Appendix D	Scenario Outline	Form ES-D-1

HARRIS 2014 NRC SCENARIO 1

Facility: SHEARON-HARRIS Scenario No.: 1 Op Test No.: 05000400/2014302

Examiners: _____ Operators: SRO:

_____ OATC:

_____ BOP:

Initial Conditions:
- IC-5, BOL, 49% power
- 'B' DEH Pump is under clearance for motor repairs.
- 1SI-3, Boron Injection Tank Outlet valve is under clearance for breaker repairs
- 'B' Gland Seal Exhauster Fan is under clearance due to high vibrations on the motor bearing.
- Thunderstorms have been forecasted for the area, AP-301 actions are completed.

Turnover:
- Plant is at approximately 49% power. Plant startup is in progress IAW GP-005 step 132.e. After taking the shift, continue plant startup at 4 DEH Units/min. to ~52% power then start the 2nd Main Feedwater Pump. Plant risk condition is YELLOW due to startup.

Critical Tasks:
- Manually trip all RCPs within 10 minutes of a Phase B isolation signal
- Isolate AFW flow to 'B' Steam Generator prior to exiting EOP-E-2
- Shut BIT Outlet valve 1SI-4 prior to establishing flow through the charging header

Event No.	Malf. No.	Event Type*	Event Description
1	n/a	R – RO/SRO N – BOP/SRO	Continue plant startup to ~52% power Start 2nd Main Feedwater Pump
2	prs06a	C – RO/SRO TS – SRO	Pressurizer PORV 445A Leakage
3	eps12	C – BOP/SRO	Total Loss of Cooling Banks on the UAT 1A (AOP-039)
4	pt:475	I - BOP/SRO TS - SRO	Failure of the 'A' SG Pressure Transmitter PT-475 to 0%
5	sws07a	C – RO/SRO TS – SRO	NSW Pump 'A' Shaft Shear (AOP-022)
6	mss01b	M – All	Steam line Break on 'B' SG inside Containment
7	zrpk616a zrpk616b	I – BOP/SRO	Failure of Auto AFW Isolation on 'B' SG
8	zrpk 719a zrpk719b zrpk722a zrpk722b zrpk710a zrpk710b	C – RO/SRO	Failure of PZR PORVs to auto open when required
9	sis017 sis018	C – RO/SRO	Failure of BIT outlet isolation valve 1SI-4 to close
10	nis06a	I – RO/SRO	SR Nuclear Instruments fail to energize post trip due to IR NI-35 undercompensated

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

SCENARIO SUMMARY: 2014 NRC EXAM SCENARIO 1

Turnover provided to the crew is - The plant is operating at ~49% power in BOL. Criticality was achieved 8 hours ago, 74 hours after a trip from 100% power. A plant startup in accordance with GP-005, Power Operation Mode 2 to Mode 1, is in progress. After initial turbine loading, the load increase has been performed at 4 units/min. The unit is currently at ~49% power. The National Weather Service has forecasted thunderstorms for the New Hill area and the actions for AP-301, Seasonal Weather Preparations and Monitoring have been completed by the crew. Plant risk condition is YELLOW due to startup.

A startup has commenced and the crew has been directed to continue the power increase using GP-005 to ~52% power at a ramp rate of 4 DEH units/minute. At ~52% power or greater than 6.4 MPPH feedwater flow, the Turbine will be placed in hold and the BOP will place the second Main Feedwater Train Pump in service per OP-134.01, Feedwater System, Section 5.4. Following the start of the 'B' MFW Pump the crew will continue to ramp the unit towards full power operation.

The following equipment is under clearance:

- 'B' DEH Pump is under clearance for motor repairs. The pump has been unavailable for 8 hours. Repairs are expected to be completed within 24 hours.

- 'B' Gland Seal Exhauster Fan is under clearance for motor repairs. The fan has been under clearance for 8 hours. Repairs are expected to be completed within 24 hours.

- 1SI-3, Boron Injection Tank Outlet valve is under clearance for breaker repairs. The valve is shut with power removed. The valve has been under clearance for 4 hours. OWP-SI-01, Safety Injection System, has been completed. Repairs are expected to be completed within 24 hours. Tech Specs 3.5.2 and 3.6.3 apply.

EMERGENCY CORE COOLING SYSTEMS

3/4.5.2 ECCS SUBSYSTEMS - T_{avg} GREATER THAN OR EQUAL TO 350°F

LIMITING CONDITION FOR OPERATION

3.5.2 Two independent Emergency Core Cooling System (ECCS) subsystems shall be OPERABLE with each subsystem comprised of:

a. One OPERABLE Charging/safety injection pump,

b. One OPERABLE RHR heat exchanger,

c. One OPERABLE RHR pump, and

d. An OPERABLE flow path capable of taking suction from the refueling water storage tank on a Safety Injection signal and, upon being manually aligned, transferring suction to the containment sump during the recirculation phase of operation.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

SCENARIO SUMMARY: 2014 NRC EXAM SCENARIO 1 (continued)

- 1SI-3, Boron Injection Tank Outlet valve, Tech Specs…continued

3/4.6.3 CONTAINMENT ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.3 Each containment isolation valve specified in the Technical Specification Equipment List Program, plant procedure PLP-106, shall be OPERABLE with isolation times less than or equal to required isolation times.

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

ACTION:

With one or more of the containment isolation valve(s) inoperable, maintain at least one isolation valve OPERABLE in each affected penetration that is open and:

a. Restore the inoperable valve(s) to OPERABLE status within 4 hours, or

b. Isolate each affected penetration within 4 hours by use of at least one deactivated automatic valve secured in the isolation position, or

Event 1: Continue plant startup to ~52% power: The crew will perform a power increase of approximately 3%-5% power then place the Turbine to hold until the (BOP) starts the standby 'B' MFW pump IAW OP-134.01 Section 5.4. Following the start of the 'B' MFW pump the crew will continue efforts to raise power to the Lead Examiners discretion. For the reactivity manipulation it is expected that the SRO will conduct a reactivity brief, the RO will dilute and monitor auto rod withdrawal per the reactivity plan and the BOP will operate the DEH Controls as necessary to raise Main Turbine power.

Event 2: Pressurizer PORV 445A Leakage: This failure will cause PRZ PORV 445A to leak, resulting in rising PRT pressure and level. PORV Line Temp indicator TI-463 will increase as observed on the MCB and the crew will respond IAW ALB 009-8-2, Pressurizer Relief Discharge High Temp. The crew may utilize AOP-016, Excessive Primary Plant Leakage, Attachment 5 to determine which PORV is leaking by isolating each PORV Block valve individually until the leaking PORV is identified. The SRO will evaluate Tech Spec 3.4.4, Reactor Coolant System – Relief Valves.

TS 3.4.4 applicable LCO is Action **a,** 1 hour to restore

SCENARIO SUMMARY: 2014 NRC EXAM SCENARIO 1 (continued)

REACTOR COOLANT SYSTEM

3/4.4.4 RELIEF VALVES

LIMITING CONDITION FOR OPERATION

3.4.4 All power-operated relief valves (PORVs) and their associated block valves shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3

ACTION:

a. With one or more PORV(s) inoperable, because of excessive seat leakage, within 1 hour either restore the PORV(s) to OPERABLE status or close the associated block valve(s) with power maintained to the block valve(s); otherwise, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

The SRO should also prepare OMM-001, Operations Administrative Requirements, Attachment 5 Equipment Problem Checklist for the failure.

Event 3: Total Loss of Cooling Banks on the UAT 1A (AOP-039): The BOP should respond to annunciator ALB-022-3-1, Unit Aux Xfer-A Trouble. The crew should dispatch an operator to locally investigate the cause of the alarm. The report from the AO will be that all transformer cooling is lost. The crew should recognize this meets the entry conditions of AOP-039, Startup And Unit Auxiliary Transformer Trouble. The crew should monitor EFRIS to determine the UAT 1A temperature is approaching the limit that will require the transformer to be unloaded within 30 minute and the CRS should direct the BOP to transfer the house loads from the UAT 1A to the SUT 1A using OP-156.02, AC Electrical Distribution.

The SRO should also prepare OMM-001, Operations Administrative Requirements, Attachment 5 Equipment Problem Checklist for the failure.

Event 4: Failure of the 'A' SG Pressure Transmitter PT-475 to 0%: This event will require the BOP to place the 'A' SG level control to manual and control SG level within Reactor trip limits. The SRO should provide level band and trip guidance IAW OMM-001. The crew will take the channel out of service using OWP-ESF-02, Engineered Safety Feature Actuation, protection channel III Steam flow. The SRO should evaluate Tech Spec 3.3.1 action 6, Tech Spec 3.3.3.6 Accident Monitoring Instrumentation Action **a** (tracking only since minimum number of channels are met), and Tech Spec 3.3.2 1.e Steam Line Press Low Action 19 applies.

SCENARIO SUMMARY: 2014 NRC EXAM SCENARIO 1 (continued)

T.S. 3.3.1: As a minimum, the Reactor Trip System instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
14. Steam Generator Water Level--Low Coincident With Steam/ Feedwater Flow Mismatch	2 stm. gen. level and 2 stm./feed-water flow mismatch in each stm. gen.	1 stm. gen. level coincident with 1 stm./feedwater flow mismatch in same stm. gen.	1 stm. gen. level and 2 stm./feed-water flow mismatch in same stm. gen. or 2 stm. gen. level and 1 stm./feedwater flow mismatch in same stm. gen.	1, 2	6

ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours, and

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1.

TS 3.3.3.6 The Accident Monitoring instrumentation channels shown in Table 3.3-10 shall be OPERABLE – tracking only since the minimum number of channels operable are met

- ACTION a. - With the number of OPERABLE accident monitoring instrumentation channels except In Core Thermocouples and Reactor Vessel Level less than the Total Required Number of Channels requirements shown in Table 3.3-10 restore the inoperable channel(s) to OPERABLE status within 7 days, or be in at least HOT STANDBY within the next 6 hours and in at least HOT SHUTDOWN within the following 6 hours.

Tech Spec 3.3.2

INSTRUMENTATION

3/4.3.2 ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The Engineered Safety Features Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be OPERABLE with their Trip Setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4.

APPLICABILITY: As shown in Table 3.3-3.

SCENARIO SUMMARY: 2014 NRC EXAM SCENARIO 1 (continued)

Tech Spec 3.3.2 (Continued)

TABLE 3.3-3

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
1. Safety Injection (Reactor Trip, Feedwater Isolation, Control Room Isolation, Start Diesel Generators, Containment Ventilation Isolation, Phase A Containment Isolation, Start Auxiliary Feedwater System Motor-Driven Pumps, Start Containment Fan Coolers, Start Emergency Service Water Pumps, Start Emergency Service Water Booster Pumps)					
e. Steam Line Pressure--Low	3/steam line	2/steam line in any steam line	2/steam line	1, 2, 3#	19

ACTION 19 - With the number of OPERABLE channels one less than the Total Number of Channels, operation may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours, and

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.2.1.

The SRO should also prepare OMM-001, Operations Administrative Requirements, Attachment 5 Equipment Problem Checklist for the failure.

Event 5: NSW Pump 'A' Shaft Shear (AOP-022) – Normal Service Water Pump 'A' sheared shaft can be inserted once the crew has stabilized 'A' SG water level. This will result in multiple NSW alarms and the crew should enter AOP-022. Once immediate actions are complete the crew should use the AOP to start up the standby NSW pump and verify proper system operation. While NSW system pressure is low the ESW system will automatically start and isolate into the 'A' and 'B' train headers. With lower temperature ESW water providing cooling into Containment the potential exist for a low pressure condition to occur. This will be indicated by ALB-028-5-1, Containment Air High Vacuum. The SRO should evaluate Tech Spec 3.6.1.4.

