Function, and the operator will transition to FRP-P.1, "Response to Imminent Pressurized Thermal Shock Condition."

The scenario will terminate at Step 12 of FRP-P.1, when the operator stops SI Pumps.

Critical Tasks:

Manually control "C" S/G Narrow Range Level before a Reactor Trip occurs on low S/G level or a Protective Action occurs on high S/G Level.

Safety Significance: failure to take manual control of the "C" S/G Feed Reg Valve and control Narrow Range S/G level, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection/Engineered Safeguards Actuation System. Performance of the critical task would stabilize the S/G level transient. A failure to stabilize the S/G level transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS temperature/pressure control.

Insert Negative Reactivity into the Core by Inserting Control Rods Manually Prior to Locally Tripping the Reactor (EOP-Based)

Safety Significance: Failure to insert negative reactivity, under the postulated plant conditions, results in an unnecessary situation in which the reactor remains critical or returns to a critical condition. Performance of the critical task would make the reactor subcritical and provide sufficient shutdown margin to prevent (or at least minimize the power excursion associated with) any subsequent return to criticality. Failure to insert negative reactivity constitutes mis-operation or incorrect operator performance which fails to prevent incorrect reactivity control. In the scenario postulated by the plant conditions, failure to insert negative reactivity by inserting control rods can result in the needless continuation of an extreme or a severe challenge to the subcriticality CSF. Although the challenge was not initiated by the operator (was not initiated by operator error), continuation of the challenge is a result of the operator's failure to insert negative reactivity.

Isolate Feedwater Flow Into and Steam Flow From the Faulted S/G Before a Transition Out of E-2 Occurs (EOP-Based)

Safety Significance: Failure to isolate a faulted SG that can be isolated causes challenges to CSFs beyond those irreparably introduced by the postulated conditions. Also, depending upon the plant conditions, it could constitute a failure by the operator to demonstrate the ability to recognize a failure or an incorrect automatic actuation of an ESF system or component. Failure to isolate a faulted SG can result in challenges to the Integrity, Subcriticality and Containment CSFs.

Stop the High Head SI Pumps Before a Transition Out of FRP-P.1 Occurs (EOP-Based)

Scenario Event Description

NRC Scenario 4

Safety Significance: Failure to stop the high head SI Pumps results in challenges to the Integrity CSF; and could unnecessarily result in a mechanical failure due to Pressurized Thermal Shock.

Scenario Event Description
NRC Scenario 4

SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Sim. Setup	Reset to Temp IC 611	
<input type="checkbox"/>	<p>T = 0 Malfunctions:</p> <p>“A” SI Pump Pump OOS:</p> <ul style="list-style-type: none"> IRF EPS480E1_130 f: RACK_OUT (“A” SI Pump OOS) IRF EPS480E1_124 f: RACK_IN (“B” SI Pump Racked IN to E-1) <p>PLACE CAPs as follows:</p> <ul style="list-style-type: none"> RED Cap over “A” SI Control Switch <p>PI-1616 SW North Header Pressure indication OOS</p> <ul style="list-style-type: none"> IOR aoSWSDOD024A f:0 <p>Place WHITE DOT on PI-1616</p> <p>RTGB Annunciator APP-007-C3 failed OFF</p> <ul style="list-style-type: none"> IMF ANN07C03 f:ALARM_OFF <p>Place WHITE DOT on APP-007-C3</p> <p>Insert the following:</p> <ul style="list-style-type: none"> \$006_MANUAL_TURB_TRIP DMF TUR05B (Stop Valve closes on Manual Turb Trip) \$006_MANUAL_TURB_TRIP DMF TUR05C (Gov Valve closes on Manual Turb Trip) \$006_TURBINE_TRIP IMF CRF02 (Rods Fail in AUTO on Turbine Trip) IMF ANN05E02 f:ALARM_OFF (Rods Fail in AUTO on Turbine Trip) \$006_RODS_IN_MAN DMF CRF02 (Rods Fail in AUTO on Turbine Trip) \$006_RODS_IN_MAN IOR diRPSBOI063 c:1 f:DE_PRSSD (Rods Fail in AUTO on Turbine Trip) IMF RPS01A f:FAILURE_TO_OPEN, BOTH (ATWS on SLB) IMF RPS01B f:FAILURE_TO_OPEN, BOTH (ATWS on SLB) IOR diCVCAOI731 f:AS-IS (MOV-350 fails to OPEN) <p>Place the Simulator in RUN and ACKNOWLEDGE all alarms.</p>		
<input type="checkbox"/>	Perform Attachment 2 (Simulator Setup For Exams) of TAP-411.		

Scenario Event Description
NRC Scenario 4

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Crew Briefing <ol style="list-style-type: none"> 1. Assign Crew Positions based on evaluation requirements 2. Review the Shift Turnover Information with the crew. 3. Provide the crew with the following: <ul style="list-style-type: none"> • Copy of OP-105 marked up for power increase • Copy of Section 8.2.7 of OP-301 • Copy of Technical Specifications/Basis 4. Direct the crew to Review the Control Boards taking note of present conditions, alarms. 		
<input type="checkbox"/>	T-0	Begin Familiarization Period	
<input type="checkbox"/>	At direction of examiner	Execute Lesson Plan for Simulator Scenario N16-1-4.	
<input type="checkbox"/>	At direction of examiner	Event 1 IMF CVC06A	"A" Primary Water Pump trips during Dilution
<input type="checkbox"/>	The crew will initiate upon restoration of dilution capability	Event 2	Raise Power
<input type="checkbox"/>	At direction of examiner	Event 3 IMF CCW08 r:01:00 f:85 IOR diCVCAAI047 f:DEMIN \$006_TC-144_MAN DMF CCW08	Letdown Temperature Controller TCV-144 fails CLOSED/Divert Valve TCV-143 Fails to DIVERT Note: The Booth Instructor will need to DOR diCVCAAI047 when the operator places TCV-143 Control Switch to VCT.
<input type="checkbox"/>	At direction of examiner	Event 4 ICO SGNXMTPT_495 r:01:15 f:0	Main Steam Line "C" Pressure Transmitter Fails LOW
<input type="checkbox"/>	At direction of examiner	Event 5 IMF NIS07G f:70	Power Range NI-44 Upper Detector fails HIGH

Scenario Event Description
NRC Scenario 4

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	At direction of examiner	Event 6 IMF TUR14 r:01:00 f:100 IMF TUR05B f:100 IMF TUR05C f:AS-IS	Low Turbine Oil Pressure/Failure of Auto Turbine Trip
<input type="checkbox"/>	At direction of examiner	Event 7 IMF NIS12A f:CONTROL	Power Range NI-41 Control Power Fuse Blows/ATWS NOTE: The ATWS is inserted at T=0
<input type="checkbox"/>	Post-Rx Trip	Event 8 IOR diCVCAOI731 f:AS-IS	MOV-350 fails to OPEN NOTE: Failure is inserted at T=0
<input type="checkbox"/>	Post-Rx Trip	Event 9 IMF MSS01B r:10:00 f:9.95E6	"B" SG SLB Inside CV NOTE: Inserted when the crew exits FRP-S.1 and transitions to EOP-E-0.
<input type="checkbox"/>	Terminate the scenario upon direction of Lead Examiner		

Op Test No.: N16-1 Scenario # 4 Event # 1 Page 10 of 58Event Description: **"A" Primary Water Pump trips during Dilution**

Shortly after taking the watch, the operator will attempt to raise power to 100% using OP-105, "Maneuvering the Plant When Greater than 25% Power," and OP-301, "Chemical and Volume Control System (CVCS)." During the first dilution, the "A" Primary Water Pump will trip. The operator will respond in accordance with APP-003-E5, "MAKEUP WATER DEV," and/or AOP-003, "Malfunction of Reactor makeup Control." The operator will place the "B" Primary Water Pump in service and continue with the startup.

Booth Operator Instructions: **After 10 gallons of Primary Water has been added to the RCS IMF CVC06A**

Indications Available:

- "A" PW Pump Red status light is OFF, Green status light is LIT
- Primary Water Totalizer YIC-114 stops beeping during a dilution
- Primary Water Totalizer YIC-114 stops digitally counting during a dilution
- RTGB Annunciator APP-003-E5, MAKEUP WATER DEV, alarms within 45 seconds

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The crew will initiate a Turbine Load Increase.
OP-105, MANEUVERING THE PLANT WHEN GREATER THAN 25% POWER			
	RO	(Step 5) Maintain Tave within 5°F of Tref using a combination of Control Rods and Boron Concentration changes.	NOTE: The RO will likely place Control Rods in MANUAL.
OP-301, CHEMICAL AND VOLUME CONTROL SYSTEM (CVCS) SECTION 8.2.7, RCS QUICK DILUTION CHECKLIST			
	RO	(Step 1) This revision has been verified to be the latest revision available.	
	RO	(Step 2) DETERMINE the amount of water to add to the RCS and if applicable, the expected change in RCS temperature AND Reactor Power.	NOTE: The RO will determine that several 200-300 gallon batches of water must be added.
	RO	(Step 3) OBTAIN an independent check of the volume of water required.	

Op Test No.: N16-1 Scenario # 4 Event # 1 Page 11 of 58Event Description: **"A" Primary Water Pump trips during Dilution**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 4) OBTAIN permission from the CRS OR the SM to add the amount of water previously determined, including the expected change in RCS temperature AND Reactor Power.	
	RO	(Step 5) IF flow adjustment is desired, THEN adjust FCV-114A, PRIMARY WTR FLOW DILUTE MODE, potentiometer to obtain desired flow rate.	
	RO	(Step 6) PLACE the RCS MAKEUP MODE selector switch in the DILUTE position.	
	RO	(Step 7) SET YIC-114, PRIMARY WTR TOTALIZER to the desired quantity.	
	RO	(Step 8) IF two letdown orifices are in service and it is desired to divert flow to the HUT, THEN...	NOTE: Two orifices will be in service.
	RO	(Step 9) Momentarily PLACE the RCS MAKEUP SYSTEM switch to the START position.	Booth Instructor : After 10 gallons of Primary Water has been added to the RCS IMF CVC06A
			Examiner NOTE: The CRS may enter AOP-003 directly. If so, move forward to Page 12 .
APP-003-E5, MAKEUP WATER DEV			
	RO	(Step 1) IF alarm is due to intentional operator action, THEN.....	NOTE: The alarm is NOT due to intentional operator action.
	RO	(Step 2) IF alarm is due to Primary Water Pump Trip, THEN perform the following:	
		<ul style="list-style-type: none"> Start the Primary Water Pump currently selected to STOP 	

Op Test No.: N16-1 Scenario # 4 Event # 1 Page 12 of 58Event Description: **"A" Primary Water Pump trips during Dilution**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Place the control switch for the Primary Water Pump that tripped to STOP 	NOTE: Once the "B" PW Pump is started, the RO will need to reset the Makeup System to restart the dilution.
	RO	(Step 3) IF the alarm is due to a Malfunction of Makeup Control, THEN refer to AOP-003, Malfunction of Reactor Makeup Control.	Examiner NOTE: The CRS may not address AOP-003 if APP-003-E5 is used to place the "B" PW in service. If so, the crew will continue to load increase (Event 2).
			NOTE: The CRS may dispatch an AO to check the "A" PW Pump. If so, Booth Instructor acknowledge as AO, and after 1 minute report that the "A" PW Pump Breaker has tripped – There is an acrid odor near the breaker.
AOP-003, MALFUNCTION OF REACTOR MAKEUP CONTROL			
			NOTE: This AOP-003 script is written assuming the "B" PW Pump is started upon entry. If not, the AOP will start the "B" PW Pump.
	RO	(Step 1) Check For Failure Of A Level Transmitter As Follows:	NOTE: There is no VCT Level Transmitter failure.
		<ul style="list-style-type: none"> Obtain a VCT level for LT-115 using ERFIS 	
		<ul style="list-style-type: none"> PT ID CHL0115A 	
		<ul style="list-style-type: none"> Obtain a VCT level for LT-112 using ERFIS 	
		<ul style="list-style-type: none"> PT ID CHL0112A 	
		<ul style="list-style-type: none"> Check VCT level indicators - OSCILLATING LEVEL DEVIATION OBSERVED 	
	CRS	(Step 1.c RNO) Go To Step 1.e	

Op Test No.: N16-1 Scenario # 4 Event # 1 Page 13 of 58Event Description: **"A" Primary Water Pump trips during Dilution**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 1.e) Check VCT level deviation between LT-112 and LT-115 - GREATER THAN 8 INCHES (13%)	
	RO	(Step 1.e RNO) Go To Step 6.	
	CRS	(Step 6) Make PA Announcement For Procedure Entry	NOTE: The CRS will most likely make this announcement.
	CRS	(Step 7) Implement The EALs	NOTE: The CRS may ask SM to address. If so, Floor Instructor acknowledge as SM.
	RO	(Step 8) Check VCT Level - LESS THAN 12.5 INCHES (21%)	
	RO	(Step 8 RNO) IF VCT level lowers to less than 12.5 inches (21%), THEN perform Steps 9 and 10.	NOTE: This is a Continuous Action. The CRS will make both board operators aware.
	CRS	Go To Step 11.	
	RO	(Step 11) Check VCT Level - LESS THAN 20 INCHES (33%)	
	CRS	(Step 11 RNO) Go To Step 21.	
	RO	(Step 21) Check VCT Level - LESS THAN 51.5 INCHES (86%)	
	RO	(Step 22) Verify Charging And Letdown Flows Are Normal For Plant Conditions	
	RO	(Step 23) Check APP-003-D5, BA FLOW DEV - ILLUMINATED	

Op Test No.: N16-1 Scenario # 4 Event # 1 Page 14 of 58Event Description: **"A" Primary Water Pump trips during Dilution**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 23 RNO) Go To Step 28.	
	RO	(Step 28) Check APP-003-E5, MAKEUP WATER DEV - ILLUMINATED	NOTE: If the Makeup System has not been reset, APP-003-E5 will be ILLUMINATED.
	RO	(Step 29) Check Cause Of Alarm - DUE TO INTENTIONAL OPERATOR ACTION	
	RO	(Step 29 RNO) Perform the following:	
		<ul style="list-style-type: none"> Verify CLOSED FCV-113B, BLENDED MU TO CHG SUCT 	
		<ul style="list-style-type: none"> Verify CLOSED FCV-114B, BLENDED MU TO VCT. 	
		<ul style="list-style-type: none"> Go To ATTACHMENT 4, PRIMARY WATER DEVIATION. 	
			NOTE: The CRS will transition to Attachment 4 of AOP-003.
AOP-003, MALFUNCTION OF REACTOR MAKEUP CONTROL ATTACHMENT 4, PRIMARY WATER DEVIATION			
	RO	(Step 1) Check Primary Water Flow Demand Signal - EXISTS	
	RO	(Step 2) Check Primary Water Pump Selected To Auto - RUNNING	NOTE: The "B" PW Pump may be running if started using APP-003-E5. If so, it is selected for AUTO, and it is running prompting the CRS to move to Step 3 on next page. The "B" PW Pump may be stopped. If so, the Step 2 RNO will be performed.

Op Test No.: N16-1 Scenario # 4 Event # 1 Page 15 of 58Event Description: **"A" Primary Water Pump trips during Dilution**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 2 RNO) Perform the following:	Examiner NOTE: This step will be performed if the "A" PW Pump is selected for Auto. If the "B" PW is selected for AUTO and running, the crew will perform a slightly different path through Attachment 4, and return to the main body of AOP-003 at Step 36 instead of Step 37.
		<ul style="list-style-type: none"> Place control switch for the selected Primary Water Pump to START. 	NOTE: The crew will likely not attempt to start the "A" PW Pump.
		<ul style="list-style-type: none"> IF Primary Water Pump starts, THEN..... 	
		<ul style="list-style-type: none"> IF Primary Water Pump did NOT start, THEN perform the following: 	
		<ul style="list-style-type: none"> Momentarily place the RCS MAKEUP SYSTEM Switch to STOP. 	
		<ul style="list-style-type: none"> Place the alternate Primary Water Pump Control Switch to AUTO. 	NOTE: The crew will start the "B" PW Pump.
		<ul style="list-style-type: none"> Verify FCV-113B, BLENDED MU TO CHG SUCT, Control Switch in AUTO. 	
		<ul style="list-style-type: none"> Verify FCV-114B, BLENDED MU TO VCT, Control Switch in AUTO. 	
		<ul style="list-style-type: none"> Momentarily place the RCS MAKEUP SYSTEM Switch to START. 	
		<ul style="list-style-type: none"> Contact I&C to investigate and repair failure of Primary Water Pump to start. 	
		<ul style="list-style-type: none"> Go To the Main Body, Step 37, of this procedure. 	Examiner NOTE: Move forward to Step 37 on Page 16.
	RO	(Step 3) Check Primary Water Flow Indicated On One Of The Following:	NOTE: The crew will perform this step if the "B" PW Pump is already running.
		<ul style="list-style-type: none"> Flow Recorder FR-113 	
		OR	
		<ul style="list-style-type: none"> Primary Water Totalizer YIC-114 	
	CRS	(Step 3 RNO) Go To Step 12.	

Op Test No.: N16-1 Scenario # 4 Event # 1 Page 16 of 58Event Description: **"A" Primary Water Pump trips during Dilution**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 12) Check FCV-114A, PW TO BLENDER - CLOSED	NOTE: FCV-114A is OPEN.
	CRS	(Step 12 RNO) Go To Step 19.	
	RO	(Step 19) Place FCV-114B, BLENDED MU TO VCT, Control Switch in OPEN	
	RO	(Step 20) Check FCV-114B, BLENDED MU TO VCT - OPEN	
	BOP	(Step 21) Locally Check Primary Water Pump Discharge Pressure - GREATER THAN 80 PSIG	
	CRS	(Step 22) Contact Plant Operations Staff For Guidance In Determining The Cause Of The Primary Water Deviation	
	CRS	(Step 23) Go To The Main Body, Step 36, Of This Procedure	
AOP-003, MALFUNCTION OF REACTOR MAKEUP CONTROL			
	RO	(Step 36) Borate The RCS As Required Using OP-301, Chemical And Volume Control System (CVCS), section titled Operation of RCS Makeup System for Automatic Makeup, Dilution, Boration, and Alternate Dilute.	NOTE: The crew will return from Attachment 4 here if the "B" PW Pump was running upon entry into Attachment 4.
	RO	(Step 37) Check Dilution - REQUIRED	NOTE: The crew will return from Attachment 4 here if the "B" PW Pump was started in Attachment 4.
	CRS	(Step 37 RNO) Go To Step 40.	

Op Test No.: N16-1 Scenario # 4 Event # 1 Page 17 of 58Event Description: **"A" Primary Water Pump trips during Dilution**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 40) Check Technical Specifications, Section 3.4.17, Chemical and Volume Control System (CVCS), For Applicable LCO	NOTE: Technical Specification LCO 3.4.17 is MET.
	CRS	(Step 41) Return To Procedure And Step In Effect	
			NOTE: The dilution should be restored or re-initiated.
When the dilution is re-initiated move to Event #2.			

Op Test No.: N16-1 Scenario # 4 Event # 2 Page 18 of 58Event Description: **Raise Power**

After this, the operator will raise power to 100% using OP-105, "Maneuvering the Plant When Greater than 25% Power," and OP-301, "Chemical and Volume Control System (CVCS)."

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

Time	Pos.	Expected Actions/Behavior	Comments
OP-105, MANEUVERING THE PLANT WHEN GREATER THAN 25% POWER			
	RO	(Step 5) Maintain Tave within 5°F of Tref using a combination of Control Rods and Boron Concentration changes.	NOTE: The RO may withdrawal control rods.
OP-301, CHEMICAL AND VOLUME CONTROL SYSTEM (CVCS) SECTION 8.2.7, RCS QUICK DILUTION CHECKLIST			
			NOTE: The RO may perform this section more than once during the power ascension.
	RO	(Step 1) This revision has been verified to be the latest revision available.	
	RO	(Step 2) DETERMINE the amount of water to add to the RCS and if applicable, the expected change in RCS temperature AND Reactor Power.	NOTE: The RO will determine that several 200-300 gallon batches of water must be added.
	RO	(Step 3) OBTAIN an independent check of the volume of water required.	
	RO	(Step 4) OBTAIN permission from the CRS OR the SM to add the amount of water previously determined, including the expected change in RCS temperature AND Reactor Power.	

Op Test No.: N16-1 Scenario # 4 Event # 2 Page 19 of 58Event Description: **Raise Power**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 5) IF flow adjustment is desired, THEN adjust FCV-114A, PRIMARY WTR FLOW DILUTE MODE, potentiometer to obtain desired flow rate.	
	RO	(Step 6) PLACE the RCS MAKEUP MODE selector switch in the DILUTE position.	
	RO	(Step 7) SET YIC-114, PRIMARY WTR TOTALIZER to the desired quantity.	
	RO	(Step 8) IF two letdown orifices are in service and it is desired to divert flow to the HUT, THEN...	NOTE: Two orifices will be in service.
	RO	(Step 9) Momentarily PLACE the RCS MAKEUP SYSTEM switch to the START position.	
	RO	(Step 10) IF LCV-115A is in AUTO, THEN ENSURE proper operation of LCV-115A, VCT/HLDP TK DIV valve.	
	RO	(Step 11) IF any of the following conditions occur, THEN momentarily PLACE the RCS MAKEUP SYSTEM switch in the STOP position:	
		<ul style="list-style-type: none"> Unanticipated Rod Motion 	
		<ul style="list-style-type: none"> Primary Water addition exceeds the desired value 	
	RO	(Step 12) WHEN the desired amount of Primary Water has been added to the RCS, THEN ENSURE the following:	
		<ul style="list-style-type: none"> FCV-114A, PW TO BLENDER, closes. 	
		<ul style="list-style-type: none"> FCV-114B, BLENDED MU TO VCT, closes. 	

Op Test No.: N16-1 Scenario # 4 Event # 2 Page 20 of 58Event Description: **Raise Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> IF in Auto, THEN the operating Primary Water Pump stops. 	
		<ul style="list-style-type: none"> The RCS MAKEUP SYSTEM is OFF. 	
		<ul style="list-style-type: none"> IF desired, THEN ENSURE LCV-115A, VCT/HLDP TK DIV valve control switch in AUTO. 	
	RO	(Step 13) RETURN the RCS Makeup System to automatic as follows:	
		<ul style="list-style-type: none"> ENSURE FCV-114A, PRIMARY WTR FLOW DILUTE MODE is in AUTO. 	
		<ul style="list-style-type: none"> PLACE the RCS MAKEUP MODE switch in the AUTO position. 	
		<ul style="list-style-type: none"> Momentarily PLACE the RCS MAKEUP SYSTEM switch in the START position. 	
	RO	(Step 14) RECORD, in AUTO LOG, as indicated by PRIMARY WATER TOTALIZER, YIC-114 total amount of Primary Water added during the dilution.	
	RO	(Step 15) MONITOR parameters for the expected change in reactivity AND inform the CRS OR the SM the results of the dilution.	
OP-105, MANEUVERING THE PLANT WHEN GREATER THAN 25% POWER			
	BOP	(Step 6) IF EH Turbine Control is in OPER AUTO, THEN raise turbine load as follows:	
		<ul style="list-style-type: none"> Adjust the SETTER indication using the REF ▼ or REF ▲ pushbuttons to the desired load. 	
		<ul style="list-style-type: none"> Use the GO, HOLD, REF ▼, and REF ▲ pushbuttons as necessary to continue the rise in load. 	

Op Test No.: N16-1 Scenario # 4 Event # 2 Page 21 of 58Event Description: **Raise Power**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 7) IF EH Turbine Control is in TURB MANUAL, THEN.....	NOTE: The Turbine is in OPER AUTO.
	CRS	(Step 8) IF Heater Drain Tank suspended solids are greater than 25 ppb, THEN.....	NOTE: From Turnover it is noted that HDT Suspended Solids are < 25 ppb.
	CRS	(Step 9) WHEN Heater Drain Tank suspended solids are less than or equal to 25 ppb, THEN perform the following while continuing with this procedure:	
	BOP	<ul style="list-style-type: none"> Start a Heater Drain Pump. 	NOTE: The BOP will start one HDP.
		<ul style="list-style-type: none"> Ensure Quenching Valve control switches on QUENCHING VALVES CONTROL PANEL are placed in AUTO: 	NOTE: The CRS/BOP may contact an AO. If so, Booth Instructor acknowledge as AO , use IRF CFW102 f:AUTO and report after 1 minute that the BOTH valves are in AUTO .
		<ul style="list-style-type: none"> FCV-1597 	
		<ul style="list-style-type: none"> FCV-1596 	
		<ul style="list-style-type: none"> Locally check Quenching Valves are CLOSED: 	NOTE: The CRS/BOP may contact an AO. If so, Booth Instructor acknowledge as AO , and report after 1 minute that the BOTH valves are CLOSED .
		<ul style="list-style-type: none"> FCV-1597 	
		<ul style="list-style-type: none"> FCV-1596 	
		<ul style="list-style-type: none"> Check proper operation of the following: 	NOTE: The CRS/BOP may contact an AO. If so, Booth Instructor acknowledge as AO , and report after 1 minute that the ALL valves are operating properly .
		<ul style="list-style-type: none"> LC-1530 	
		<ul style="list-style-type: none"> LCV-1530A 	

Op Test No.: N16-1 Scenario # 4 Event # 2 Page 22 of 58

Event Description: **Raise Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none">LCV-1530B	
After the 1st Dilution and MWe raised by 15-20 MWe, and at the discretion of the Lead Examiner move to Event #3.			

Op Test No.: N16-1 Scenario # 4 Event # 3 Page 23 of 58Event Description: **Letdown Temperature Controller TCV-144 fails CLOSED/Divert Valve TCV-143 Fails to DIVERT**

During the power increase Letdown Temperature Controller, TCV-144, will fail CLOSED causing letdown temperature to rise above 135°F. Simultaneously, Divert Valve TCV-143, will fail to divert letdown flow to the VCT. The operator will respond in accordance with APP-001-A6, "LTDN FLOW HI TEMP DEMIN BYPD," divert letdown flow to the VCT, take MANUAL control of TCV-144 to stabilize letdown temperature, and return letdown to the VCT.

Booth Operator Instructions:

IMF CCW08 r:01:00 f:85
IOR diCVCAAI047 f:DEMIN
\$006_TC-144_MAN DMF CCW08

NOTE: The malfunction takes 2-3 minutes to fully develop

NOTE: The Booth Instructor will need to DOR diCVCAAI047 when the operator places TCV-143 Control Switch to VCT.

Indications Available:

- RTGB Annunciator APP-001-A6, LTDN FLOW HI TEMP DEMIN BYPD
- TCV-144 Controller demand is rising
- NRHX Outlet Temperature (TI-144) is rising
- TCV-143 Red status light is LIT with Control Switch in AUTO

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: It is likely that the BOP will go to HOLD on the Turbine.
APP-001-A6, LTDN FLOW HI TEMP DEMIN BYPD			
	RO	(Step 1) IF Letdown Temperature is greater than 135°F, THEN ENSURE controller TC-143 is diverted to the VCT.	NOTE: The RO will divert TCV-143 to the VCT. Booth Instructor use DOR diCVCAAI047 WHEN the operator places TCV-143 Control Switch to VCT.
	RO	(Step 2) IF CCW flow to the Non-regenerative Heat Exchanger is low, THEN RAISE Component Cooling Water flow using TC-144.	NOTE: The RO will manually adjust controller to maintain temperature at 100-130°F on TI-143.

Op Test No.: N16-1 Scenario # 4 Event # 3 Page 24 of 58Event Description: **Letdown Temperature Controller TCV-144 fails CLOSED/Divert
Valve TCV-143 Fails to DIVERT**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 3) IF letdown flow is high, THEN REDUCE Letdown flow.	NOTE: It is likely that control of TCV-144 will stabilize the event, and Letdown will NOT need to be reduced.
			NOTE: The CRS may call WCC/Chemistry to request a Demin effluent sample prior to placing TCV-143 back to the DEMIN position. If so, Booth Instructor acknowledge as WCC/CHEMISTRY , wait 20 minutes and report that the Demin effluent is acceptable to be placed in operation.
			NOTE: The CRS may call WCC/I&C to address the Controller failure. If so, Booth Instructor acknowledge as WCC/I&C.
			NOTE: The CRS will likely conduct an Alignment Brief, and THEN re-commence the up-power.
At the discretion of the Lead Examiner move to Event #4.			

Op Test No.: N16-1 Scenario # 4 Event # 4 Page 25 of 58Event Description: **Main Steam Line "C" Pressure Transmitter Fails LOW**

Following this, Main Steam Line "C" Pressure Transmitter, PT-495, will fail LOW. The operator will respond in accordance with AOP-025, "RTGB Instrument Failure." The operator will remove the failed instrument from service in accordance with OWP-025, "Steam Generator Pressure (SGP)." The operator will address Technical Specification LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," and Technical Specification LCO 3.3.6, "Containment Ventilation Isolation Instrumentation."

Booth Operator Instructions: **ICO SGNXMTPT_495 r:01:15 f:0**

Indications Available:

- RTGB Annunciator APP-006-A4, STM LINE HI ΔP
- Main Steam Pressure indicator PI-495 is lowering
- "C" FRV controller output is lowering
- Feed Flow to "C" S/G is lowering
- Steam Flow to "C" S/G is lowering
- "C" S/G Narrow Range Level is lowering

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: It is likely that the BOP will go to HOLD on the Turbine.
AOP-010, MAIN FEEDWATER/CONDENSATE MALFUNCTION			
			Examiner NOTE: The CRS may go to AOP-025 directly. If so, go to AOP-025 Step 1 actions on Page 27.
	BOP	(Step 1) CHECK FRVs - OPERATING PROPERLY (MANUAL OR AUTO):	Immediate Action NOTE: FCV-498 in NOT operating properly in AUTO.
		• FCV-478	
		• FCV-488	
		• FCV-498	
	BOP	(Step 1 RNO) PERFORM the following:	Immediate Action NOTE: The BOP will control FCV-498 in MANUAL.
		• ENSURE FRV for affected S/G(s) in manual control.	

Op Test No.: N16-1 Scenario # 4 Event # 4 Page 26 of 58Event Description: **Main Steam Line "C" Pressure Transmitter Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> ATTEMPT to stabilize S/G level using FRV and/or FRV Bypass Valves by matching steam flow with feed flow. 	
		<ul style="list-style-type: none"> STOP any load change in progress. 	
		<ul style="list-style-type: none"> If unable to control S/G level, THEN..... 	

Critical Task:

Manually control "C" S/G Narrow Range Level before a Reactor Trip occurs on low S/G level or a Protective Action occurs on high S/G Level.

Safety Significance: failure to take manual control of the "C" S/G Feed Reg Valve and control Narrow Range S/G level, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection/Engineered Safeguards Actuation System. Performance of the critical task would stabilize the S/G level transient. A failure to stabilize the S/G level transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS temperature/pressure control.