LIMITING CONDITION FOR OPERATION

3.6.1.4 Primary containment internal pressure shall be maintained between -1.0 inches water gauge and 1.6 psig.

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

ACTION:

With the containment internal pressure outside of the limits above, restore the internal pressure to within the limits within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

The SRO should also prepare OMM-001, Operations Administrative Requirements, Attachment 5 Equipment Problem Checklist for the failure.

SCENARIO SUMMARY: 2014 NRC EXAM SCENARIO 1 (continued)

Event 6: MAJOR – Steam line Break on 'B' SG inside Containment. Once RCS pressure control has been established to the satisfaction of the Lead Examiner a Steam Line Break inside Containment on the 'B' SG will occur. The crew should enter and carry out the immediate actions of EOP-E-0, Reactor Trip Or Safety Injection.

The crew should diagnose that a LOCA is NOT in progress and transition from EOP-E-0 to EOP-E-2, Faulted Steam Generator Isolation.

While the crew is performing actions of EOP-E-2 the Containment pressure will continue to rise beyond 10 psig which will actuate a Containment Spray and a Phase B isolation signal. This will require ALL RCPs to be secured.

All RCPs will need to be manually tripped within 10 minutes of a Phase B isolation signal. **(Critical Task)**

Event 7: Failure of Auto AFW Isolation on 'B' SG. The crew should identify that an actuation signal for AFW Auto Isolation has failed on the 'B' SG and manually isolate AFW flow to the 'B' SG. **(Critical Task)**

Event 8: Failure of PZR PORVs to auto open when required. As RCS pressure increases the crew will be required to secure SI flow. If SI flow continues the RCS pressure will continue to increase as the PZR fills. If or when RCS pressure exceeds the PORV lift setting of 2335 psig the PORVs will NOT automatically open. The operator can manually open and close the PORVs to prevent an overpressure condition which could cause the RCS Safety Relief Valves to lift at 2485 psig. The Technical Specification RCS Safety Limit is 2735 psig which is 110% of design pressure.

Event 9: Failure of BIT outlet isolation valve 1SI-4 to close. While implementing EOP-E-2 the crew will be directed to reset SI and shut BIT outlet valves then establish a normal Charging lineup. Prior to the establishment of the Charging lineup High head SI flow should be isolated. When the crew attempts to shut 1SI-4 from the MCB the valve will not close. RNO actions direct locally shutting the valves. The crew will direct an Aux Operator to locate and shut the valves. The actions and locally shutting 1SI-4 need to be performed prior to filling the RCS to solid conditions which could cause the SRVs to lift. **(Critical Task)**

Event 10: Source Range channels will fail to energize post trip due to IR NI-35 under compensation. The crew will need to identify the failure of the SR instrumentation MCB indication and audible counts. They will then manually energize the SR channels to establish an audio count rate.

The scenario will end when Safety Injection has been terminated and the crew restores letdown to service while implementing EOP-ES-1.1, SI Termination. With PZR level lowering and RCS Hot Leg Temperatures stable or lowering the RCS pressure challenge will be removed.

CRITICAL TASK JUSTIFICATION:

1. Manually trip all RCPs within 10 minutes of a Phase B isolation signal

Securing RCPs during a large steam break inside Containment is procedurally required when Containment pressure has exceeded the High 3 setpoint of 10 psig. Exceeding this pressure causes a Phase B actuation that isolates CCW flow to the RCP heat exchangers. If the RCPs are left operating they will overheat and become inoperable. Due to the rapid pressure increase in Containment from this event EOP-E-0 continuous action step 16 RNO b requires the crew to secure ALL RCPs. This action should be accomplished within 10 minutes of the Phase B actuation and prior to transitioning out of EOP-E-0.

2. Isolate AFW flow to 'B' Steam Generator prior to exiting EOP-E-2.

Failure to isolate a faulted Steam Generator that can be isolated causes challenges to the Critical Safety Functions beyond those irreparably introduced by the postulated conditions. Also, depending upon the plant conditions, it could constitute a demonstrated inability by the crew to recognize a failure of the automatic actuation of an ESF system or component. This critical task requires the crew to recognize an automatic actuation should have occurred of an ESF system or component but has not and then take manual operator actions to perform the isolation.

3. Shut BIT Outlet valve 1SI-4 prior to establishing flow through the charging header.

Isolation of Safety Injection is required to allow the operator to stabilize RCS plant conditions. Eventually the Pressurizer will fill with water rendering pressurizer control ineffective. Consequently, in order to decrease RCS pressure to conserve makeup water, Safety Injection flow must be decreased. Because Safety Injection flow cannot be throttled, once the criteria to reduce Safety Injection flow is met Safety Injection is terminated by isolating Safety Injection flow, reducing to one CSIP in operation and realigning the CSIP discharge to the normal charging header. Shutting the BIT outlet valves is the first step in realigning normal charging to the RCS. Not shutting 1SI-4 prior to establishing a normal Charging lineup will cause simultaneous flow through the Charging and SI lines and cause a CSIP run out condition indicated by oscillating discharge pressure.

Note: An unanticipated critical task may be created in a scenario should an applicant's action or lack of action cause an unexpected RPS or ESFAS actuation. A critical task may be assigned and graded as unsatisfactory even if corrected by another team member prior to the unanticipated RPS/ESFAS actuation. Should the applicant self-correct the action or inaction prior to the unanticipated plant response, a critical task failure should not be assigned to the applicant.

SIMULATOR SETUP

For the 2014 NRC Exam Simulator Scenario # 1

Reset to IC-161 password “spurs”

Press Start on Scaler / Timer and ensure range set correctly
Go to RUN
Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner.

Set ERFIS screens

(The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

SPECIAL INSTRUCTIONS:

Post conditions for status board from IC-5
Reactor Power 48% steady state
Control Bank D at 146 steps
RCS boron 1842 ppm
Provide crew marked up copy of GP-005 up to step 131 for turnover (step 2 N/A, step 121 and 122 still open)

Update the status board:

1SI-3, Boron Injection Tank Outlet valve has been under clearance for 4 hours. Tech Spec 3.5.2 applies – 72 hour LCO or HSB within the next 6 hours and HSD within the following 6 hours. Tech Spec 3.6.3 also applies but is met by removing power and having the valve shut.

Align equipment for repairs:

“B” Gland Seal Exhauster Fan, place pump switch to STOP, and hang CIT on MCB switch
“B” DEH Pump, place pump switch to STOP-PULL-TO-LOCK, and hang CIT on MCB switch
1SI-3, Boron Injection Tank Outlet valve, and hang CIT on MCB switch

Place filled out copies of OWP’s into the OWP book – ensure they are removed at end of day:
OWP-SI-01 for 1SI-3
Hang restricted access signs on MCR entry swing gates

Op Test No.: NRC	Scenario # 1	Event # 1	Page 10 of 82
Event Description:	**Power escalation from 48% power**		

Time	Position	Applicant's Actions or Behavior
Lead Evaluator:		**The crew has been directed to re-commence a power escalation from 48% to 100% power. The power increase is on hold for turnover. The SRO is expected to conduct a reactivity brief prior to commencing the power escalation. This brief may be conducted outside the simulator prior to starting the scenario.**
		When the crew has completed their board walk down and are ready to take the shift inform the Simulator Operator to place the Simulator in Run. When the Simulator is in run announce: **CREW UPDATE – (SRO's Name) Your crew has the shift. END OF UPDATE**
Simulator Operator:		**When directed by the Lead Evaluator, ensure that the annunciator horns are on and place the Simulator in RUN.**
	SRO	GP-005, Step 131
	SRO/BOP	Direct BOP to depress the GO button. BOP verifies turbine settings and places DEH to GO.
Evaluator's Note:		**The crew should monitor diverse indications of power during the power escalation (NIs, Core ΔT, Turbine First Stage Pressure, Main Generator Output, ERFIS Continuous Calorimetric)** **Crew may determine to allow rods to withdraw in automatic instead of diluting per reactivity plan. If so, ramp will continue without makeup. Crew might also choose to dilute prior to starting the ramp.**

Op Test No.: NRC	Scenario # 1	Event # 1	Page 11 of 82
Event Description:	**Power escalation from 48% power**		

Time	Position	Applicant's Actions or Behavior
	BOP	• Requests PEER check prior to manipulations of DEH Control • DEPRESS the GO push-button to start the power escalation and informs crew through 'Crew Update' Turbine in 'GO' and DEH is properly responding. • VERIFY the number in the REFERENCE display increases. • VERIFY Generator load is increasing.
	RO	MONITORS primary systems response.
Procedure Note:		**NOTE:** With only one Main Feedwater Pump running, Turbine First Stage Pressure should be monitored and the Second Main Feedwater Pump started prior to exceeding 456 psig Turbine First Stage Pressure. A Turbine Runback will occur at approximately 507.2 psig. **NOTE:** The second Main Feedwater Pump should be started after exceeding 6.4 and before 7.0 MPPH total feed flow. If 6.4 MPPH is not obtainable prior to exceeding 456 psig Turbine First Stage Pressure, then the second Main Feedwater Pump should be started and Turbine loading continued until total feed flow is greater than 6.4 MPPH.
	SRO	WHEN Turbine First Stage Pressure between 360 psig and 456 psig (approximately 45% and 55% Turbine load), THEN PLACE the second Main Feedwater Train Pump in service per OP-134.01 Section 5.4.
	CREW	Monitors plant primary parameters while ramp is performed and places second Main Feedwater Train Pump in service when indications of Turbine First Stage Pressure are between 360 psig and 456 psig (45% - 55% Turbine load)

Op Test No.: NRC	Scenario # 1	Event # 1	Page 12 of 82
Event Description:	**Power escalation from 48% power**		

Time	Position	Applicant's Actions or Behavior
OP-107.01	RO	RCS Temperature Adjustment (Alt Dilution Method) per OP-107.01, Section 5.4
	RO	Verifies Initial Conditions: • The required amount of reactor makeup water is available in the RMW tank to provide adequate dilution without reducing the tank volume below 37.5%. • The Reactor is in steady state power operations and dilution is desired to compensate for fuel depletion. • Normal charging is being maintained per OP-107 Section 5.3. • The reactor makeup water system is available to supply water to the makeup control system per OP-102. • Reactivity evolution signs have been posted to limit MCR access.
Evaluator Note:		**The crew is provided a reactivity plan and should determine the required volume of makeup water from the reactivity plan vice OPT-1525 for this evolution.**
	RO	DETERMINE the volume of makeup water to be added (Current OPT-1525 Attachments 4 through 7)
Procedure Note:		FIS-114 may be set for one gallon less than desired. A pressure transient caused by 1CS-151 shutting results in FIS-114 normally indicating one gallon more than actual flow but two gallons more would be unexpected.

Op Test No.: NRC	Scenario # 1	Event # 1	Page 13 of 82
Event Description:	**Power escalation from 48% power**		

Time	Position	Applicant's Actions or Behavior
Procedure Caution:		If the translucent covers associated with the Boric Acid and Total Makeup Batch counters FIS-113 and FIS-114, located on the MCB, are not closed, the system will not automatically stop at the preset value.
	SRO	Directs Alternate dilution
	RO	SET FIS-114, TOTAL MAKEUP WTR BATCH COUNTER, to obtain the desired quantity.
	RO	VERIFY the RMW CONTROL switch has been placed in the STOP position. VERIFY the RMW CONTROL switch green light is lit.
	RO	IF the current potentiometer setpoint of controller 1CS-151, FK-114 RWMU FLOW, needs to be changed to obtain makeup flow, THEN PERFORM the following:
		a. RECORD the current potentiometer setpoint of controller 1CS-151, FK-114 RWMU FLOW, in Section 5.4.3. b. SET controller 1CS-151, FK-114 RWMU FLOW, for the desired flow rate.
	RO	PLACE control switch RMW MODE SELECTOR to the ALT DIL position.
Procedure Note:		Alternate Dilution may be manually stopped at any time by turning the control switch RMW CONTROL to STOP.
	RO	START the makeup system as follows:

Op Test No.: NRC	Scenario # 1	Event # 1	Page 14 of 82
Event Description:	**Power escalation from 48% power**		

Time	Position	Applicant's Actions or Behavior
		a. TURN control switch RMW CONTROL to START momentarily. b. VERIFY the red indicator light is lit. c. IF expected system response is not obtained, THEN TURN control switch RMW CONTROL to STOP.
	RO	VERIFY dilution automatically terminates when the desired quantity has been added.
	RO	IF controller 1CS-151, FK-114 RWMU FLOW, potentiometer was changed in Step 5.4.2.5, THEN PERFORM the following: a. REPOSITION controller, FK-114 RWMU FLOW, in Section 5.4.3.
	BOP	b. INDEPENDENTLY VERIFY FK-114 potentiometer position of Step 5.4.2.9.a is correct.
	RO	MONITOR Tavg and rod control for proper operation.
	RO	WHEN VCT pressure is between 20 – 30 psig, THEN TURN control switch RMW MODE SELECTOR to AUTO.
	RO	START the makeup system as follows:
		a. TURN control switch RMW CONTROL to START momentarily. b. VERIFY the red indicator light is lit. c. IF expected system response is not obtained, THEN TURN control switch RMW CONTROL to STOP.

Op Test No.: NRC	Scenario # 1	Event # 1	Page 15 of 82
Event Description:	**Power escalation from 48% power**		

Time	Position	Applicant's Actions or Behavior
Procedure Note:		Systems and components operated from the Main Control Board on a daily basis to support normal plant operations do not require Independent Verification. If this evolution is performed daily or more frequently, then Section 5.4.3 is not required to be performed. (Reference OPS-NGGC-1303)
	RO	IF required, THEN COMPLETE Section 5.4.3.
	BOP	IF reactivity evolutions are complete, THEN REMOVE reactivity evolution signs limiting MCR access.
	CREW	Monitors plant parameters until target power level and target 1st stage pressure is reached to meet initial conditions for starting the 'B' MFW pump
	BOP	Places main Turbine to hold to start 'B' MFW pump
OP-134.01	BOP	Starting the Second Main FW Pump per OP-134.01, Section 5.4
Procedure Note:		This Section assumes the start of Main FW Pump B. Equipment numbers for the start of Main FW Pump A are in parentheses.

Op Test No.: NRC	Scenario # 1	Event # 1	Page 16 of 82
Event Description:	**Power escalation from 48% power**		

Time	Position	Applicant's Actions or Behavior	
	BOP	Verifies initial conditions are met: • One Main FW Pump is running • Two Condensate Pumps and two Condensate Booster Pumps are in operation • At least 267 psig suction pressure exists at PI-2200, FW PMPS SUCT HDR PRESS • Seal water pressure is greater than 325 psig, as evident by absence of alarm ALB-016-2-3, MAIN FW PUMP SEAL WATER LOW PRESS OR HI DISCH TEMP • An Operator is standing by to observe starting of the Main FW Pump and to report any abnormal conditions (Contacts TB Aux Operator) • Starting second Main FW Pump is directed by GP-005.	(YES) (YES) (YES) (YES) (YES) (YES)
Procedure Note:		Chemistry is notified to ensure that hydrazine flow is increased up to and including starting a second hydrazine pump to eliminate a vacuum being drawn on the hydrazine line due to the increased flow of two pumps running and thus causing the hydrazine pump to air bind. (Ref. 2.5.8)	
	BOP	Chemistry has been notified that a second feed pump will be started. Notifies Chemistry that a second feed pump will be started	
Simulator Communicator:		**Acknowledges second feed pump is being placed in service.**	

Op Test No.: NRC	Scenario # 1	Event # 1	Page 17 of 82
Event Description:	**Power escalation from 48% power**		

Time	Position	Applicant's Actions or Behavior
	BOP	Directs Turbine Building Aux Operator to perform prestart checks on 'B' MFW pump
Simulator Communicator:		**The prestart checks are completed on the 'B' MFW pump. I am standing by for the pump start.**
	BOP	To ensure an adequate number of Condensate Polishing Beds are in service, NOTIFY the TB Operator prior to starting the second Main FW Pump. Notifies TB Aux Operator to ensure an adequate number of Condensate Polishing Beds are in service.
Simulator Communicator:		**TB AO – An adequate number of Condensate Polishing Beds are in service.**
	BOP	PLACE 1FW-39, MFW PUMP B RECIRC CONTROL, to OPEN AND VERIFY 1FW-39 is open. Locates MCB switch for 1FW-39 and takes switch to OPEN and verifies 1FW-39 red light lit.
Procedure Note:		In modulate, the Main FW Pump Recirc Valves, 1FW-8 and 1FW-39, should shut when Main FW Pump total suction flow reaches 8600 kpph (if available, the sum of ERFIS points FCE2210A and FCE2210B can be used).

Op Test No.: NRC	Scenario # 1	Event # 1	Page 18 of 82
Event Description:	**Power escalation from 48% power**		

Time	Position	Applicant's Actions or Behavior
	BOP	PERFORM the following: • MOMENTARILY PLACE MAIN FW PUMP B Control Switch to START (Starts 'B' MFW pump) • CHECK MAIN FW PUMP B starts. • MONITOR Condensate Booster Pumps controllers and flows to ensure proper operation when the second Main FW Pump is started. • IF any SG level exceeds 62%, THEN PERFORM the following: o MANUALLY ADJUST the associated Main FW Regulating Valve(s) position until Feed Flow is just less than Steam Flow AND level is trending towards the normal operating band (55% to 59%). o WHEN Steam Generator level is trending to 55% to 59%, THEN PLACE the associated Main FW Regulating Valve controller back to AUTO. • PLACE 1FW-39 control switch to MODU.
	BOP	Locally VERIFY the Main Feed Pump B Aux Oil Pump has stopped. Contacts TB AO to verify Aux Oil Pump has stopped.
Simulator Communicator:		**TB AO: Main Feed Pump B Aux Oil Pump has stopped**
	Crew	Continues ramp to full power operations IAW GP-005

Op Test No.: NRC	Scenario # 1	Event # 1	Page 19 of 82
Event Description:	**Power escalation from 48% power**		

Time	Position	Applicant's Actions or Behavior
Evaluators:		The next procedural steps will occur when Reactor Power is between 49 and 50% Reactor Power. The ramp to start the 2nd MFW pump may have exceeded this power level and this step may have been performed. IF so, the RO would have been directed by the SRO to verify bistables below - VERIFY the following bistable and permissive status light conditions: PR P-8 NC 41N (ON) PR P-8 NC 42N (ON) PR P-8 NC 43N (ON) PR P-8 NC 44N (ON) SINGLE LOOP LO FLOW TRIP BLOCKED P-8 (OFF)
Lead Evaluator:		**Cue Event 2 – "Pressurizer PORV 445A Leakage". Event takes ~1min before annunciator alarms.**

Op Test No.: NRC	Scenario # 1	Event # 2	Page 20 of 82
Event Description:	**Pressurizer PORV 445A Leakage**		

Time	Position	Applicant's Actions or Behavior	
Simulator Operator:		**When directed by Lead Evaluator: Actuate Trigger 2 "PRZ PORV 445B leakage"**	
Indications Available:		• **TI-463 rising** • **ALB-009-8-2 PRESSURIZER RELIEF DISCHARGE HIGH TEMP**	
	RO	• RESPONDS to alarms ALB-009-8-2. • ENTERS and performs APP-ALB-009-8-2.	
	SRO	Refer to TS 3.4.4 action a and 3.4.6.2 as referenced by ALB-009-8-2	
Evaluator Note:		**The SRO may elect to enter AOP-016, Excessive Primary Leakage. If so, then those actions begin on page 22 of this guide.**	
Procedure Note:		**Past experience has shown that this alarm may come in due to valve stem leakoff from one of the PORV Block Valves. The block valves share a common leak-off line with the PORVs. This can be checked using ERFIS points TVL5647 and TVL5646.**	
ALB-009-8-2	RO	CONFIRM alarm using:	
		• PRZ PORV discharge line temperature TI-463. • PRESSURIZER relief tank level, pressure, and temperature LI-470.1, PI-472.1, and TI-471.1. • PRESSURIZER PORV position indication.	
	RO	VERIFY Automatic Functions:	(None)
		PERFORM Corrective Actions: • IF a PORV is open, THEN CHECK PRZ pressure using PI-444, PI-445.1, PI-456, and PI-457.	(NO)

Op Test No.: NRC	Scenario # 1	Event # 2	Page 21 of 82
Event Description:	**Pressurizer PORV 445A Leakage**		

Time	Position	Applicant's Actions or Behavior
Procedure Note:		**For minor leakage, it may be necessary to have Engineering assistance to develop proper strategies.**
Procedure Caution:		**Any PORV isolations that are shut due to decreasing RCS Pressure should NOT be reopened without further evaluation.**
	SRO	• IF all PORV's are closed and RCS pressure is normal, THEN DETERMINE which PORV is leaking and isolate it: • IF leakage is significant, THEN SHUT all PORV isolations. REOPEN one at a time to identify affected PORV. ○ Determines leakage is NOT significant and ONLY directs shutting one valve at a time
Evaluator Note:		**ERFIS Point TRC-0463 can be used to evaluate if PORV is leaking.**
	RO	• Shuts PORV isolations as directed by SRO ○ After shutting 1RC-117, PRT Relief Line Temperature starts to decrease • Determines/reports PORV-445A leaking.
	SRO	Directs RO to reopen 1RC-115 and or 1RC-113 if shut.
	SRO	Declares 1RC-118 inoperable for excessive seat leakage – (power will be maintained with block valve closed) ENTER TS 3.4.4.a – within one hour either restore the PORV to operable or close the block valve with power maintained.
Evaluator Note:		**Cue Event 3 - Total Loss of Cooling Banks on the UAT 1A (AOP-039) after the leaking PORV is isolated and the TS declaration.**

Op Test No.: NRC	Scenario # 1	Event # 2	Page 22 of 82
Event Description:	**Pressurizer PORV 445A Leakage**		

Time	Position	Applicant's Actions or Behavior	
Evaluator Note:		**If AOP-016 is entered (Optional reference), the crew will be directed to Attachment 5 for specific actions for a leaking PRZ PORV.**	
AOP-016	SRO	Enter AOP-016 (Optional reference) Makes plant PA announcement for AOP entry No immediate actions Conducts a crew alignment brief	
	SRO	WHEN leakage location has been determined, THEN PERFORM the applicable Attachment (Attachment 5)	
	RO	• CHECK the PRZ PORVs SHUT. • CHECK that the leaking PORV has been identified. • SHUT the associated PORV Block Valve. • PERFORM ONE of the following based on severity of leak. • SHUT AND REOPEN ONE PORV Block Valve at a time to identify the affected PORV	(YES) (NO)
	SRO	• Enter Tech Spec 3.4.4.a. • VERIFY valve manipulated for leak isolation is documented per the following: o OMM-001, Operations – Conduct of Operations o OPS-NGGC-1303, Independent Verification. o Initiates Equipment Problem Checklist o Contacts WCC for assistance • EXIT this procedure.	
Evaluator Note:		**Cue Event 3 – Total Loss of Cooling Banks on the UAT 1A (AOP-039).**	

Op Test No.: NRC	Scenario # 1	Event # 3	Page 23 of 82
Event Description:	**Total Loss of Cooling Banks on the UAT 1A (AOP-039)**		