	RO/ BOP	(Step 2) CHECK Reactor Trip Setpoint - BEING APPROACHED	
	CRS	(Step 2 RNO) IF a reactor trip setpoint is approached, THEN....	
		GO TO Step 4.	
	RO	(Step 4) CHECK Reactor Power - LESS THAN OR EQUAL TO 100%	
	CRS	(Step 5) NOTIFY Plant Personnel Of Procedure Entry Using Plant Page System	NOTE: The CRS will most likely make this announcement.
	CRS	(Step 6) GO TO Appropriate Step From Table Below:	
		<ul style="list-style-type: none"> FRV Failure To Control - OBSERVE NOTE 58 	

Op Test No.: N16-1 Scenario # 4 Event # 4 Page 27 of 58Event Description: **Main Steam Line "C" Pressure Transmitter Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 58) CHECK S/G Level - AT OR TRENDING TO PROGRAM	NOTE: The CRS go to AOP-025 based on the Note prior to Step 58.
AOP-025, RTGB INSTRUMENT FAILURE			
	CRS	(Step 1) GO TO Appropriate Section For Failed Instrument:	NOTE: The CRS will select Section D of AOP-025.
		<ul style="list-style-type: none"> S/G STEAM PRESSURE, (PT-495) - SECTION D 	
AOP-025, RTGB INSTRUMENT FAILURE SECTION D, S/G FEED FLOW, STEAM FLOW OR STEAM PRESSURE TRANSMITTER FAILURE			
	BOP	(Step 1) CHECK affected FRV in MAN:	Immediate Action NOTE: FCV-498 will likely be in MANUAL by this Step.
		<ul style="list-style-type: none"> FCV-498 (FRV "C") 	
	BOP	(Step 2) RESTORE affected S/G level to program	Immediate Action
<u>Critical Task:</u>			
Manually control "C" S/G Narrow Range Level before a Reactor Trip occurs on low S/G level or a Protective Action occurs on high S/G Level.			
<p>Safety Significance: failure to take manual control of the "C" S/G Feed Reg Valve and control Narrow Range S/G level, under the postulated plant conditions, results in an unnecessary transient to the plant and challenge to the Reactor Protection/Engineered Safeguards Actuation System. Performance of the critical task would stabilize the S/G level transient. A failure to stabilize the S/G level transient, when able to do so, constitutes a mis-operation or incorrect crew performance which leads to incorrect RCS temperature/pressure control.</p>			

Op Test No.: N16-1 Scenario # 4 Event # 4 Page 28 of 58Event Description: **Main Steam Line "C" Pressure Transmitter Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP/ CRS	(Step 3) CHECK Reactor Trip Setpoint – BEING APPROACHED	NOTE: This is a Continuous Action. The CRS will make both board operators aware.
	CRS	(Step 3 RNO) IF a reactor trip setpoint is approached, THEN...	
		GO TO Step 5	
	CRS	(Step 5) NOTIFY Plant Personnel of Procedure Entry Using PA System	NOTE: The CRS will most likely make this announcement.
	BOP	(Step 6) CHECK Failure – FEED FLOW INSTRUMENT FAILURE	
	BOP	(Step 6 RNO) IF failure was a steam flow instrument, THEN...	NOTE: The BOP/CRS could go to Step 12 incorrectly believing that it is the Steam Flow instrument that has failed.
	CRS	IF failure was a steam pressure instrument, THEN GO TO Step 17.	
	BOP	(Step 17) PLACE S/G Steam Flow Selector Switch affected by Failed Pressure Instrument to Alternate Channel Below:	
		<ul style="list-style-type: none"> S/G "C" STEAM FLOW – FR-498 	
		<ul style="list-style-type: none"> FAILED CHANNEL (PT-495) AFFECTED CHANNEL (FI-494) SELECTED POSITION (CH 495) 	
	BOP	(Step 18) RESTORE affected Controller to Automatic:	
		<ul style="list-style-type: none"> CHECK S/G level – WITHIN $\pm 1\%$ OF PROGRAMMED LEVEL 	
		<ul style="list-style-type: none"> PLACE affected controller in AUTO 	

Op Test No.: N16-1 Scenario # 4 Event # 4 Page 29 of 58Event Description: **Main Steam Line "C" Pressure Transmitter Fails LOW**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 19) REMOVE affected Transmitter from Servicing Using OWP-025:	
		CHANNEL (PT-495) OWP (SGP-12)	NOTE: The CRS will address OWP-025.
OWP-025, STEAM GENERATOR PRESSURE (SGP) SGP-11, MAIN STEAM LINE "C" PRESSURE TRANSMITTER PT-495			
	BOP	FR-498 (STM) – SELECTED TO 495	
	BOP	DELETE INPUT PT-495 FROM CALO PROCESSING. (MSP0441A)	
	BOP	BISTABLE SWITCH B/S 495 RACK #17	NOTE: The will enter the Simulator Booth (Simulating the Hagan Room). Booth Instructor coordinate with BOP to insert Trip Signals: OPEN Protection Racks Door: IRF BST101 f:D_OPEN • IRF BST014 f:TRIP CLOSE Protection Racks Door: IRF BST101 f:D_CLOSED BISTABLE LIGHT LOOP 3 PH-P3 HI PC-495 will ILLUMINATE.
			NOTE: The CRS will return to Section D of AOP-025.
AOP-025, RTGB INSTRUMENT FAILURE SECTION D, S/G FEED FLOW, STEAM FLOW OR STEAM PRESSURE TRANSMITTER FAILURE			
	CRS	(Step 20) REVIEW TS LCOs for applicability:	NOTE: The CRS will address Technical Specifications.

Op Test No.: N16-1 Scenario # 4 Event # 4 Page 30 of 58Event Description: **Main Steam Line "C" Pressure Transmitter Fails LOW**

Time	Pos.	Expected Actions/Behavior			Comments
		• TS LCO 3.3.1			
		• TS LCO 3.3.2			
		• TS LCO 3.3.3			
		• TS LCO 3.3.4			
	CRS	(Step 21) GO TO Procedure Main Body, Step 2			
TECHNICAL SPECIFICATION 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION					
	CRS	LCO 3.3.2 The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE.			
	CRS	APPLICABILITY: According to Table 3.3.2-1.			
	CRS	ACTIONS			
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that Function 1.e (Steam Line High Differential Pressure Between Steam Header and Steam Lines) is affected, and ACTION D.1 or D.2 and D.3 are required.
		D. One channel inoperable	NOTE For Function 4.c, a channel may be taken out of the trip condition for 6 hours for maintenance.	6 hours	
			D.1 Place channel in trip.	12 hour	
			OR D.2.1 Be in MODE 3.	18 hours	
			AND D.2.2 Be in MODE 4.		

Op Test No.: N16-1 Scenario # 4 Event # 4 Page 31 of 58Event Description: **Main Steam Line "C" Pressure Transmitter Fails LOW**

Time	Pos.	Expected Actions/Behavior			Comments
TECHNICAL SPECIFICATION 3.3.6, CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION					
	CRS	The Containment Ventilation Isolation instrumentation for each Function in Table 3.3.6-1 shall be OPERABLE.			
	CRS	APPLICABILITY: According to Table 3.3.6-1.			
	CRS	ACTIONS			
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that Function 4 (Safety Injection), is affected.
			Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 1, for all initiation functions and requirements.		
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 below: <ul style="list-style-type: none">Pressurizer Pressure ≥2205 psig			
	CRS	APPLICABILITY: Mode 1			
	CRS	ACTIONS			

Op Test No.: N16-1 Scenario # 4 Event # 4 Page 32 of 58Event Description: **Main Steam Line "C" Pressure Transmitter Fails LOW**

Time	Pos.	Expected Actions/Behavior			Comments
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: If RCS pressure lowered to less than 2205 psig, the CRS will determine that ACTION A.1 is required.
		A. One or more RCS DNB parameters not within limits.	A.1 Restore RCS DNB parameter(s) to within limit.	2 hours	
					NOTE: The CRS will likely conduct an Alignment Brief, and THEN re-commence the up-power.
At the discretion of the Lead Examiner move to Event #5.					

Op Test No.: N16-1 Scenario # 4 Event # 5 Page 33 of 58Event Description: **Power Range NI-44 Upper Detector fails HIGH**

Next, Power Range, NI-44, Upper Detector will fail HIGH. The operator will remove the failed instrument from service in accordance with OWP-011, "Nuclear Instrumentation (NI)." The operator will address Technical Specification LCO 3.3.1, "Reactor Protection System (RPS) Instrumentation."

Booth Operator Instructions:**IMF NIS07G f:70****Indications Available:**

- RTGB Annunciator APP-005-C3, PR CHANNEL DEV
- Power Range N44 is indicating Off-Scale HIGH
- Delta-Flux Power Range N44 is Off-Scale HIGH
- RTGB Annunciator APP-005-D6, ΔFLUX WARNING/STATUS (30 seconds delayed)

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: It is likely that the BOP will go to HOLD on the Turbine.
APP-005-C3, PR CHANNEL DEV			
	RO	(Step 1) MONITOR the following parameters:	
		<ul style="list-style-type: none"> • Reactor power 	
		<ul style="list-style-type: none"> • Control rod position 	
	RO	(Step 2) IF a Control Rod is misaligned, THEN....	NOTE: There is NO misaligned Control Rod.
	RO	(Step 3) IF indications of a radial flux tilt are present, THEN PERFORM a Quadrant Power Tilt Ratio per FMP-007, Quadrant Power Tilt.	
	RO/ CRS	(Step 4) IF a Power Range detector has failed, THEN REMOVE failed Power Range Detector from service per OWP-011, Nuclear Instrumentation (NI).	
	CRS	(Step 5) REFER TO TS:	
		<ul style="list-style-type: none"> • 3.2.4, Quadrant Power Tilt Ratio (QPTR) . 	

Op Test No.: N16-1 Scenario # 4 Event # 5 Page 34 of 58Event Description: **Power Range NI-44 Upper Detector fails HIGH**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Table 3.3.1-1, Reactor Protection System Instrumentation. 	NOTE: The CRS will address OWP-011.
			NOTE: The CRS may call WCC/I&C to address the PR instrument failure. If so, Booth Instructor acknowledge as WCC/I&C.
OWP-011, NUCLEAR INSTRUMENTATION (NI) NI-4, N-44, POWER RANGE			
	BOP	REMOVE NI-44 from ERFIS SCAN: NIN0044A	
	BOP	DROPPED ROD MODE Switch (BYPASS)	
	BOP	NI-44 OUT OF SERVICE TRIP SWITCH (TRIP)	
	BOP	ROD STOP BYPASS Switch (BYPASS N44)	
	BOP	COMPARATOR CHANNEL DEFEAT Switch (PR44)	
	BOP	DETECTOR CURRENT COMPARATOR Drawer:	
		<ul style="list-style-type: none"> UPPER SECTION Switch (PR44) 	
		<ul style="list-style-type: none"> LOWER SECTION Switch (PR44) 	
			NOTE: The CRS will address the Technical Specifications.
TECHNICAL SPECIFICATION 3.3.1, REACTOR PROTECTION SYSTEM (RPS) INSTRUMENTATION			
	CRS	LCO 3.3.1, The RPS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.	

Op Test No.: N16-1 Scenario # 4 Event # 5 Page 35 of 58Event Description: **Power Range NI-44 Upper Detector fails HIGH**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	APPLICABILITY: According to Table 3.3.1-1.	
	CRS	ACTIONS	
		NOTE: Separate Condition entry is allowed for each Function.	

Op Test No.: N16-1 Scenario # 4 Event # 5 Page 36 of 58Event Description: **Power Range NI-44 Upper Detector fails HIGH**

Time	Pos.	Expected Actions/Behavior			Comments	
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that Functions 2 (Power Range Neutron Flux, a. High, b. Low), 17.c (RPS Interlocks – P8) and 17.d (RPS Interlocks – P10) are affected, and: ACTION D.1.1 <u>and</u> D.1.2 <u>or</u> D.2.1 <u>and</u> D.2.2 <u>or</u> D.3 are required; ACTION E.1 <u>or</u> E.2 is required; ACTION S.1 <u>or</u> S.2 is required; ACTION T.1 <u>or</u> T.2 is required.	
		D. One Power Range Neutron Flux-High channel inoperable.	D.1.1 Place channel in trip. AND D.1.2 Reduce THERMAL POWER to ≤ 75% RTP. OR D.2.1 Place channel in trip. AND NOTE: Only required to be performed when the Power Range Neutron Flux input to QPTR is inoperable.	6 hours 12 hours 6 hours		
			D.2.2 Perform SR 3.2.4.2. OR D.3 Be in MODE 3.	Once per 12 hours 12 hours		
			E. One channel inoperable.	E.1 Place channel in trip. OR E.2 Be in MODE 3.		6 hours 12 hours
			S. One channel inoperable.	S.1 Verify interlock is in required state for existing unit conditions. OR S.2 Be in MODE 3.		1 hour 7 hours
		T. One channel inoperable.	T.1 Verify interlock is in required state for existing unit conditions. OR T.2 Be in MODE 2.	1 hour 7 hours	NOTE: The CRS will likely conduct an Alignment Brief.	
At the discretion of the Lead Examiner move to Event #6.						

Op Test No.: N16-1 Scenario # 4 Event # 6 Page 37 of 58Event Description: **Low Turbine Oil Pressure/Failure of Auto Turbine Trip**

Shortly afterwards, an oil leak will develop on the Main Turbine. The operator will respond in accordance with various APP-008, SW, CW & TURB GEN AUX, alarms, and ultimately enter AOP-007, "Turbine Trip Below P-8." When the Main Turbine Trips one Turbine Stop Valve and one Turbine Governor Valve will remain OPEN, and the operator will need to manually TRIP the Turbine.

Booth Operator Instructions: IMF TUR14 r:01:00 f:100
IMF TUR05B f:100
IMF TUR05C f:AS-IS

NOTE: The malfunction takes ≈1 minute to fully develop

Indications Available:

- Turbine Bearing Oil pressure is lowering
- RTGB Annunciator APP-008-A4, TURB BRG OIL LO PRESS
- RTGB Annunciator APP-008-B4, LO BRG OIL PRESS TURB TRIP

Time	Pos.	Expected Actions/Behavior	Comments
AOP-007, TURBINE TRIP BELOW P-8			
	BOP	(Step 1) CHECK turbine stop valves – CLOSED	
		• BOTH turbine stop valves - CLOSED	
		OR	
		• ALL governor valves - CLOSED	
	BOP	(Step 1 RNO) PERFORM the following:	
		• Manually TRIP the turbine by simultaneously depressing the THINK and TURBINE TRIP pushbuttons.	
	BOP	(Step 2) CHECK MSR PURGE and SHUTOFF VALVES - CLOSED	
	BOP	(Step 3) CHECK Steam Dump Control – IN PRESSURE MODE	

Op Test No.: N16-1 Scenario # 4 Event # 6 Page 38 of 58Event Description: **Low Turbine Oil Pressure/Failure of Auto Turbine Trip**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3 RNO) PLACE steam dumps in pressure control mode:	
		<ul style="list-style-type: none"> ENSURE STEAM HEADER PRESS Controller PC-464B is in AUTO. 	
		<ul style="list-style-type: none"> ENSURE PC-464B pot setting is 7.28. 	
		<ul style="list-style-type: none"> IF PC-464B has a demand output greater than 0, THEN PERFORM the following: 	
		<ul style="list-style-type: none"> PLACE PC-464B in MAN. 	
		<ul style="list-style-type: none"> SET PC-464B demand output to 0. 	
		<ul style="list-style-type: none"> PLACE PC-464B in AUTO. 	
		<ul style="list-style-type: none"> SELECT STEAM DUMP MODE Switch to STEAM PRESS. 	
		<ul style="list-style-type: none"> Slowly ADJUST PC-464B pot setting to 7.17. 	
	BOP	(Step 4) CHECK Steam Dump Operation – STEAM DUMP OPEN	
	RO	(Step 5) ENERGIZE All Available PZR Heaters	
	RO	(Step 6) CHECK Control Rods – INSERTING IN AUTO	
	RO	(Step 6 RNO) Manually INSERT control rods to achieve Tavg between 547°F and 551°F AND reactor power between 5 and 10%.	NOTE: The RO may take the control rods to AUTO.

If the plant trips due to the Turbine Trip transient, or when power is between 5-10%, move to Events #7-9.

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 39 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Subsequently, the Control Power fuse for Power Range channel N41 will blow causing an automatic reactor trip signal to be generated, however, the reactor will fail to TRIP both automatically and manually (ATWS). The operator will enter EOP-E-0, "Reactor Trip or Safety Injection," and attempt to manually trip the reactor. When this fails, the operator will enter FRP-S.1, "Response to Nuclear Power Generation- ATWS." While in FRP-S.1, Boric Acid to Charging Pump Suction Valve MOV-350 will fail CLOSED. The operator will direct a local trip of the reactor, drive rods in manually, and align the suction of the Charging Pumps to the RWST. Upon completion of FRP-S.1, a "B" Steam Line will rupture inside Containment (over 10 minutes), and the operator will re-enter EOP-E-0, "Reactor Trip or Safety Injection." Ultimately, the operator will transition to EOP-E-2, "Faulted Steam Generator Isolation," to isolate the flow into and out of the "B" Steam Generator and then terminate Safety Injection. However, an Orange and/or Red Path will exist on the RCS Critical Safety Function, and the operator will transition to FRP-P.1, "Response to Imminent Pressurized Thermal Shock Condition." The scenario will terminate at Step 12 of FRP-P.1, when the operator stops SI Pumps.

Booth Operator Instructions:**IMF NIS12A f:CONTROL****Indications Available:**

- Rx Trip First Out LIT, without Rx Trip

Time	Pos.	Expected Actions/Behavior	Comments
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO	(Step 1) CHECK Reactor Trip:	Immediate Action
		<ul style="list-style-type: none"> • Reactor Trip AND Bypass Breakers - OPEN 	
		<ul style="list-style-type: none"> • Rod position indicators - FULLY INSERTED 	
		<ul style="list-style-type: none"> • Rod Bottom Lights - ILLUMINATED 	
	RO	(Step 1 RNO) Manually TRIP Reactor	Immediate Action
		IF reactor power is GREATER THAN OR EQUAL TO 5% OR Intermediate Range SUR is positive, THEN GO TO FRP-S.1, Response to Nuclear Power Generation 0 ATWS, Step 1.	
			NOTE: The CRS will transition to FRP-S.1.
FRP-S.1, RESPONSE TO NUCLEAR POWER GENERATION-ATWS			

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 40 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 1) CHECK Reactor Trip:	Immediate Action
		<ul style="list-style-type: none"> Reactor Trip AND Bypass Breakers - OPEN 	
		<ul style="list-style-type: none"> Rod position indicators - FULLY INSERTED 	
		<ul style="list-style-type: none"> Rod Bottom Lights - ILLUMINATED 	
		<ul style="list-style-type: none"> Neutron flux - LOWERING 	
	RO	(Step 1 RNO) PERFORM the following:	Immediate Action
		<ul style="list-style-type: none"> Manually TRIP Reactor. 	
		<ul style="list-style-type: none"> IF Reactor will NOT trip, THEN INSERT Control Rods. 	

Critical Task:**Insert Negative Reactivity into the Core by Inserting Control Rods Manually Prior to Locally Tripping the Reactor (EOP-Based)**

Safety Significance: Failure to insert negative reactivity, under the postulated plant conditions, results in an unnecessary situation in which the reactor remains critical or returns to a critical condition. Performance of the critical task would make the reactor subcritical and provide sufficient shutdown margin to prevent (or at least minimize the power excursion associated with) any subsequent return to criticality. Failure to insert negative reactivity constitutes mis-operation or incorrect operator performance which fails to prevent incorrect reactivity control. In the scenario postulated by the plant conditions, failure to insert negative reactivity by inserting control rods can result in the needless continuation of an extreme or a severe challenge to the subcriticality CSF. Although the challenge was not initiated by the operator (was not initiated by operator error), continuation of the challenge is a result of the operator's failure to insert negative reactivity.

--	--	--	--

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 41 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> DISPATCH operator to locally open the following breakers: 	NOTE: The CRS will dispatch both the Inside and Outside AO. Booth Instructor: Acknowledge as each AO , and report after 2 minutes use: IRF EPSV480B3_104 f:RACK_OUT IRF EPSV480B2B_097 f:RACK_OUT and report that the Rx has been locally tripped.
		<ul style="list-style-type: none"> Reactor Trip breakers 	
		<ul style="list-style-type: none"> Reactor Trip Bypass breakers 	
		<ul style="list-style-type: none"> BOTH MG Set Generator Output breakers 	
		<ul style="list-style-type: none"> BOTH MG Set Motor Input breakers 	
	BOP	(Step 2) CHECK Turbine Trip:	Immediate Action
		<ul style="list-style-type: none"> Both Turbine Stop Valves - CLOSED 	
		<ul style="list-style-type: none"> CLOSE MSR Purge and Shutoff valves 	
	BOP	(Step 3) CHECK AFW Pumps Running:	
		<ul style="list-style-type: none"> CHECK Motor Driven AFW Pumps – BOTH RUNNING 	
		<ul style="list-style-type: none"> CHECK S/G Narrow Range levels – TWO S/Gs LESS THAN 16% 	
	BOP/ CRS	(Step 3b RNO) IF S/G Narrow Range level lowers to less than 16% on two S/Gs THEN PERFORM Step3.c.	
		CONTINUE WITH Step 4.	
	BOP/ RO	(Step 4) INITIATE Emergency Boration:	

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 42 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> START two Charging Pumps at maximum speed 	
		<ul style="list-style-type: none"> ALIGN Boration Flow Path: 	
		<ul style="list-style-type: none"> OPEN MOV-350, BA TO CHARGING PMP SUCT 	NOTE: MOV-350 will not OPEN.
	BOP/RO	(Step 4.b.1 RNO) ALIGN suction from RWST:	
		<ul style="list-style-type: none"> OPEN LCV-115B, EMERG MU TO CHG SUCT. IF LCV-115B can NOT be opened THEN... 	
		<ul style="list-style-type: none"> CLOSE LCV-115C, VCT OUTLET Valve. 	
	BOP/RO	(Step 4.b.2) START Boric Acid Pump ALIGNED for BLEND	
	BOP/RO	(Step 4.b.3) CHECK for Boric Acid flow on FI-110	NOTE: There should be no indicated flow.
	BOP/RO	(Step 4.c) ALIGN Charging flow path:	
		<ul style="list-style-type: none"> OPEN CVC-310B, LOOP 2 COLD LEG CHG Valve 	
		<ul style="list-style-type: none"> ADJUST the following as necessary to maintain proper Seal Injection and MAXIMUM Charging flow: 	
		<ul style="list-style-type: none"> Charging Pump Speed Controller(s) 	
		<ul style="list-style-type: none"> HIC-121, CHARGING FLOW Controller 	
		<ul style="list-style-type: none"> Seal Water Flow Control Valves 	
		<ul style="list-style-type: none"> MAINTAIN Seal Injection flow between 6 gpm and 20 gpm per RCP UNLESS Seal Injection isolated 	
		<ul style="list-style-type: none"> MAINTAIN Charging flow on FI-122A – GREATER THAN BORIC ACID FLOW 	

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 43 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK PZR pressure – LESS THAN 2335 PSIG 	
	BOP/RO	(Step 5) CHECK CV Ventilation Isolation Valves - CLOSED	
	BOP/RO	(Step 6) CHECK NO SI Signal Exists	
	RO	(Step 7) CHECK IF the Following Trips Have Occurred:	
		<ul style="list-style-type: none"> Reactor - TRIPPED 	
		<ul style="list-style-type: none"> Turbine - TRIPPED 	
	RO	(Step 8) CHECK IF Reactor is Subcritical:	
		<ul style="list-style-type: none"> Power Range channels – LESS THAN 5% 	
		<ul style="list-style-type: none"> Intermediate Range channels - NEGATIVE STARTUP RATE 	
		<ul style="list-style-type: none"> OBSERVE CAUTION prior to Step 18 and GO TO Step 18 	
	RO	(Step 18) CHECK ARPI – LESS THAN TWO RODS STUCK OUT	
	RO	(Step 19) STOP RCS Boration:	
		<ul style="list-style-type: none"> CHECK MOV-350, BA TO CHARGING PMP SUCT - CLOSED 	
		<ul style="list-style-type: none"> CHECK Boric Acid Pump Control Switch aligned for blend – IN AUTO 	
		<ul style="list-style-type: none"> CHECK Emergency Boration – PERFORMED USING MOV-350 FLOWPATH 	
	CRS	(Step 19.c RNO) GO TO Step 19.e	

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 44 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 19.e) CHECK BOTH of the following conditions – EXIST:	
		<ul style="list-style-type: none"> Emergency Boration performed using RWST flowpath 	
		AND	
		<ul style="list-style-type: none"> Charging Pump suction aligned to the VCT is desired 	
		<ul style="list-style-type: none"> CHECK VCT Level – GREATER THAN 20 INCHES 	
		<ul style="list-style-type: none"> OPEN LCV-115C, VCT OUTLET 	
		<ul style="list-style-type: none"> CLOSE the RWST supply valve previously opened: 	
		<ul style="list-style-type: none"> LCV-115B, EMERG TO CHG SUCT 	
		<ul style="list-style-type: none"> REDUCE Charging Pump speed as desired 	
	RO/ CRS	(Step 20) PERFORM the following:	
		<ul style="list-style-type: none"> RESET SPDS 	
		<ul style="list-style-type: none"> RETURN TO Procedure AND Step in Effect 	
BOOTH INSTRUCTOR: When the CRS is directing the RO to check the Reactor subcritical, IMF MSS01B r:10:00 f:9.95E6			
			NOTE: The CRS will transition to EOP-E-0.
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO	(Step 1) CHECK Reactor Trip:	Immediate Action
		<ul style="list-style-type: none"> Reactor Trip AND Bypass Breakers - OPEN 	
		<ul style="list-style-type: none"> Rod position indicators - FULLY INSERTED 	

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 45 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Rod Bottom Lights - ILLUMINATED 	
		<ul style="list-style-type: none"> Neutron Flux - LOWERING 	
	BOP	(Step 2) CHECK Turbine Trip:	Immediate Action
		<ul style="list-style-type: none"> Both Turbine Stop Valves - CLOSED 	
		<ul style="list-style-type: none"> All MSR Purge AND Shutoff Valves - CLOSED 	
	BOP	(Step 3) CHECK Power To AC EMERGENCY BUSSES:	Immediate Action
		<ul style="list-style-type: none"> CHECK Bus E-1 OR E-2 - AT LEAST ONE ENERGIZED 	
		<ul style="list-style-type: none"> CHECK Bus E-1 AND E-2 - BOTH ENERGIZED 	
	RO	(Step 4) CHECK SI Status:	Immediate Action
	RO	CHECK if SI is actuated:	
		<ul style="list-style-type: none"> SI annunciators - ANY ILLUMINATED 	
		OR	
		<ul style="list-style-type: none"> SI equipment - AUTO STARTED 	
	RO	CHECK BOTH trains of SI actuated:	
		<ul style="list-style-type: none"> SI Pumps - TWO RUNNING 	
		<ul style="list-style-type: none"> RHR Pumps - BOTH RUNNING 	
	RO/ BOP	Foldout Page:	
		RCP TRIP CRITERIA	
		FAULTED S/G AFW ISOLATION CRITERIA	NOTE: The condition will be MET.

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 46 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> PERFORM Supplement D, De-energizing AFW Valves For AFFECTED S/G. 	NOTE: The CRS will dispatch an AO. Booth Instructor acknowledge as AO, and use: IRF EPSMCC9_254 f: RACKED_OUT IRF EPSMCC10_266 f: RACKED_OUT As AO , report after 3 minutes that the Supplement D is complete.
		AFW SUPPLY SWITCHOVER CRITERIA	
		DC BUS, INSTRUMENT BUS, OR MCC-5 FAILURE CRITERIA	
		SPENT FUEL POOL COOLING CRITERIA	
	CRS	(Step 5) PERFORM Attachment 1, Auto Action Verification, While CONTINUING WITH This Procedure	Examiner NOTE: The CRS may assign the BOP to perform this action. If so, BOP Examiner follow actions of Attachment 1. Other Examiners follow EOP-E-0 Actions, Step 6 , on Page 52 .
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION ATTACHMENT 1, AUTO ACTION VERIFICATION			
	BOP	(Step 1) CHECK ECCS Pumps Running:	
		<ul style="list-style-type: none"> SI Pumps - TWO RUNNING 	
		<ul style="list-style-type: none"> RHR Pumps - BOTH RUNNING 	
	BOP	(Step 2) CHECK ECCS Valves In Proper Emergency Alignment	
	BOP	(Step 3) CHECK CCW Pumps - AT LEAST ONE RUNNING	
	BOP	(Step 4) CHECK Containment Isolation Phase A:	

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 47 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK Containment Isolation Phase A - ACTUATED 	
		<ul style="list-style-type: none"> CHECK Containment Isolation Phase A Valves - CLOSED 	
		<ul style="list-style-type: none"> CHECK Excess Letdown - ISOLATED 	
		<ul style="list-style-type: none"> CVC-387, EXCESS LTDN STOP VALVE - CLOSED 	
		<ul style="list-style-type: none"> HIC-137, EXCESS LTDN FLOW CONTROLLER - AT 0% DEMAND 	
	BOP	(Step 5) CHECK Feedwater Isolation:	
		<ul style="list-style-type: none"> CHECK Main Feed Pumps - BOTH TRIPPED 	
		<ul style="list-style-type: none"> CHECK Main Feedwater isolated: 	
		<ul style="list-style-type: none"> Feedwater Reg Valves - CLOSED 	
		<ul style="list-style-type: none"> Feedwater Reg Bypass Valves - CLOSED 	
		<ul style="list-style-type: none"> Feedwater Header Section Valves - CLOSED 	
	BOP	(Step 6) CHECK If Main Steam Lines Should Be Isolated:	
		<ul style="list-style-type: none"> CHECK Main Steam Line Isolation - REQUIRED 	
		<ul style="list-style-type: none"> CHECK Containment pressure - GREATER THAN 10 PSIG 	
		<ul style="list-style-type: none"> CHECK MSIVs AND MSIV Bypass Valves - CLOSED 	
	BOP	(Step 7) CHECK Proper Service Water System Operation:	
		<ul style="list-style-type: none"> CHECK SW Pumps - ALL RUNNING 	
		<ul style="list-style-type: none"> CHECK SW Booster Pumps – BOTH RUNNING 	
		<ul style="list-style-type: none"> CHECK Both SW Header Low Pressure Alarms - EXTINGUISHED 	
		<ul style="list-style-type: none"> APP-008-F7,SOUTH SW HDR LO PRESS 	
		<ul style="list-style-type: none"> APP-008-F8,NORTH SW HDR LO PRESS 	

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 48 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 8) CHECK BOTH EDGs - RUNNING	
	BOP	(Step 9) CHECK ECCS Flow:	
		<ul style="list-style-type: none"> CHECK RCS pressure - LESS THAN 1650 PSIG [1725 PSIG] 	NOTE: Adverse Containment Numbers will be required.
		<ul style="list-style-type: none"> CHECK SI Pumps – FLOW INDICATED 	
		<ul style="list-style-type: none"> CHECK RCS pressure – LESS THAN 275 PSIG [325 PSIG] 	NOTE: Adverse Containment Numbers will be required.
	BOP	(Step 9.c RNO) GO TO Step 10.	
	BOP	(Step 10) CHECK CV Recirculation Fans - ALL RUNNING	
	BOP	(Step 11) CHECK IVSW System Actuated:	
		<ul style="list-style-type: none"> PCV-1922A, AUTOMATIC HEADER PRESSURE CONTROL VALVE - OPEN 	
		<ul style="list-style-type: none"> PCV-1922B, AUTOMATIC HEADER PRESSURE CONTROL VALVE - OPEN 	
	BOP	(Step 12) CHECK CV Ventilation Isolation:	
		<ul style="list-style-type: none"> CV Ventilation Isolation Valves - CLOSED 	
	BOP	(Step 13) CHECK Control Room Ventilation Aligned For Pressurization Mode:	
		<ul style="list-style-type: none"> HVA-1A OR HVA-1B, CONTROL ROOM AIR HANDLING FAN - RUNNING 	
		<ul style="list-style-type: none"> HVE-19A OR HVE-19B, CONTROL ROOM AIR CLEANING FAN - RUNNING 	
		<ul style="list-style-type: none"> HVE-16, CONTROL ROOM AIR EXHAUST FAN - STOPPED 	
		<ul style="list-style-type: none"> Control Room HVAC Outside Air Damper A OR B - OPEN 	