Time	Position	Applicant's Actions or Behavior	
Simulator Operator:		**When directed by Lead Evaluator:** **Actuate Trigger 3 "Total Loss of Cooling Banks on the UAT 1A (AOP-039)"**	
Indications Available		**ALB-022-3-1, Unit Aux Xfmr-A Trouble**	
Procedure Note:		**• This alarm is common for any local alarm at UAT 1A.** **• If this annunciator is locked in, consideration should be given for compensatory actions.**	
Procedure Caution:		**Ground fault indication on both a 480V bus and the 6.9KV bus feeding it indicate transformer degradation. This could lead to catastrophic failure. Actions up to and including a reactor trip may be required in preparation for loss of bus resulting from transformer de-energization. If the transformer is confirmed to be grounded action should be taken to immediately isolate the grounded transformer.**	
ALB-022 Window 3-1	BOP	CONFIRM alarm using:	
	BOP	VERIFY Automatic Functions: • If UAT 1A Lockout Fault Pressure Trip occurs: o Generator Lockout occurs o Auto transfer to SUT 1A occurs o UAT 1A Cooling Pumps and Fans will stop (To enable automatic control, both 86/G1A and 86/G1B Generator Lockout relays must be reset at the MCR Generator Relay Panels).	(NO)
	BOP	PERFORM Corrective Actions: • IF the loss of UAT 1A results in a loss of Emergency Bus 1A-SA, THEN GO TO AOP-025, Loss of One Emergency AC Bus (6.9KV) or Loss of One Emergency DC Bus (125V).	(NO)

Op Test No.: NRC	Scenario # 1	Event # 3	Page 24 of 82
Event Description:	**Total Loss of Cooling Banks on the UAT 1A (AOP-039)**		

Time	Position	Applicant's Actions or Behavior	
Procedure Note:		**Relay flags for 59/UATX and 59/UATY do not function. Contacts closed on the induction disc indicate the relay is picked up and open indicates not picked up.**	
Procedure Caution:		**A ground makes the electrical system unreliable; therefore, a high priority should be placed on locating and isolating the ground.**	
	BOP	• DISPATCH an operator to 286 RAB Swgr Room to check the following relays for grounds: ○ Aux Bus 1A-3, UAT 1A to Aux Bus 1A, 59/UATX relay contact status ○ Aux Bus 1D-1, UAT 1A to Aux Bus 1D, 59/UATY relay contact status	(NO) (NO)
	CREW	Dispatches an AO to check the following relays for grounds	
Simulator Communicator:		**Acknowledge request and wait 2 minutes then report back using the telephone "NO grounds present on Aux Bus 1A or 1D"**	
	BOP	• DISPATCH an operator to UAT-1A Local Panel Alarm to check for alarms.	
Simulator Communicator:		**Acknowledge request and wait 3 minutes then report back using the radio "The High Winding Temperature Annunciator is in and No cooling fans are running."**	
	BOP	• IF UAT 1A local alarms exist, THEN GO TO AOP-039, Startup and Unit Auxiliary Transformer Trouble.	(YES)

Op Test No.: NRC	Scenario # 1	Event # 3	Page 25 of 82
Event Description:	**Total Loss of Cooling Banks on the UAT 1A (AOP-039)**		

Time	Position	Applicant's Actions or Behavior
AOP-039	SRO	Enter AOP-039 Makes plant PA announcement for AOP entry No immediate actions Conducts a crew alignment brief
Procedure Note:		**This procedure contains no immediate actions.**
	BOP	DISPATCH an operator to the alarming transformer with the applicable Attachment: • Attachment 2, Unit Auxiliary Transformer 1A or 1B Trouble Local Actions
	BOP	• DISPATCH an operator to perform Attachment 2 for the 1A UAT
Simulator Communicator:		**Acknowledge request and wait 3 minutes then report back using the radio "The Cooling Control toggle switch is in MANUAL per AOP-039 Attachment 2 and ALL cooling fans are NOT running."**
	CREW	NOTIFY the following personnel of any problems with Startup or Unit Auxiliary Transformers: • Responsible Engineer • Load Dispatcher (System Operator) • Plant/Transmission Activities Coordinator (PTAC)
	SRO	GO TO the applicable Section:
		Section / **Page**
		3.2, Unit Auxiliary Transformer Trouble / 16
AOP-039	SRO	Unit Auxiliary Transformer Trouble, Section 3.2

Op Test No.: NRC	Scenario # 1	Event # 3	Page 26 of 82
Event Description:	**Total Loss of Cooling Banks on the UAT 1A (AOP-039)**		

Time	Position	Applicant's Actions or Behavior
	BOP	CHECK alarming UAT supplying associated 6900V Aux Buses. (YES)
Procedure Note:		**The following actions are taken in response to reports received from the operator performing Attachment 2, Unit Auxiliary Transformer 1A or 1B Trouble Local Actions.**
	SRO	GO TO the applicable Step:

Section	Step	Page
UAT - Total Loss of Cooling Banks	3	16

Procedure Note:		• **Each UAT has three transformer cooling banks. Each bank consists of one oil pump and three associated cooling fans. A cooling bank is considered to be in service if the pump and at least one fan are operating.** • **This step may be terminated if the transformer has at least one cooling bank restored to service.**
Procedure Caution:		**UATs are not designed to be self-cooled. If NO transformer cooling banks are operating, the transformer should be removed from service within 30 minutes (1-hour absolute maximum) of cooling loss if loaded (6-hours if unloaded) unless cooling is restored. Bubble formation in the oil reduces heat transfer and may result in transformer winding failure.**
	SRO	**PERFORM** the following for TOTAL loss of transformer cooling banks:
		•
	BOP	• VERIFY the Cooling Control Switch has been placed in MANUAL. (YES)

Op Test No.: NRC	Scenario # 1	Event # 3	Page 27 of 82
Event Description:	**Total Loss of Cooling Banks on the UAT 1A (AOP-039)**		

Time	Position	Applicant's Actions or Behavior	
	SRO	• REDUCE UAT load using ONE of the following methods: o TRANSFER affected buses to the SUT, if available. (Refer to OP-156.02 as necessary.) o TRANSFER to equipment with another power supply. Directs the BOP to transfer Aux Bus 1A to the SUT per OP-156.02	
Evaluator Note:		**OP-156.02, Section 7.1 is attached at the end of scenario, see Attachment 2**	
	SRO	• CHECK that ANY cooling banks have been restored.	(NO)
		PERFORM the following: • COMMENCE power reduction using AOP-038, Rapid Downpower. • GO TO Step 7 to remove transformers from service within the applicable time limits: o 1-hour from loss of cooling (loaded)	
Evaluator Note:		**After Aux Bus 1A is transferred to the SUT and the SRO communications with the Work Control Center are completed cue Simulator Operator for Event 4** **Failure of the 'A' SG Pressure Transmitter PT-475 to 0%.**	

Op Test No.: NRC	Scenario # 1	Event # 4	Page 28 of 82
Event Description:	**Failure of the 'A' SG Pressure Transmitter PT-475 to 0%**		

Time	Position	Applicant's Actions or Behavior	
Simulator Operator:		**On cue from Lead Evaluator Actuate Trigger 4** **Failure of the 'A' SG Pressure Transmitter PT-475 to 0%**	
Indications Available:		• **ALB-014-1-2, Loop A Hi Steam Line ΔP Low-P1** • **ALB-014-1-4, Loop A Hi Steam Line Press Rate Alert** • **ALB-014-4-2A, Loop A Low Stm Line Press Alert** • **ALB-014-4-1A, SG A FW > STM Flow Mismatch** • **PI-475 SA failing to 0** • **SG FF/SF mismatch** • **SG level lowering** • **FI-474 SA Steam Flow failing to 0**	
	BOP/RO	RESPONDS to alarms and evaluates ALB-014.	
Evaluator Note:		**IAW AD-OP-ALL-1000, the operator may take MANUAL control of a malfunctioning controller before being directed by a procedure.**	
ALB-014-1-2	BOP	CONFIRM alarm using PI-474.1 SB, FI-474 SA, PI-484.1 SB, and PI-494 SB, Steam Generator A pressure. • Reports PI-475 or FI-474 reading or failing low.	
	BOP	VERIFY Automatic Functions: • Takes manual control of FK-478 (1FW-133) "A" SG Main FW Reg Valve and stabilizes "A" SG level	(NONE)

Op Test No.: NRC	Scenario # 1	Event # 4	Page 29 of 82
Event Description:	**Failure of the 'A' SG Pressure Transmitter PT-475 to 0%**		

<table>
<tr><th>Time</th><th>Position</th><th colspan="2">Applicant's Actions or Behavior</th></tr>
<tr><td></td><td>BOP</td><td>PERFORM Corrective Actions:
• Dispatch an operator to investigate for feed line break and steam line rupture
• Check Containment press and temp for evidence of a Containment leak
• IF no leakage is detected, THEN:
o CHECK for failed instrument
o IF failed instrument identified then remove the failed instrument from service</td><td>(NONE)
(NO)
(YES)</td></tr>
<tr><td></td><td>BOP</td><td colspan="2">Restores level to normal (57% NR).</td></tr>
<tr><td></td><td>SRO</td><td colspan="2">• Should provide guidance to maintain "A" SG level to be maintained between 52 to 62% IAW OMM-001, Attachment 13
<table>
<tr><th>Controller</th><th>Control Band</th><th colspan="2">Trip Limit</th></tr>
<tr><th></th><th></th><th>Low</th><th>High</th></tr>
<tr><td>Steam Generator Level</td><td>52% to 62%</td><td>30%</td><td>73%</td></tr>
</table>
• Refer to OWP-ESF-02 to remove channel from service.
• Contacts I&C to have channel removed from service.
• Dispatch AO to investigate</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td colspan="2">Evaluator's Note:</td><td colspan="2">The failed channel does NOT have to be removed from service to continue the scenario.
If time is an issue with this scenario then evaluation of SRO Tech Specs for any event can be performed as follow-up questions at the conclusion of the scenario.</td></tr>
</table>

Op Test No.: NRC	Scenario # 1	Event # 4	Page 30 of 82
Event Description:	**Failure of the 'A' SG Pressure Transmitter PT-475 to 0%**		

Time	Position	Applicant's Actions or Behavior
	SRO	Enters Instrumentation TS TS 3.3.1 Functional Unit 14 Steam Generator Water Level—Low Coincident With Steam/ Feedwater Flow Mismatch • ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied: The inoperable channel is placed in the tripped condition within 6 hours, and the Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1. TS 3.3.2 Table 3.3-3 Functional Unit item 1.e and 4.d • ACTION 19. - With the number of OPERABLE channels one less than the Total Number of Channels. operation may proceed provided the following conditions are satisfied: a. The inoperable channel is placed in the tripped condition within 6 hours. and b. The Minimum Channels OPERABLE requirement is met; however the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.2.1. TS 3.3.3.6 Accident Monitoring instrumentation Table 3.3-10 number of channels is met (tracking LCO only)
	BOP	At request of the CRS – Place main turbine ramp in hold
	SRO	Requests extra operator for dedicated feedwater operation Directs operator and I&C to perform OWP-ESF-02 Reviews/prepares OMM-001, Attachment 5 Equipment Problem Checklist for the failure of "A" SG PT-475

Op Test No.: NRC	Scenario # 1	Event # 4	Page 31 of 82
Event Description:	**Failure of the 'A' SG Pressure Transmitter PT-475 to 0%**		