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 49 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CR-D1A-SA, CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER - CLOSED 	
		<ul style="list-style-type: none"> CR-D1B-SB, CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER - CLOSED 	
	BOP	(Step 14) CHECK DS Bus - ENERGIZED	
	BOP	(Step 15) CHECK Battery Chargers ENERGIZED:	
		<ul style="list-style-type: none"> APP-036-D1, BATT CHARGER A/A-1 TROUBLE Alarm - EXTINGUISHED 	
		<ul style="list-style-type: none"> APP-036-D2, BATT CHARGER B/B-1 TROUBLE Alarm - EXTINGUISHED 	
	BOP	(Step 16) STOP R-11/12 Sample Pump	
	BOP	(Step 17) Locally RESET AND LOAD Instrument Air Compressor(s) As Necessary (38 KW each):	NOTE: The BOP may contact the Inside AO. Booth Instructor: as AO, acknowledge and report that the "B" IA Compressor is running, and the "A" IA Compressor is NOT running.
		<ul style="list-style-type: none"> Compressor A (MCC-5 CMPT 7M) 	
		<ul style="list-style-type: none"> Compressor B (MCC-6 CMPT 3G) 	
	BOP	(Step 18) PERFORM Crew Update To Include The Following:	
		<ul style="list-style-type: none"> Attachment completion 	
		<ul style="list-style-type: none"> Manual actions taken 	
		<ul style="list-style-type: none"> Failed equipment status 	
		<ul style="list-style-type: none"> SW status per Step 7.c 	
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION			

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 50 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
			Examiner NOTE: Examiners following the CRS/RO continue HERE .
	RO	(Step 6) CHECK AFW Pumps Running:	
		<ul style="list-style-type: none"> CHECK Motor Driven AFW Pumps - BOTH RUNNING 	
		<ul style="list-style-type: none"> CHECK S/G Narrow Range levels – TWO S/Gs LESS THAN 16% 	
	BOP	(Step 6b RNO) IF S/G Narrow Range level lowers to LESS THAN 16% on Two S/Gs, THEN PERFORM Step 6.c.	
	CRS	CONTINUE WITH Step 7	
	RO	(Step 7) CHECK AFW Valves In Proper Emergency Alignment:	
		<ul style="list-style-type: none"> AFW Header Discharge Valves - FULL OPEN 	
		<ul style="list-style-type: none"> AFW Header Section Valves - FULL OPEN 	
		<ul style="list-style-type: none"> Steam Driven AFW Pump Discharge Valves - FULL OPEN IF PUMP RUNNING 	
	RO	(Step 8) CHECK Total AFW Flow:	
		<ul style="list-style-type: none"> RESET SI 	
		<ul style="list-style-type: none"> CONTROL AFW flow to maintain Intact S/G Narrow Range level between 9%[18%] AND 50% 	NOTE: Adverse Containment Numbers will be required.
		<ul style="list-style-type: none"> CHECK total AFW flow - GREATER THAN 300 GPM 	
	RO	(Step 9) CHECK CV Spray NOT Required:	
		<ul style="list-style-type: none"> CHECK Containment Pressure - HAS REMAINED LESS THAN 10 PSIG 	

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 51 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 9 RNO) PERFORM the following:	
		<ul style="list-style-type: none"> CHECK CV Spray actuated. 	
		<ul style="list-style-type: none"> IF CV Spray is NOT actuated, THEN.... 	
		<ul style="list-style-type: none"> ENSURE BOTH CV Spray Pumps are running. 	
		<ul style="list-style-type: none"> ENSURE CV Spray Pump Discharge Valves are OPEN: 	
		<ul style="list-style-type: none"> SI-880A 	
		<ul style="list-style-type: none"> SI-880B 	
		<ul style="list-style-type: none"> SI-880C 	
		<ul style="list-style-type: none"> SI-880D 	
		<ul style="list-style-type: none"> ENSURE CV Spray Additive Tank Discharge Valves are OPEN: 	
		<ul style="list-style-type: none"> SI-845A 	
		<ul style="list-style-type: none"> SI-845B 	
		<ul style="list-style-type: none"> ADJUST Spray Additive Tank flow using SI-845C,SAT THROTTLING VALVE to approximately 12 gpm. 	
		<ul style="list-style-type: none"> ENSURE Containment Isolation Phase B Valves are closed. 	
		<ul style="list-style-type: none"> STOP ALL RCPs. 	
	CRS	<ul style="list-style-type: none"> OBSERVE CAUTION prior to Step 10 AND GO TO Step 10. 	
			Examiner NOTE: it is expected that an Orange/Red Path will occur on RCS Integrity. When this occurs the CRS will transition to FRP-P.1. When this occurs move forward to actions on Page 56.
	RO	(Step 10) CHECK RCP Seal Cooling:	
		<ul style="list-style-type: none"> CCW flow to RCP(s) Thermal Barriers - NORMAL 	
		<ul style="list-style-type: none"> APP-001-C1,RCP THERM BAR COOL WTR HI FLOW ALARM - EXTINGUISHED 	

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 52 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> APP-001-D1,RCP THERM BAR COOL WTR LO FLOW alarm - EXTINGUISHED 	
	RO	(Step 10 RNO) IF CCW to ANY RCP Motor OR ALL Seal Cooling to ANY RCP has been lost, THEN...	
		<ul style="list-style-type: none"> IF ALL Charging Pumps are STOPPED, THEN... 	
	RO	(Step 11) CHECK RCS Temperatures:	
		<ul style="list-style-type: none"> With ANY RCP running,..... 	
		OR	
		<ul style="list-style-type: none"> With NO RCPs running, RCS Cold Leg temperatures - STABLE AT OR TRENDING TO 547°F 	
	RO	(Step 11 RNO) IF temperature is LESS THAN 547°F AND lowering, THEN PERFORM the following:	
		<ul style="list-style-type: none"> STOP dumping steam. 	
		<ul style="list-style-type: none"> IF RCS cooldown continues, THEN REDUCE total AFW flow to minimum for decay heat removal. 	
		<ul style="list-style-type: none"> MAINTAIN total AFW flow GREATER THAN 300 gpm UNTIL S/G Narrow Range level is GREATER THAN 9%[18%] in at least one S/G. 	NOTE: Adverse Containment Numbers will be required.
		<ul style="list-style-type: none"> IF RCS cooldown continues, THEN CLOSE MSIVs AND MSIV Bypass Valves. 	
	RO	(Step 12) CHECK PZR PORVs AND Spray Valves:	
		<ul style="list-style-type: none"> CHECK PZR PORVs - CLOSED 	
		<ul style="list-style-type: none"> CHECK Normal PZR Spray Valves - CLOSED 	

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 53 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK Aux PZR Spray Valve - CLOSED 	
	RO	(Step 13) CHECK If RCPs Should Be Stopped:	NOTE: It is likely that the RCPs are already OFF.
		<ul style="list-style-type: none"> CHECK RCPs - ANY RUNNING 	
	CRS	(Step 13.c RNO) GO TO Step 14.	
	RO	(Step 14) CHECK If S/G Secondary Pressure Boundaries Are Intact:	
		<ul style="list-style-type: none"> NONE LOWERING IN AN UNCONTROLLED MANNER 	
		<ul style="list-style-type: none"> NONE COMPLETELY DEPRESSURIZED 	
	CRS	(Step 14 RNO) PERFORM the following:	
		<ul style="list-style-type: none"> RESET SPDS AND INITIATE monitoring of Critical Safety Functions Status Trees. 	
		<ul style="list-style-type: none"> GO TO EOP-E-2, Faulted Steam Generator Isolation, Step 1. 	
FRP-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK			
	BOP	(Step 1) CHECK CST Level - GREATER THAN 13%	
	RO	(Step 2) CHECK RCS Pressure - GREATER THAN 275 PSIG [325 PSIG]	NOTE: Adverse Containment Numbers will be required.
	RO	(Step 3) CHECK RCS Cold Leg Temperatures - STABLE OR RISING	
	BOP	(Step 3 RNO) TRY to stop RCS cooldown:	

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 54 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	<ul style="list-style-type: none"> ENSURE S/G Steam Line PORVs are CLOSED. 	
		<ul style="list-style-type: none"> ENSURE Condenser Steam Dumps are CLOSED. 	
		<ul style="list-style-type: none"> IF RHR is in service, THEN..... 	
		<ul style="list-style-type: none"> CONTROL feed flow to Intact S/G(s) to stop RCS cooldown: 	
		<ul style="list-style-type: none"> MAINTAIN total feed flow GREATER THAN 300 gpm (0.2x10⁶ pph) UNTIL S/G Narrow Range level is GREATER THAN 9% [18%] in at least one Intact S/G. 	
		<ul style="list-style-type: none"> MINIMIZE cooldown from Faulted S/G(s): 	
		<ul style="list-style-type: none"> RESET SI. 	
		<ul style="list-style-type: none"> IF SI will NOT reset, THEN..... 	
		<ul style="list-style-type: none"> ENSURE Main Steamline Isolation AND Bypass Valves for each Faulted S/G are CLOSED. 	
		<ul style="list-style-type: none"> CLOSE STEAM SHUTOFF valve(s) from Faulted S/G(s) to Steam Driven AFW Pump. 	
		<ul style="list-style-type: none"> V1-8B 	
		<ul style="list-style-type: none"> IF ALL S/Gs are Faulted, THEN.... 	NOTE: Only the "B" S/G is faulted.
		<ul style="list-style-type: none"> IF a Faulted S/G is necessary for RCS Temperature Control, THEN.... 	
		<ul style="list-style-type: none"> CLOSE Feed REG AND Bypass, FW HDR Section, AND AFW Discharge Valves to Faulted S/G(s). 	
		<ul style="list-style-type: none"> S/G B: 	
		<ul style="list-style-type: none"> FCV-488 	
		<ul style="list-style-type: none"> FCV-489 	
		<ul style="list-style-type: none"> V2-6B 	
		<ul style="list-style-type: none"> V2-14B 	
		<ul style="list-style-type: none"> V2-16B 	

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 55 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> IF ANY valve can NOT be closed, THEN..... 	
Critical Task: Isolate Feedwater Flow Into and Steam Flow From the Faulted S/G Before a Transition Out of FRP-P.1 Occurs (EOP-Based) Safety Significance: Failure to isolate a faulted SG that can be isolated causes challenges to CSFs beyond those irreparably introduced by the postulated conditions. Also, depending upon the plant conditions, it could constitute a failure by the operator to demonstrate the ability to recognize a failure or an incorrect automatic actuation of an ESF system or component. Failure to isolate a faulted SG can result in challenges to the Integrity, Subcriticality and Containment CSFs; and result in a mechanical failure due to Pressurized Thermal Shock.			
	RO	(Step 4) CHECK PZR PORV Block Valves:	
		<ul style="list-style-type: none"> Power to PZR PORV Block Valves - AVAILABLE 	
		<ul style="list-style-type: none"> PZR PORV Block Valves - AT LEAST ONE OPEN 	
	RO	(Step 5.a) CHECK If PZR PORVs Should Be Closed:	
		CHECK LTOPP - IN SERVICE	
	CRS	(Step 5.a RNO) GO TO Step 5.d.	
	RO	(Step 5.d) CHECK PZR pressure - LESS THAN 2335 PSIG	
	RO	(Step 5.e) PZR PORVs - CLOSED	
	RO	(Step 6) CHECK SI Pumps - ANY RUNNING	

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 56 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 7) CHECK If SI Can Be Terminated:	
		<ul style="list-style-type: none"> RCS Subcooling based on Core Exit T/Cs - GREATER THAN 68°F [87°F] 	NOTE: Adverse Containment Numbers will be required.
		<ul style="list-style-type: none"> RVLIS indication - GREATER THAN REQUIRED VALUE FROM TABLE 	NOTE: With all RCPs off, 65% is required in RVLIS Full Range.
	RO	(Step 8) RESET SI	
	RO	(Step 9) RESET Containment Isolation Phase A	
	RO	(Step 10) RESET Containment Spray Signal:	
		<ul style="list-style-type: none"> PLACE CONTAINMENT SPRAY Key Switch to OVRD/RESET and RETURN to NORMAL 	NOTE: If CV pressure is > 10 psig, CV Spray and Phase B Containment Isolation will NOT be able to be reset.
		<ul style="list-style-type: none"> RESET Containment Isolation Phase B 	
	RO	(Step 11) ESTABLISH Instrument Air To CV:	
		<ul style="list-style-type: none"> CHECK APP-002-F7, INSTR AIR HDR LO PRESS alarm - EXTINGUISHED 	
		<ul style="list-style-type: none"> RESET IA PCV-1716, INSTRUMENT AIR ISOLATION TO CV 	
		<ul style="list-style-type: none"> CHECK IA PCV-1716 - OPEN 	
	RO	(Step 12) STOP ECCS Pumps:	
		<ul style="list-style-type: none"> RHR Pumps 	
		<ul style="list-style-type: none"> SI Pumps 	

Op Test No.: N16-1 Scenario # 4 Event # 7, 8 & 9 Page 57 of 58Event Description: **ATWS/MOV-350 fails to OPEN/"B" SG SLB Inside CV**

Time	Pos.	Expected Actions/Behavior	Comments
Critical Task:			
Stop the High Head SI Pumps Before a Transition Out of FRP-P.1 Occurs (EOP-Based)			
Safety Significance: Failure to stop the high head SI Pumps results in challenges to the Integrity CSF; and could unnecessarily result in a mechanical failure due to Pressurized Thermal Shock.			
At the discretion of the Lead Examiner terminate the exam.			

NRC SCENARIO N16-1-4 TURNOVER SHEET

1. INITIAL CONDITIONS

- | | | |
|----|----------------------|-------------|
| a) | Time in Core Life: | BOL |
| b) | Reactor Power: | 25% |
| c) | Turbine Load: | 129 MWe |
| d) | Boron Concentration: | 1462 ppm |
| e) | Rod Height: | 147 CB 'D' |
| f) | RCS Pressure: | 2235 psig |
| g) | PZR Level: | 28.5% |
| h) | Xenon: | Equilibrium |

2. TECHNICAL SPECIFICATION LCO ACTIONS STATEMENTS IN EFFECT

<u>T.S. #</u>	<u>Description</u>
None	

3. CLEARANCES IN EFFECT

- a) The "A" SI Pump is OOS. The "B" SI Pump has been aligned to 480 VAC ESF Bus E-1.

4. CAUTION CAPS IN EFFECT

- a) None

5. PROTECTED EQUIPMENT

- a) None

6. DEGRADED EQUIPMENT

- a) PI-1616, SW North Header Pressure, is OOS (I&C Investigating).
b) RTGB Annunciator APP-007-C3, "FW PMP A LO FLOW TRIP," has failed to the EXTINGUISHED condition (I&C is investigating).

7. SWITCHYARD ACCESS

- a) Unrestricted (NOT-PROTECTED)

8. PLANNED EVOLUTIONS

- a) Raise power to 100% at 1%/minute.

9. TURNOVER INFORMATION

- a) The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.
b) Chemistry reports that Heater Drains tank suspended solids is < 25 ppb.

10. REACTIVITY INFORMATION

- a) The Reactor Engineer (RE) is available in the Control Room
b) The RE recommends a 6300 gallon dilution, made in several 200-300 gallon batch additions using Section 8.2.7, RCS Quick Dilution Checklist, of OP-301
c) The RE recommends that Control Bank D be at approximately 200 steps upon achieving 100%

11. RISK

- a) YELLOW (Planned Power Increase)

ROBINSON Nuclear Training
Committed to Excellence

OPERATIONS TRAINING

N16-1-5

Initial Licensed Operator Training

Rev 012016

**THIS EXERCISE GUIDE DOES NOT
IMPLEMENT ANY COMMITMENTS**


Developed By:

 CHRISTOPHER McCOMBS
Instructor/Developer

Date:

1/20/16


Concurred By:

 JOHN R. LITTLE
Line Superintendent/Supervisor/SRO

Date:

01/22/16

Approved By:

 J. RACKLEY
Superintendent/Supervisor Training

Date:

1/23/16

PROGRAM: H B Robinson Operations Training

MODULE: Initial License Operator Training Class 15-1

TOPIC: NRC Simulator Exam

Scenario N16-1-5

REFERENCES:

1. GP-005, "Power Operation" (Rev 128)
2. AOP-006, "Turbine Eccentricity/Vibration" (Rev 21)
3. APP-005, "NIS & Reactor Control" (Rev 39)
4. OWP-011, "Nuclear Instrumentation (NI)" (Rev 24)
5. Technical Specification LCO 3.3.1, "Reactor Protection System (RPS) Instrumentation" (Amendment 176)
6. AOP-003, "Malfunction of Reactor Makeup Control" (Rev 20)
7. APP-001, "Miscellaneous NSSS" (Rev 60)
8. AOP-014, "Component Cooling Water Malfunction" (Rev 37)
9. Technical Specification LCO 3.6.1, "Containment" (Amendment 176)
10. Technical Specification LCO 3.6.3, "Containment Isolation Valves" (Amendment 176)
11. OMM-001, "RNP Conduct of Operations" (Rev 67)
12. EOP-E-0, "Reactor Trip or Safety Injection" (Rev 6)
13. EOP-E-2, "Faulted Steam Generator Isolation" (Rev 3)
14. EOP-ECA-2.1, "Uncontrolled Depressurization of All Steam Generators" (Rev 1)

Validation Time: 136 minutes

Scenario Event Description
NRC Scenario 5

Facility: H B Robinson		Scenario No.: 5		Op Test No.: N16-1	
Examiners: _____		Operators: _____		(SRO)	
_____		_____		(RO)	
_____		_____		(BOP)	
Initial Conditions:		The plant is at 3-5% power (EOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.			
Turnover:		The following equipment is Out-Of-Service: The "B" Condensate Pump is OOS. LI-1417A, Hotwell Level Indication is OOS (I&C Investigating). RTGB Annunciator APP-006-F7, "PWST HI/LO LVL," has failed to the ILLUMINATED condition (I&C is investigating). The crew will be directed to raise power to 30%.			
Event No.	Malf. No.	Event Type*	Event Description		
1	NA	R-RO N-BOP N-SRO	Roll Turbine		
2	1	C-BOP C-SRO	High Turbine Eccentricity		
3	2	I-BOP I(TS)-SRO	Loss of Compensation Voltage to Intermediate Range N-35		
4	3	I-RO I-SRO	VCT Level transmitter LT-112 fails HIGH		
5	4	C-RO C(TS)-SRO	"B" RCP Thermal Barrier Leak/Flow Control Valve FCV-626 fails to CLOSE		
6	5	M-RO M-BOP M-SRO	Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE		
7	6	C-RO	Failure of Automatic Rx Trip		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Scenario Event Description
NRC Scenario 5

H B Robinson 2016 NRC Scenario #5

The plant is at 3-5% power (EOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

The following equipment is Out-Of-Service: The "B" Condensate Pump is OOS. LI-1417A, Hotwell Level Indication is OOS (I&C Investigating). RTGB Annunciator APP-006-F7, "PWST HI/LO LVL," has failed to the ILLUMINATED condition (I&C is investigating). The crew will be directed to raise power to 30%.

Shortly after taking the watch, the operator will raise power to 5-8% and startup the Turbine using GP-005, "Power Operation."

When the Turbine is rolling, a HIGH Eccentricity condition will develop on the Main Turbine. The operator will respond using AOP-006, "Turbine Eccentricity/Vibration," and place the Turbine startup on HOLD.

Shortly afterwards, the compensating voltage on Intermediate Range Channel N-35 will fail. The operator will remove the instrument from service using OWP-011, "Nuclear Instrumentation (NI)." The failed channel will require that the Source Range instruments be manually re-energized in the subsequent post-trip conditions. The operator will address Technical Specification LCO 3.3.1, "Reactor Protection System (RPS) Instrumentation," and determine to continue with the power increase.

Following this, VCT Level Transmitter LT-112 will fail HIGH causing LCV-115A to divert all letdown flow to the CVCS HUTs and result in an automatic makeup to the VCT. The operator will respond in accordance with AOP-003, "Malfunction of Reactor Makeup Control." After this, the power increase will continue.

Next, a Thermal barrier leak will develop on the "B" RCP and Flow Control Valve FCV-626 will fail to CLOSE. The operator will respond in accordance with APP-001-C1, "RCP THERM BAR COOL WTR HI FLOW," and AOP-014, "Component Cooling Water Malfunction." The operator will address Technical Specification LCO 3.6.1, "Containment," and Technical Specification LCO 3.6.3, "Containment Isolation Valves."

Subsequently, a Steam Rupture will occur downstream of the MSIVs and the MSIVs will fail to CLOSE automatically and manually. Simultaneously, the Reactor will fail to TRIP automatically. The operator will enter EOP-E-0, "Reactor Trip or Safety Injection," and manually trip the reactor.

Upon completion of EOP-E-0, the operator will transition to EOP-E-2, "Faulted Steam Generator Isolation," and then when it is realized that all Steam Generators are faulted, transition to EOP-ECA-2.1, "Uncontrolled Depressurization of All Steam Generators," and lower AFW flow to each Steam Generator to 60 gpm.

While terminating Safety Injection in EOP-ECA-2.1, the "A" MSIV will close and the "A" S/G pressure is expected to rise higher than that of the "B" and "C" S/G's. Since the crew will be in the process of terminating SI in EOP-ECA-2.1, the crew will continue to complete the SI termination steps before transitioning back to EOP-E-2.

Scenario Event Description
NRC Scenario 5

The scenario will terminate at Step 4.c of EOP-E-2, after the operator has closed the AFW Discharge valves to the “B” and “C” Steam Generators. Depending on the timing of the actions taken by the crew when the “A” MSIV is closed, the “A” S/G pressure may not rise significantly higher than that of the “B” and “C” S/Gs, and the crew will remain in EOP-ECA-2.1 past the SI termination steps (i.e. Step 19). If this situation occurs, the scenario will terminate at Step 20 of EOP-ECA-2.1.

Critical Tasks:

Manually trip the reactor from the control room before entry into FRP-S.1

Safety Significance: Failure to manually trip the reactor causes a challenge to the subcriticality CSF beyond that irreparably introduced by the postulated conditions. Additionally, it constitutes an incorrect performance that necessitates the operator taking compensating action that would complicate the event mitigation strategy and demonstrates the inability of the operator to recognize a failure or an incorrect automatic actuation of an ESF system or component. The ERG Background Document for E-0 states that one function of E-0 is to verify that all required automatic protective actions occur before transitioning the crew to the appropriate ORG. The verification is important because the subsequent ORGs are based on the assumption that protective systems will protect all CSFs while the ORG is implemented. Not tripping the reactor when it is possible to do so (as in the postulated conditions) forces an immediate extreme challenge to the subcriticality CSF. Additionally, the incorrect performance of failing to trip the reactor necessitates the operator taking compensating action that seriously complicates the event mitigation strategy. This mis-operation constitutes a significant reduction of safety margin beyond that irreparably introduced by the scenario.

Control the AFW flow rate to not less than 60 gpm per SG in order to minimize the RCS cooldown rate before an EXTREME (Red Path) challenge develops to the RCS Integrity CSF

Safety Significance: Failure to control the AFW flow rate to the SGs leads to an unnecessary and avoidable extreme challenge to the integrity CSF. Also, failure to perform the critical task increases the challenges to the subcriticality CSF beyond which is irreparably introduced by the postulated plant conditions. Thus, failure to perform the critical task constitutes a demonstrated inability by the operator to take one or more actions that would prevent a challenge to plant safety. It also fails to prevent a significant reduction of safety margin beyond that irreparably introduced by the scenario.

Scenario Event Description
NRC Scenario 5

SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Sim. Setup	Reset to Temp IC 612	
<input type="checkbox"/>	<p>T = 0 Malfunctions:</p> <p>“B” Condensate Pump OOS:</p> <ul style="list-style-type: none"> IRF EPSV4160B4_069 f: RACK_OUT (“B” Condensate Pump Breaker Racked Out) <p>PLACE RED CAP on the RTGB Control Switch for the “B” Condensate Pump PLACE GREEN CAP on the RTGB Control Switch for the “A” Condensate Pump</p> <p>LI-1417A Hotwell Level Indication OOS</p> <ul style="list-style-type: none"> IOR aoCFWDOD035B f:2 <p>Place WHITE DOT on LI-1417A</p> <p>RTGB Annunciator APP-006-F7 failed ON</p> <ul style="list-style-type: none"> IMF ANN06f07 f:ALARM_ON <p>Place WHITE DOT on APP-006-F7</p> <p>Insert the following:</p> <ul style="list-style-type: none"> \$006_FCV_626_TRIP IOR diCVCAA103 d:9 f:OPEN (FCV-626 fails to auto CLOSE) \$006_FCV_626_TRIP IOR doCVCAA0103O d:10 f:ON (FCV-626 fails to auto CLOSE) \$006_FCV_626_TRIP IOR doCVCAA0103S d:10 f:ON (FCV-626 fails to auto CLOSE) \$006_FCV_626_TRIP IRF EPSMCC6_221 d:11 f:RACK_OUT (FCV-626 fails to auto CLOSE) IMF MSS03A f:FAIL_TO_CLOSE (“A” MSIV fails to CLOSE) IMF MSS03B f:FAIL_TO_CLOSE (“B” MSIV fails to CLOSE) IMF MSS03C f:FAIL_TO_CLOSE (“C” MSIV fails to CLOSE) IOR diMSSDDI049 f:OPEN (“A” MSIV fails to CLOSE) IOR diMSSDDI050 f:OPEN (“B” MSIV fails to CLOSE) IOR diMSSDDI051 f:OPEN (“C” MSIV fails to CLOSE) IMF RPS01A f:FAILURE_TO_OPEN, AUTO IMF RPS01B f:FAILURE_TO_OPEN, AUTO <p>Place the Simulator in RUN and ACKNOWLEDGE all alarms.</p>		
<input type="checkbox"/>	Perform Attachment 2 (Simulator Setup For Exams) of TAP-411.		

Scenario Event Description
NRC Scenario 5

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Crew Briefing 1. Assign Crew Positions based on evaluation requirements 2. Review the Shift Turnover Information with the crew. 3. Provide the crew with the following: <ul style="list-style-type: none"> • Copy of OP-105 marked up for power increase • Attachment 8, Turbine Recommended Start-Up and Loading Times, of GP-005 • Attachment 10, Condenser Backpressure Limit Curve, of GP-005 • Copy of Technical Specifications/Basis 4. Direct the crew to Review the Control Boards taking note of present conditions, alarms.		
<input type="checkbox"/>	T-0	Begin Familiarization Period	
<input type="checkbox"/>	At direction of examiner	Execute Lesson Plan for Simulator Scenario N16-1-5.	
<input type="checkbox"/>	At direction of examiner	Event 1	Roll Turbine
<input type="checkbox"/>	Turbine RPM reaches 150 RPM	Event 2 \$006_ECC-RPM ICO TURXMTET_HP r:15 F:3.3	High Turbine Eccentricity NOTE: This Malfunction will occur when the Turbine speed reaches 150 RPM
<input type="checkbox"/>	At direction of examiner	Event 3 IMF NIS06A f:4.4E-7	Loss of Compensation Voltage to Intermediate Range N-35
<input type="checkbox"/>	At direction of examiner	Event 4 ICO CVCXMTLT_112 r:01:00 f:100	VCT Level transmitter LT-112 fails HIGH
<input type="checkbox"/>	At direction of examiner	Event 5 IMF RCS12B r: 01:00 f:40	"B" RCP Thermal Barrier Leak/Flow Control Valve FCV-626 fails to CLOSE

Scenario Event Description
NRC Scenario 5

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	At direction of examiner	Event 6 IMF MSS09 f:855700	Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE
<input type="checkbox"/>	Post-Rx Trip Signal	Event 7 IMF RPS01A f:FAILURE_TO_OPEN, AUTO IMF RPS01B f:FAILURE_TO_OPEN, AUTO	Failure of Automatic Rx Trip NOTE: These malfunctions are inserted at T=0
<input type="checkbox"/>	Terminate the scenario upon direction of Lead Examiner		

Op Test No.: N16-1 Scenario # 5 Event # 1 Page 9 of 57Event Description: **Roll Turbine**

Shortly after taking the watch, the operator will raise power to 5-8% and startup the Turbine using GP-005, "Power Operation."

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

Time	Pos.	Expected Actions/Behavior	Comments
GP-005, POWER OPERATION SECTION 6.3, ROLLING THE TURBINE			
			Examiner NOTE: Procedure Steps are NOT numbered in a continuous manner because some Steps in GP-005 have been previously signed off/completed.
	RO	(Step 8) WHEN Reactor Power approaches 5% THEN perform the following:	
		<ul style="list-style-type: none"> Make a plant announcement that MODE 1 has been entered 	
		<ul style="list-style-type: none"> Record time MODE 1 entered 	
		<ul style="list-style-type: none"> Change ERFIS Mode Indication to display MODE 1 	
	RO	(Step 9) Adjust Control Rods to maintain Reactor Power between 5% and 8% while continuing with this procedure	
	RO/ BOP	(Step 10) Ensure the ERFIS Calorimetric (CALO) program is properly configured for the current plant operation:	
		<ul style="list-style-type: none"> Current Excess Letdown operation 	
		<ul style="list-style-type: none"> Current AFW Pump operation 	
		<ul style="list-style-type: none"> Current Steam Generator Blowdown (SGBD) operation. 	

Op Test No.: N16-1 Scenario # 5 Event # 1 Page 10 of 57Event Description: **Roll Turbine**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 11) Ensure cooling water is being supplied to the following components per OP-903, Placing Secondary Coolers in Service:	NOTE: The BOP will contact the AO and direct that the Secondary coolers placed in service. Booth Instructor acknowledge as AO, and report after 3 minutes that all secondary coolers have been placed in service.
		<ul style="list-style-type: none"> Generator Hydrogen Coolers. 	
		<ul style="list-style-type: none"> H2 Seal Oil Coolers. 	
		<ul style="list-style-type: none"> Turbine Lube Oil Coolers. 	
		<ul style="list-style-type: none"> Exciter Air Coolers. 	
	BOP	(Step 12) Equalize hydrogen and air side seal oil temperatures per OP-505, Hydrogen Seal Oil System, Section titled "Equalizing Hydrogen Side and Air Side Seal Oil Temperatures Prior to Rolling Turbine".	
	BOP	(Step 13) IF the Generator Temperature Recorder is shutdown, THEN.....	
	BOP	(Step 14) Ensure the following recorders and associated instruments monitoring the Turbine Generator are energized and functional to the point necessary to support Turbine operation:	
		<ul style="list-style-type: none"> Turbine Generator Supervisory Recorder. 	
		<ul style="list-style-type: none"> Turbine MSR Temperature Recorder (MSR-TEMP-REC). 	
		<ul style="list-style-type: none"> Turbine Supervisory Alarm Mimic Display. 	
		<ul style="list-style-type: none"> Generator Temperature Recorder. 	
	BOP	(step 15) Record the As Found turbine eccentricity (ECC) as indicated on the Turbine Supervisory Instrument Recorder.	