Time	Position	Applicant's Actions or Behavior
Lead Evaluator Note:		**It is not required to implement the entire OWP prior to continuing with the scenario.**
	BOP	Performs OWP-ESF-02 (sheet 3 of 8) steps 1 and 2
Simulator Communicator:		**Acknowledge request to perform OWP-ESF-02 for PT-475 failure.**
Simulator Operator:		**If requested to perform OWP-ESF-02 for PT 475 by the Lead Evaluator then:** **Run OWP-ESF-02-III-TST when directed.**
Evaluator Note:		**OWP-ESF-02 is attached at the end of scenario, see Attachment 1** **FRV should go back to Auto when channel II instruments are selected per the OWP.** **While the crew is processing OWP-ESF-02 for PT-475 the scenario may continue.** **Cue Event 5 - Insert failure NSW Pump 'A' Shaft Shear after SG level is under control, the Tech Spec has been identified and the Work Control Center has been called.**

Op Test No.: NRC	Scenario # 1	Event # 5	Page 32 of 82
Event Description:	**NSW Pump 'A' Shaft Shear (AOP-022)**		

Time	Position	Applicant's Actions or Behavior	
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 5** **NSW Pump 'A' Shaft Shear**	
Indications Available:		• **ALB-002-6-1, Serv Wtr Supply Hdr A Low Press** • **ALB-002-7-1, Serv Wtr Supply Hdr B Low Press** • **ALB-002-7-2, Serv Wtr Pumps Discharge Low Press** • **ALB 002-5-5, Serv Wtr Header A High-Low Flow** • **ALB 002-6-6, Serv Wtr Header B High-Low Flow**	
	RO	Responds to ALB-002 alarms – reports low NSW header pressure with pump running indication.	
Evaluator Note:		**The ESW Pumps will auto start on low header pressure.**	
AOP-022	SRO	Enters AOP-022, Loss Of Service Water. Makes PA announcement for AOP entry. Conducts a crew alignment brief	
Immediate Action	RO	CHECK ESW flow lost to ANY RUNNING CSIP - MORE THAN 1-minute:	(NO)
	SRO	RNO: GO TO Step 2.	
Immediate Action	RO	CHECK ESW flow lost to ANY RUNNING EDG - MORE THAN 1-minute:	(NO)
	SRO	RNO: GO TO Step 3.	

Op Test No.: NRC	Scenario # 1	Event # 5	Page 33 of 82
Event Description:	**NSW Pump 'A' Shaft Shear (AOP-022)**		

Time	Position	Applicant's Actions or Behavior	
Simulator Communicator:		**There are several points in the AOP where an AO may be dispatched to check for leaks and proper operation of equipment. Report no leaks, no breaker problems but when dispatched to the pump, after 1 to 2 minutes report that the coupling appears to have failed and request maintenance assistance.**	
Simulator Operator:		**IF REQUESTED TO OPEN KNIFE SWITCH ON THE 'A' NSW PUMP BREAKER: go to rf SWS100 and "open the knife switch" then have Communicator report back when completed**	
	SRO	GO TO the appropriate step as indicated by the parameter LOST: • NSW Pump failure • NSW Pump loss of flow GO TO 3.0/ Step 6 (Page 6)	(YES)
	RO	CHECK loss of NSW Header due to NSW Pump FAILED or LOSS OF FLOW. START standby NSW Pump as follows: • VERIFY discharge valve for affected pump is CLOSING by placing affected pump control switch to STOP. • START standby NSW Pump in priming mode by momentarily placing standby NSW Pump control switch to START. • WHEN discharge valve for affected pump is fully SHUT, THEN PLACE and HOLD control switch for running pump to START to fully OPEN pump discharge valve. CHECK ANY NSW Pump - RUNNING.	(YES)
	SRO	GO TO Section 3.2 (page 30).	

Op Test No.: NRC	Scenario # 1	Event # 5	Page 34 of 82
Event Description:	**NSW Pump 'A' Shaft Shear (AOP-022)**		

Time	Position	Applicant's Actions or Behavior	
Evaluator Note:		**The following alarms will annunciate due to loss of cooling in containment and subsequent start of ESW:** • **ALB-028-5-1, CONTAINMENT AIR HIGH VACUUM** • **ALB-028-8-5, COMPUTER ALARM VENTILATION SYSTEM** **The BOP should identify these alarms and identify Tech Specs 3.6.1.4, 3.6.1.1, 3.6.3, 3.6.5 and 3.9.4 to be referenced**	
	BOP	MAY go to MANUAL and shut FK-7624 in order to raise CNMT pressure to exit T.S. 3.6.1.4	
	SRO	T.S. 3.6.1.4 – Restore within 1 hour LCO or HSD within next 6 hours: due to High Vac in CNMT	
	RO	CHECK Turbine trip required by ANY of the following conditions - EXIST: • No NSW Pump can be operated • Non-isolable leak exists in the NSW system • Major isolable leak exists on the Turbine Building NSW Header AND time does not permit a controlled plant shutdown	(NO)
	SRO	RNO: OBSERVE Note prior to Step 13 AND GO TO Step 13.	
Procedure Note:		**Steps 13 through 19 address leaks on NSW turbine building header. Leaks on individual components supplied by the Turbine Building header are addressed by Steps 20 and 21.**	
	CREW	CHECK for minor isolable leak on Turbine Building header – ANY EXISTING.	(NO)

Op Test No.: NRC	Scenario # 1	Event # 5	Page 35 of 82
Event Description:	**NSW Pump 'A' Shaft Shear (AOP-022)**		

Time	Position	Applicant's Actions or Behavior	
	SRO	RNO: GO TO Step 20.	
	CREW	CHECK for leak in an individual component - ANY EXISTING.	(NO)
	SRO	RNO: GO TO Step 22.	
	CREW	CHECK for leak on WPB header - ANY EXISTING.	(NO)
	SRO	RNO: GO TO Step 24.	
	RO	CHECK that NSW Pump(s) - MALFUNCTIONED.	(YES)
	CREW	PERFORM the following for affected NSW Pump(s): • CHECK NSW Pump breaker(s) - MALFUNCTIONED.	(NO)
	SRO	RNO: GO TO Step 25.b.	
	CREW	• CHECK adequate pump suction inventory EXISTS: ○ LI-9300.1, Service Water PMP A CHMBR LVL, GREATER THAN 51% (ERFIS LSW9300) ○ LI-9302, Service Water PMP B CHMBR LVL, GREATER THAN 51% (ERFIS LSW9302) ○ LI-1931, Cooling Tower Basin Level, GREATER THAN 31 inches	(YES) (YES) (YES)

Op Test No.: NRC	Scenario # 1	Event # 5	Page 36 of 82
Event Description:	**NSW Pump 'A' Shaft Shear (AOP-022)**		

Time	Position	Applicant's Actions or Behavior	
	CREW	• Locally VERIFY the following for the affected NSW Pump per OP-139, Service Water System: o Proper cooling and seal water supply to NSW Pumps. o Proper operation of NSW strainer backwash. • Locally CHECK NSW Pump(s) for signs of damage (shaft shear or other obvious problems).	(YES) (YES) (YES)
	SRO	INITIATE appropriate corrective action for the loss of NSW. • Reviews/prepares OMM-001, Attachment 5 Equipment Problem Checklist for the failure of "A" NSW Pump	
	SRO	CHECK Reactor thermal power changed by less than 15% in any one hour period	(YES)
	RO	IF ESW Pump(s) were placed in service by this procedure, THEN NOTIFY Chemistry to sample the return to the Auxiliary Reservoir per CRC-155	
	SRO	Exit AOP-022	
Evaluator Note:		**The Lead Evaluator can cue Event 6 (Steam line break on 'B' SG inside containment) once the plant has stabilized back in its normal pressure band, the Tech Spec identification is completed and the Work Control Center communications are completed..**	

Op Test No.: NRC	Scenario # 1	Event # 6	Page 37 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		
Time	Position	Applicant's Actions or Behavior	

Simulator Operator:	**On cue from the Lead Evaluator actuate Trigger 6** **Major Event: Steam Line Break 'B' SG Inside Containment**

Evaluator Note:	**The crew should identify the leak and initiate a manual Safety Injection. The crew will enter E-0 and perform the immediate actions. The SRO may also direct a manual Steam Line Isolation. The crew should diagnose that a LOCA is NOT in progress and transition from E-0 to E-2, Faulted Steam Generator Isolation.** • **When SG 'B' pressure is < 100 psi of 'A' and 'C' SG (with MSLI) an AFW isolation signal should have closed the 'B' MD and TD AFW valves but fails to do so.** • **When Containment pressure > 3 psig the crew should identify 'Adverse Containment' conditions are required to be implemented.** • **When RCS Pressure exceeds 2385 psig the PORVs should open but will fail to open when required to** • **When 1SI-4 is closed from the MCB it will fail to close requiring the RAB Aux Operator to locally close the valve** • **The Source Range will fail to auto energize due to Intermediate Range NI-36 being undercompensated** • **When Containment pressure exceeds 10 psig CNMT Spray pumps will auto start.**
Indications Available	• ALB-028-5-1 CONTAINMENT AIR HIGH VACUUM will clear (if in due to earlier ESW Pump start) • ALB-028-8-5 COMPUTER ALARM VENTILATION SYSTEM • Rising pressure in containment • Rising temperature in containment • Increased SG steam flow • Tavg lowers • Prz level and pressure lower • Power rises

Op Test No.:	NRC	Scenario #	1	Event #	6	Page	38 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**						

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**The crew may go to AOP-042. They will not have time to make progress before requiring a trip.**
	RO	Identifies an ESF actuation setpoint will be exceeded on any Safety Injection parameter. Informs SRO then actuates a Manual Reactor Trip
	SRO	Directs manual Reactor Trip and Safety Injection activation
EOP E-0		Reactor Trip Or Safety Injection
	SRO	Makes plant PA announcement Conducts a crew alignment brief
Immediate Action	RO	Verify Reactor Trip **REACTOR TRIP CONFIRMATION** **Reactor Trip AND Bypass BKRs – OPEN** **Rod Bottom Lights (Zero Steps – LIT** **Neutron Flux – DROPPING** (YES)
Immediate Action	BOP	Check Turbine is Tripped – All throttle valves shut TURB STOP VLV 1 TSLB-2-11-1 TURB STOP VLV 2 TSLB-2-11-2 TURB STOP VLV 3 TSLB-2-11-3 TURB STOP VLV 4 TSLB-2-11-4 (YES)

Op Test No.: NRC	Scenario # 1	Event # 6	Page 39 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior	
Immediate Action	BOP	Perform The Following: • AC emergency buses – AT LEAST ONE ENERGIZED • AC emergency buses – BOTH energized	(YES) (YES)
Immediate Action	RO	Safety Injection – ACTUATED (BOTH TRAINS) BPLP 4-1,"SI ACTUATED" - LIT (CONTINUOUSLY)	(YES)
	SRO	Perform The Following: • Review Foldout page. o RO: ▪ RCP Trip criteria ▪ Alternate Miniflow Open/Shut criteria ▪ RHR restart criteria o BOP ▪ Ruptured SG AFW Isolation criteria ▪ AFW supply switchover criteria	

Op Test No.: NRC	Scenario # 1	Event # 6	Page 40 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior

Evaluator Aide: **E-0 Foldout**

REACTOR TRIP OR SAFETY INJECTION

FOLDOUT

- **RCP TRIP CRITERIA**

  IF both of the following occur, **THEN** stop all RCPs:

  - SI flow - GREATER THAN 200 GPM
  - RCS pressure - LESS THAN 1400 PSIG

- **ALTERNATE MINIFLOW OPEN/SHUT CRITERIA**

  - **IF** RCS pressure drops to less than 1800 PSIG, **THEN** verify alternate miniflow isolation **OR** miniflow block valves - SHUT
  - **IF** RCS pressure rises to greater than 2200 PSIG, **THEN** verify alternate miniflow isolation **AND** miniflow block valves - OPEN

- **RHR RESTART CRITERIA**

  IF RCS pressure drops to less than 230 PSIG in an uncontrolled manner, **THEN** restart RHR pumps to supply water to the RCS.

- **RUPTURED SG AFW ISOLATION CRITERIA**

  IF all of the following occur to any SG, **THEN** stop feed flow by shutting the isolation valves (preferred) **OR** flow control valves to that SG:

  - Any SG level rises in uncontrolled manner **OR** has abnormal secondary radiation
  - Narrow range level - GREATER THAN 25% [40%]

- **AFW SUPPLY SWITCHOVER CRITERIA**

  IF CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.

	SRO	• Evaluate EAL Matrix.	
	CREW	Identifies Containment Adverse Conditions Containment Pressure > 3 psig	
	RO	Verify CSIPs – ALL RUNNING 'A' and 'B' running	(YES)
	RO	Verify RHR Pumps – ALL RUNNING 'A' and 'B' running	(YES)
	RO	Safety Injection flow > 200 gpm	(YES)

Op Test No.: NRC	Scenario # 1	Event # 6	Page 41 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior	
	RO	RCS pressure LESS than 230 PSIG	(NO)
	BOP	Main Steam Line Isolation – ACTUATED MAIN STEAM LINE ISOLATION ACTUATION CRITERIA CNMT pressure - GREATER THAN OR EQUAL TO 3.0 PSIG Any SG pressure - LESS THAN OR EQUAL TO 601 PSIG	(YES)
	BOP	Verify All MSIVs AND Bypass Valves – SHUT	(YES)
		Event 7 – Failure of Auto AFW Isolation	
	BOP	Any SG pressure - 100 PSIG LOWER THAN PRESSURE IN TWO OTHER SGs	(YES)
	BOP	Verify MDAFW AND TDAFW Isolation Valves AND Flow Control Valves To Affected SG – SHUT Shuts both MDAFW and TDAFW isolation valve and FCV to the 'B' SG • 1AF-93 • 1AF-143	**(NO)** (SHUT) (SHUT)
Critical Task #1	RO	Check CNMT Pressure – HAS REMAINED LESS THAN 10 PSIG (YES / NO time dependent) Perform the following: • Verify Containment Spray – ACTUATED • Stop ALL RCP's o Locates MCB switches and STOPS ALL 3 RCP's Critical to trip ALL 3 RCPs within 10 minutes of a Phase B isolation signal (ALB-001-5-1)	
		Time ALB-001-5-1, Containment Isolation Phase B, received _____	

Op Test No.: NRC	Scenario # 1	Event # 6	Page 42 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior	
	BOP	Verify AFW flow - AT LEAST 210 KPPH ESTABLISHED	(YES)
	BOP	Sequencer Load Block 9 (Manual Loading Permissive) - ACTUATED (BOTH TRAINS)	(YES)
	BOP	Energize AC buses 1A1 AND 1B1	
Evaluator Note:		**E-0, Attachment 3 is located in the back of this guide.**	
Evaluator Note:		**The RO will perform all board actions until the BOP completes Attachment 3. The BOP is permitted to properly align plant equipment IAW E-0 Attachment 3 without SRO approval.** **The Scenario Guide still identifies tasks by board position because the time frame for completion of Attachment 3 is not predictable.**	
	BOP	Verify Alignment Of Components From Actuation Of ESFAS Signals Using Attachment 3, "Safeguards Actuation Verification", While Continuing With This Procedure.	
	BOP	Directs AO to place 1A and 1B Air Compressor in the local control mode per E-0 Attachment 3 step 22	
Simulator Communicator		**Acknowledge the request to place 1A and 1B Air Compressor in the local control mode per E-0 Attachment 3 step 22**	
Simulator Operator		**When directed to place the 1A and 1B Air Compressor in the local control mode: Run APP\air\acs_to_local**	

Op Test No.: NRC	Scenario # 1	Event # 6	Page 43 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		
Time	Position	Applicant's Actions or Behavior	

Simulator Communicator		**When the APP for 1A and 1B Air Compressor has completed running call the MCR and inform them that the air compressors are running in local control.**
	BOP	Directs AO to Unlock AND Turn ON The Breakers For The CSIP Suction AND Discharge Cross-Connect Valves per E-0 Attachment 3 step 23
Simulator Communicator		**Acknowledge the request to Unlock AND Turn ON The Breakers For The CSIP Suction AND Discharge Cross-Connect Valves per E-0 Attachment 3 step 23**
Simulator Operator		**When directed to Unlock AND Turn ON The Breakers for the CSIP Suction AND Discharge Cross-Connect Valves: Run APP\cvc\path-1 att 6 csip suction valves power.txt.**
Simulator Communicator		**When the APP for CSIP Suction AND Discharge Cross-Connect Valves has completed running call the MCR and inform them that CSIP Suction AND Discharge Cross-Connect Valves are energized.**
Examiners Note:		**RCP's are secured therefore WR CL temperatures should be used when checking RCS temperature. RCS temp trend will be < 557° and dropping – control FF, maintain total FF > 210 KPPH until SG level > 40% (all MSIV's are shut)**
	RO	Stabilize AND Maintain Temperature Between 555°F AND 559°F Using Table 1.

Op Test No.: NRC	Scenario # 1	Event # 6	Page 44 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior
	RO	TABLE 1: RCS TEMPERATURE CONTROL GUIDELINES FOLLOWING RX TRIP • Guidance is applicable until another procedure directs otherwise. • IF no RCPs running, THEN use wide range cold leg temperature.

	RCS TEMPERATURE TREND		
	LESS THAN 557°F AND DROPPING	GREATER THAN 557°F AND RISING	STABLE AT OR TRENDING TO 557°F
OPERATOR ACTION	• Stop dumping steam • Control feed flow • Maintain total feed flow greater than 210 KPPH until level greater than 25% [40%] in at least one on intact SG • IF cooldown continues, THEN, shut MSIVs AND BYPASS valves	• IF condenser available THEN transfer steam dump to STEAM PRESSURE mode using OP-126, Section 5.3 AND dump steam to condenser - OR - • Dump steam using intact SG PORVs • Control feed flow to maintain SG levels	• Control feed flow and steam dump to establish and maintain RCS temperature between 555°F AND 559°F

Evaluator Note:		**PORVs will NOT auto open when required (> 2235 psig)**

Op Test No.: NRC	Scenario # 1	Event # 6/8	Page 45 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment Failure of PORVs to Auto Open**		

Time	Position	Applicant's Actions or Behavior	
		Event 8 - Failure of PORVs to Auto Open	
	RO	PRZ PORVs – SHUT PRZ Spray Valves – SHUT (RCPs are secured) PRZ PORV Block Valves - AT LEAST ONE OPEN	(YES) (YES) (YES)
	SRO	Any SG pressure – DROPPING IN AN UNCONTROLLED MANNER OR COMPLETELY DEPRESSURIZED ('B' SG) GO TO E-2, "FAULTED STEAM GENERATOR ISOLATION", Step 1.	(YES)
EOP-E-2		"FAULTED STEAM GENERATOR ISOLATION"	
Procedure Caution:		• At least one SG must be maintained available for RCS cooldown. • Any faulted SG OR secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown.	
	SRO	Initiate Monitoring Of Critical Safety Function Status Trees.	
	BOP	Verify All MSIVs – SHUT Verify All MSIV bypass valves – SHUT	(YES) (YES)
	BOP	Check Any SG pressure - STABLE OR RISING (NOT FAULTED) ('A' and 'C' SG)	(YES)
	BOP	Any SG pressure – DROPPING IN AN UNCONTROLLED MANNER OR COMPLETELY DEPRESSURIZED ('B' SG)	(YES)

Op Test No.:	NRC	Scenario #	1	Event #	6	Page	46 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**						

Time	Position	Applicant's Actions or Behavior	
Procedure Caution:		• IF the TDAFW pump is the only available source of feed flow, THEN maintain steam supply to the TDAFW pump from one SG.	
	BOP	Isolate Faulted SG(s) (Identified In Step 5): • Verify faulted SG(s) PORV – SHUT • Verify main FW isolation valves – SHUT (Automatically)	(YES) (YES)
		Event 7 – Failure of Auto AFW Isolation	
Critical Task #2	BOP	Verify MDAFW AND TDAFW pump isolation valves to faulted SG(s) – SHUT • 1AF-93 • 1AF-143 (YES / NO time dependent – may have identified and isolated these valves in E-0) Critical Task to isolate both valves prior to exiting E-2	(SHUT) (SHUT)
Critical Task #2	BOP	Shut faulted SG(s) steam supply valve to TDAFW pump – SHUT SG B: 1MS-70 SG C: 1MS-72 1MS-70 (Should have shut in E-0 actions) Critical Task to isolate both valve prior to exiting E-2	(SHUT)
	BOP	Verify main steam drain isolation(s) before MSIVs - SHUT: SG A: 1MS-231 SG B: 1MS-266 SG C: 1MS-301	(YES)

Op Test No.: NRC	Scenario # 1	Event # 6	Page 47 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior	
	BOP	Verify SG blowdown isolation valves – SHUT **SG Blowdown Isolation Valves** Process Line / Outside CNMT (MLB-1A-SA) / Inside CNMT (MLB-1B-SB) SG A Blowdown / 1BD-11 / 1BD-1 SG B Blowdown / 1BD-30 / 1BD-20 SG C Blowdown / 1BD-49 / 1BD-39	(YES)
	BOP	Verify main steam analyzer isolation valves – SHUT Check CST Level - GREATER THAN 10%	(YES) (YES)
Procedure Note:		A SG may be suspected to be ruptured if it fails to dry out following isolation of feed flow. Local checks for radiation can be used to confirm primary-to-secondary leakage.	
	CREW	Any SG - ABNORMAL RADIATION OR UNCONTROLLED LEVEL RISE **Secondary Radiation Monitors And Indications** RM-01MS-3591 SB, Main Steam Line A RM-01MS-3592 SB, Main Steam Line B RM-01MS-3593 SB, Main Steam Line C REM-01TV-3534, Condenser Vacuum Pump Effluent (RM-11: Grid 2 or Group 16) REM-1BD-3527, Steam Generator Blowdown (RM-11: Grid 2 or Group 16) RM-1TV-3536-1, Turbine Building Vent Stack Effluent (RM-11: Grid 2 or Group 16) SG Activity Sample	(NO)
	RO	Check If SI Has Been Terminated: • Check for all of the following: ○ Check BIT outlet valves – SHUT OR ISOLATED ▪ 1SI-3 (Under clearance – SHUT) ▪ 1SI-4 (OPEN)	(YES) (NO)

Op Test No.: NRC	Scenario # 1	Event # 6	Page 48 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior	
Procedure Caution:		• Simultaneous flow through the charging and SI lines may cause CSIP runout (as indicated by oscillating discharge pressure). • Charging flow should NOT exceed 150 GPM to prevent damage to the regenerative heat exchanger.	
	BOP	Check SI Termination Criteria: • Check Subcooling – > 40°F • Level in at least one SG > 40%	(YES) (YES)
	RO	• RCS pressure – STABLE OR RISING • PRZ level - > 30% (YES / NO – time dependent action)	(YES)
Evaluator Note:		**PRZ level > 30%** **IF YES** then crew will continue with E-2 below **IF NO** then crew will transition to E-1 – the actions for E-1 follow E-2 in this guide beginning on page 52	
E-2 Continues	RO	Reset SI	
	Crew	Manually Realign Safeguards Equipment Following A Loss Of Offsite Power. (There is no loss of power – N/A)	
	RO	Reset Phase A AND Phase B Isolation Signals.	