Op Test No.: N16-1 Scenario # 5 Event # 1 Page 11 of 57Event Description: **Roll Turbine**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 16) IF turbine rotor eccentricity (ECC) is greater than or equal to three mills (0.003 inches) as indicated on the Turbine Supervisory Instrument Recorder OR is in alarm on the RTGB Mimic Display, THEN.....	
	BOP	(Step 17) Using Curve 7.8 or Attachment 8, Turbine Recommended Start-Up And Loading Times, determine the Time Required to Accelerate to Sync Speed based on point TC-MTL-IMP-CHMBR indicated temperature and record.	
	BOP	(Step 18) Depress the Valve Position Limit ▽ (lower) pushbutton until the Valve Position Limit indicator registers 0% Valve Limit Position.	
	BOP	(Step 19) IF this is a turbine startup following replacement OR repair of any turbine shaft components or bearings, THEN.....	
	BOP	(Step 20) IF AT ANY TIME during turbine startup it is required to stop turbine rolling activities, THEN perform Attachment 6, Securing Turbine During Startup.	NOTE: This Attachment provides steps for securing the Turbine Startup.
	BOP	(Step 21) Monitor EH oil pressure during latching using ERFIS	
	BOP	(Step 22) Latch the Turbine using one of the following methods:	

Op Test No.: N16-1 Scenario # 5 Event # 1 Page 12 of 57Event Description: **Roll Turbine**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Depress and hold the Turbine pushbutton until local indication PI-63ASO (Auto Stop Oil Press) is greater than 80 psig 	NOTE: The BOP will contact the AO at the Turbine Standard, and direct that pressure on PI-63ASO be reported. Booth Instructor acknowledge as AO, and report > 80 psig.
	BOP	(Step 23) WHEN PI-63ASO (Auto Stop Oil Press) is greater than 80 psig, THEN perform the following:	
		<ul style="list-style-type: none"> Ensure SL and SR Turbine Stop Valves indicate OPEN on the EH Turbine Control Panel 	
		<ul style="list-style-type: none"> Ensure 1RL, 2RL, 1RR, 2RR, Reheat Stop Valves indicate OPEN on the EH Turbine Control Panel 	
		<ul style="list-style-type: none"> Ensure 1IL, 2IL, 1IR, 2IR, Intercept Valves indicate OPEN on the EH Turbine Control Panel 	
		<ul style="list-style-type: none"> Ensure GLU, GLL GRU, GRL Governor Valves indicate CLOSED on the EH Turbine Control Panel 	
		<ul style="list-style-type: none"> Check green Latch Light is ILLUMINATED 	
		<ul style="list-style-type: none"> Ensure Unit Trip Light is EXTINGUISHED 	
	BOP	(Step 24) Record the following data from the EH Pump (Governor Fluid Pump) local flow indications	NOTE: The BOP will contact the AO, and direct that the EH Pump local flow indications be reported. Booth Instructor acknowledge as AO, and report: FI-4428A – 5 gpm FI-4427A – 3 gpm FI-4428B – 5 gpm FI-4427B – 3 gpm

Op Test No.: N16-1 Scenario # 5 Event # 1 Page 13 of 57Event Description: **Roll Turbine**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 25) IF either EH Pump Discharge Flow reads greater than 6 gpm OR IF either EH Pump Drain Flow indicated greater than 4 gpm, THEN...	NOTE: No EH Pump Discharge Flow is greater than 6 gpm and no EH Pump Drain Flow is greater than 4 gpm.
	BOP	(Step 26) IF the Turbine has rolled off the Turning Gear AND it is desired to place the Turbine back on the Turning Gear, THEN...	NOTE: The Turbine has NOT rolled off the Turning Gear.
	BOP	(Step 27) PERFORM the Turbine Valve/Trip Test	
		<ul style="list-style-type: none"> • Trip the Turbine by simultaneously depressing the Think and Turbine Trip pushbuttons 	
		<ul style="list-style-type: none"> • CHECK the following Valves: 	
		<ul style="list-style-type: none"> • SL and SR, Turbine Stop Valves - CLOSED 	
		<ul style="list-style-type: none"> • 1RL, 2RL, 1RR, 2RR, Reheat Stop Valves - CLOSED 	
		<ul style="list-style-type: none"> • 1IL, 2IL, 1IR, 2IR, Intercept Valves - CLOSED 	
		<ul style="list-style-type: none"> • Monitor EH pressure during latching using ERFIS 	
		<ul style="list-style-type: none"> • Latch the Turbine using one of the following methods: 	
		<ul style="list-style-type: none"> • Depress and hold the Turbine Latch pushbutton until local indication PI-63ASO (Auto Stop Oil Press) is greater than 80 psig 	NOTE: The BOP will contact the AO at the Turbine Standard, and direct that pressure on PI-63ASO be reported. Booth Instructor acknowledge as AO, and report > 80 psig.
		<ul style="list-style-type: none"> • WHEN PI-63ASO (Auto Stop Oil Press) is greater than 80 psig THEN perform the following: 	

Op Test No.: N16-1 Scenario # 5 Event # 1 Page 14 of 57Event Description: **Roll Turbine**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Ensure SL and SR, Turbine Stop Valves indicate OPEN on the EH Turbine Control Panel 	
		<ul style="list-style-type: none"> Ensure 1RL, 2RL, 1RR, 2RR, Reheat Stop Valves indicate OPEN on the EH Turbine Control Panel 	
		<ul style="list-style-type: none"> Ensure 1IL, 2IL, 1IR, 2IR, Intercept Valves indicate OPEN on the EH Turbine Control Panel 	
		<ul style="list-style-type: none"> Ensure GLU, GLL GRU, GRL Governor Valves indicate CLOSED on the EH Turbine Control Panel 	
		<ul style="list-style-type: none"> Check green Latch Light is ILLUMINATED 	
		<ul style="list-style-type: none"> Ensure Unit Trip Light is EXTINGUISHED 	
		<ul style="list-style-type: none"> Direct an Operator to trip the Turbine locally at the Turbine Front Standard by positioning the Turbine Trip Lever to the TRIP Position 	<p>NOTE: The BOP will contact the AO at the Turbine Standard, and direct that the Turbine be tripped.</p> <p>Booth Instructor acknowledge as AO, and use: IRF TUR004 f:TRIPPED and report that the Turbine has been tripped.</p>
		<ul style="list-style-type: none"> Check the following: 	
		<ul style="list-style-type: none"> SL and SR, Turbine Stop Valves - CLOSED 	
		<ul style="list-style-type: none"> 1RL, 2RL, 1RR, 2RR, Reheat Stop Valves - CLOSED 	
		<ul style="list-style-type: none"> 1IL, 2IL, 1IR, 2IR, Intercept Valves - CLOSED 	

Op Test No.: N16-1 Scenario # 5 Event # 1 Page 15 of 57Event Description: **Roll Turbine**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Direct the Operator at the Turbine Front Standard to reset the Turbine locally by placing the Turbine Trip Lever to RESET and holding (lever will be released in Section 6.3 Step 27.j) 	<p>NOTE: The BOP will contact the AO at the Turbine Standard, and direct that the Turbine be latched.</p> <p>Booth Instructor acknowledge as AO, and use: IRF TUR004 f:RESET_HOLD</p> <p>And report that the Turbine has been reset.</p>
		<ul style="list-style-type: none"> Check the following: 	
		<ul style="list-style-type: none"> Ensure SL and SR, Turbine Stop Valves indicate OPEN on the EH Turbine Control Panel 	
		<ul style="list-style-type: none"> Ensure 1RL, 2RL, 1RR, 2RR, Reheat Stop Valves indicate OPEN on the EH Turbine Control Panel 	
		<ul style="list-style-type: none"> Ensure 1IL, 2IL, 1IR, 2IR, Intercept Valves indicate OPEN on the EH Turbine Control Panel 	
		<ul style="list-style-type: none"> Ensure GLU, GLL GRU, GRL Governor Valves indicate CLOSED on the EH Turbine Control Panel 	
		<ul style="list-style-type: none"> Check green Latch Light is ILLUMINATED 	
		<ul style="list-style-type: none"> Ensure Unit Trip Light is EXTINGUISHED 	
		<ul style="list-style-type: none"> (Operator at the Front Standard) WHEN PI-63ASO (Auto Stop Oil Press) indicates greater than 80 psig, THEN position the Turbine Trip Lever to NORMAL. 	<p>NOTE: The BOP will contact the AO at the Turbine Standard, and direct that the Turbine Trip Lever to Normal when PI-63ASO is greater than 80 psig.</p> <p>Booth Instructor acknowledge as AO, and use: IRF TUR004 f:NORMAL</p> <p>And report the Turbine Trip Lever has been returned to Normal.</p>

Op Test No.: N16-1 Scenario # 5 Event # 1 Page 16 of 57Event Description: **Roll Turbine**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 30) Depress the Valve Position Limit Δ (raise) pushbutton until the Valve Position Limit indicator stops rising.	
	BOP	(Step 31) Depress the Oper Auto pushbutton	
	BOP	(Step 32) At the E-H Cabinet, check the AVP cards are in AUTOMATIC.	NOTE: The CRS will contact an AO and direct this action. Floor Instructor respond as the AO and after taking direction and receiving Key #17 and Attachment 9, wait 30 seconds (Out of sight of CRS), initial Attachment 9, and return to CRS.
	BOP	(Step 33) Set a speed of 490 rpm to 510 rpm in the Setter display using the REF \downarrow and/or REF \uparrow pushbuttons.	
	BOP	(Step 34) Set the Acceleration Rate thumbwheel to 50 rpm/minute	
	BOP	(Step 35) Record steam inlet pressure as indicated on PI-1304 (HP Turb Throttle Press)	
	BOP	(Step 36) Record Condenser back pressure as indicated on PI-1310 (LP Turb A Cond Press Indicator) and PI-1311 (LP Turb B Cond Press Indicator)	

Op Test No.: N16-1 Scenario # 5 Event # 1 Page 17 of 57Event Description: **Roll Turbine**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 37) WHEN steam inlet pressure is at least 600 psig as indicated on PI-1304 (HP Turb Throttle Press) [Step 35] AND Condenser back pressure is less than or equal to 3.8 inches Hg Abs on PI-1310 (LP Turb 'A' Cond Press Indicator) and PI-1311 (LP Turb 'B' Cond Press Indicator) [Step 36] THEN depress the Go pushbutton to raise speed.	
	BOP	(Step 38) Perform the following as turbine speed raises;	
		<ul style="list-style-type: none"> Ensure turning gear disengages 	
		<ul style="list-style-type: none"> IF governor valve leakage is causing turbine speed to raise above the speed into the Setter, THEN... 	
		<ul style="list-style-type: none"> IF Turbine speed stabilizes in resonant speed range, THEN... 	
		<ul style="list-style-type: none"> IF Turbine speed exceeds 1395 rpm AND is NOT under positive control of the Operator, THEN... 	
When the Turbine Eccentricity Alarms move to Event #2.			

Op Test No.: N16-1 Scenario # 5 Event # 2 Page 18 of 57Event Description: **High Turbine Eccentricity**

When the Turbine is rolling, a HIGH Eccentricity condition will develop on the Main Turbine. The operator will respond using AOP-006, "Turbine Eccentricity/Vibration," and place the Turbine startup on HOLD.

Booth Operator Instructions:

\$006_ECC_RPM ICO
TURXMTET_HP r:15 f:3.3

Indications Available:

- RTGB Annunciator APP-008-B4, TURBINE SUPERVISORY INSTRUMENT
- Red ECC status light on Turbine Status Light Panel is LIT
- Turbine Supervisory Instrumentation Recorder indicates Turbine Eccentricity at 3.3 mils (If/When selected)

Time	Pos.	Expected Actions/Behavior	Comments
APP-008-A8, TURBINE SUPERVISORY INSTRUMENT			
	BOP	(Step 1) IF caused by High Rotor Eccentricity, THEN REFER TO AOP-006	
AOP-006, TURBINE ECCENTRICITY/VIBRATION			
	BOP	(Step 1) NOTIFY Plant Personnel Of Procedure Entry Using Plant Page System	
	BOP	(Step 2) CHECK Turbine Speed - LESS THAN OR EQUAL TO 600 RPM	
	BOP	(Step 3) CHECK Turbine Eccentricity On TURBINE SUPERVISORY INSTRUMENT RECORDER - LESS THAN 3 MILS	
	BOP	(Step 3 RNO) PERFORM the following:	
		<ul style="list-style-type: none"> • DEPRESS turbine HOLD pushbutton. 	
		<ul style="list-style-type: none"> • CONTACT Engineering to evaluate conditions and to provide recommended actions. 	

Op Test No.: N16-1 Scenario # 5 Event # 2 Page 19 of 57Event Description: **High Turbine Eccentricity**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none">MAINTAIN turbine speed less than 600 rpm until Engineering provides recommended actions.	NOTE: The BOP will suspend the Turbine Startup.
			NOTE: The CRS may call WCC to address the abnormal Turbine condition. If so, Booth Instructor acknowledge as WCC.
At the discretion of the Lead Examiner move to Event #3.			

Op Test No.: N16-1 Scenario # 5 Event # 3 Page 20 of 57Event Description: **Loss of Compensation Voltage to Intermediate Range N-35**

Shortly afterwards, the compensating voltage on Intermediate Range Channel N-35 will fail. The operator will remove the instrument from service using OWP-011, "Nuclear Instrumentation (NI)." The failed channel will require that the Source Range instruments be manually re-energized in the subsequent post-trip conditions. The operator will address Technical Specification LCO 3.3.1, "Reactor Protection System (RPS) Instrumentation," and determine to continue with the power increase.

Booth Operator Instructions: **IMF NIS06A**
f:4.4E-7

Indications Available:

- RTGB Annunciator APP-005-B2, N-35 LOSS OF COMP VOLT
- N35 indication changed slightly on NR-45

Time	Pos.	Expected Actions/Behavior	Comments
APP-005-B2, N-35 LOSS OF COMP VOLT			
	RO	(Step 1) MONITOR Intermediate Range amps.	
	RO	(Step 2) IF NI-35 has failed, THEN REMOVE NI-35 from service per OWP-011, Nuclear Instrumentation (NI).	NOTE: The CRS may call WCC/I&C to address the failed IR Channel. If so, Booth Instructor acknowledge as WCC/I&C and after 2 minutes call as WCCS/I&C and direct that the channel be removed from service.
	RO	(Step 3) IF a Reactor shutdown occurs, THEN manually ACTIVATE Source Range NIS.	NOTE: This is a Continuous Action. The CRS will make both board operators aware.
	CRS	(Step 4) REFER TO TS Table 3.3.1-1, Reactor Protection System Instrumentation.	
OWP-011, NUCLEAR INSTRUMENTATION (NI) NI-7, NI-35 INTERMEDIATE RANGE			

Op Test No.: N16-1 Scenario # 5 Event # 3 Page 21 of 57Event Description: **Loss of Compensation Voltage to Intermediate Range N-35**

Time	Pos.	Expected Actions/Behavior			Comments
	BOP	REMOVE NI-35 from ERFIS SCAN: NIN0035A			
	BOP	START UP RATE CHANNEL SELECT Switch – N36			
	BOP	LEVEL TRIP Switch - Bypass			
TECHNICAL SPECIFICATION 3.3.1, REACTOR PROTECTION SYSTEM (RPS) INSTRUMENTATION					
	CRS	LCO 3.3.1: The RPS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.			
	CRS	APPLICABILITY: According to Table 3.3.1-1.			
	CRS	NOTE: Separate Condition entry is allowed for each Function.			
	CRS	ACTIONS			
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that ACTION F.1or F.2 must be entered.
		F. THERMAL POWER > P- 6 and < P-10, one Intermediate Range Neutron Flux channel inoperable.	F.1 Reduce THERMAL POWER to < P-6. OR F.2 Increase THERMAL POWER to > P- 10.	2 hours 2 hours	
					NOTE: The CRS will likely perform an Alignment Brief.
At the discretion of the Lead Examiner move to Event #4.					

Op Test No.: N16-1 Scenario # 5 Event # 4 Page 22 of 57Event Description: **VCT Level transmitter LT-112 fails HIGH**

Following this, VCT Level Transmitter LT-112 will fail HIGH causing LCV-115A to divert all letdown flow to the CVCS HUTs and result in an automatic makeup to the VCT. The operator will respond in accordance with AOP-003, "Malfunction of Reactor Makeup Control." After this, the power increase will continue.

Booth Operator Instructions: **ICO CVCXMTLT_112**
r:01:00 f:100

Indications Available:

- RTGB Annunciator APP-003-E3, VCT HI/LO LVL
- LT-112 indicates HIGH on ERFIS
- LCV-115 Amber status light is LIT (indicating full divert to CVC HUT)
- Auto Makeup occurs

Time	Pos.	Expected Actions/Behavior	Comments
AOP-003, MALFUNCTION OF REACTOR MAKEUP CONTROL			
	RO	(Step 1) Check for Failure of A Level Transmitter as follows:	NOTE: An Auto Makeup is likely to occur due to Letdown being diverted to the radwaste system.
		<ul style="list-style-type: none"> • Obtain a VCT level for LT-115 using ERFIS 	
		<ul style="list-style-type: none"> • PT ID CHL0115A 	
		<ul style="list-style-type: none"> • Obtain a VCT level for LT-112 using ERFIS 	
		<ul style="list-style-type: none"> • PT ID CHL0112A 	
		<ul style="list-style-type: none"> • Check VCT level indicator – OSCILLATING LEVEL DEVIATION OBSERVED 	
	CRS	(Step 1.c RNO) GO to Step 1.e	
	RO	<ul style="list-style-type: none"> • CHECK VCT level deviation between LT-112 and LT-115 – GREATER THAN 8 INCHES (13%) 	
	CRS	(Step 2) CHECK LT-115 - FAILED	NOTE: LT-115 is NOT failed.

Op Test No.: N16-1 Scenario # 5 Event # 4 Page 23 of 57Event Description: **VCT Level transmitter LT-112 fails HIGH**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 2 RNO) GO to Step 4	
	RO	(Step 4) CHECK LT-112 - FAILED	
	RO	(Step 5) Stabilize the RCS Makeup System as follows:	
		<ul style="list-style-type: none"> Check LT-112 – FAILED HIGH 	
		<ul style="list-style-type: none"> Place LCV-115A, VCT/HLDP TK DIV, Control Switch to VCT 	
		<ul style="list-style-type: none"> Obtain Hagan Racks Key number 10 	
		<ul style="list-style-type: none"> Place VCT Level Transmitter Selector Switch located in Hagan Rack #19, IN LT-115 POSITION 	NOTE: The BOP will go to the Hagan Room. Booth Instructor use IRF CVC067 f:LT-115.
		<ul style="list-style-type: none"> Place the LCV-115A Control Switch to AUTO 	
		<ul style="list-style-type: none"> Contact I&C to repair failed channel 	NOTE: The CRS may call WCC/I&C to address the failed channel. If so, Booth Instructor acknowledge as WCC/I&C.
	CRS	(Step 6) Make PA Announcement for Procedure Entry	NOTE: The CRS will most likely make this announcement.
	CRS	(Step 7) Implement the EALs	NOTE: The CRS may ask SM to address. If so, Floor Instructor acknowledge as SM.
	RO	(Step 8) Check VCT Level – LESS THAN 12.5 INCHES (21%)	Examiner NOTE: All required actions have been completed for this failure. Move to the next event as desired.

Op Test No.: N16-1 Scenario # 5 Event # 4 Page 24 of 57Event Description: **VCT Level transmitter LT-112 fails HIGH**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 8 RNO) IF VCT level lowers to less than 12.5 inches (21%) THEN perform Steps 9 and 10.	
	CRS	<ul style="list-style-type: none"> Go to Step 11. 	
	RO	(Step 11) Check VCT Level – LESS THAN 20 INCHES (33%)	
	CRS	(Step 11 RNO) Go to Step 21	
	RO	(Step 21) Check VCT Level – LESS THAN 51.5 INCHES (86%)	
	RO	(Step 22) Verify Charging and Letdown Flows are Normal for Plant Conditions	
	RO	(Step 23) Check APP-003-D5, BA FLOW DEV - ILLUMINATED	
	CRS	(Step 23 RNO) Go to Step 28.	
	RO	(Step 28) Check APP-003-E5, MAKEUP WATER DEV - ILLUMINATED	
	CRS	(Step 28 RNO) Go to Step 34	
	RO	(Step 34) Check Boration - REQUIRED	
	CRS	(Step 34 RNO) GO to Step 37	
	RO	(Step 37) Check Dilution - REQUIRED	
	CRS	(Step 37 RNO) Go to Step 40.	

Op Test No.: N16-1 Scenario # 5 Event # 4 Page 25 of 57Event Description: **VCT Level transmitter LT-112 fails HIGH**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 40) Check Technical Specifications, Section 3.4.17, Chemical and Volume Control System (CVCS), For Applicable LCO	
	CRS	(Step 41) Return to Procedure and Step in Effect	
At the discretion of the Lead Examiner move to Event #5.			

Op Test No.: N16-1 Scenario # 5 Event # 5 Page 26 of 57Event Description: **"B" RCP Thermal Barrier Leak/Flow Control Valve FCV-626 fails to CLOSE**

Next, a Thermal barrier leak will develop on the "B" RCP and Flow Control Valve FCV-626 will fail to CLOSE. The operator will respond in accordance with APP-001-C1, "RCP THERM BAR COOL WTR HI FLOW," and AOP-014, "Component Cooling Water Malfunction." The operator will address Technical Specification LCO 3.6.1, "Containment," and Technical Specification LCO 3.6.3, "Containment Isolation Valves."

Booth Operator Instructions: **IMF RCS12B**
r: 01:00 f:40

Indications Available:

- RTGB Annunciator APP-001-C1, RCP THERM BAR COOL WTR HI FLOW
- RTGB Annunciator APP-001-B2, RCP LABYRTH LO ΔP
- Seal Injection flow on "B" RCP rising
- "B" RCP Thermal Barrier ΔP, PI-123A indicating 0"
- CCW Surge Tank Level rising
- RTGB Annunciator APP-036-D8, PROCESS MONITOR HI RAD

Time	Pos.	Expected Actions/Behavior	Comments
APP-001-C1, RCP THERM BAR COOL WTR HI FLOW			
	RO	(Step 1) IF CCW AND Seal Injection are lost to any RCP, THEN...	
	RO	(Step 2) IF result of CCW Pump start only, THEN...	
	CRS	(Step 3) IF a failure of an RCP Thermal Barrier has occurred, THEN REFER to AOP-014.	NOTE: The CRS will transition to AOP-014.
	RO	(Step 4) IF a RCP Number 1 Seal failure has occurred, THEN...	
			NOTE: The BOP may address AOP-005 as time permits.
AOP-014, COMPONENT COOLING WATER MALFUNCTION			

Op Test No.: N16-1 Scenario # 5 Event # 5 Page 27 of 57Event Description: **"B" RCP Thermal Barrier Leak/Flow Control Valve FCV-626 fails to CLOSE**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 1) IMPLEMENT The EALs	NOTE: The CRS may ask SM to address. If so, Floor Instructor acknowledge as SM.
	CRS	(Step 2) NOTIFY Plant Personnel of Procedure Entry Using Plant Page System	NOTE: The CRS will most likely make this announcement.
	CRS	(Step 3) GO TO Appropriate Section for Indicated Malfunction:	
		<ul style="list-style-type: none"> Rising CCW inventory OR R-17 Alarming – Go to Section B 	NOTE: The CRS will address Section B of AOP-014.
AOP-014, COMPONENT COOLING WATER MALFUNCTION SECTION B, RISING CCW INVENTORY OR R-17 ALARMING			
	RO	(Step 1) CHECK FCV-626, THERM BAR FLOW CONT – AUTO CLOSED	
	RO	(Step 1 RNO) PERFORM the following:	
		IF APP-001-C1, RCP THERM BAR COOL WTR HI FLOW, is ILLUMINATED, THEN PERFORM ONE of the following:	
		<ul style="list-style-type: none"> ENSURE FV-626 is CLOSED AND GO TO Step 2. (RTGB) 	NOTE: FCV-626 will fail to CLOSE.
		OR	
		<ul style="list-style-type: none"> IF FCV-626 will NOT close, THEN CLOSE CC-735, THERM BAR OUT ISO, AND GO TO Step 2. 	NOTE: The operator will close CC-735.
	RO	(Step 2) CHECK RCP Seal Leakoff – ANY GREATER THAN 5 GPM	
	CRS	(Step 2 RNO) GO TO Step 4.	

Op Test No.: N16-1 Scenario # 5 Event # 5 Page 28 of 57Event Description: **"B" RCP Thermal Barrier Leak/Flow Control Valve FCV-626 fails to CLOSE**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 4) CHECK the following indications of an RCP Thermal Barrier Failure – BOTH EXIST	
		<ul style="list-style-type: none"> RCP Thermal Barrier Cooling – ISOLATED DUE TO HIGH FLOW 	NOTE: Thermal Barrier is isolated by CC-735.
		AND	
		<ul style="list-style-type: none"> R-17, COMPONENT COOLING WATER RADIOACTIVE LIQUID – RISING TREND OR ALARM 	NOTE: R-17 is in alarm.
	RO	(Step 5) CHECK Seal Injection Flow to the Affected RCP(s) - LOST	
	CRS	(Step 5 RNO) GO TO Step 7.	
	CRS	(Step 7) DISPATCH Operator to Containment to Perform Attachment 6, RCP Thermal Barrier Isolation	NOTE: The CRS may call WCC to address the performance of Attachment 6. If so, Booth Instructor acknowledge as WCC.
	RO	(Step 8) CHECK RCP Status as follows:	
		<ul style="list-style-type: none"> CHECK RCP B OR C - RUNNING 	
		<ul style="list-style-type: none"> CHECK RCP B - RUNNING 	
		<ul style="list-style-type: none"> CHECK RCP C - RUNNING 	
	CRS	(Step 9) WHEN Attachment 6 is completed, THEN GO TO Step 23	NOTE: This Attachment will require a Containment Entry, and will not be completed within the remainder of the Scenario.

Op Test No.: N16-1 Scenario # 5 Event # 5 Page 29 of 57Event Description: **"B" RCP Thermal Barrier Leak/Flow Control Valve FCV-626 fails to CLOSE**

Time	Pos.	Expected Actions/Behavior			Comments
					Examiner NOTE: Because of the dynamic nature of this event, and the response, the CRS may NOT check the Tech Specs. If not, evaluate the Technical Specification after the Scenario is complete.
TECHNICAL SPECIFICATION 3.4.13, RCS OPERATIONAL LEAKAGE					
	CRS	LCO 3.4.13 RCS operational LEAKAGE shall be limited to: 1 gpm unidentified LEAKAGE			
	CRS	APPLICABILITY:MODES 1, 2, 3 and 4			
	CRS	ACTIONS			
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that ACTION A.1 must be entered until FCV-626 is isolated (CC-735 Closed).
		A. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE	A.1 Reduce LEAKAGE to within limits	4 hours	
TECHNICAL SPECIFICATION 3.6.3, CONTAINMENT ISOLATION VALVES					
	CRS	LCO 3.6.3 Each containment isolation valve shall be OPERABLE			
	CRS	APPLICABILITY: MODES 1, 2, 3 AND 4.			

Op Test No.: N16-1 Scenario # 5 Event # 5 Page 30 of 57Event Description: **"B" RCP Thermal Barrier Leak/Flow Control Valve FCV-626 fails to CLOSE**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	ACTIONS	
		NOTES	
		1. Penetration flow path(s) may be unisolated intermittently under administrative controls.	
		2. Separate Condition entry is allowed for each penetration flow path.	
		3. Enter applicable Conditions and Required Actions for systems made inoperable by containment isolation valves.	
		4. Enter applicable Conditions and Required Actions of LCO 3.6.1, "Containment", when isolation valve leakage results in exceeding the overall containment leakage rate acceptance criteria.	NOTE: When FCV-626 is unisolated and failed OPEN, Technical Specification LCO 3.6.1 is NOT met.
		5. Enter applicable Conditions and Required Actions of LCO 3.6.8, "Isolation Valve seal Water (IVSW) System" when required IVSW supply to a penetration flowpath is isolated.	

Event Description: **“B” RCP Thermal Barrier Leak/Flow Control Valve FCV-626 fails to CLOSE**

Time	Pos.	Expected Actions/Behavior			Comments
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that ACTION A.1, and A.2 must be entered.
		A. One or more penetration flow paths with one containment isolation valve inoperable.	A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. AND A.2 NOTE: Isolation devices in high radiation areas may be verified by use of administrative means. Verify the affected penetration flow path is isolated.	4 hours Once per 31 days for isolation devices outside containment AND Prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment.	
TECHNICAL SPECIFICATION 3.6.1, CONTAINMENT					
	CRS	LCO 3.6.1: Containment shall be OPERABLE.			
	CRS	APPLICABILITY: MODES 1, 2, 3, and 4.			
	CRS	ACTIONS			

Op Test No.: N16-1 Scenario # 5 Event # 5 Page 32 of 57Event Description: **"B" RCP Thermal Barrier Leak/Flow Control Valve FCV-626 fails to CLOSE**

Time	Pos.	Expected Actions/Behavior			Comments
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that ACTION A.1 must be entered until FCV-626 is isolated (CC-735 closed and deactivated).
		A. Containment inoperable.	A.1 Restore containment to OPERABLE status.	1 hour	
At the discretion of the Lead Examiner move to Events #6-7.					

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 33 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Subsequently, a Steam Rupture will occur downstream of the MSIVs and the MSIVs will fail to CLOSE automatically and manually. Simultaneously, the Reactor will fail to TRIP automatically. The operator will enter EOP-E-0, "Reactor Trip or Safety Injection," and manually trip the reactor. Upon completion of EOP-E-0, the operator will transition to EOP-E-2, "Faulted Steam Generator Isolation," and then when it is realized that all Steam Generators are faulted, transition to EOP-ECA-2.1, Loss of Reactor or Secondary Coolant," and lower AFW flow to each Steam Generator to 60 gpm. While terminating Safety Injection in EOP-ECA-2.1, the "A" MSIV will close and the "A" S/G pressure will rise higher than that of the "B" and "C" S/G's. Since the crew will be in the process of terminating SI in EOP-ECA-2.1, the crew will continue to complete the SI termination steps before transitioning back to EOP-E-2. The scenario will terminate at Step 4.c of EOP-E-2, after the operator has closed the AFW Discharge valves to the "B" and "C" Steam Generators.

Booth Operator Instructions: **IMF MSS09**
f:855700

Indications Available:

- Steam noise heard in the Control Room
- Lowering pressure in all Steam Generators
- Rising level in all Steam Generators
- Rising steam flowing all Steam Generators
- RCS pressure is lowering

Time	Pos.	Expected Actions/Behavior	Comments
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO	(Step 1) CHECK Reactor Trip:	Immediate Action
		<ul style="list-style-type: none"> • Reactor Trip AND Bypass Breakers - OPEN 	NOTE: The operator will need to trip the Reactor Manually.
		<ul style="list-style-type: none"> • Rod position indicators - FULLY INSERTED 	
		<ul style="list-style-type: none"> • Rod Bottom Lights - ILLUMINATED 	
		<ul style="list-style-type: none"> • Neutron Flux - LOWERING 	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 34 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
Critical Task:			
Manually trip the reactor from the control room before entry into FRP-S.1			
<p>Safety Significance: Failure to manually trip the reactor causes a challenge to the subcriticality CSF beyond that irreparably introduced by the postulated conditions. Additionally, it constitutes an incorrect performance that necessitates the operator taking compensating action that would complicate the event mitigation strategy and demonstrates the inability of the operator to recognize a failure or an incorrect automatic actuation of an ESF system or component. The ERG Background Document for E-0 states that one function of E-0 is to verify that all required automatic protective actions occur before transitioning the crew to the appropriate ORG. The verification is important because the subsequent ORGs are based on the assumption that protective systems will protect all CSFs while the ORG is implemented. Not tripping the reactor when it is possible to do so (as in the postulated conditions) forces an immediate extreme challenge to the subcriticality CSF. Additionally, the incorrect performance of failing to trip the reactor necessitates the operator taking compensating action that seriously complicates the event mitigation strategy. This mis-operation constitutes a significant reduction of safety margin beyond that irreparably introduced by the scenario.</p>			
	BOP	(Step 2) CHECK Turbine Trip:	Immediate Action
		<ul style="list-style-type: none"> Both Turbine Stop Valves - CLOSED 	
		<ul style="list-style-type: none"> All MSR Purge AND Shutoff Valves - CLOSED 	
	BOP	(Step 3) CHECK Power To AC EMERGENCY BUSES:	Immediate Action
		<ul style="list-style-type: none"> CHECK Bus E-1 OR E-2 - AT LEAST ONE ENERGIZED 	
		<ul style="list-style-type: none"> CHECK Bus E-1 AND E-2 - BOTH ENERGIZED 	
	RO/ BOP	(Step 4) CHECK SI Status:	Immediate Action
		CHECK if SI is actuated:	
		<ul style="list-style-type: none"> SI annunciators - ANY ILLUMINATED 	
		OR	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 35 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> SI equipment - AUTO STARTED 	
		CHECK BOTH trains of SI actuated:	
		<ul style="list-style-type: none"> SI Pumps - TWO RUNNING 	
		<ul style="list-style-type: none"> RHR Pumps - BOTH RUNNING 	
			Examiner NOTE: The crew may transition to EOP-ES-0.1. If so, wait here until they return to EOP-E-0 on the Foldout Page, and proceed.
	RO/ BOP	Foldout Page:	
		RCP TRIP CRITERIA	
		FAULTED S/G AFW ISOLATION CRITERIA	
		AFW SUPPLY SWITCHOVER CRITERIA	
		DC BUS, INSTRUMENT BUS, OR MCC-5 FAILURE CRITERIA	
		SPENT FUEL POOL COOLING CRITERIA	
	CRS	(Step 5) PERFORM Attachment 1, Auto Action Verification, While CONTINUING WITH This Procedure	
			Examiner NOTE: The CRS will likely assign the BOP to perform this action. If so, BOP Examiner follow actions of Attachment 1. CRS/RO follow E-0 Actions, Step 6 , on Page 37 .
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION ATTACHMENT 1, AUTO ACTION VERIFICATION			
	BOP	(Step 1) CHECK ECCS Pumps Running:	
		<ul style="list-style-type: none"> SI Pumps - TWO RUNNING 	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 36 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> RHR Pumps - BOTH RUNNING 	
	BOP	(Step 2) CHECK ECCS Valves In Proper Emergency Alignment	
	BOP	(Step 3) CHECK CCW Pumps - AT LEAST ONE RUNNING	NOTE: The "A" CCW Pump is running.
	BOP	(Step 4) CHECK Containment Isolation Phase A:	
		<ul style="list-style-type: none"> CHECK Containment Isolation Phase A - ACTUATED 	
		<ul style="list-style-type: none"> CHECK Containment Isolation Phase A Valves - CLOSED 	
	BOP	<ul style="list-style-type: none"> CHECK Excess Letdown - ISOLATED 	
		<ul style="list-style-type: none"> CVC-387, EXCESS LTDN STOP VALVE - CLOSED 	
		<ul style="list-style-type: none"> HIC-137, EXCESS LTDN FLOW CONTROLLER - AT 0% DEMAND 	
	BOP	(Step 5) CHECK Feedwater Isolation:	
		<ul style="list-style-type: none"> CHECK Main Feed Pumps - BOTH TRIPPED 	
		<ul style="list-style-type: none"> CHECK Main Feedwater isolated: 	
		<ul style="list-style-type: none"> Feedwater Reg Valves - CLOSED 	
		<ul style="list-style-type: none"> Feedwater Reg Bypass Valves - CLOSED 	
		<ul style="list-style-type: none"> Feedwater Header Section Valves - CLOSED 	
	BOP	(Step 6) CHECK If Main Steam Lines Should Be Isolated:	
		<ul style="list-style-type: none"> CHECK Main Steam Line Isolation - REQUIRED 	
		<ul style="list-style-type: none"> High steam flow with: 	NOTE: The High Steam Flow criteria will be met.
		<ul style="list-style-type: none"> S/G pressure - LESS THAN 614 PSIG 	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 37 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		OR	
		<ul style="list-style-type: none"> Tavg - LESS THAN 543°F 	
	BOP	(Step 6.b) CHECK MSIVs AND MSIV Bypass Valves - CLOSED	NOTE: The valves have failed OPEN and cannot be CLOSED from the RTGB.
	BOP	(Step 6.b RNO) Manually CLOSE valve(s) as necessary.	
	BOP	(Step 7) CHECK Proper Service Water System Operation:	
		<ul style="list-style-type: none"> CHECK SW Pumps - ALL RUNNING 	
		<ul style="list-style-type: none"> CHECK SW Booster Pumps - BOTH RUNNING 	
		<ul style="list-style-type: none"> CHECK Both SW Header Low Pressure Alarms - EXTINGUISHED 	
		<ul style="list-style-type: none"> APP-008-F7,SOUTH SW HDR LO PRESS 	
		<ul style="list-style-type: none"> APP-008-F8,NORTH SW HDR LO PRESS 	
	BOP	(Step 8) CHECK BOTH EDGs - RUNNING	
	BOP	(Step 9) CHECK ECCS Flow:	
		<ul style="list-style-type: none"> CHECK RCS pressure - LESS THAN 1650 PSIG [1725 PSIG] 	
		<ul style="list-style-type: none"> CHECK SI Pumps – FLOW INDICATED 	NOTE: Based on event timing the SI Pumps may or may not be indicating flow.
		<ul style="list-style-type: none"> CHECK RCS pressure – LESS THAN 275 PSIG [325 PSIG] 	
	BOP	(Step 9.c RNO) GO TO Step 10.	
	BOP	(Step 10) CHECK CV Recirculation Fans - ALL RUNNING	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 38 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 11) CHECK IVSW System Actuated:	
		<ul style="list-style-type: none"> PCV-1922A, AUTOMATIC HEADER PRESSURE CONTROL VALVE - OPEN 	
		<ul style="list-style-type: none"> PCV-1922B, AUTOMATIC HEADER PRESSURE CONTROL VALVE - OPEN 	
	BOP	(Step 12) CHECK CV Ventilation Isolation:	
		<ul style="list-style-type: none"> CV Ventilation Isolation Valves - CLOSED 	
	BOP	(Step 13) CHECK Control Room Ventilation Aligned For Pressurization Mode:	
		<ul style="list-style-type: none"> HVA-1A OR HVA-1B, CONTROL ROOM AIR HANDLING FAN - RUNNING 	
		<ul style="list-style-type: none"> HVE-19A OR HVE-19B, CONTROL ROOM AIR CLEANING FAN - RUNNING 	
		<ul style="list-style-type: none"> HVE-16, CONTROL ROOM AIR EXHAUST FAN - STOPPED 	
		<ul style="list-style-type: none"> Control Room HVAC Outside Air Damper A OR B - OPEN 	
		<ul style="list-style-type: none"> CR-D1A-SA, CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER - CLOSED 	
		<ul style="list-style-type: none"> CR-D1B-SB, CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER - CLOSED 	
	BOP	(Step 14) CHECK DS Bus - ENERGIZED	
	BOP	(Step 15) CHECK Battery Chargers ENERGIZED:	
		<ul style="list-style-type: none"> APP-036-D1, BATT CHARGER A/A-1 TROUBLE Alarm - EXTINGUISHED 	
		<ul style="list-style-type: none"> APP-036-D2, BATT CHARGER B/B-1 TROUBLE Alarm - EXTINGUISHED 	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 39 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 16) STOP R-11/12 Sample Pump	
	BOP	(Step 17) Locally RESET AND LOAD Instrument Air Compressor(s) As Necessary (38 KW each):	NOTE: This step is NOT necessary.
	BOP	(Step 18) PERFORM Crew Update To Include The Following:	
		<ul style="list-style-type: none"> Attachment completion 	
		<ul style="list-style-type: none"> Manual actions taken 	
		<ul style="list-style-type: none"> Failed equipment status 	
		<ul style="list-style-type: none"> SW status per Step 7.c 	
		<ul style="list-style-type: none"> If applicable, PERFORM Supplement M, Component Alignment For Loss Of SW To Turbine Building, as time permits 	
			Examiner NOTE: Examiners following the CRS/RO continue HERE .
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION			
			NOTE: Due to a previous malfunction on IR N-35, the RO will need to manually re-energize the Source Ranges when < P-6.
	RO	(Step 6) CHECK AFW Pumps Running:	NOTE: Based on timing of events, and response actions to these events, the operator may not perform the RNO.
		<ul style="list-style-type: none"> CHECK Motor Driven AFW Pumps – BOTH RUNNING 	
		<ul style="list-style-type: none"> CHECK S/G Narrow Range levels – TWO S/Gs LESS THAN 16% 	
	RO	(Step 6b RNO) IF S/G Narrow Range level lowers to LESS THAN 16% on Two S/Gs, THEN PERFORM Step 6.c. CONTINUE WITH Step 7.	NOTE: This is a Continuous Action. The CRS will make both board operators aware.

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 40 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 7) CHECK AFW Valves In Proper Emergency Alignment:	
		<ul style="list-style-type: none"> AFW Header Discharge Valves - FULL OPEN 	
		<ul style="list-style-type: none"> AFW Header Section Valves - FULL OPEN 	
		<ul style="list-style-type: none"> Steam Driven AFW Pump Discharge Valves - FULL OPEN IF PUMP RUNNING 	NOTE: it is likely that the SDAFW Pump is running.
	RO	(Step 8) CHECK Total AFW Flow:	
		<ul style="list-style-type: none"> RESET SI 	
		<ul style="list-style-type: none"> CONTROL AFW flow to maintain Intact S/G Narrow Range level between 9%[18%] AND 50% 	
		<ul style="list-style-type: none"> CHECK total AFW flow - GREATER THAN 300 GPM 	
	RO	(Step 9) CHECK CV Spray NOT Required:	
		<ul style="list-style-type: none"> CHECK Containment Pressure - HAS REMAINED LESS THAN 10 PSIG 	
		<ul style="list-style-type: none"> CHECK CV Spray – NOT ACTUATED 	
	RO	(Step 10) CHECK RCP Seal Cooling:	
		<ul style="list-style-type: none"> CCW flow to RCP(s) Thermal Barriers - NORMAL 	
		<ul style="list-style-type: none"> APP-001-C1,RCP THERM BAR COOL WTR HI FLOW ALARM - EXTINGUISHED 	
		<ul style="list-style-type: none"> APP-001-D1,RCP THERM BAR COOL WTR LO FLOW alarm - EXTINGUISHED 	NOTE: APP-001-D1 is LIT because CC-735 is CLOSED.
		OR	
		<ul style="list-style-type: none"> Seal Injection flow - ADEQUATE 	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 41 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Seal Injection flow - GREATER THAN 6 GPM PER RCP 	
	RO	(Step 11) CHECK RCS Temperatures:	
		<ul style="list-style-type: none"> With ANY RCP running, RCS average temperature - STABLE AT OR TRENDING TO 547°F 	
	RO	(Step 11 RNO) IF temperature is LESS THAN 547°F AND lowering, THEN PERFORM the following:	NOTE: Due to the unisolable Steam Rupture the RCS temperature is lowering.
		<ul style="list-style-type: none"> STOP dumping steam. 	
		<ul style="list-style-type: none"> IF RCS cooldown continues, THEN REDUCE total AFW flow to minimum for decay heat removal. 	
		<ul style="list-style-type: none"> MAINTAIN total AFW flow GREATER THAN 300 gpm UNTIL S/G Narrow Range level is GREATER THAN 9%[18%] in at least one S/G. 	
		<ul style="list-style-type: none"> IF RCS cooldown continues, THEN CLOSE MSIVs AND MSIV Bypass Valves. 	NOTE: The valves have failed OPEN and cannot be CLOSED from the RTGB.
	RO	(Step 12) CHECK PZR PORVs AND Spray Valves:	
		<ul style="list-style-type: none"> CHECK PZR PORVs - CLOSED 	
		<ul style="list-style-type: none"> CHECK Normal PZR Spray Valves - CLOSED 	
		<ul style="list-style-type: none"> CHECK Aux PZR Spray Valve - CLOSED 	
	RO	(Step 13) CHECK If RCPs Should Be Stopped:	
		<ul style="list-style-type: none"> CHECK RCPs - ANY RUNNING 	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 42 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK SI Pumps - AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW 	
		<ul style="list-style-type: none"> CHECK RCS Subcooling based on Core Exit T/Cs - LESS THAN 13°F[32°F] 	
	CRS	(Step 13.c RNO) GO TO Step 14.	
	RO	(Step 14) CHECK If S/G Secondary Pressure Boundaries Are Intact:	NOTE: All Steam Generator pressures are lowering uncontrollably.
		<ul style="list-style-type: none"> NONE LOWERING IN AN UNCONTROLLED MANNER 	
		<ul style="list-style-type: none"> NONE COMPLETELY DEPRESSURIZED 	
	CRS	(Step 14 RNO) PERFORM the following:	
		<ul style="list-style-type: none"> RESET SPDS AND INITIATE monitoring of Critical Safety Functions Status Trees. 	
		<ul style="list-style-type: none"> GO TO EOP-E-2, Faulted Steam Generator Isolation, Step 1. 	NOTE: The CRS will transition to EOP-E-2.
EOP-E-2, FAULTED STEAM GENERATOR ISOLATION			
	BOP	(Step 1) CHECK MSIVs AND MSIV Bypass valves For Faulted S/G(s) CLOSED:	
		<ul style="list-style-type: none"> S/G A: 	
		<ul style="list-style-type: none"> V1-3A 	
		<ul style="list-style-type: none"> MS-353A 	
		<ul style="list-style-type: none"> S/G B: 	
		<ul style="list-style-type: none"> V1-3B 	
		<ul style="list-style-type: none"> MS-353B 	
		<ul style="list-style-type: none"> S/G C: 	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 43 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> V1-3C 	
		<ul style="list-style-type: none"> MS-353C 	
	BOP	(Step 1 RNO) Manually CLOSE valve(s) as necessary.	NOTE: The valves have failed OPEN and cannot be CLOSED from the RTGB.
	BOP	(Step 2) CHECK If ANY S/G Secondary Pressure Boundary Is Intact	
		<ul style="list-style-type: none"> CHECK pressures in ALL S/Gs - ANY STABLE OR RISING 	NOTE: All Steam Generator pressures are lowering uncontrollably.
	BOP	(Step 2 RNO) IF ALL S/G pressures are lowering in an uncontrolled manner, THEN PERFORM the following:	
		<ul style="list-style-type: none"> RESET SPDS. 	
		<ul style="list-style-type: none"> GO TO EOP-ECA-2.1, Uncontrolled Depressurization Of All Steam Generators, Step 1. 	
			NOTE: The CRS will transition to EOP-ECA-2.1.
EOP-ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS			
	RO/ BOP	Foldout Page:	
		SI REINITIATION CRITERIA	
		EOP-E-2 TRANSITION CRITERIA	
		<ul style="list-style-type: none"> IF ANY S/G pressure rises at ANYTIME, EXCEPT while performing SI Termination in Steps 10 THROUGH 19, THEN GO TO EOP-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1. 	NOTE: This criteria is expected to be applicable while in EOP-ECA-2.1.
		EOP-E-3 TRANSITION CRITERIA	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 44 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		COLD LEG RECIRCULATION SWITCHOVER CRITERIA	
		AFW SUPPLY SWITCHOVER CRITERIA	
	BOP	(Step 1) CHECK Secondary Pressure Boundary:	NOTE: The valves have failed OPEN and cannot be CLOSED from the RTGB.
		<ul style="list-style-type: none"> CHECK MSIVs AND MSIV Bypass Valves - CLOSED 	
	BOP/ CRS	(Step 1.a RNO) Manually OR locally CLOSE valve(s) as necessary, ONE S/G loop at a time:	
		<ul style="list-style-type: none"> S/G A 	NOTE: The CRS will dispatch an AO. Booth Instructor acknowledge as AO. This action will NOT be taken until Step 11 of EOP-ECA-2.1, AFTER Phase "A" Containment Isolation is RESET.
		<ul style="list-style-type: none"> V1-3A 	
		<ul style="list-style-type: none"> MS-353A 	
		<ul style="list-style-type: none"> S/G B 	
		<ul style="list-style-type: none"> V1-3B 	
		<ul style="list-style-type: none"> MS-353B 	
		<ul style="list-style-type: none"> S/G C 	
		<ul style="list-style-type: none"> V1-3C 	
		<ul style="list-style-type: none"> MS-353C 	
	BOP	<ul style="list-style-type: none"> CHECK Feedwater Isolation: 	
		<ul style="list-style-type: none"> FW Reg valves – CLOSED 	
		<ul style="list-style-type: none"> FW Reg Bypass valves – CLOSED 	
		<ul style="list-style-type: none"> FW Header Section valves - CLOSED 	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 45 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	<ul style="list-style-type: none"> CHECK Steam Driven AFW Pump Steam Shutoff Valves – CLOSED: 	NOTE: The CRS may dispatch an AO. Booth Instructor acknowledge as AO , and use codes listed BELOW .
		<ul style="list-style-type: none"> V1-8A, SDAFW PUMP STEAM ISOLATION (MCC-5, CMPT-16F) 	IRF EPSMCC5_189 f:RACK_OUT
		<ul style="list-style-type: none"> V1-8B, SDAFW PUMP STEAM ISOLATION (MCC-6, CMPT-16M) 	IRF EPSMCC6_226 f:RACK_OUT
		<ul style="list-style-type: none"> V1-8C, SDAFW PUMP STEAM ISOLATION (MCC-6, CMPT-18M) 	IRF EPSMCC6_227 f:RACK_OUT
	BOP	<ul style="list-style-type: none"> CHECK S/G Steam Line PORVs - CLOSED 	
	BOP	<ul style="list-style-type: none"> CHECK Faulted S/G(s) Blowdown AND Blowdown Sample Valves - CLOSED 	
		<ul style="list-style-type: none"> CHECK valve status using ERFIS/SPDS. 	
	BOP	<ul style="list-style-type: none"> Locally ENSURE the following valves CLOSED: (pipe jungle above/right of associated V1-8 valves): 	NOTE: The CRS will dispatch an AO. Booth Instructor acknowledge as AO , and report after 1 minute that the area has too much steam, and that entry cannot be made.
		<ul style="list-style-type: none"> BYPASS DRN & WARM-UP LINE TO AFW PUMP 	
		<ul style="list-style-type: none"> MS-20 	
		<ul style="list-style-type: none"> MS-29 	
		<ul style="list-style-type: none"> MS-38 	
		<ul style="list-style-type: none"> STEAM LINE BEFORE SEAT DRAIN ROOT ISOL 	
		<ul style="list-style-type: none"> MS-19 	
		<ul style="list-style-type: none"> MS-28 	
		<ul style="list-style-type: none"> MS-37 	
		<ul style="list-style-type: none"> STEAM LINE AFTER SEAT DRAIN ROOT ISOL 	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 46 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> MS-21 	
		<ul style="list-style-type: none"> MS-30 	
		<ul style="list-style-type: none"> MS-39 	
	BOP/ CRS	(Step 2) CHECK for adequate Shutdown Margin:	NOTE: The CRS may call WCC/Chemistry to address the samples. If so, Booth Instructor acknowledge as WCC/Chemistry.
		<ul style="list-style-type: none"> SAMPLE RCS for boron 	
		<ul style="list-style-type: none"> SAMPLE PZR for boron 	
		<ul style="list-style-type: none"> CHECK Shutdown Margin – ADEQUATED FOR COLD SHUTDOWN (When results available) 	
	RO/ BOP	(Step 3) CONTROL Feed Flow to MINIMIZE RCS Cooldown:	
		<ul style="list-style-type: none"> CHECK cooldown rate in RCS Cold Legs – LESS THAN 100°F in the last 60 minutes 	
	BOP	(Step 3.a RNO) LOWER feed flow to 60 gpm to each S/G.	NOTE: The crew may take various actions to reduce FW flow to 60 gpm to each S/G, including stopping AFW Pump(s), adjusting Pump discharge valves and/or directing that the AO locally adjust flow (If so, Booth Instructor use codes listed BELOW).
	BOP	(Step 3.b) CHECK S/G Narrow Range level in ALL S/Gs – LESS THAN 50%	
		<ul style="list-style-type: none"> CHECK RCS Hot Leg temperatures – STABLE OR LOWERING 	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 47 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK ANY S/G Narrow Range Level – LESS THAN 9% [18%] 	
	BOP/ CRS	<ul style="list-style-type: none"> OPEN MDAFW HEADER DISCHARGE Valve breakers: 	NOTE: The CRS will dispatch an AO. Booth Instructor acknowledge as AO , and use codes listed BELOW .
		<ul style="list-style-type: none"> V2-16A, MCC-9, CMPT-2ML 	IRF EPSMCC9_255 f:RACK_OUT
		<ul style="list-style-type: none"> V2-16C, MCC-9, CMPT-3J 	IRF EPSMCC9_256 f:RACK_OUT
		<ul style="list-style-type: none"> V2-16A, MCC-10, CMPT-4C 	IRF EPSMCC10_264 f:RACK_OUT
		<ul style="list-style-type: none"> V2-16B, MCC-10, CMPT-4F 	IRF EPSMCC10_266 f:RACK_OUT
	BOP/ CRS	<ul style="list-style-type: none"> THROTTLE AFFECTED S/G MDAFW HDR DISCH valve to establish a MINIMUM of 60 gpm to the AFFECTED S/G 	NOTE: The CRS will dispatch an AO.
		<ul style="list-style-type: none"> S/G A – V2-16A 	IRF CFW009 r: 35 f:2.2
		<ul style="list-style-type: none"> S/G B – V2-16B 	IRF CFW010 r: 33 f:2
		<ul style="list-style-type: none"> S/G C – V2-16C 	IRF CFW011 r: 31 f:2
			Examiner NOTE: When AFW flow is throttled to 60 gpm to each S/G a Red Path will exist on the HEAT SINK CSFST. The operator will address FRP-H.1 and immediately return to EOP-ECA-2.1.

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 48 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
Critical Task:			
Control the AFW flow rate to not less than 60 gpm per SG in order to minimize the RCS cooldown rate before an EXTREME (Red Path) challenge develops to the RCS Integrity CSF			
Safety Significance: Failure to control the AFW flow rate to the SGs leads to an unnecessary and avoidable extreme challenge to the integrity CSF. Also, failure to perform the critical task increases the challenges to the subcriticality CSF beyond which is irreparably introduced by the postulated plant conditions. Thus, failure to perform the critical task constitutes a demonstrated inability by the operator to take one or more actions that would prevent a challenge to plant safety. It also fails to prevent a significant reduction of safety margin beyond that irreparably introduced by the scenario.			
	RO	(Step 4) CHECK if RCPs Should be Stopped:	
		<ul style="list-style-type: none"> CHECK RCPs – ANY RUNNING 	
		<ul style="list-style-type: none"> CHECK SI Pumps – AT LEAST ONE RUNNING AND CAPABLE Of DELIVERING FLOW 	
		<ul style="list-style-type: none"> CHECK RCS Subcooling based on Core Exit T/Cs – LESS THAN 13°F [32°F] 	
	CRS	(Step 4.c RNO) OBSERVE CAUTION prior to Step 5 AND GO TO Step 5	
	RO	(Step 5) CHECK PZR PORVs AND Block Valves:	
		<ul style="list-style-type: none"> CHECK power to PORV Block Valves - AVAILABLE 	
		<ul style="list-style-type: none"> CHECK PORVs - CLOSED 	
		<ul style="list-style-type: none"> CHECK PORV Block Valves – AT LEAST ONE OPEN 	
	BOP	(Step 6) Check Secondary Radiation:	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 49 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> REQUEST periodic activity samples of ALL S/Gs 	NOTE: The CRS may call RP/Chemistry to address the samples. If so, Booth Instructor acknowledge as RP/Chemistry .
		<ul style="list-style-type: none"> CHECK unisolated secondary radiation monitors – HAVE REMAINED NORMAL 	
		<ul style="list-style-type: none"> R-15, CONDENSER AIR EJECTOR GAS 	
		<ul style="list-style-type: none"> R-19s S/G Blowdown Radiation 	
		<ul style="list-style-type: none"> R-31s, STEAMLINE RADIATION MONITORS 	
	CRS	<ul style="list-style-type: none"> CHECK secondary sample results – NORMAL (When results available) 	
	RO	(Step 7) CHECK If RHR Pumps Should Be Stopped:	
		<ul style="list-style-type: none"> CHECK RHR pumps – ANY RUNNING WITH SUCTION ALIGNED TO RWST 	
		<ul style="list-style-type: none"> CHECK RCS pressure: 	
		<ul style="list-style-type: none"> Pressure – GREATER THAN 275 PSIG [325 PSIG] 	
		<ul style="list-style-type: none"> Pressure – STABLE OR RISING 	
		<ul style="list-style-type: none"> RESET SI 	
		<ul style="list-style-type: none"> STOP RHR pumps 	
		<ul style="list-style-type: none"> CHECK RCS pressure remains – GREATER THAN 275 PSIG [325 PSIG] 	
	RO	(Step 8) CHECK IF CV Spray Should Be Stopped:	
		<ul style="list-style-type: none"> CHECK CV Spray Pumps – ANY RUNNING 	
	CRS	(Step 8.a RNO) GO TO Step 9.	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 50 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 9) CHECK RWST Level – GREATER THAN 27%	
	RO	(Step 10) RESET SI	
	RO	(Step 11) RESET Containment Isolation:	
		<ul style="list-style-type: none"> PHASE A 	<p>NOTE: The CRS has previously dispatched an AO to locally CLOSE an MSIV.</p> <p>Booth Instructor: AFTER Phase “A” Containment Isolation is RESET in Step 11, use:</p> <p>DMF MSS03A</p> <p>DOR diMSSDDI049</p> <p>To locally CLOSE the “A” MSIV.</p> <p>30 seconds later report that the “A” MSIV has been CLOSED.</p> <p>NOTE: The “A” S/G will rise in comparison to the “B” and “C” S/G’s and the criteria for item #2 on the Foldout Page will be met. However, the transition back to EOP-E-2 cannot take place until the SI Termination Step is complete (Step 19).</p>
		<ul style="list-style-type: none"> PHASE B 	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 51 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 12) RESET IVSW System:	NOTE: The CRS will dispatch an AO. Booth Instructor acknowledge as AO , and use: IRF SIS026 f:RESET IRF SIS027 f:RESET and report after 1 minute that the IVSW System has been reset.
		<ul style="list-style-type: none"> IVSW RESET PCV-1922A (In Relay Cabinet ARP-1) 	
		<ul style="list-style-type: none"> IVSW RESET PCV-1922B (In Relay Cabinet ARP-2) 	
	RO	(Step 13) ESTABLISH Instrument Air To CV:	
		<ul style="list-style-type: none"> CHECK APP-002-F7, INSTR AIR HDR O PRESS alarm - EXTINGUISHED 	
		<ul style="list-style-type: none"> RESET IA PCV-1716, INSTRUMENT AIR ISOLATION TO CV 	
		<ul style="list-style-type: none"> CHECK IA PCV-1716 - OPEN 	
	RO	(Step 14) CHECK if SI Accumulators Should Be Isolated:	
		<ul style="list-style-type: none"> CHECK at least two RCS Hot Leg temperatures –LESS THAN 430°F 	
		<ul style="list-style-type: none"> CHECK power to Accumulator Discharge Valves - ENERGIZED 	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 52 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 14.b RNO) RESTORE power to Accumulator Discharge Valves by closing the following:	NOTE: The CRS/RO will dispatch an AO to CLOSE the Accumulator Isolation Valve motor breakers. Booth Instructor acknowledge as AO , and use: IRF EPSMCC5_204 f:RACK_IN IRF EPSMCC5_205 f:RACK_IN IRF EPSMCC6_232 f:RACK_IN report after 2 minutes that the breakers are CLOSED .
		<ul style="list-style-type: none"> MCC-5 CMPT 9F (SI-865C) 	
		<ul style="list-style-type: none"> MCC-5 CMPT 14F (SI-865A) 	
		<ul style="list-style-type: none"> MCC-6 CMPT 10J (SI-865B) 	
		<ul style="list-style-type: none"> CLOSE ALL Accumulator Discharge Valves 	
	BOP	(Step 15) CHECK Power Supply to Charging Pumps - OFFSITE POWER AVAILABLE	
	RO	(Step 16) ESTABLISH Charging Flow:	
		<ul style="list-style-type: none"> CHECK Charging Pumps – AT LEAST ONE RUNNING 	
		<ul style="list-style-type: none"> ESTABLISH desired charging flow: 	
		<ul style="list-style-type: none"> START additional Charging Pump(s) as necessary 	
		<ul style="list-style-type: none"> ADJUST the following as necessary to maintain proper Seal Injection AND desired Charging flow: 	
		<ul style="list-style-type: none"> Charging Pump Speed Controller(s) 	
		<ul style="list-style-type: none"> HIC-121, CHARGING FLOW Controller 	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 53 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Seal Water Flow Control Valves 	
		<ul style="list-style-type: none"> MAINTAIN Seal Injection flow between 6 gpm AND 20 gpm per RCP UNLESS Seal Injection isolated 	
	RO	(Step 17) CHECK If ECCS Flow Should Be Terminated:	
		<ul style="list-style-type: none"> CHECK SI pumps – ANY RUNNING 	
		<ul style="list-style-type: none"> CHECK RCS Subcooling based on Core Exit T/Cs – GREATER THAN 18°F [37°F] 	
		<ul style="list-style-type: none"> Pressure – GREATER THAN 1650 PSIG 	
	CRS	(Step 17.c RNO) OBSERVE CAUTION prior to STEP 3 AND RETURN TO Step 3.	NOTE: Based on the EOP-ECA-2.1 Foldout Page criteria being met, the CRS may transition back to EOP-E-2, and isolate the “B” and “C” S/G’s. If not, continue.
		<ul style="list-style-type: none"> Pressure - STABLE OR RISING 	
		<ul style="list-style-type: none"> PZR level - GREATER THAN 14% [31%] 	
		(Step 18) STOP ECCS Pumps:	
		<ul style="list-style-type: none"> STOP SI pumps 	
		<ul style="list-style-type: none"> CHECK RHR Pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST 	
		<ul style="list-style-type: none"> STOP RHR Pumps 	
		(Step 19) CHECK ECCS Flow Not Required:	
		<ul style="list-style-type: none"> CHECK RCS Subcooling based on Core Exit T/Cs - GREATER THAN 18°F [37°F] 	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 54 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK PZR level - GREATER THAN 14% [31%] 	
EOP-E-2, FAULTED STEAM GENERATOR ISOLATION			
	BOP	(Step 1) CHECK MSIVs AND MSIV Bypass valves For Faulted S/G(s) CLOSED:	
		<ul style="list-style-type: none"> S/G A: 	NOTE: The "A" MSIV and Bypass Valves are CLOSED.
		<ul style="list-style-type: none"> V1-3A 	
		<ul style="list-style-type: none"> MS-353A 	
		<ul style="list-style-type: none"> S/G B: 	NOTE: The "B" MSIV is failed OPEN.
		<ul style="list-style-type: none"> V1-3B 	
		<ul style="list-style-type: none"> MS-353B 	
		<ul style="list-style-type: none"> S/G C: 	NOTE: The "C" MSIV is failed OPEN.
		<ul style="list-style-type: none"> V1-3C 	
		<ul style="list-style-type: none"> MS-353C 	
	BOP	(Step 1 RNO) Manually CLOSE valve(s) as necessary.	NOTE: The valves have failed OPEN and cannot be CLOSED from the RTGB.
			The CRS may dispatch an AO to locally CLOSE one of the two failed OPEN MSIVs. If so, Booth Instructor acknowledge as AO.
	BOP	(Step 2) CHECK If ANY S/G Secondary Pressure Boundary Is Intact	
		<ul style="list-style-type: none"> CHECK pressures in ALL S/Gs - ANY STABLE OR RISING 	NOTE: The "A" S/G pressure is stable for plant conditions.