Op Test No.: NRC	Scenario # 1	Event # 6	Page 49 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior	
	RO	Open Instrument Air AND Nitrogen Valves to Containment: **1IA-819 (ISOL VALVE CONT. BLDG 236' PENETRATION (M-80))** **1SI-287 (ACCUMULATOR & PRZ PORV N2 SUPPLY ISO VLV)** Locates and OPENS both valves	
	RO	Stop all but ONE CSIP (STOPS A / B CSIP) RCS pressure – STABLE OR RISING	(YES)
	RO	Check CSIP suction - ALIGNED TO RWST **VCT OUTLET (SHUT)**: **1CS-165 (LCV-115C)**, **1CS-166 (LCV-115E)** **RWST SUCTION (OPEN)**: **1CS-291 (LCV-115B)**, **1CS-292 (LCV-115D)**	(YES)
	RO	Open Normal Miniflow Isolation Valves: **CSIP A: 1CS-182** **CSIP B: 1CS-196** **CSIP C: 1CS-210** **COMMON: 1CS-214** Locates controls and OPENS each valve	

Op Test No.: NRC	Scenario # 1	Event # 6	Page 50 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior
		Event 9 - Failure of 1SI-4 to close
Critical Task #3	RO	Shut BIT Outlet Valves: 1SI-3 1SI-4 1SI-3 is under clearance and SHUT 1SI-4 will not SHUT from MCB switch Dispatches RAB Aux Operator to locally shut 1SI-4 (may also request that the breaker for the valve OPEN) Critical Task to shut BIT Outlet valve 1SI-4 prior to establishing flow through the charging header or CSIP run out conditions will occur as indicated by oscillating discharge pressure.
Evaluator Note:		**To allow evaluation of the candidates ability to control PRZ Pressure manually using the PRZ PORVs the Simulator Operator actions will not be performed until PRZ Pressure is above the PRZ PORV lift setpoint of 2335 psig unless otherwise directed by the Lead Evaluator.**
Simulator Communicator:		**IF this valve has not been previously shut then:** **Acknowledge request to locally shut 1SI-4 (A-230-FX32-W3-S2) AND if requested acknowledge request to OPEN breaker prior to locally valve operation.** **Report back approximately 1 minute after Simulator Operator completes actions below that 1SI-4 is SHUT.**
Simulator Operator -		**When PRZ pressure exceeds 2335 psig confirm the lead evaluator is ready for the local operator actions for 1SI-4 to be performed. IF YES perform the following actions from Sim Diagram SIS02 to operate 1SI-4:** **(IF requested) OPEN control power rf sis016** **Engage handwheel rf sis017** **Shut valve rf sis018**

Op Test No.: NRC	Scenario # 1	Event # 6	Page 51 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior	
	RO	Verify Cold Leg AND Hot Leg Injection Valves – SHUT **1SI-52** **1SI-86** **1SI-107**	(YES)
Procedure Note:		High head SI flow should be isolated before continuing.	
	RO	Establish Charging Lineup: • Shut charging flow control valve: **FK-122.1** • Open charging line isolation valves: **1CS-235** **1CS-238**	(SHUT) (OPEN) (OPEN)
	RO	Monitor RCS Hot Leg Temperature: Check RCS hot leg temperature – STABLE (YES / NO – time dependent - probably rising) YES / NO – BOP action next step	
	BOP	**IF YES** – Manually dump steam AND control feed flow to maintain RCS temperature stable.	
	BOP	**IF NO** - If temperature rising, THEN manually dump steam from intact SG PORVs at maximum rate to stabilize temperature.	
Procedure Note:		RCS temperature must be stabilized to allow evaluation of PRZ level trend.	
	BOP	**IF NO** - WHEN temperature stabilizes, THEN manually dump steam AND control feed flow to maintain RCS temperature stable.	

Op Test No.: NRC	Scenario # 1	Event # 6	Page 52 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior	
Procedure Caution:		Charging flow should NOT exceed 150 GPM to prevent damage to the regenerative heat exchanger.	
	RO	Control Charging Flow To Maintain PRZ Level: • Control charging using charging flow control valve: FK-122.1 • Maintain charging flow less than 150 GPM	
	RO	• PRZ level – CAN BE MAINTAINED STABLE OR RISING	(YES)
	SRO	GO TO ES-1.1, "SI TERMINATION", step 1	
Evaluator Note:		**IF the crew transitioned to E-1 based on PRZ level < 30% then continue on next page.** **If PRZ level is > 30% then go to PAGE 56 to continue with ES-1.1, SI Termination step 1.**	
EOP-E-1		Loss of Reactor or Secondary Coolant	
Procedure Note:		Foldout applies	
	SRO	Assigns Foldout items to RO and BOP RO: RCP Trip criteria, RHR Restart criteria, Alternate Miniflow Open/Shut criteria, Cold Leg Recirculation switchover criteria BOP: AFW supply switchover criteria, Secondary integrity criteria, E-3 transition criteria	

Op Test No.: NRC	Scenario # 1	Event # 6	Page 53 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior

Evaluator Aide:	**E-1** Foldout

LOSS OF REACTOR OR SECONDARY COOLANT

FOLDOUT

- **RCP TRIP CRITERIA**

  IF both of the following occur, **THEN** stop all RCPs:

  - SI flow - GREATER THAN 200 GPM
  - RCS pressure - LESS THAN 1400 PSIG

- **AFW SUPPLY SWITCHOVER CRITERIA**

  IF CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.

- **RHR RESTART CRITERIA**

  IF RCS pressure drops to less than 230 PSIG in an uncontrolled manner, **THEN** restart RHR pumps to supply water to the RCS.

- **ALTERNATE MINIFLOW OPEN/SHUT CRITERIA**

  - **IF** RCS pressure drops to less than 1800 PSIG, **THEN** verify alternate miniflow isolation **OR** miniflow block valves - SHUT
  - **IF** RCS pressure rises to greater than 2200 PSIG, **THEN** verify alternate miniflow isolation **AND** miniflow block valves - OPEN

- **SECONDARY INTEGRITY CRITERIA**

  IF any of the following occurs, **THEN** GO TO E-2, "FAULTED STEAM GENERATOR ISOLATION", Step 1.

  - Any SG pressure - DROPS IN AN UNCONTROLLED MANNER **AND** THAT SG HAS **NOT** BEEN ISOLATED
  - Any SG - COMPLETELY DEPRESSURIZED **AND** THAT SG HAS **NOT** BEEN ISOLATED

- **E-3 TRANSITION CRITERIA**

  IF any SG level rises in an uncontrolled manner **OR** any SG has abnormal radiation levels, **THEN** GO TO E-3, "STEAM GENERATOR TUBE RUPTURE", Step 1.

- **COLD LEG RECIRCULATION SWITCHOVER CRITERIA**

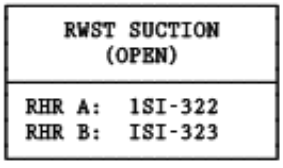
  IF RWST level drops to less than 23.4% (2/4 Low-Low alarm), **THEN** GO TO ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION", Step 1 .

	CREW	Initiate Monitoring Of Critical Safety Function Status Trees.	
	RO	Maintain RCP Seal Injection Flow Between 8 GPM And 13 GPM.	
	BOP	Check Intact SG Levels: • Any level - GREATER THAN 40% • Control Feed Flow to maintain all intact levels between 40% - 50%	(YES)

Op Test No.: NRC	Scenario # 1	Event # 6	Page 54 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior	
	BOP	• Any level – RISING IN AN UNCONTROLLED MANNER	(NO)
Evaluator Note:		**The PRZ PORVs are failed. The crew should identify that when RCS pressure exceeds 2285 psig the PZR PORVs failed to open and will MANUALLY open the PORVs to prevent the PRZ Safety valves from lifting.**	
	RO	Check PRZ PORV AND Block Valves:	
	RO	• Verify AC buses 1A1 AND 1B1 – ENERGIZED • Check PRZ PORVs – SHUT (failed) • Check block valves - AT LEAST ONE OPEN • IF a PRZ PORV opens on high pressure, THEN verify it shuts after pressure drops to less than opening setpoint. (should open / close when RCS pressure reaches 2335 psig)	(YES) (YES) (YES)
	RO	Check SI Termination Criteria: • RCS subcooling - >40°F	(YES)
	BOP	• Level in at least one intact SG > 40% • Total feed flow to intact SGs > 210 KPPH	(YES) (YES)
	RO	PRZ level > 30% (YES / NO time dependent) **YES** – GO TO **ES-1.1, SI Termination, Step 1 (PAGE 56)** **NO** – Continue with E-1 actions below	

Op Test No.: NRC	Scenario # 1	Event # 6/10	Page 55 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment SR NI fails to energize**		

Time	Position	Applicant's Actions or Behavior	
E-1 Continues	RO	Check CNMT Spray Status: • Check any CNMT spray pump – RUNNING • Consult plant operations staff to determine if CNMT spray should be placed in standby. CNMT spray - TO BE PLACED IN STANDBY (When directed by plant operations staff)	(YES)
Evaluator Note:		**The Intermediate Range channel N-35 is undercompensated and the crew must identify the failure and manually energize the SR detectors.**	
		Event 10 – SR NI fails to energize	
	RO	Check Source Range Detector Status: • Intermediate range flux – LESS THAN 5x10-11 AMPS • Verify source range detectors – ENERGIZED Identifies NI-35 under-compensation, reports finding to SRO and manually energizes the SR detectors • Transfer nuclear recorder to source range scale.	(YES) (NO)
	RO	Check RHR Pump Status: • Check RHR pump suction – ALIGNED TO RWST 	
	RO	• RCS Pressure - GREATER THAN 230 PSIG • RCS pressure - STABLE OR RISING • Stop RHR pumps (STOPS both RHR pumps)	(YES) (YES)

Op Test No.: NRC	Scenario # 1	Event # 6	Page 56 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior
	RO	Check RCS And SG Pressures: **(time dependent)** Check for both of the following: All SG Pressures - STABLE OR RISING (YES / NO) RCS pressure - STABLE OR DROPPING (YES / NO) **IF NO** - the crew will return to step 1 and loop back to through the procedure. When they reach step 5 to check PRZ level they will have adequate level and transition to ES-1.1, SI Termination.
Evaluator Note:		**SI Termination is entered from either E-2 step 29 or E-1 Step 5.e**
EOP-ES-1.1		SI Termination
Procedure Note:		Foldout Applies
	SRO	Assigns foldout action items to RO and BOP RO – Cold leg recirculation switchover criteria and RHR restart criteria BOP – Secondary integrity criteria and AFW switchover criteria

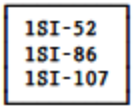
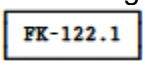
Op Test No.: NRC	Scenario # 1	Event # 6	Page 57 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior
Evaluator Aide:		**ES-1.1** Foldout
		SI TERMINATION **FOLDOUT** • **SECONDARY INTEGRITY CRITERIA** **IF** any of the following occurs, **THEN** GO TO E-2, "FAULTED STEAM GENERATOR ISOLATION", Step 1. • Any SG pressure - DROPS IN AN UNCONTROLLED MANNER **AND** THAT SG HAS **NOT** BEEN ISOLATED • Any SG - COMPLETELY DEPRESSURIZED **AND** THAT SG HAS **NOT** BEEN ISOLATED • **COLD LEG RECIRCULATION SWITCHOVER CRITERIA** **IF** RWST level drops to less than 23.4% (2/4 Low-Low alarm), **THEN** GO TO ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION", Step 1. • **AFW SUPPLY SWITCHOVER CRITERIA** **IF** CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1. • **RHR RESTART CRITERIA** **IF** RCS pressure drops to less than 230 PSIG in an uncontrolled manner, **THEN** restart RHR pumps to supply water to the RCS.
	SRO	Initiate Monitoring Of Critical Safety Function Status Trees.
	RO	Check If SI Has Been Terminated: Check for all of the following: Check BIT outlet valves – SHUT OR ISOLATED • 1SI-3 (YES – shut and under clearance)
	RO	• 1SI-4 (YES / NO – shut in E-2 step 22 OR will be shut in ES-1.1 step 9.c – coming up) IF answer is **NO** then perform actions on following pages for "NO" response to reset SI If **YES** then do this action then pick up on page 60 after "NO" response ends.
	RO	Check cold leg AND hot leg injection valves – SHUT • 1SI-52 (YES) • 1SI-86 (YES) • 1SI-107 (YES)