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 55 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3) IDENTIFY Faulted S/G(s):	
		<ul style="list-style-type: none"> CHECK pressures in ALL S/Gs - 	
		<ul style="list-style-type: none"> ANY S/G PRESSURE LOWERING IN AN UNCONTROLLED MANNER 	NOTE: The "B" and "C" S/Gs are still faulted.
		OR	
		<ul style="list-style-type: none"> ANY S/G COMPLETELY DEPRESSURIZED 	
	BOP	(Step 4) ISOLATE Faulted S/G(s):	
		<ul style="list-style-type: none"> CHECK Main Feedwater Reg Valve, Reg Bypass Valve AND Header Section Valve to Faulted S/G(s) shut: 	
		<ul style="list-style-type: none"> S/G B valves - CLOSED 	
		<ul style="list-style-type: none"> FCV-488 	
		<ul style="list-style-type: none"> FCV-489 	
		<ul style="list-style-type: none"> V2-6B 	
		<ul style="list-style-type: none"> S/G C valves - CLOSED 	
		<ul style="list-style-type: none"> FCV-498 	
		<ul style="list-style-type: none"> FCV-499 	
		<ul style="list-style-type: none"> V2-6C 	
		<ul style="list-style-type: none"> RESET SI 	
		<ul style="list-style-type: none"> CLOSE AFW Discharge Valve(s) to Faulted S/G(s): 	
		<ul style="list-style-type: none"> S/G B valves - CLOSED 	
		<ul style="list-style-type: none"> V2-14B 	
		<ul style="list-style-type: none"> V2-16B 	NOTE: The BOP will contact the AO and direct that V2-16B be locally CLOSED. Booth Instructor acknowledge as AO , and use IRF CFW010 f:0 .
		<ul style="list-style-type: none"> S/G C valves - CLOSED 	
		<ul style="list-style-type: none"> V2-14C 	

Op Test No.: N16-1 Scenario # 5 Event # 6 & 7 Page 56 of 57Event Description: **Steam Rupture downstream of the MSIVs w/failure of the MSIVs to CLOSE/ Failure of Automatic Rx Trip**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none">V2-16C	NOTE: The BOP will contact the AO and direct that V2-16C be locally CLOSED. Booth Instructor acknowledge as AO , and use IRF CFW011 f:0 .
At the discretion of the Lead Examiner terminate the exam.			

NRC SCENARIO N16-1-5 TURNOVER SHEET

1. INITIAL CONDITIONS

- | | |
|-------------------------|-------------|
| a) Time in Core Life: | EOL |
| b) Reactor Power: | 4.5% |
| c) Turbine Load: | 0 MWe |
| d) Boron Concentration: | 511 ppm |
| e) Rod Height: | 148 CB 'D' |
| f) RCS Pressure: | 2235 psig |
| g) PZR Level: | 26.4% |
| h) Xenon: | Equilibrium |

2. TECHNICAL SPECIFICATION LCO ACTIONS STATEMENTS IN EFFECT

<u>T.S. #</u>	<u>Description</u>
None	

3. CLEARANCES IN EFFECT

- a) The "B" Condensate Pump is OOS.

4. CAUTION CAPS IN EFFECT

- a) None

5. PROTECTED EQUIPMENT

- a) "A" Condensate Pump

6. DEGRADED EQUIPMENT

- a) LI-1417A, Hotwell Level Indication is OOS (I&C Investigating).
b) RTGB Annunciator APP-006-F7, "PWST HI/LO LVL," has failed to the ILLUMINATED condition (I&C is investigating).

7. SWITCHYARD ACCESS

- a) Unrestricted (NOT-PROTECTED)

8. PLANNED EVOLUTIONS

- a) Raise power to 30% IAW GP-005 starting with Section 6.3

9. TURNOVER INFORMATION

- a) The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

10. REACTIVITY INFORMATION

- a) The Reactor Engineer (RE) is available in the Control Room
b) The RE recommends a 7,485 gallon dilution, made in several 200-300 gallon batch additions
c) The RE recommends that Control Bank D be at approximately 160 steps upon achieving 30%

11. RISK

- a) YELLOW (Planned power increase)

ROBINSON Nuclear Training
Committed to Excellence

OPERATIONS TRAINING

N16-1-6

Initial Licensed Operator Training

Rev 012216

**THIS EXERCISE GUIDE DOES NOT
IMPLEMENT ANY COMMITMENTS**


Developed By:

 CHRISTOPHER McCombs
Instructor/Developer

Date:

1/22/16

Concurred By:

 JOHN R. LITTLE JR.
Line Superintendent/Supervisor/SRO

Date:

01/22/16

Approved By:

 Terry Giese
Superintendent/Supervisor Training

Date:

1/22/16

PROGRAM: H B Robinson Operations Training

MODULE: Initial License Operator Training Class 15-1

TOPIC: NRC Simulator Exam

Scenario N16-1-6

REFERENCES:

1. Technical Specification LCO 3.8.1, "AC Sources - Operating" (Amendment 203)
2. AOP-010, "Main Feedwater/Condensate Malfunction" (Rev 33)
3. OP-105, "Maneuvering the Plant When Greater Than 25% Power" (Rev 62)
4. OP-301, "Chemical And Volume Control System" (Rev 112)
5. APP-008 "SW, CW, & TURB GEN AUX" (Rev 67)
6. Technical Specification LCO 3.7.7, "Service Water System (SWS)" (Amendment 176)
7. Technical Specification LCO 3.6.6, "Containment Spray and Cooling Systems" (Amendment 176)
8. AOP-018, "Reactor Coolant Pump Abnormal Conditions" (Rev 31)
9. Technical Specification LCO 3.7.6, "Component Cooling Water (CCW) System" (Amendment 176)
10. Technical Specification LCO 3.4.17, "Chemical and Volume Control System (CVCS)" (Amendment 223)
11. EOP-E-0, "Reactor Trip or Safety Injection" (Rev 6)
12. EOP-ECA-0.0, "Loss of All AC Power" (Rev 4)
13. EOP-ES-1.1, "SI Termination" (Rev 2)
14. EOP-ES-0.1, "Reactor Trip Response" (Rev 7)

Validation Time: 100 minutes

Scenario Event Description
NRC Scenario 6

Facility:	HB Robinson	Scenario No.:	6	Op Test No.:	N16-1
Examiners:	_____	Operators:	_____ (SRO)		
	_____		_____ (RO)		
	_____		_____ (BOP)		
Initial Conditions:	The plant is at 100% power (MOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.				
Turnover:	The following equipment is Out-Of-Service: The "A" EDG is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.8.1 ACTION B.1, B.2, B.3.2.1 and B.3.2.2, and B.4. R-15, Condenser Air Ejector Gas Radiation Monitor is OOS (I&C Investigating). RTGB Annunciator APP-002-F8, "STA AIR HDR LO PRESS," has failed to the ILLUMINATED condition (I&C is investigating). The "B" MFWP has experienced high noise/vibration over the last two hours (Maintenance is investigating).				
Event No.	Malf. No.	Event Type*	Event Description		
1	1	C-BOP C-SRO	Feedwater Heater Bypass Valve fails OPEN		
2	NA	R-RO N-BOP N-SRO	Lower Power		
3	2	C-BOP C(TS)-SRO	"C" Service Water Pump Trips		
4	3	C-RO C(TS)-SRO	DS Bus De-energizes/"C" CCW Pump Trips on Start		
5	4	C-RO C-SRO	"A" RCP Seal Failure		
6	5	M-RO M-BOP M-SRO	Loss of Offsite Power		
7	5	C-BOP	"B" EDG Fails to Start		
8	6	NA	DSDG Trips		
9	7	C-BOP	"D" Service Water Pump fails to Auto Start		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Scenario Event Description
NRC Scenario 6

H B Robinson 2016 NRC Scenario #6

The plant is at 100% power (MOL). The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.

The following equipment is Out-Of-Service: The following equipment is Out-Of-Service: The "A" EDG is OOS. ACTION has been taken in accordance with Technical Specification LCO 3.8.1 ACTION B.1, B.2, B.3.2.1 and B.3.2.2, and B.4. R-15, Condenser Air Ejector Gas Radiation Monitor is OOS (I&C Investigating). RTGB Annunciator APP-002-F8, "STA AIR HDR LO PRESS," has failed to the ILLUMINATED condition (I&C is investigating). The "B" MFWP has experienced high noise/vibration over the last two hours (Maintenance is investigating).

Shortly after taking the watch, HCV-1459, Heater Bypass Valve will fail OPEN. The crew will implement AOP-010, "Main Feedwater/Condensate Malfunction," and close the valve.

After the overpower transient is stabilized, the WCCS will call the control room and direct that reactor power be lowered to 50% for the purpose of removing the "B" Main Feedwater Pump from service. The operator will lower power in accordance with AOP-038, "Rapid Downpower."

After the power reduction is in progress, the "C" Service Water Pump will trip on overload. This will cause the running Service Water Booster Pump to trip as well. The operator will respond in accordance with various APP-008 annunciators and start a standby Service Water Pump; and then respond in accordance with APP-002-A through D8, "HVV WTR OUTLET LO FLOW," and re-start a Service Water Booster Pump. The operator will address Technical Specification LCO 3.7.7, "Service Water System (SWS)," and Technical Specification LCO 3.6.6, "Containment Spray and Cooling Systems."

Following this, Breaker 52/32A will Trip de-energizing the DS Bus, and stopping the only running Charging Pump and CCW Pump. The operator may address AOP-018, "Reactor Coolant Pump Abnormal Conditions," or various APP's to restore Charging and Seal Injection flow; and then APP-001-F5, CCW PMP LO PRESS, and ensure that the standby CCW Pump started. 10 seconds after the Standby CCW Pumps start, the "C" CCW Pump will trip, and only the "B" CCW will be left running. The operator will address Technical Specification LCO 3.7.6, "Component Cooling Water (CCW) System," and Technical Specification LCO 3.4.17, "Chemical and Volume Control System (CVCS)."

Next, a #1 Seal Failure will occur on the "A" RCP. The crew will implement AOP-018, "Reactor Coolant Pump Abnormal Conditions," trip the reactor, stop the pump, and three minutes after the pump is stopped, CLOSE the Seal Leakoff Valve. The crew will enter EOP-E-0, "Reactor Trip or Safety Injection." Simultaneously, a Loss of Offsite Power will occur on the reactor trip, and the "B" Emergency Diesel Generator will fail to automatically start. Additionally, the DS DG will trip.

Upon entry into EOP-E-0, the operator will determine that both ESF buses are de-energized and transition to EOP-ECA-0.0, "Loss of All AC Power." The operator will subsequently start the "B" EDG by depressing the SI Actuate Pushbutton, restore power to Bus E-2, and transition back to EOP-E-0. When Bus E-2 is re-energized, the "D" Service Water Pump will fail to sequence automatically and will need to be manually started.

Upon transition back to EOP-E-0, the crew will complete the immediate actions of EOP-E-0, and continue with AOP-018.

Scenario Event Description
NRC Scenario 6

The scenario will terminate when the crew has terminated Safety Injection and re-established Charging/Seal Injection in Step 6 of ES-1.1.

Critical Tasks:

Energize at Least One AC Emergency Bus Before Defeating the Auto Loading of the Safeguards Equipment in EOP-ECA-0.0

Safety Significance: Failure to energize an ac emergency bus constitutes mis-operation or incorrect crew performance in which the crew does not prevent degraded emergency power capacity. Failure to perform the critical task also results in needless degradation of any barrier to fission product release, specifically of the RCS barrier at the point of the RCP seals. Additionally, failure to perform the critical task results in the unnecessary continuation of a situation in which RCS inventory is being lost uncontrollably and cannot be replaced. This situation is equivalent to mis-operation or incorrect operator performance in which the operator does not prevent degraded emergency core cooling system (ECCS) capacity at a time when a small-break LOCA is in progress. In this case, at least one ac emergency bus can be energized from the control room. Failure to perform the critical task means that RCS inventory lost through the RCP seals cannot be replaced. It also means that the RCP seals remain without cooling and gradually deteriorate. As the seals deteriorate the rate of RCS inventory loss increases.

Manually Start SW Pump for EDG Cooling within 40 Minutes of starting the “B” EDG

Safety Significance: Failure to manually start the SW pump under the postulated plant conditions means that the EDG is running without SW cooling. Running the EDG without SW cooling leads to a high-temperature condition that can result in EDG failure due to damage caused by engine overheating. Under the postulated plant conditions, the running EDG is the only operable EDG. The calculated maximum time an EDG may operate without cooling to preclude adverse effects is 40 minutes. Since during the first 40 minutes of EDG operation in this scenario there are two procedural cues to check, and if needed, start a SW Pump, it is believed that failure to perform the critical task constitutes mis-operation or incorrect performance in which the crew does not prevent “degraded... emergency power capacity.”

Scenario Event Description
NRC Scenario 6

SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Sim. Setup	Reset to Temp IC 613	
<input type="checkbox"/>	<p>T = 0 Malfunctions:</p> <p>EDG “A” OOS:</p> <ul style="list-style-type: none"> • IRF EPSV480E1_120, d:0 f: RACK_OUT (EDG BKR Racked Out) • IRF EDG01A, d:0 (EDG “A” OOS) • IRF EDG003, d:0 f: Local (EDG “A” OOS) <p>PLACE RED CAP on the RTGB Control Switch for EDG “A” & 52/17B</p> <p>Place GREEN CAPS on the RTGB Control Switches BELOW (See OMM-048, Attachment 9):</p> <ul style="list-style-type: none"> • HVS-5 RTGB Switch • HVE-17 RTGB Switch • 52/27B RTGB Switch • 52/28B RTGB Switch • “B” EDG RTGB Switch • V1-8A RTGB Switch • V1-8B RTGB Switch • V1-8C RTGB Switch • V2-14A RTGB Switch • V2-14B RTGB Switch • V2-14C RTGB Switch • Protected Switchyard <p>Place GREEN DOT on APP-010-D2</p> <p>R-15 OOS</p> <ul style="list-style-type: none"> • IRF RMS049 f:PWR_OFF <p>Place WHITE DOT on R-15 Place GREEN DOT on APP-036-D8 Place GREEN DOT on APP-036-E7</p> <p>RTGB Annunciator APP-002-F8 failed ON</p> <ul style="list-style-type: none"> • IMF ANN02F08 f:ALARM_ON <p>Place WHITE DOT on APP-002-F8</p> <p>Insert the following:</p> <ul style="list-style-type: none"> • \$006_RTA_TRIP IMF EDG01B (“B” EDG fails to START on Rx Trip) • IMF EDG04E f:TRAIN_B (“D” SW Pump fails to Sequence ON when E-2 re-energized) <p>Verify that the “A” Charging Pump is RUNNING and the “B” and “C” Charging Pumps are OFF.</p> <p>Place the Simulator in RUN and ACKNOWLEDGE all alarms.</p>		
<input type="checkbox"/>	Perform Attachment 2 (Simulator Setup For Exams) of TAP-411.		

Scenario Event Description
NRC Scenario 6

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Crew Briefing <ol style="list-style-type: none"> 1. Assign Crew Positions based on evaluation requirements 2. Review the Shift Turnover Information with the crew. 3. Provide the crew with the following: <ul style="list-style-type: none"> • Copy of Technical Specifications/Basis 4. Direct the crew to Review the Control Boards taking note of present conditions, alarms. 		
<input type="checkbox"/>	T-0	Begin Familiarization Period	
<input type="checkbox"/>	At direction of examiner	Execute Lesson Plan for Simulator Scenario N16-1-6.	
<input type="checkbox"/>	At direction of examiner	Event 1 IMF CFW36	Feedwater Heater Bypass Valve fails OPEN
<input type="checkbox"/>	At direction of examiner	Event 2	Lower Power NOTE: to initiate this event, the WCCS will call and inform the operator that reactor power be lowered to 50% for the purpose of removing the "B" Main Feedwater Pump from service.
<input type="checkbox"/>	At direction of examiner	Event 3 IMF SWS01C	"C" Service Water Pump Trips
<input type="checkbox"/>	At direction of examiner	Event 4 IRF EPSV480DS_063 f:TRIP IMF CCW01C d:10	DS Bus De-energizes/"C" CCW Pump Trips on Start
<input type="checkbox"/>	At direction of examiner	Event 5 IMF RCS13A r:2:00 f:50	"A" RCP Seal Failure
<input type="checkbox"/>	Post-Rx Trip	Event 6 IMF EPS13	Loss of Offsite Power NOTE: This event occurs on the Rx Trip

Scenario Event Description
NRC Scenario 6

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Post-Rx Trip	Event 7	"B" EDG Fails to Start NOTE: Failure is inserted at T=0
<input type="checkbox"/>	Post-Rx Trip	Event 8 IMF EDG01C d:2	DSDG Trips NOTE: This event occurs on the Rx Trip
<input type="checkbox"/>	Post-Rx Trip	Event 9	"D" Service Water Pump fails to Auto Start NOTE: Failure is inserted at T=0
<input type="checkbox"/>	Terminate the scenario upon direction of Lead Examiner		

Op Test No.: N16-1 Scenario # 6 Event # 1 Page 9 of 58Event Description: **Feedwater Heater Bypass Valve fails OPEN**

Shortly after taking the watch, HCV-1459, Heater Bypass Valve will fail OPEN. The crew will implement AOP-010, "Main Feedwater/Condensate Malfunction," and close the valve.

Booth Operator Instructions: **IMF CFW36**

Indications Available:

- Rx Power starts to RISE
- RTGB Annunciator APP-007-D7, HTR 3A HI/LO LVL
- RTGB Annunciator APP-007-D8, HTR 3B HI/LO LVL
- HCV-1459 Red and Green status lights are LIT

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The crew may enter and exit TS LCO 3.4.1 (DNB) one or more times during this event.
AOP-010, MAIN FEEDWATER/CONDENSATE MALFUNCTION			
	BOP	(Step 1) CHECK FRVs - OPERATING PROPERLY (MANUAL OR AUTO):	
		• FCV-478	
		• FCV-488	
		• FCV-498	
	RO/ BOP	(Step 2) CHECK Reactor Trip Setpoint - BEING APPROACHED	NOTE: A Power Limit Warning is possible during this event which will require a reduction in power.
	CRS	(Step 2 RNO) IF a reactor trip setpoint is approached, THEN TRIP the reactor and GO TO EOP-E-0, Reactor Trip Or Safety Injection.	NOTE: This is a Continuous Action. The CRS will make both board operators aware.
		GO TO Step 4.	
	RO	(Step 4) CHECK Reactor Power - LESS THAN OR EQUAL TO 100%	

Op Test No.: N16-1 Scenario # 6 Event # 1 Page 10 of 58Event Description: **Feedwater Heater Bypass Valve fails OPEN**

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	(Step 4 RNO) IF reactor power exceeds 100%, THEN REDUCE turbine load as necessary using turbine valve limiter to maintain reactor power less than or equal to 100%.	
	CRS	(Step 5) NOTIFY Plant Personnel Of Procedure Entry Using Plant Page System	NOTE: The CRS will most likely make this announcement.
	CRS	(Step 6) GO TO Appropriate Step From Table Below:	
		<ul style="list-style-type: none"> Other –Step 35 	
	BOP	(Step 35) REDUCE Turbine Load Using Attachment 1 to Match Feedwater And Steam Flows WHILE CONTINUING WITH This Procedure.	NOTE: The CRS may assign the BOP to perform this action. BOP Examiner follow actions of Attachment 1. Other Examiners follow AOP-010 Actions, Step 36 , on Page 12 .
AOP-010, MAIN FEEDWATER/CONDENSATE MALFUNCTION ATTACHMENT 1, REDUCING TURBINE LOAD			
	BOP	(Step 1) REDUCE Turbine Load at 1%/MIN to 5%/ MIN to achieve Goal Specified in Procedure Body:	
		<ul style="list-style-type: none"> CHECK control rods – IN AUTOMATIC 	
		<ul style="list-style-type: none"> CHECK turbine mode - AUTOMATIC 	
		<ul style="list-style-type: none"> DEPRESS IMP IN pushbutton 	
		<ul style="list-style-type: none"> SET desired load rate 	
		<ul style="list-style-type: none"> DEPRESS GO or HOLD pushbutton as needed to reduce turbine load 	
		<ul style="list-style-type: none"> BORATE using OP-301, RCS Boration Quick Checklist, as necessary to maintain AFD within the operating band 	

Op Test No.: N16-1 Scenario # 6 Event # 1 Page 11 of 58Event Description: **Feedwater Heater Bypass Valve fails OPEN**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 2) CHECK Goal of Load Reduction - REACHED	
		<ul style="list-style-type: none"> To achieve a target power level 	
		OR	
		<ul style="list-style-type: none"> To match steam flow with feed flow 	
		OR	
		<ul style="list-style-type: none"> To raise MFP suction pressure 	
	BOP	(Step 3) CHECK Current Loading for the following Pumps – LESS THAN MAXIMUM	NOTE: The BOP will contact the Outside AO to check associated parameters. Booth Instructor report data from Attachment 10.2 of OST-013 (See Below).
		<ul style="list-style-type: none"> MFP – 0.710 KILOAMPS 	"A" MFP - .60 KAMPs "B" MFP - .59 KAMPs
		<ul style="list-style-type: none"> Condensate Pump – 370 AMPS 	"A" MCP - 360 AMPS "B" MCP - 350 AMPS
		<ul style="list-style-type: none"> HDP – 90 AMPS 	"A" HDP - 79 AMPS "B" HDP - 78 AMPS
	BOP	(Step 4) Stop Load Reduction	
	BOP	(Step 5) NOTIFY CRS/SM that Load Reduction is Complete	

Op Test No.: N16-1 Scenario # 6 Event # 1 Page 12 of 58Event Description: **Feedwater Heater Bypass Valve fails OPEN**

Time	Pos.	Expected Actions/Behavior	Comments
AOP-010, MAIN FEEDWATER/CONDENSATE MALFUNCTION			
			Examiner NOTE: Examiners following the CRS/RO continue HERE .
	CRS	(Step 36) DISPATCH an Operator to Observe Valve positions:	NOTE: The CRS will dispatch an AO. Booth Instructor acknowledge as AO, and report after 1 minute that the LCV-1530A and B are operating normally.
		<ul style="list-style-type: none"> LCV-1530A, HDT LEVEL CONTROL VALVE 	
		<ul style="list-style-type: none"> LCV-1530B, HEATER DRAIN PUMPS SUCTION DUMP TO CONDENSER 	
	BOP	(Step 37) DETERMINE If a Heater Drain Tank Level Control Valve has Failed:	
		<ul style="list-style-type: none"> CHECK HDT level control valve or controller – HAS MALFUNCTIONED 	
	CRS	(Step 37.a RNO) IF HDT Level is controlling correctly, THEN OBSERVE NOTE prior to Step 40 and GO TO Step 40.	
	CRS	(Step 40) CHECK for Leak – CAUSING FW TRANSIENT	NOTE: The CRS may dispatch an AO to look for leaks, however, the reason for being in the AOP is because the Heater Bypass valve has opened.
		<ul style="list-style-type: none"> Visual indication of leak 	
		<ul style="list-style-type: none"> FW Heater level alarms 	
		<ul style="list-style-type: none"> FW Heater normal and alternate drain valve positions level dump valve positions 	
		<ul style="list-style-type: none"> FW Heater #1 & #2 emergency dump valve positions 	

Op Test No.: N16-1 Scenario # 6 Event # 1 Page 13 of 58Event Description: **Feedwater Heater Bypass Valve fails OPEN**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Gland Steam Condenser abnormal indications/alarms 	
	CRS	(Step 40 RNO) OBSERVE NOTE prior to Step 43 and GO TO Step 43.	
	CRS	(Step 43) DETERMINE If a HDP has malfunctioned:	
		<ul style="list-style-type: none"> DISPATCH an operator to evaluate HDPs for damage: 	NOTE: The CRS will dispatch an AO. Booth Instructor acknowledge as AO , and report after 1 minute that the HDPs are operating normally .
		<ul style="list-style-type: none"> LISTEN for unusual noise 	
		<ul style="list-style-type: none"> OBSERVE pump shaft for breakage 	
		<ul style="list-style-type: none"> OBSERVE for abnormal running current: 	
		<ul style="list-style-type: none"> A - 4KV Bus 1 CMPT-5 	
		<ul style="list-style-type: none"> B – 4KV Bus 4 CMPT-25 	
		<ul style="list-style-type: none"> CHECK pump damage - INDICATED 	
	CRS	(Step 43.b RNO) OBSERVE NOTE prior to Step 46 and GO TO Step 46.	
	CRS	(Step 46) DETERMINE if a Condensate Pump has malfunctioned:	
		<ul style="list-style-type: none"> DISPATCH an operator to evaluate Condensate Pumps for damage: 	NOTE: The CRS will dispatch an AO. Booth Instructor acknowledge as AO , and report after 1 minute that the Condensate Pumps are operating normally .
		<ul style="list-style-type: none"> LISTEN for unusual noise 	
		<ul style="list-style-type: none"> OBSERVE pump shaft for breakage 	

Op Test No.: N16-1 Scenario # 6 Event # 1 Page 14 of 58Event Description: **Feedwater Heater Bypass Valve fails OPEN**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> OBSERVE for abnormal running current: 	
		<ul style="list-style-type: none"> A - 4KV Bus 1 CMPT-6 	
		<ul style="list-style-type: none"> B – 4KV Bus 4 CMPT-22 	
		<ul style="list-style-type: none"> CHECK pump damage - INDICATED 	
	CRS	(Step 46.b RNO) OBSERVE CAUTION and NOTE prior to Step 49 and GO TO Step 49.	
	BOP	(Step 49) CHECK for HCV-1459 Failure:	
		<ul style="list-style-type: none"> CHECK HCV-1459, LP HEATERS BYP - OPEN 	
	CRS/ BOP	(Step 50) DISPATCH an Operator to monitor MFP Suction Pressures:	NOTE: The CRS will dispatch an AO. Booth Instructor acknowledge as AO , and report after 1 minute the suction pressure for both pumps . Use actual indications from Simulator P&ID screen CFW3.
		<ul style="list-style-type: none"> PI-1433 – “A” FW PUMP SUCTION PRESSURE 	
		<ul style="list-style-type: none"> PI-1434 – “B” FW PUMP SUCTION PRESSURE 	
	CRS/ BOP	(Step 51) CHECK MFP Suction Pressures – LESS THAN 400 PSIG	
	CRS	(Step 51 RNO) GO TO Step 54.	
	BOP	(Step 54) CLOSE HCV-1459	

Op Test No.: N16-1 Scenario # 6 Event # 1 Page 15 of 58Event Description: **Feedwater Heater Bypass Valve fails OPEN**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 55) CONTACT I&C to Troubleshoot and Correct HCV-1459 Problem	NOTE: The CRS may call WCC/I&C to address the Valve failure. If so, Booth Instructor acknowledge as WCC/I&C.
	CRS	(Step 56) GO TO Step 58	
	BOP	(Step 58) CHECK S/G Level – AT OR TRENDING TO PROGRAM	
	RO	(Step 59) CHECK Tavg – AT OR TRENDING TO Tref	
	CRS	(Step 60) CONTACT Maintenance to Troubleshoot and Correct the Feedwater Problem	NOTE: The CRS may call WCC/I&C to address the Valve failure. If so, Booth Instructor acknowledge as WCC/I&C.
	CRS	(Step 61) IMPLEMENT EALs	NOTE: The CRS may ask SM to address. If so, Floor Instructor acknowledge as SM.
	RO	(Step 62) CHECK Total Reactor Power Change – LESS THAN 15%	
	RO	(Step 63) CHECK APP-005-B5, ROD BANDS A/B/C/D LO LIMIT - EXTINGUISHED	
	RO	(Step 64) MONITOR Axial Flux Difference to Ensure Compliance with TS 3.2.3	

Op Test No.: N16-1 Scenario # 6 Event # 1 Page 16 of 58Event Description: **Feedwater Heater Bypass Valve fails OPEN**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 65) NOTIFY Load Dispatcher of Unit's Load Capability	NOTE: The BOP will call Load Dispatcher. If so, Booth Instructor acknowledge as Load Dispatcher.
	CRS	(Step 66) RETURN TO Procedure and Step In Effect	
			NOTE: The CRS will likely conduct an Alignment Brief.
At the discretion of the Lead Examiner move to Event #2.			

Op Test No.: N16-1 Scenario # 6 Event # 2 Page 17 of 58Event Description: **Lower Power**

After the overpower transient is stabilized, the WCCS will call the control room and direct that reactor power be lowered to 50% for the purpose of removing the "B" Main Feedwater Pump from service. The operator will lower power in accordance with AOP-038, "Rapid Downpower."

Booth Operator Instructions:

As WCCS, call Control Room and state the following:
"A step change has occurred on the "B" Main Feedwater Pump vibrations, and station management has directed that reactor power be lowered to 50% using AOP-038 at 1-2%/minute for the purpose of removing the "B" Main Feedwater Pump from service.

Indications Available:**NA**

Time	Pos.	Expected Actions/Behavior	Comments
AOP-038, RAPID DOWNPOWER			
	BOP	(Step 1) NOTIFY Plant Personnel Of Procedure Entry Using The Plant Page System	
	RO	(Step 2) DETERMINE Corrected Boration And Target Rod Height For Target Power Level Using Most Recently Performed OST-947, OPERATIONS REACTIVITY PLAN	
		• Target Load Reduction Rate ___%/min	
		• Target Power Level ____	
		• Target Rod Height ____	NOTE: The RO will determine approximately 144 Steps (2%/minute).
		• Corrected Boration ____	NOTE: The RO will determine approximately 146 gallons (2%/minute).
	RO	(Step 3) CHECK Required Power Reduction Rate - LESS THAN OR EQUAL TO 5%/MINUTE	

Op Test No.: N16-1 Scenario # 6 Event # 2 Page 18 of 58Event Description: **Lower Power**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 4) PERFORM Brief Of Control Room Personnel To Include The Following:	
		<ul style="list-style-type: none"> Reason for downpower 	
		<ul style="list-style-type: none"> Target Power Level 	
		<ul style="list-style-type: none"> Target Rod Height 	
		<ul style="list-style-type: none"> Rate of load reduction 	
		<ul style="list-style-type: none"> Amount of boric acid addition 	
	RO	(Step 5) ENERGIZE All Available PZR Heaters	
		<ul style="list-style-type: none"> PZR HTR CONTROL GROUP 	
		<ul style="list-style-type: none"> PZR HTR BACK-UP GROUP A 	
		<ul style="list-style-type: none"> PZR HTR BACK-UP GROUP B 	
	RO	(Step 6) CHECK Rod Control - IN AUTO	
	RO	(Step 7) INITIATE Boration Using Attachment 1, RCS Boration, While Continuing With This Procedure	
			<p>Examiner NOTE: The CRS will assign the RO to perform this action.</p> <p>RO Examiner follow actions of Attachment 1.</p> <p>Other Examiners follow AOP-038 Actions, Step 8, on Page 19.</p>
AOP-038, RAPID DOWNPOWER ATTACHMENT 1, RCS BORATION			
	RO	(Step 1) PLACE The RCS MAKEUP MODE Selector Switch In BORATE	

Op Test No.: N16-1 Scenario # 6 Event # 2 Page 19 of 58Event Description: **Lower Power**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 2) IF Frequent Boric Acid Transfer Pump Starts Are Anticipated, THEN PLACE Boric Acid Transfer Pump Switch Aligned To BLEND To ON.	
	RO	(Step 3) SET YIC-113, BORIC ACID TOTALIZER to amount determined in Main Body Step 2	
	RO	(Step 4) Momentarily PLACE the RCS MAKEUP SYSTEM switch to START	
	RO	(Step 5) IF Boric Acid flow is NOT achieving the desired effect, THEN PLACE FCV-113A, BORIC ACID FLOW, in MAN AND manually Adjust controller FCV-113A, BORIC ACID FLOW, using the UP and DOWN pushbuttons	
	RO	(Step 6) WHEN the desired amount of Boric Acid has been added to the RCS OR the RCS MAKEUP SYSTEM Switch is placed in STOP, THEN ENSURE the following:	
		<ul style="list-style-type: none"> FCV-113A, BA TO BLENDER, closes. 	
		<ul style="list-style-type: none"> FCV-113B, BLENDED MU TO CHG SUCT, closes. 	
		<ul style="list-style-type: none"> IF in AUTO, THEN operating Boric Acid Pump stops. 	
		<ul style="list-style-type: none"> RCS MAKEUP SYSTEM is OFF. 	
AOP-038, RAPID DOWNPOWER			
			Examiner NOTE: Examiners following the CRS/BOP continue HERE .
	BOP	(Step 8) INITIATE Turbine Load Reduction While Continuing With This Procedure	
		<ul style="list-style-type: none"> CHECK EH Turbine Control - IN OPER AUTO 	

Op Test No.: N16-1 Scenario # 6 Event # 2 Page 20 of 58Event Description: **Lower Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> PREPARE For Turbine Load Reduction As Follows: 	
		<ul style="list-style-type: none"> CHECK IMP IN - ILLUMINATED 	
	BOP	(Step 8.b.1 RNO 1) IF Turbine Load reduction is available using IMP IN, THEN PERFORM the following:	
		<ul style="list-style-type: none"> DEPRESS IMP IN pushbutton 	
		<ul style="list-style-type: none"> CHECK IMP IN light illuminated 	
		<ul style="list-style-type: none"> CHECK IMP OUT light extinguished 	
	BOP	(Step 8.b) SET desired load in the SETTER	
		<ul style="list-style-type: none"> SELECT the desired Load Rate 	
		<ul style="list-style-type: none"> DEPRESS the GO pushbutton to initiate Turbine Load reduction 	
	BOP	(Step 9) ADJUST Turbine Load To Control Tavg Within 5°F Of Tref Using One Of The Following:	
		<ul style="list-style-type: none"> ADJUST Load Rate 	
		OR	
		<ul style="list-style-type: none"> DEPRESS GO and HOLD pushbuttons 	
	CRS/ BOP	(Step 10) INITIATE Notification of The Following:	NOTE: The CRS may ask SM/WCC/Communicator to address. If so, Floor Instructor acknowledge.
		<ul style="list-style-type: none"> Load Dispatcher of load reduction 	
		<ul style="list-style-type: none"> E&C to control secondary chemistry 	
		<ul style="list-style-type: none"> RC for elevated radiation levels in CV Pump Bays and Pipe Alley 	
		<ul style="list-style-type: none"> On-call Duty Manager to activate the Event Response Team 	

Op Test No.: N16-1 Scenario # 6 Event # 2 Page 21 of 58Event Description: **Lower Power**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> E&C for impending 15% power change for I-131 sampling within 2 to 6 hours 	
		<ul style="list-style-type: none"> E&C for impending power reduction greater than 20% terminate zinc injection 	
		<ul style="list-style-type: none"> NRC within 4 hours 	
	BOP	(Step 11) CHECK Auxiliary Boilers - AT LEAST ONE OPERATING	
	BOP	(Step 11 RNO) IF Plant Shutdown is required, THEN NOTIFY AO to start at least one Auxiliary Boiler per OP-401, AUXILIARY HEATING SYSTEM.	NOTE: The BOP will dispatch an AO. Booth Instructor acknowledge as AO.
	RO	(Step 12) CHECK Tavg - WITHIN 5°F OF Tref	
	RO	(Step 13) CHECK Axial Flux Distribution - WITHIN TARGET BAND	
	BOP	(Step 14) CHECK APP-006-F5, STEAM DUMP ARMED - EXTINGUISHED	
	RO	(Step 15) CHECK Any Of The Following Conditions - MET:	
		<ul style="list-style-type: none"> Target load/power has been reached 	
		<ul style="list-style-type: none"> Load reduction is no longer required 	
		<ul style="list-style-type: none"> CRS/SM directs termination of load reduction 	
		<ul style="list-style-type: none"> STOP Rapid Downpower using Attachment 3, Termination Of Rapid Downpower 	
At the discretion of the Lead Examiner move to Event #3.			

Op Test No.: N16-1 Scenario # 6 Event # 3 Page 22 of 58Event Description: **“C” Service Water Pump Trips**

After the power reduction is in progress, the “C” Service Water Pump will trip on overload. This will cause the running Service Water Booster Pump to trip as well. The operator will respond in accordance with various APP-008 annunciators and start a standby Service Water Pump; and then respond in accordance with APP-002-A through D8, “HVH WTR OUTLET LO FLOW,” and re-start a Service Water Booster Pump. The operator will address Technical Specification LCO 3.7.7, “Service Water System (SWS),” and Technical Specification LCO 3.6.6, “Containment Spray and Cooling Systems.”

Booth Operator Instructions: **IMF SWS01C**

Indications Available:

- RTGB Annunciator APP-008-F4, SW PMP A/B/C/D OVLD
- RTGB Annunciator APP-008-F7, SOUTH SW HDR LO PRESS
- RTGB Annunciator APP-008-F8, NORTH SW HDR LO PRESS
- SW North Header Pressure PI-1616 indicating ≈12 psig
- SW South Header Pressure PI-1684 indicating ≈13 psig
- “C” SW Pump Green and Red status lights LIT
- “A” SW Booster Pump trips
- RTGB Annunciator APP-002-A8 THROUGH D8, HVH-1(2-4) WTR OUTLET LO FLOW

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The crew will likely place the Turbine in HOLD.
APP-008-F4, SW PMP A/B/C/D OVLD			
	BOP	(Step 1) IF an operating SW Pump has tripped, THEN PERFORM the following:	
		<ul style="list-style-type: none"> • START a Standby Pump. 	
		<ul style="list-style-type: none"> • DISPATCH operator to check breaker(s) AND Current Limiter Fuses: SW Pump C - 480V Bus E2 (CMP 24A) 	NOTE: The CRS will dispatch an AO. If so, Booth Instructor acknowledge as AO , and report after 10 minutes that the “C” SW Pump motor is “Hot to the touch.”
		<ul style="list-style-type: none"> • THROTTLE CCW Heat Exchanger Return Valves, as necessary, to maintain 40 to 50 psig in the SW Headers. 	NOTE: This action is NOT needed (Starting the “D” SW Pump will restore system pressure).

Op Test No.: N16-1 Scenario # 6 Event # 3 Page 23 of 58Event Description: **"C" Service Water Pump Trips**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 2) IF a single-phase open circuit condition is suspected ENTER AOP-026.	NOTE: This action will need further investigation.
APP-002-A8, HVH-1 WTR OUTLET LO FLOW			
	BOP	(Step 1) IF the operating Service Water Booster Pump has tripped, THEN start Standby Service Water Booster Pump.	
	BOP	(Step 2) IF no Service Water Booster Pump can be started, THEN.....	NOTE: The Standby SW Booster Pump will start.
	BOP	(Step 3) IF V6-33A (SW Booster Pump 'A' Supply to HVH-1) has closed, THEN....	NOTE: V6-33A has NOT CLOSED.
	BOP	(Step 4) IF a Service Water rupture outside of the HVH boundaries is indicated, THEN.....	NOTE: There is no SW Piping Rupture.
	BOP	(Step 5) IF required, THEN dispatch personnel to check local indications:	NOTE: The CRS/BOP may dispatch an AO. If so, Booth Instructor acknowledge as AO , and report after 1 minute that the system flows/pressures are normal and that the standby SW Booster Pump is NOT rotating in reverse.
		<ul style="list-style-type: none"> FI-1698A (HVH-1 Outlet Flow). 	
		<ul style="list-style-type: none"> PI-1646A (HVH-1 Outlet Pressure). 	
		<ul style="list-style-type: none"> Standby Service Water Booster Pump rotation. 	
	BOP	(Step 6) IF standby Service Water Booster Pump check valve is stuck open, THEN.....	NOTE: The standby SW Booster Pump Check Valve is NOT stuck OPEN.

Op Test No.: N16-1 Scenario # 6 Event # 3 Page 24 of 58Event Description: **"C" Service Water Pump Trips**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 7) IF a SW leak exists inside the CV, THEN.....	NOTE: There is no SW leak in the CV.
	CRS	(Step 8) IF at least 800 gpm flow through HVH-1 can NOT be established, THEN declare HVH-1 inoperable and refer to ITS LCO 3.6.6.	NOTE: Once the standby SW Booster Pump is started LCO 3.6.6 will be met.
	BOP	(Step 9) IF required, THEN ensure correct valve alignment in accordance with OP-903, Service Water System.	NOTE: This action will not be required.
	BOP	(Step 10) IF alarm is invalid, THEN	NOTE: The alarm is valid.
			NOTE: The CRS may call WCC to address the "C" SW Pump failure. <i>If so, Booth Instructor acknowledge as WCC.</i>
			NOTE: The CRS may address Technical Specifications.
TECHNICAL SPECIFICATION 3.7.7, SERVICE WATER SYSTEM (SWS)			
	CRS	LCO 3.7.7: Two SWS trains and the Turbine Building loop isolation valves shall be OPERABLE.	
	CRS	APPLICABILITY: MODES 1, 2, 3, and 4.	
	CRS	ACTIONS	

Op Test No.: N16-1 Scenario # 6 Event # 3 Page 25 of 58Event Description: **"C" Service Water Pump Trips**

Time	Pos.	Expected Actions/Behavior			Comments
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that ACTION A.1 must be entered. NOTE: The "A" and "B" SW Pumps must be declared inoperable within 4 hours because the "A" EDG is inoperable.
		A. One SWS train inoperable.	A.1 NOTES: Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources-Operating," for emergency diesel generator made inoperable by SWS. Restore SWS train to OPERABLE status.	72 hours	
TECHNICAL SPECIFICATION 3.6.6, CONTAINMENT SPRAY AND COOLING SYSTEMS					
	CRS	LCO 3.6.6: Two containment spray trains and two containment cooling trains shall be OPERABLE.			
	CRS	APPLICABILITY: MODES 1, 2, 3, and 4.			
	CRS	ACTIONS			
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that ACTION D.1 must be entered (Until SWBP is restarted).
		D. Two containment cooling trains inoperable.	D.1 Restore one containment cooling train to OPERABLE status.	72 hours	
					NOTE: The CRS will likely conduct an Alignment Brief.
					NOTE: The crew will likely continue to down power.
At the discretion of the Lead Examiner move to Event #4.					

Op Test No.: N16-1 Scenario # 6 Event # 4 Page 26 of 58Event Description: **DS Bus De-energizes/"C" CCW Pump Trips on Start**

Following this, Breaker 52/32A will Trip de-energizing the DS Bus, and stopping the only running Charging Pump and CCW Pump. The operator may address AOP-018, "Reactor Coolant Pump Abnormal Conditions," or various APP's to restore Charging and Seal Injection flow; and then APP-001-F5, CCW PMP LO PRESS, and ensure that the standby CCW Pump started. 10 seconds after the Standby CCW Pumps start, the "C" CCW Pump will trip, and only the "B" CCW will be left running. The operator will address Technical Specification LCO 3.7.6, "Component Cooling Water (CCW) System," and Technical Specification LCO 3.4.17, "Chemical and Volume Control System (CVCS)."

Booth Operator Instructions:**IRF EPSV480DS_063 f:TRIP****IMF CCW01C d:10****Indications Available:**

- RTGB Annunciator APP-001-B4, RCP SEAL INJ HI/LO FLOW
- "A" Charging Pump trips
- FR-124 indicates no Seal Injection flow
- RTGB Annunciator APP-001-F4, CCW PMP MOTOR OVLD/TRIP
- "A" CCW Pump trips
- "B" and "C" CCW Pump auto start
- "C" CCW Pump trips 10 seconds after start (Green and Red status lights are LIT)
- RTGB Annunciator APP-036-H6, DS BUS SUPPLY BKR 52/32A TRIP
- RTGB Annunciator APP-036-H8, DS BUS UNDER VOLT

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: The RO may start a Charging Pump using the APP, and bypass AOP-018.
APP-001-B4, RCP SEAL INJ HI/LO FLOW			
	RO	(Step 1) DETERMINE if alarm is High or Low flow condition.	
	RO	(Step 2) IF Number 1 Seal failure OR Loss of Seal Injection has occurred, THEN....	NOTE: A Number 1 Seal Failure has NOT occurred.
	RO	(Step 3) IF FR-124 is NOT available, THEN....	NOTE: FR-124 is available.

Op Test No.: N16-1 Scenario # 6 Event # 4 Page 27 of 58Event Description: **DS Bus De-energizes/"C" CCW Pump Trips on Start**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 4) PERFORM any of the following to establish adequate seal injection flow:	Examiner NOTE: The crew may address AOP-018. If so, continue below. If not, proceed to Page 30 to address the CCW Pump failure.
		<ul style="list-style-type: none"> ADJUST position of HCV-121, Charging Flow 	
		<ul style="list-style-type: none"> ADJUST Charging Pump speed 	
		<ul style="list-style-type: none"> START additional Charging Pumps 	
	RO	(Step 5) IF required, THEN DISPATCH an operator to adjust RCP SEAL WATER FLOW CONTROL VALVE CVC-297A, CVC-297B OR CVC-297C IAW OP-301.	
	RO	(Step 6) IF Seal Injection flow can NOT be maintained greater than 6 gpm, THEN REFER to ITS SR 3.4.17.1.	
			NOTE: The CRS may enter AOP-018.
AOP-018, REACTOR COOLANT PUMP ABNORMAL CONDITIONS			
	CRS	(Step 1) MAKE PA announcement for Procedure Entry	NOTE: The CRS will most likely make this announcement.
	CRS	(Step 2) EVALUATE Plant Conditions AND GO to the Appropriate Section for RCP Malfunction Not Yet Addressed:	
		<ul style="list-style-type: none"> Loss of Seal Injection – Section C 	NOTE: The CRS will transition to Section C of AOP-018.
AOP-018, REACTOR COOLANT PUMP ABNORMAL CONDITIONS SECTION C, LOSS OF SEAL INJECTION			

Op Test No.: N16-1 Scenario # 6 Event # 4 Page 28 of 58Event Description: **DS Bus De-energizes/"C" CCW Pump Trips on Start**

Time	Pos.	Expected Actions/Behavior	Comments
			NOTE: Power will be automatically restored to the DS Bus in ~95 seconds.
	RO	(Step 1) CHECK APP-001-D1, RCP THERM BAR COOL WTR LO FLOW alarm - ILLUMINATED	
	RO	(Step 1 RNO) IF APP-001-D1 ILLUMINATES, THEN GO TO Step 2.	NOTE: This is a Continuous Action. The CRS will make both board operators aware.
	CRS	<ul style="list-style-type: none"> OBSERVE the NOTE prior to Step 11 AND GO TO Step 11. 	
	RO	(Step 11) DETERMINE if a Charging Pump Can be Started:	
		<ul style="list-style-type: none"> CHECK Charging System Piping - RUPTURED 	
	CRS	(Step 11.a RNO) GO TO Step 12	
	RO	(Step 12) CHECK SI - INITIATED	
	CRS	(Step 12 RNO) GO TO Step 14	
	RO	(Step 14) ENSURE at Least ONE Charging Pump - RUNNING	NOTE: The RO will start the "B" and/or the "C" Charging Pump.
	RO	(Step 15) CHECK Seal Injection to RCPs:	
		<ul style="list-style-type: none"> ANY Seal Injection flow – LESS THAN 6 GPM 	
		AND	
		<ul style="list-style-type: none"> ANY Thermal Barrier ΔP – LESS THAN 5 inches 	

Op Test No.: N16-1 Scenario # 6 Event # 4 Page 29 of 58Event Description: **DS Bus De-energizes/"C" CCW Pump Trips on Start**

Time	Pos.	Expected Actions/Behavior	Comments
	CRS	(Step 15 RNO) GO TO Step 47	
		(Step 47) ESTABLISH Charging Flow on FI-122A, CHARGING LINE FLOW- GREATER THAN 40 GPM	
	RO	(Step 48) CHECK Normal Letdown – IN SERVICE	
	RO	(Step 49) CONTROL charging and Letdown Flow to Maintain Pressurizer Level as follows:	
		<ul style="list-style-type: none"> Within ± 5% Of Reference Level 	
	RO	(Step 50) ESTABLISH Normal Seal Injection	
		<ul style="list-style-type: none"> CHECK RCP Seal Injection - ALIGNED 	
		<ul style="list-style-type: none"> CHECK RCP Seal Injection Flow – BETWEEN 8 GPM AND 13 GPM 	
	RO	(Step 51) CHECK Seal Injection Flow – ESTABLISH TO ALL RCPs	
	CRS	(Step 52) IMPLEMENT the EALs	NOTE: The CRS may ask SM to address. If so, Floor Instructor acknowledge as SM.
	CRS	(Step 53) REFER to Technical Specification for any applicable LCOs	
		<ul style="list-style-type: none"> 3.4.13 – RCS Operational Leakage 	
		<ul style="list-style-type: none"> 3.4.17 - CVCS 	
		<ul style="list-style-type: none"> 3.4.9 – PZR Level 	
		<ul style="list-style-type: none"> 3.4.4, 3.4.5, & 3.4.6 – RCS Loops 	

Op Test No.: N16-1 Scenario # 6 Event # 4 Page 30 of 58Event Description: **DS Bus De-energizes/"C" CCW Pump Trips on Start**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 54) CHECK RCP Seal Cooling - ISOLATED	
	CRS	(Step 54 RNO) OBSERVE the NOTE prior to Step 2 AND GO To the Main Body, Step 2 of this procedure.	
AOP-018, REACTOR COOLANT PUMP ABNORMAL CONDITIONS			
	CRS	(Step 2) EVALUATE Plant Conditions AND GO to the Appropriate Section for RCP Malfunction Not Yet Addressed:	
	CRS	(Step 2 RNO) RETURN TO procedure and step in effect.	
			NOTE: The CRS may call WCC to address the failure of the DS Bus normal supply breaker. If so, Booth Instructor acknowledge as WCC.
			NOTE: While both the "B" and the "C" CCW Pump started on low system pressure, the "C" CCW Pump has tripped shortly after start. The CRS will address the APP.
APP-001-F4, CCW PMP MOTOR OVLD/TRIP			
	RO	(Step 1) IF alarm is due to intentional operator action, THEN...	
	RO	(Step 2) IF the running CCW Pump has tripped, THEN ENSURE Standby CCW Pump STARTED	NOTE: Both the "B" and the "C" CCW Pump started on low system pressure, however, the "C" CCW Pump has tripped shortly after start.

Op Test No.: N16-1 Scenario # 6 Event # 4 Page 31 of 58Event Description: **DS Bus De-energizes/"C" CCW Pump Trips on Start**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 3) IF Standby CCW Pump can NOT be started, THEN...	
	RO	(Step 4) IF FCV-626, THERM BAR FLOW CONT, closes due to pump start, THEN...	NOTE: FCV-626 is OPEN.
		(Step 5) IF CCW Pump tripped due to electrical fault, THEN DISPATCH an operator to check breaker and Current Limiter Fuses (E-1/E-2 breakers only)	NOTE: The CRS will dispatch an AO. Booth Instructor acknowledge as AO , and report after 1 minute that the "C" CCW Pump motor has an acrid smell.
	CRS	(Step 6) IF a single phase open circuit condition is suspected ENTER AOP-026	NOTE: This action will need further investigation.
			NOTE: The CRS may call WCC to address the "C" CCW Pump failure. If so, Booth Instructor acknowledge as WCC .
TECHNICAL SPECIFICATION 3.7.6, COMPONENT COOLING WATER (CCW) SYSTEM			
	CRS	LCO 3.7.6 Two CCW trains powered from emergency power supplies shall be OPERABLE	
	CRS	APPLICABILITY: MODES 1, 2, 3 and 4.	
	CRS	ACTIONS	

Op Test No.: N16-1 Scenario # 6 Event # 4 Page 32 of 58Event Description: **DS Bus De-energizes/"C" CCW Pump Trips on Start**

Time	Pos.	Expected Actions/Behavior			Comments
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that ACTION A.1 must be entered. NOTE: The “B” CCW Pump must declared inoperable within 4 hours because the “A” EDG is inoperable.
		A. One required CCW train inoperable.	NOTE: Enter applicable Conditions and Required Actions of LCO 3.4.6, “RCS Loops – MODE 4, for residual heat removal loops made inoperable by CCW. A.1 Restore required CCW train to OPERABLE status.	72 hours	
TECHNICAL SPECIFICATION 3.4.17, CHEMICAL AND VOLUME CONTROL SYSTEM (CVCS)					
	CRS	LCO 3.4.17 Reactor Coolant Pump (RCP) seal injection shall be OPERABLE, with : <ul style="list-style-type: none">Two charging pumps shall be OPERABLETwo Makeup Water Pathways from the Refueling Water Storage Tank (RWST) shall be OPERABLE			
	CRS	APPLICABILITY: MODES 1, 2, 3 and 4			
	CRS	ACTIONS			

Op Test No.: N16-1 Scenario # 6 Event # 4 Page 33 of 58Event Description: **DS Bus De-energizes/"C" CCW Pump Trips on Start**

Time	Pos.	Expected Actions/Behavior			Comments
		CONDITION	REQUIRED ACTION	COMPLETION TIME	NOTE: The CRS will determine that because all Charging Pumps were OFF, ACTION E.1, E.2 and E.3 were entered; and that these ACTIONS were exited upon restoration of Seal Injection Flow.
		E. Seal injection to any RCP not within limit.	E.1 Initiate action to restore seal injection to affected RCP(s)	Immediately	
		AND At least one charging pump OPERABLE.	AND E.2 Be in MODE 3.	6 hours	
			AND E.3 Be in MODE 5.	36 hours	
					NOTE: The CRS will likely conduct an Alignment Brief.
At the discretion of the Lead Examiner move to Event #5.					

Op Test No.: N16-1 Scenario # 6 Event # 5 Page 34 of 58Event Description: **"A" RCP Seal Failure**

Next, a #1 Seal Failure will occur on the "A" RCP. The crew will implement AOP-018, Reactor Coolant Pump Abnormal Conditions, trip the reactor, stop the pump, and three minutes after the pump is stopped, CLOSE the Seal Leakoff Valve. The crew will enter EOP-E-0, "Reactor Trip or Safety Injection." Simultaneously, a Loss of Offsite Power will occur on the reactor trip, and the "B" Emergency Diesel Generator will fail to automatically start. Additionally, the DS DG will trip.

Booth Operator Instructions:**IMF RCS13A r:2:00****Indications Available:**

- RTGB Annunciator APP-001-B4, RCP SEAL INJ HI/LO FLOW
- RTGB Annunciator APP-001-D2, RCP #1 SEAL LEAKOFF HI FLOW
- FR-124 indicates that "A" RCP Seal injection flow is rising
- FR-124 indicates that "B" and "C" RCP Seal injection flow is lowering
- FR-154 indicates that "A" RCP seal leakoff flow is rising
- Charging Pump speed is increasing

Time	Pos.	Expected Actions/Behavior	Comments
AOP-018, REACTOR COOLANT PUMP ABNORMAL CONDITIONS			
	CRS	(Step 1) MAKE PA announcement for Procedure Entry	NOTE: The CRS will most likely make this announcement.
	CRS	(Step 2) EVALUATE Plant Conditions AND GO to the Appropriate Section for RCP Malfunction Not Yet Addressed:	
		<ul style="list-style-type: none"> • Reactor Coolant Pump Seal Failure – Section A 	NOTE: The CRS will transition to Section A of AOP-018.
AOP-018, REACTOR COOLANT PUMP ABNORMAL CONDITIONS SECTION A, REACTOR COOLANT PUMP SEAL FAILURE			
	RO	(Step 1) CHECK Any RCP #1 Seal Leakoff Flow – GREATER THAN 5.7 GPM	
	RO	(Step 2) CHECK Either of the following Conditions Exist:	

Op Test No.: N16-1 Scenario # 6 Event # 5 Page 35 of 58Event Description: **"A" RCP Seal Failure**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> RCP #1 Seal Leakoff Flow On Unaffected RCP(s) - REDUCED 	
		OR	
		<ul style="list-style-type: none"> RCP Thermal Barrier ΔP On Affected RCP(s) - REDUCED 	
	RO	(Step 3) CHECK Plant Status – MODE 1 OR MODE 2	
	RO	(Step 4) PERFORM the following:	
		<ul style="list-style-type: none"> TRIP the reactor 	
		<ul style="list-style-type: none"> TRIP the affected RCP(s) 	
		<ul style="list-style-type: none"> GO TO EOP-E-0, Reactor Trip or Safety Injection, while continuing with this procedure. 	
	RO	(Step 5) CHECK Time Elapsed Since Stopping the Affected RCP(s) – GREATER THAN 3 MINUTES.	NOTE: This action will be taken post-reactor trip.
	RO	(Step 6) CLOSE Seal Leakoff Valve(s) for Affected RCP(s):	
		<ul style="list-style-type: none"> RCP – A, VALVE – CVC-303A 	
	RO	(Step 7) CHECK SI ACTUATED	
	CRS	(Step 7 RNO) GO TO Step 30	NOTE: The CRS will likely perform this procedure concurrently with the EOPs.
When the Operator Trips the Reactor, move to Events #6-9.			

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 36 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Upon entry into EOP-E-0, the operator will determine that both ESF buses are de-energized and transition to EOP-ECA-0.0, "Loss of All AC Power." The operator will subsequently start the "B" EDG by depressing the SI Actuate Pushbutton, restore power to Bus E-2, and transition back to EOP-E-0. When Bus E-2 is re-energized, the "D" Service Water Pump will fail to sequence automatically and will need to be manually started. Upon transition back to EOP-E-0, the crew will complete the immediate actions of EOP-E-0, and continue with AOP-018. The scenario will terminate when the crew has terminated Safety Injection and re-established Charging/Seal Injection in Step 6 of ES-1.1.

Booth Operator Instructions:

IMF EPS13
IMF EDG01C d:2
(Occurs on Rx Trip)

Indications Available:

- Indications of Reactor Trip
- Control Room lights dim
- Bus E-1 is de-energized
- Bus E-2 is de-energized
- DS Bus is de-energized
- "B" EDG RUNNING

Time	Pos.	Expected Actions/Behavior	Comments
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO	(Step 1) CHECK Reactor Trip:	Immediate Action
		<ul style="list-style-type: none"> • Reactor Trip AND Bypass Breakers - OPEN 	
		<ul style="list-style-type: none"> • Rod position indicators - FULLY INSERTED 	
		<ul style="list-style-type: none"> • Rod Bottom Lights - ILLUMINATED 	
		<ul style="list-style-type: none"> • Neutron Flux - LOWERING 	
	BOP	(Step 2) CHECK Turbine Trip:	Immediate Action
		<ul style="list-style-type: none"> • Both Turbine Stop Valves - CLOSED 	
	BOP	(Step 2.a RNO) Manually TRIP Turbine.	Immediate Action NOTE: No power to the Turbine Control status lights.

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 37 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> IF Turbine will NOT trip, THEN manually RUNBACK Turbine at maximum rate UNTIL ALL Governor valves are CLOSED. 	
		<ul style="list-style-type: none"> IF Turbine can NOT be runback, THEN manually CLOSE MSIVs AND MSIV Bypass Valves. 	
	BOP	(Step 2.b) All MSR Purge AND Shutoff Valves - CLOSED	Immediate Action
	BOP	(Step 3) CHECK Power To AC EMERGENCY BUSSES:	Immediate Action
		<ul style="list-style-type: none"> CHECK Bus E-1 OR E-2 - AT LEAST ONE ENERGIZED 	
		<ul style="list-style-type: none"> CHECK Bus E-1 AND E-2 - BOTH ENERGIZED 	
	CRS	(Step 3 RNO) GO TO EOP-ECA-0.0, Loss Of All AC Power, Step 1	Immediate Action
		<ul style="list-style-type: none"> WHEN time permits, THEN TRY to restore power to de-energized AC Emergency Bus. 	
			NOTE: The CRS will transition to EOP-ECA-0.0.
EOP-ECA-0.0, TOTAL LOSS OF AC POWER			
	RO	(Step 1) CHECK Reactor Trip:	Immediate Action
		<ul style="list-style-type: none"> Reactor Trip AND Bypass breakers - OPEN 	
		<ul style="list-style-type: none"> Neutron flux - LOWERING 	
	BOP	(Step 2) CHECK Turbine Trip:	Immediate Action
		<ul style="list-style-type: none"> BOTH Turbine Stop Valves - CLOSED 	
		<ul style="list-style-type: none"> MSR Purge AND Shutoff Valves - CLOSED 	

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 38 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 2 RNO) Manually TRIP Turbine.	Immediate Action NOTE: No power to the Turbine Control status lights.
		<ul style="list-style-type: none"> If Turbine will NOT trip, THEN CLOSE MSIV AND MSIV Bypass Valves. 	
	CRS/ BOP	(Step 3) DISPATCH an Operator to Perform Attachment 1, Restoring AC Power From The DSDG	Immediate Action NOTE: The CRS will dispatch an AO. Booth Instructor acknowledge as AO , and report after 5 minutes that the DSDG will NOT start .
	RO	(Step 4) CHECK if RCS is isolated:	
		CHECK LTDN LINE STOP Valves - CLOSED	
		<ul style="list-style-type: none"> LCV-460A 	
		<ul style="list-style-type: none"> LCV-460B 	
		CHECK PRZR PORVs - CLOSED	
		CHECK CVC-387, EXCESS LTDN STOP Valve - CLOSED	
		CHECK RCS Vent System Valves – CLOSED OR DEENERGIZED	
		<ul style="list-style-type: none"> RC-567, HEAD VENT 	
		<ul style="list-style-type: none"> RC-568, HEAD VENT 	
		<ul style="list-style-type: none"> RC-569, PZR VENT 	
		<ul style="list-style-type: none"> RC-570, PZR VENT 	
		<ul style="list-style-type: none"> RC-571, PRT ISO 	
		<ul style="list-style-type: none"> RC-572, CV ATMOS 	
	RO	(Step 5) CHECK CCW Pump Running for RCP Seal Cooling	

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 39 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 5 RNO) IF LESS THAN 15 minutes elapsed since RCP SEAL Cooling lost, THEN START CCW Pump A.	NOTE: The DS Bus is de-energized.
		IF RCP SEAL Cooling can NOT be restored WITHIN 15 minutes, THEN PERFORM the following prior to starting a CCW Pump	
		<ul style="list-style-type: none"> OPEN breaker for FCV-626, THERM BAR FLOW CONT Valve (MCC-6 CMPT 8F) 	
		<ul style="list-style-type: none"> Locally CLOSE FCV-626, THERM BAR FLOW CONT Valve. 	
	BOP	(Step 6) CHECK AFW Flow	
		<ul style="list-style-type: none"> CHECK AFW flow- GREATER THAN 300 GPM 	
		<ul style="list-style-type: none"> DISPATCH an Operator to locally perform Attachment 4, Local Control Of S/G Level and Pressure 	NOTE: The CRS will dispatch an AO. If so, Booth Instructor acknowledge as AO , and use: IRF CFW 012, f:100 IRF CFW 013, f:100 IRF CFW 014, f:100 And report after 5 minutes that the Attachment 4 is complete.
		<ul style="list-style-type: none"> CONTROL S/G WR level BETWEEN 60% and 67% 	
	BOP	(Step 7) TRY To Restore Power to ANY AC Emergency Bus:	
		<ul style="list-style-type: none"> Energize AC Emergency Bus with EDG: 	
		<ul style="list-style-type: none"> CHECK EDG-A AND EDG-B - RUNNING 	NOTE: The "A" EDG is OOS. The "B" EDG is NOT running.
	BOP	(Step 7.a.1 RNO) DEPRESS BOTH SAFETY INJECTION pushbuttons	

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 40 of 58

Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> If NO EDG started, THEN..... 	
		<ul style="list-style-type: none"> IF ANY EDG is running AND its output breaker is open, THEN 	NOTE: The "B" EDG will start and close in on Bus E-2.
	BOP	(Step 7.a.2) CHECK BOTH AC Emergency Busses - AUTOMATICALLY ENERGIZED	NOTE: Bus E-2 is energized.
		<ul style="list-style-type: none"> E-1 	
		<ul style="list-style-type: none"> E-2 	
	BOP	(Step 7.a.2 RNO) IF ANY EDG is running AND its output breaker is open, THEN.....	
		<ul style="list-style-type: none"> If ANY EDG is running AND its output breaker can NOT be closed from the Control Room, THEN... 	
		<ul style="list-style-type: none"> If an AC Emergency Bus can NOT be energized OR SW Cooling is NOT available to ANY running EDG, THEN.... 	NOTE: The "D" SW Pump has failed to auto-start; and the BOP will need to start this pump manually.
	BOP	<ul style="list-style-type: none"> CHECK AC Emergency Busses – AT LEAST ONE ENERGIZED 	
		<ul style="list-style-type: none"> E-1 	
		OR	
		<ul style="list-style-type: none"> E-2 	NOTE: E-2 is energized.

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 41 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
<u>Critical Task:</u>			
Energize at Least One AC Emergency Bus Before Defeating the Auto Loading of the Safeguards Equipment in EOP-ECA-0.0			
Safety Significance: Failure to energize an ac emergency bus constitutes mis-operation or incorrect crew performance in which the crew does not prevent degraded emergency power capacity. Failure to perform the critical task also results in needless degradation of any barrier to fission product release, specifically of the RCS barrier at the point of the RCP seals. Additionally, failure to perform the critical task results in the unnecessary continuation of a situation in which RCS inventory is being lost uncontrollably and cannot be replaced. This situation is equivalent to mis-operation or incorrect operator performance in which the operator does not prevent degraded emergency core cooling system (ECCS) capacity at a time when a small-break LOCA is in progress. In this case, at least one ac emergency bus can be energized from the control room. Failure to perform the critical task means that RCS inventory lost through the RCP seals cannot be replaced. It also means that the RCP seals remain without cooling and gradually deteriorate. As the seals deteriorate the rate of RCS inventory loss increases.			
	RO	<ul style="list-style-type: none"> Establish Seal Injection flow 	
		<ul style="list-style-type: none"> CHECK adequate DSDG OR EDG capacity to run one Charging Pump (108 KW each) (DSDG preferred) 	
		<ul style="list-style-type: none"> RESET SI 	
		<ul style="list-style-type: none"> ESTABLISH Charging flow 	NOTE: The RO will start the "C" Charging Pump.
		<ul style="list-style-type: none"> CHECK Charging Pumps – ANY RUNNING 	
	RO	(Step 7.c.3.a RNO) IF RCP Seal Cooling has been lost for LESS THAN 15 minutes, THEN START Charging Pumps as necessary	NOTE: It is expected that RCP Seal Cooling will be lost for less than 15 minutes.
		<ul style="list-style-type: none"> If ALL Seal Cooling to ANY RCP can NOT be restored within 15 minutes, THEN... 	
	RO	(Step 7.c.3.b) DISPATCH an operator to perform the following:	NOTE: These valves can be controlled from the RTGB.

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 42 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> OPEN CVC-358, RWST TO CHARGING PUMP SUCTION Valve 	NOTE: The CRS may dispatch an AO. If so, Booth Instructor acknowledge as AO , use: IRF CVC048 f:100 IRF CVC059 f:0 and report after 3 minutes that the Charging Pump suction is aligned to the RWST.
		<ul style="list-style-type: none"> CLOSE LCV-115C, VCT OUTLET Valve 	
	RO	(Step 7.c.3.c) ADJUST the following as necessary to maintain proper Seal Injection AND Charging flow:	
		<ul style="list-style-type: none"> Charging Pump Speed Controller(s) 	
		<ul style="list-style-type: none"> HIC-121, CHARGING FLOW Controller 	
		<ul style="list-style-type: none"> Seal Water Flow Control Valves 	
	RO/ BOP	(Step 7.c.3.d) MAINTAIN Seal Injection flow between 6 gpm AND 20 gpm per RCP UNLESS Seal Injection isolated CHECK the applicable EDG has loaded required equipment	
		<ul style="list-style-type: none"> SW Pumps 	NOTE: The "D" SW Pump has to be manually started, if not previously started.
		<ul style="list-style-type: none"> MDAFW Pump 	NOTE: The "B" MDAFW Pump is running.
		<ul style="list-style-type: none"> CCW Pump (as needed) 	NOTE: The "C" CCW Pump has previously failed.
		<ul style="list-style-type: none"> SW Booster Pump 	NOTE: The "B" SW Booster Pump has started on the SI.

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 43 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
<u>Critical Task:</u>			
Manually Start SW Pump for EDG Cooling within 40 Minutes of starting the "B" EDG			
Safety Significance: Failure to manually start the SW pump under the postulated plant conditions means that the EDG is running without SW cooling. Running the EDG without SW cooling leads to a high-temperature condition that can result in EDG failure due to damage caused by engine overheating. Under the postulated plant conditions, the running EDG is the only operable EDG. The calculated maximum time an EDG may operate without cooling to preclude adverse effects is 40 minutes. Since during the first 40 minutes of EDG operation in this scenario there are two procedural cues to check, and if needed, start a SW Pump, it is believed that failure to perform the critical task constitutes mis-operation or incorrect performance in which the crew does not prevent "degraded... emergency power capacity."			
	RO	(Step 7.c.3.e) PERFORM the following:	
		<ul style="list-style-type: none"> RESET SPDS AND Initiate MONITORING Critical Safety Function Status Trees. 	
		<ul style="list-style-type: none"> IMPLEMENT FRPs as necessary 	
	CRS	<ul style="list-style-type: none"> RETURN TO procedure AND step in effect 	NOTE: The CRS will transition to EOP-E-0.
			NOTE: The CRS may assign the RO or the BOP to continue with AOP-018 actions, while the crew continues with EOP-E-0.
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO	(Step 1) CHECK Reactor Trip:	Immediate Action
		<ul style="list-style-type: none"> Reactor Trip AND Bypass Breakers - OPEN 	
		<ul style="list-style-type: none"> Rod position indicators - FULLY INSERTED 	
		<ul style="list-style-type: none"> Rod Bottom Lights - ILLUMINATED 	
		<ul style="list-style-type: none"> Neutron Flux - LOWERING 	

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 44 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 2) CHECK Turbine Trip:	Immediate Action
		<ul style="list-style-type: none"> Both Turbine Stop Valves - CLOSED 	
		<ul style="list-style-type: none"> All MSR Purge AND Shutoff Valves - CLOSED 	
	BOP	(Step 3) CHECK Power To AC EMERGENCY BUSES:	Immediate Action
		<ul style="list-style-type: none"> CHECK Bus E-1 OR E-2 - AT LEAST ONE ENERGIZED 	NOTE: Bus E-2 is energized.
		<ul style="list-style-type: none"> CHECK Bus E-1 AND E-2 - BOTH ENERGIZED 	
	CRS	(Step 3 RNO) WHEN time permits, THEN TRY to restore power to de-energized AC Emergency Bus.	
	RO	(Step 4) CHECK SI Status:	Immediate Action
		CHECK if SI is actuated:	NOTE: SI was manually actuated in EOP-ECA-0.0.
		<ul style="list-style-type: none"> SI annunciators - ANY ILLUMINATED 	
		OR	
		<ul style="list-style-type: none"> SI equipment - AUTO STARTED 	
	RO	CHECK BOTH trains of SI actuated:	
		<ul style="list-style-type: none"> SI Pumps - TWO RUNNING 	
		<ul style="list-style-type: none"> RHR Pumps - BOTH RUNNING 	
	RO	(Step 4.b) Manually ACTUATE SI by depressing BOTH SI pushbuttons.	NOTE: Bus E-1 is de-energized and the "A" Train ECCS Pumps cannot be started.

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 45 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	Foldout Page:	
		RCP TRIP CRITERIA	
		FAULTED S/G AFW ISOLATION CRITERIA	
		AFW SUPPLY SWITCHOVER CRITERIA	
		DC BUS, INSTRUMENT BUS, OR MCC-5 FAILURE CRITERIA	
		SPENT FUEL POOL COOLING CRITERIA	
	CRS	(Step 5) PERFORM Attachment 1, Auto Action Verification, While CONTINUING WITH This Procedure	
			Examiner NOTE: The CRS will likely assign the BOP to perform this action. If so, BOP Examiner follow actions of Attachment 1. CRS/RO follow E-0 Actions, Step 6 , on Page 51 .
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION ATTACHMENT 1, AUTO ACTION VERIFICATION			
	BOP	(Step 1) CHECK ECCS Pumps Running:	
		<ul style="list-style-type: none"> SI Pumps - TWO RUNNING 	
	BOP	(Step 1 RNO) Manually START pump(s) as necessary	NOTE: Bus E-1 is de-energized and the "A" Train ECCS Pumps cannot be started.
	BOP	(Step 2) CHECK ECCS Valves In Proper Emergency Alignment	
	BOP	(Step 2 RNO) Manually ALIGN valve(s) as necessary.	NOTE: "A" Train valves cannot be aligned from the RTGB.

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 46 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 3) CHECK CCW Pumps - AT LEAST ONE RUNNING	NOTE: The only available CCW Pump has previously tripped.
	BOP	(Step 3 RNO) PERFORM the following:	
		<ul style="list-style-type: none"> IF NO CCW Pump is RUNNING AND CV Spray is NOT actuated, THEN START one CCW Pump on Emergency Bus energized by EDG (246 Kw) 	
		<ul style="list-style-type: none"> IF NO CCW Pump can be started, THEN TRIP ALL RCPs. 	
	BOP	(Step 4) CHECK Containment Isolation Phase A:	
		<ul style="list-style-type: none"> CHECK Containment Isolation Phase A - ACTUATED 	
		<ul style="list-style-type: none"> CHECK Containment Isolation Phase A Valves - CLOSED 	
	BOP	(Step 4.b RNO) Manually CLOSE valve(s) as necessary	NOTE: Some valves will need to be closed manually.
	BOP	(Step 4.c) CHECK Excess Letdown - ISOLATED	
		<ul style="list-style-type: none"> CVC-387, EXCESS LTDN STOP VALVE - CLOSED 	
		<ul style="list-style-type: none"> HIC-137, EXCESS LTDN FLOW CONTROLLER - AT 0% DEMAND 	
	BOP	(Step 5) CHECK Feedwater Isolation:	
		<ul style="list-style-type: none"> CHECK Main Feed Pumps - BOTH TRIPPED 	
		<ul style="list-style-type: none"> CHECK Main Feedwater isolated: 	
		<ul style="list-style-type: none"> Feedwater Reg Valves - CLOSED 	
		<ul style="list-style-type: none"> Feedwater Reg Bypass Valves - CLOSED 	
		<ul style="list-style-type: none"> Feedwater Header Section Valves - CLOSED 	NOTE: V2-6A has no indication no power.

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 47 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 5.b RNO) Manually CLOSE valve(s) as necessary	
	BOP	(Step 6) CHECK If Main Steam Lines Should Be Isolated:	
		<ul style="list-style-type: none"> CHECK Main Steam Line Isolation - REQUIRED 	
		<ul style="list-style-type: none"> High steam flow with: 	
		<ul style="list-style-type: none"> S/G pressure - LESS THAN 614 PSIG 	
		OR	
		<ul style="list-style-type: none"> Tavg - LESS THAN 543°F 	
		<ul style="list-style-type: none"> CHECK MSIVs AND MSIV Bypass Valves - CLOSED 	NOTE: The MSIVs are already CLOSED.
	BOP	(Step 7) CHECK Proper Service Water System Operation:	
		<ul style="list-style-type: none"> CHECK SW Pumps - ALL RUNNING 	NOTE: The "A" and "B" SW Pumps have no power, the "C" Pump has previously tripped, and the "D" SW Pump has failed to auto start.
	BOP	(Step 7.a RNO) Manually START pump(s) as necessary	NOTE: If the "D" SW Pump has NOT been manually started, it will be started here.
	BOP	(Step 7.b) CHECK SW Booster Pumps - BOTH RUNNING	NOTE: The "B" SW Booster Pump has started on the SI, the "A" SW Booster Pump has no power.
	BOP	(Step 7.b RNO) Manually START pump(s) as necessary	
		<ul style="list-style-type: none"> CHECK Both SW Header Low Pressure Alarms - EXTINGUISHED 	NOTE: BOTH alarms will be LIT.
		<ul style="list-style-type: none"> APP-008-F7,SOUTH SW HDR LO PRESS 	
		<ul style="list-style-type: none"> APP-008-F8,NORTH SW HDR LO PRESS 	

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 48 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 7.c RNO) PERFORM the following:	
		<ul style="list-style-type: none"> ISOLATE SW to the Turbine Building: 	NOTE: BOTH valves are already CLOSED.
		<ul style="list-style-type: none"> CLOSE V6-16C, SW Turbine Building Isolation valve. 	
		OR	
		<ul style="list-style-type: none"> CLOSE V6-16A and V6-16B, SW Turbine Building Supply valves 	
		<ul style="list-style-type: none"> WHEN this Attachment is complete, THEN PERFORM Supplement M, Component Alignment For Loss Of SW To Turbine Building, as time permits. 	NOTE: The BOP will contact an AO and direct performance of Supplement M. Booth Instructor acknowledge as AO.
	BOP	(Step 8) CHECK BOTH EDGs - RUNNING	NOTE: The "B" EDG is running.
	BOP	(Step 8 RNO) Manually START Emergency Diesel(s) as necessary.	NOTE: The "A" EDG is OOS.
	BOP	(Step 9) CHECK ECCS Flow:	
		<ul style="list-style-type: none"> CHECK RCS pressure - LESS THAN 1650 PSIG [1725 PSIG] 	
	BOP	(Step 9.a RNO) GO TO Step 10.	
	BOP	(Step 10) CHECK CV Recirculation Fans - ALL RUNNING	NOTE: The "3" and "4" HVH Fans are running (With Hi Vibration).
	BOP	(Step 10 RNO) Manually START fan(s).	NOTE: The "1" and "2" HVH Fans are unavailable (No power).
	BOP	(Step 11) CHECK IVSW System Actuated:	

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 49 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> PCV-1922A, AUTOMATIC HEADER PRESSURE CONTROL VALVE - OPEN 	
		<ul style="list-style-type: none"> PCV-1922B, AUTOMATIC HEADER PRESSURE CONTROL VALVE - OPEN 	
	BOP	(Step 12) CHECK CV Ventilation Isolation:	
		<ul style="list-style-type: none"> CV Ventilation Isolation Valves - CLOSED 	NOTE: The "A" Train valves have no power or indication.
	BOP	(Step 12 RNO) DEPRESS H.V. OFF on R-11 OR R-12 to initiate Containment Ventilation Isolation.	
		<ul style="list-style-type: none"> IF ANY Containment Ventilation Isolation valve does NOT close, THEN manually OR locally ISOLATE AFFECTED penetration outside Containment while CONTINUING WITH this procedure. 	NOTE: The BOP will contact an AO and direct local action. Booth Instructor acknowledge as AO.
	BOP	(Step 13) CHECK Control Room Ventilation Aligned For Pressurization Mode:	
		<ul style="list-style-type: none"> HVA-1A OR HVA-1B, CONTROL ROOM AIR HANDLING FAN - RUNNING 	
		<ul style="list-style-type: none"> HVE-19A OR HVE-19B, CONTROL ROOM AIR CLEANING FAN - RUNNING 	
		<ul style="list-style-type: none"> HVE-16, CONTROL ROOM AIR EXHAUST FAN - STOPPED 	NOTE: No Indication. The BOP will take the Control Switch to STOP
		<ul style="list-style-type: none"> Control Room HVAC Outside Air Damper A OR B - OPEN 	
		<ul style="list-style-type: none"> CR-D1A-SA, CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER - CLOSED 	
		<ul style="list-style-type: none"> CR-D1B-SB, CONTROL ROOM AIR EXHAUST FAN DISCHARGE DAMPER - CLOSED 	

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 50 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 14) CHECK DS Bus - ENERGIZED	NOTE: The DS Bus is NOT energized. An attempt has already been made to start the DSDG and re-energize the DS Bus.
	BOP	(Step 14 RNO) Locally PLACE DSDG in service using EPP-25, Energizing Supplemental Plant Equipment Using the DSDG.	
	BOP	(Step 15) CHECK Battery Chargers ENERGIZED:	
		• APP-036-D1, BATT CHARGER A/A-1 TROUBLE Alarm - EXTINGUISHED	NOTE: The "A" Train DC Bus is on the Battery.
		• APP-036-D2, BATT CHARGER B/B-1 TROUBLE Alarm - EXTINGUISHED	
	BOP	(Step 15 RNO) RESTART Battery Chargers within 30 minutes of power loss using OP-601, DC Supply System. (46 KW each)	NOTE: The "B" Train DC Bus is on the Battery Chargers.
	BOP	(Step 16) STOP R-11/12 Sample Pump	
	BOP	(Step 17) Locally RESET AND LOAD Instrument Air Compressor(s) As Necessary (38 KW each):	NOTE: The BOP will contact the Inside AO about locally resetting and starting the "B" IA Compressor. Booth Instructor: as AO, acknowledge IRF EPSMCC6_218 f: RACK_IN
		• Compressor A (MCC-5 CMPT 7M)	
		• Compressor B (MCC-6 CMPT 3G)	
	BOP	(Step 18) PERFORM Crew Update To Include The Following:	
		• Attachment completion	

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 51 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Manual actions taken 	
		<ul style="list-style-type: none"> Failed equipment status 	
		<ul style="list-style-type: none"> SW status per Step 7.c 	
		<ul style="list-style-type: none"> If applicable, PERFORM Supplement M, Component Alignment For Loss Of SW To Turbine Building, as time permits 	
			Examiner NOTE: Examiners following the CRS/RO continue HERE .
EOP-E-0, REACTOR TRIP OR SAFETY INJECTION			
	RO	(Step 6) CHECK AFW Pumps Running:	
		<ul style="list-style-type: none"> CHECK Motor Driven AFW Pumps - BOTH RUNNING 	NOTE: The "B" MDAFW Pump is likely running.
		(Step 6.a RNO) Manually START pump(s).	NOTE: The "A" MDAFW Pump is unavailable (No power).
	RO	(Step 6.b) CHECK S/G Narrow Range levels - TWO S/Gs LESS THAN 16%	
	RO	(Step 6.b RNO) IF S/G Narrow Range level lowers to LESS THAN 16% on Two S/Gs, THEN PERFORM Step 6.c	NOTE: This is a Continuous Action. The CRS will make both board operators aware.
	CRS	<ul style="list-style-type: none"> CONTINUE WITH Step 7. 	
	RO	(Step 7) CHECK AFW Valves In Proper Emergency Alignment:	NOTE: These valves are under local control. The crew may elect to restore control of these valves to the RTGB.
		<ul style="list-style-type: none"> AFW Header Discharge Valves - FULL OPEN 	
		<ul style="list-style-type: none"> AFW Header Section Valves - FULL OPEN 	

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 52 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Steam Driven AFW Pump Discharge Valves - FULL OPEN IF PUMP RUNNING 	NOTE: The SDAFW Pump is likely to be NOT running.
	RO	(Step 8) CHECK Total AFW Flow:	
		<ul style="list-style-type: none"> RESET SI 	
		<ul style="list-style-type: none"> CONTROL AFW flow to maintain Intact S/G Narrow Range level between 9%[18%] AND 50% 	
		<ul style="list-style-type: none"> CHECK total AFW flow - GREATER THAN 300 GPM 	NOTE: It is likely the S/G levels are high, and that AFW flow has been throttled to little or no flow.
	RO	(Step 8.c RNO) IF S/G Narrow Range level is GREATER THAN 9% [18%] in ANY S/G, THEN CONTROL AFW flow to maintain S/G Narrow Range level.	NOTE: S/G levels are likely high in the band, but under operator control.
		<ul style="list-style-type: none"> IF S/G Narrow Range level is LESS THAN 9% [18%] in ALL S/Gs, THEN... 	
	RO	(Step 9) CHECK CV Spray NOT Required:	
		<ul style="list-style-type: none"> CHECK Containment Pressure - HAS REMAINED LESS THAN 10 PSIG 	
		<ul style="list-style-type: none"> CHECK CV Spray - NOT ACTUATED 	
	RO	(Step 10) CHECK RCP Seal Cooling:	
		<ul style="list-style-type: none"> CCW flow to RCP(s) Thermal Barriers - NORMAL 	
		<ul style="list-style-type: none"> APP-001-C1,RCP THERM BAR COOL WTR HI FLOW ALARM - EXTINGUISHED 	
		<ul style="list-style-type: none"> APP-001-D1,RCP THERM BAR COOL WTR LO FLOW alarm - EXTINGUISHED 	NOTE: The LO Flow alarm will be LIT.
		OR	

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 53 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> Seal Injection flow - ADEQUATE 	
		<ul style="list-style-type: none"> Seal Injection flow - GREATER THAN 6 GPM PER RCP 	NOTE: It is likely that Seal Injection flow is > 6 to each RCP.
		OR	
		<ul style="list-style-type: none"> Thermal Barrier ΔPs - GREATER THAN 5 INCHES WATER PER RCP 	
	RO	(Step 11) CHECK RCS Temperatures:	
		<ul style="list-style-type: none"> With NO RCPs running, RCS Cold Leg temperatures - STABLE AT OR TRENDING TO 547°F 	NOTE: It is likely that Tcolds are >547°F.
	RO	(Step 11 RNO) IF temperature is LESS THAN 547°F AND lowering, THEN...	
		IF temperature is GREATER THAN 547°F AND rising THEN...	<p>NOTE: Although Tcolds are >547°F, they are most likely stable.</p> <p>If Tcolds are rising, the CRS will contact the AO to locally dump steam using the S/G Steam Line PORVs.</p> <p>If so, Booth Instructor use:</p> <p>IRF MSS097 f:15:00 IRF MSS091 f:DEFEAT IRF MSS094 f:MANUAL IRF MSS098 f:15:00 IRF MSS092 f:DEFEAT IRF MSS095 f:MANUAL IRF MSS099 f:15:00 IRF MSS093 f:DEFEAT IRF MSS096 f:MANUAL IRF AIR027 f:N2_SUPPLY IRF MSS099 r:25 f:1022 IRF MSS098 r:25 f:1022 IRF MSS097 r:25 f:1022</p>

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 54 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 12) CHECK PZR PORVs AND Spray Valves:	
		<ul style="list-style-type: none"> CHECK PZR PORVs - CLOSED 	
		<ul style="list-style-type: none"> CHECK Normal PZR Spray Valves - CLOSED 	
		<ul style="list-style-type: none"> CHECK Aux PZR Spray Valve - CLOSED 	
	RO	(Step 13) CHECK If RCPs Should Be Stopped:	
		<ul style="list-style-type: none"> CHECK RCPs - ANY RUNNING 	NOTE: All RCPs are OFF.
	CRS	(Step 13.a RNO) GO TO Step 14.	
	RO	(Step 14) CHECK If S/G Secondary Pressure Boundaries Are Intact:	
		<ul style="list-style-type: none"> NONE LOWERING IN AN UNCONTROLLED MANNER 	
		<ul style="list-style-type: none"> NONE COMPLETELY DEPRESSURIZED 	
	RO	(Step 15) CHECK If S/G Tubes Are Intact:	
		<ul style="list-style-type: none"> Secondary Radiation Monitors - HAVE REMAINED NORMAL 	
		<ul style="list-style-type: none"> R-15, CONDENSER AIR EJECTOR GAS 	NOTE: R-15 is OOS.
		<ul style="list-style-type: none"> R-19s, S/G Blowdown Radiation 	NOTE: R-19 is de-energized.
		<ul style="list-style-type: none"> R-31s, STEAMLINE RADIATION MONITORS 	
		<ul style="list-style-type: none"> S/G levels - NONE RISING IN AN UNCONTROLLED MANNER 	
	RO	(Step 16) CHECK if RCS is Intact:	
		<ul style="list-style-type: none"> CV radiation - NORMAL 	

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 55 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D"
Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> R-2, CV AREA 	
		<ul style="list-style-type: none"> R-32A, CV HIGH RANGE 	
		<ul style="list-style-type: none"> R-32B, CV HIGH RANGE 	
		<ul style="list-style-type: none"> CV pressure - NORMAL 	
		<ul style="list-style-type: none"> CV Sump level - NORMAL 	
	RO/ BOP	(Step 17) CHECK If ECCS Flow Should Be Terminated:	
		<ul style="list-style-type: none"> CHECK RCS Subcooling based on Core Exit T/Cs – GREATER THAN 18°F 	
		<ul style="list-style-type: none"> CHECK Secondary Heat Sink level 	
		<ul style="list-style-type: none"> Total AFW flow to S/G(s) – GREATER THAN 300 GPM 	
		OR	
		<ul style="list-style-type: none"> S/G Narrow Range level in at least one S/G – GREATER THAN 9% 	NOTE: It is likely that all S/G Narrow Range levels are > 9%.
		<ul style="list-style-type: none"> CHECK RCS pressure: 	
		<ul style="list-style-type: none"> Pressure – GREATER THAN 1650 PSIG 	
		<ul style="list-style-type: none"> Pressure – STABLE OR RISING 	
		<ul style="list-style-type: none"> CHECK PZR level – GREATER THAN 14% 	
		<ul style="list-style-type: none"> RESET SPDS AND INITIATE monitoring of Critical Safety Functions Status Trees. 	
		<ul style="list-style-type: none"> GO TO EOP-ES-1.1, SI Termination, Step 1 	NOTE: The CRS will transition to EOP-ES-1.1.
EOP-ES-1.1, SI TERMINATION			
	RO/ BOP	Foldout Page:	
		<ul style="list-style-type: none"> SI REINITIATION CRITERIA 	
		<ul style="list-style-type: none"> SECONDARY INTEGRITY CRITERIA 	

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 56 of 58Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D" Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> AFW SUPPLY SWITCHOVER CRITERIA 	
	RO	(Step 1) RESET SI	
	RO	(Step 2) RESET Containment Isolation PHASE A	
	RO	(Step 3) ESTABLISH Instrument Air To CV:	
		<ul style="list-style-type: none"> CHECK APP-002-F7, INSTR AIR HDR LO PRESS alarm - EXTINGUISHED 	NOTE: If not previously done, the BOP will contact the Inside AO about locally resetting and starting the "B" IA Compressor. Booth Instructor: as AO, acknowledge IRF EPSMCC6_218 f: RACK_IN
		<ul style="list-style-type: none"> RESET IA PCV-1716, INSTRUMENT AIR ISOLATION TO CV 	
		<ul style="list-style-type: none"> CHECK IA PCV-1716 - OPEN 	
	BOP	(Step 4) CHECK DC Busses A AND B - ENERGIZED	NOTE: Both DC Busses are energized, although the "A" DC Bus is on the Battery.
	RO	(Step 5) STOP ECCS Pumps:	
		<ul style="list-style-type: none"> STOP SI Pumps 	
		<ul style="list-style-type: none"> CHECK RHR Pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST 	
		<ul style="list-style-type: none"> STOP RHR Pumps 	
	RO	(Step 6) CHECK Charging Flow Has Been - ESTABLISHED	

Op Test No.: N16-1 Scenario # 6 Event # 6, 7, 8 & 9 Page 57 of 58

Event Description: **Loss of Offsite Power/"B" EDG Fails to Start/DSDG Trips/"D"
Service Water Pump fails to Auto Start**

Time	Pos.	Expected Actions/Behavior	Comments
		<ul style="list-style-type: none"> CHECK Charging Pumps - AT LEAST ONE RUNNING 	
		<ul style="list-style-type: none"> ESTABLISH desired Charging flow: 	
		<ul style="list-style-type: none"> START additional Charging Pump(s) as necessary 	
		<ul style="list-style-type: none"> ADJUST the following as necessary to maintain Charging flow AND Seal Injection: 	
		<ul style="list-style-type: none"> Charging Pump speed controller 	
		<ul style="list-style-type: none"> HIC-121, CHARGING FLOW Controller 	
		<ul style="list-style-type: none"> RCP Seal Water Flow Control Valve 	<p>NOTE: The RO may contact the AO to adjust Seal Injection flows.</p> <p>If so, Booth Instructor acknowledge as AO; and use:</p> <p>IRF CVC030 f: 100</p> <p>IRF CVC031 f: 100</p> <p>IRF CVC032 f: 100</p>
		<ul style="list-style-type: none"> MAINTAIN Seal Injection flow between 6 gpm AND 20 gpm per RCP UNLESS Seal Injection isolated 	
At the discretion of the Lead Examiner terminate the exam.			

NRC SCENARIO N16-1-6 TURNOVER SHEET

1. INITIAL CONDITIONS

- | | |
|-------------------------|-------------|
| a) Time in Core Life: | MOL |
| b) Reactor Power: | 100% |
| c) Turbine Load: | 770.3 MWe |
| d) Boron Concentration: | 853 ppm |
| e) Rod Height: | 218 CB 'D' |
| f) RCS Pressure: | 2235 psig |
| g) PZR Level: | 53.3% |
| h) Xenon: | Equilibrium |

2. TECHNICAL SPECIFICATION LCO ACTIONS STATEMENTS IN EFFECT

<u>T.S. #</u>	<u>Description</u>
LCO 3.8.1	Condition B1, B.2, B.3.2.2 and B4

3. CLEARANCES IN EFFECT

- a) The "A" EDG is OOS.

4. CAUTION CAPS IN EFFECT

- a) None

5. PROTECTED EQUIPMENT

- a) "B" EDG
- b) DSDG
- c) DS Bus
- d) 4KV Bus 3
- e) Bus E-2
- f) SDAFW Pump

6. DEGRADED EQUIPMENT

- a) R-15, Condenser Air Ejector Gas Radiation Monitor is OOS (I&C Investigating).
- b) RTGB Annunciator APP-002-F8, "STA AIR HDR LO PRESS," has failed to the ILLUMINATED condition (I&C is investigating).

7. SWITCHYARD ACCESS

- a) PROTECTED

8. PLANNED EVOLUTIONS

- a) Maintain Steady-State conditions

9. TURNOVER INFORMATION

- a) The area has experienced steady light rain for the past 6 hours, with light wind from the South at 5-10 mph, and this is expected to continue throughout the shift.
- b) The "B" MFWP has experienced high noise/vibration over the last two hours (Maintenance is investigating).
- c) SR 3.8.1.1, Offsite Power Checks were last completed 2 hours ago.

10. REACTIVITY INFORMATION

- a) IAW OST-947 data

11. RISK

- a) GREEN