Op Test No.: NRC	Scenario # 1	Event # 6	Page 58 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior	
"NO" response	RO	Reset SI Manually realign Safeguards Equipment Following A Loss of Offsite Power (NO action required) Reset Phase A and Phase B Isolation Signals Open IA and Nitrogen Valves to CNMT: 1IA-819 (ISOL VALVE CONT. BLDG 236' PENETRATION (M-80)) 1SI-287 (ACCUMULATOR & PRZ PORV N2 SUPPLY ISO VLV) Stop all but ONE CSIP Check RCS Pressure – STABLE OR RISING Isolate High Head SI Flow: • Check CSIP suction – aligned to RWST VCT OUTLET (SHUT): 1CS-165 (LCV-115C), 1CS-166 (LCV-115E) RWST SUCTION (OPEN): 1CS-291 (LCV-115B), 1CS-292 (LCV-115D) • Open normal miniflow isolation valves: CSIP A: 1CS-182 CSIP B: 1CS-196 CSIP C: 1CS-210 COMMON: 1CS-214 • Shut BIT outlet valves: (1SI-4 is failed OPEN) 1SI-3 1SI-4 RNO for 1SI-4 – dispatch an Aux Operator to locally shut or isolate valve 1SI-4 (A-230-FX-W3-S2)	(DONE) (DONE) (DONE) (DONE) (YES)

Op Test No.: NRC	Scenario # 1	Event # 6	Page 59 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**To allow evaluation of the candidates ability to control PRZ Pressure manually using the PRZ PORVs the Simulator Operator actions will not be performed until PRZ Pressure is above the PRZ PORV lift setpoint of 2335 psig unless otherwise directed by the Lead Evaluator.**
Simulator Communicator:		**IF this valve has not been previously shut then:** **Acknowledge request to locally shut 1SI-4 (A-230-FX32-W3-S2) AND if requested acknowledge request to OPEN breaker prior to locally valve operation.** **Report back approximately 1 minute after Simulator Operator completes actions below that 1SI-4 is SHUT.**
Simulator Operator -		**When PRZ pressure exceeds 2335 psig confirm the lead evaluator is ready for the local operator actions for 1SI-4 to be performed. IF YES perform the following actions from Sim Diagram SIS02 to operate 1SI-4:** **(IF requested) OPEN control power rf sis016** **Engage handwheel rf sis017** **Shut valve rf sis018**
"NO" response	RO	• Verify cold leg AND hot leg injection valves – SHUT (YES) 
Procedure Caution:		High head SI flow should be isolated before continuing
"NO" response * ends after this step	RO	Establish Charging Lineup: • Shut charging flow control valve: (SHUTS) 

Op Test No.: NRC	Scenario # 1	Event # 6	Page 60 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior	
		• Open charging line isolation valves: 1CS-235 1CS-238	(OPEN) (OPEN)
Procedure Caution:		Charging flow should NOT exceed 150 GPM to prevent damage to the regenerative heat exchanger.	
	RO	Control Charging Flow To Maintain PRZ Level: • Control charging using charging flow control valve: FK-122.1 • Maintain charging flow < 150 gpm • PRZ level – CAN BE MAINTAINED STABLE OR RISING	(YES)
	RO	Check If RHR Pumps Should Be Stopped: • Check RHR pumps – ANY RUNNING WITH SUCTION ALIGNED TO RWST RWST SUCTION (OPEN) RHR A: 1SI-322 RHR B: ISI-323 • Stop RHR pumps (locates MCB stop switches and STOPs both RHR pumps)	(YES)
Procedure Caution:		• Simultaneous flow through the charging and SI lines may cause CSIP runout (as indicated by oscillating discharge pressure). • Charging flow should NOT exceed 150 GPM to prevent damage to the regenerative heat exchanger.	

Op Test No.: NRC	Scenario # 1	Event # 6	Page 61 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior	
	RO	Check SI Reinitiation Criteria: • RCS subcooling - GREATER THAN 40°F • PRZ level - GREATER THAN 30% • PRZ level - Can Be Maintained GREATER THAN 30%	(YES) (YES) (YES)
Procedure Note:		Additional foldout item, "SI REINITIATION CRITERIA" applies. **SI TERMINATION** **FOLDOUT** • **SI REINITIATION CRITERIA** Following SI termination, **IF** any of the following occurs: • RCS subcooling - LESS THAN 10° F [40° F] - C 20° F [50° F] - M • PRZ level - CAN **NOT** BE MAINTAINED GREATER THAN 10% [30%]	
	SRO	Assigns RO SI Reinitiation criteria	
	BOP	Establish Steam Generator Pressure Control Mode: • Check if steam dump to condenser AVAILABLE: **Condenser Available Requirements** Any Intact SG MSIV - OPEN Condenser Available (C-9)- LIT (BPLB 3-3) Steam Dump Contol - AVAILALBE • Use intact SG PORV for steam dumping in subsequent steps.	(NO)
Procedure Note:		RCS temperature must be stabilized to allow evaluation of PRZ level trend.	

Op Test No.: NRC	Scenario # 1	Event # 6	Page 62 of 82
Event Description:	**Steam line Break on 'B' SG inside Containment**		

Time	Position	Applicant's Actions or Behavior	
	RO	Monitor RCS Hot Leg Temperature: • Check RCS hot leg temperature - STABLE	(YES)
Procedure Caution:		Excessive RCS activity can cause adverse radiological conditions when letdown is placed in service.	
Procedure Note:		Pressure controller PK-145.1 is normally set to maintain 350 PSIG (58%). If RCS pressure is low, the setpoint may have to be reduced to obtain proper letdown flow.	
	RO	Check If Letdown Can Be Placed In Service: • Check PRZ Level – GREATER THAN 40% • Establish Letdown	(YES)
Examiners Note:		After letdown is established Pressurizer level can be lowered and Pressurizer pressure should no longer be a problem. The PORVs not functioning in Automatic are not a challenge since the Pressurizer level can be reduced to not be solid. END OF SCENARIO	

Lead Evaluator	**With RCS hot leg temperature stable or stabilizing under the crews control and letdown established then: TERMINATE THE SCENARIO.** **Direct the Simulator Operator to place the Simulator to FREEZE** **Announce "CREW UPDATE" – The NRC has the shift. Inform the crew to remain seated at their desk and to not discuss the scenario.**

Simulator Operator	**When directed by Lead Evaluator go to FREEZE**

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 1 of 8
Safeguards Actuation Verification

NOTE

- General guidance for verification of safeguards equipment is contained in Attachment 4 of this procedure.
- ERFIS displays of safeguards equipment status are not reliable while any associated safety-related electrical buses are de-energized.

☐ 1. Verify Two CSIPs - RUNNING

☐ 2. Verify Two RHR Pumps - RUNNING

☐ 3. Verify Two CCW Pumps - RUNNING

☐ 4. Verify All ESW **AND** ESW Booster Pumps - RUNNING

☐ 5. Verify SI Valves - PROPERLY ALIGNED

(Refer to Attachment 1.)

☐ 6. Verify CNMT Phase A Isolation Valves - SHUT

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 4.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 2 of 8
Safeguards Actuation Verification

☐ 7. Verify SG Blowdown **AND** SG Sample Isolation Valves In Table 1 - SHUT

Table 1: SG Blowdown And Sample Isolation Valves

Process Line	Outside CNMT (MLB-1A-SA)	Inside CNMT (MLB-1B-SB)
SG A Sample	1SP-217	1SP-214/216
SG B Sample	1SP-222	1SP-219/221
SG C Sample	1SP-227	1SP-224/226
SG A Blowdown	1BD-11	1BD-1
SG B Blowdown	1BD-30	1BD-20
SG C Blowdown	1BD-49	1BD-39

8. **IF** Main Steam Line Isolation Actuated **OR** Is Required By Any Of The Following, **THEN** Verify MSIVs **AND** MSIV Bypass Valves - SHUT

☐ • Steam line pressure - LESS THAN 601 PSIG

☐ • CNMT pressure - GREATER THAN 3.0 PSIG

9. **IF** CNMT Spray Actuation Signal Actuated **OR** Is Required, **THEN** Verify The Following:

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 9.)

☐ • CNMT spray pumps - RUNNING

☐ • CNMT spray valves - PROPERLY ALIGNED

☐ • Phase B isolation valves - SHUT

☐ • All RCPs - STOPPED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 3 of 8
Safeguards Actuation Verification

☐ 10. Verify Both Main FW Pumps - TRIPPED

☐ 11. Verify FW Isolation Valves - SHUT

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 6.)

☐ 12. Verify both MDAFW pumps - RUNNING

13. **IF** any of the following conditions exist, **THEN** verify the TDAFW pump - RUNNING

☐ • Undervoltage on either 6.9 KV emergency bus

☐ • Level in two SGs - LESS THAN 25%

☐ • Manual actuation to control SG level

14. Verify AFW Valves - PROPERLY ALIGNED

☐ • **IF** no AFW Isolation Signal, **THEN** verify isolation and flow control valves - OPEN

NOTE

An AFW Isolation signal signal requires a Main Steam Line Isolation coincident with one SG pressure 100 PSIG below the other two SGs.

☐ • **IF** AFW Isolation Signal present, **THEN** verify MDAFW and TDAFW isolation and flow control valves to affected SG - SHUT

☐ 15. Verify Both EDGs - RUNNING

☐ 16. Verify CNMT Fan Coolers - ONE FAN PER UNIT RUNNING IN SLOW SPEED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 4 of 8
Safeguards Actuation Verification

☐ 17. Verify CNMT Ventilation Isolation Valves - SHUT

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 7.)

☐ 18. Verify Control Room Area Ventilation - MAIN CONTROL ROOM ALIGNED FOR EMERGENCY OPERATION

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 5, Sheets 1 and 2, Sections for MAIN CONTROL BOARD, SLB-5 and SLB-6.)

19. Verify Essential Service Chilled Water System Operation:

☐ • Verify both WC-2 chillers - RUNNING

☐ • Verify both P-4 pumps - RUNNING

☐ (Refer to AOP-026, "LOSS OF ESSENTIAL SERVICE CHILLED WATER SYSTEM" for loss of any WC-2 chiller.)

20. Verify CSIP Fan Coolers - RUNNING

☐ AH-9 A SA
☐ AH-9 B SB
☐ AH-10 A SA
☐ AH-10 B SB

NOTE

Security systems are powered by bus 1A1 (normal supply) or bus 1B1 (alternate supply). Backup power will be available for approximately 30 MINUTES after the supplying bus is de-energized. (Refer to OP-115, "CENTRAL ALARM STATION ELECTRICAL SYSTEMS", Section 8.9 and 8.10.)

☐ 21. Verify AC buses 1A1 **AND** 1B1 - ENERGIZED

☐ 22. Place Air Compressor 1A **AND** 1B In The LOCAL CONTROL Mode.

(Refer to Attachment 7.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 5 of 8
Safeguards Actuation Verification

CAUTION

The maximum calculated dose rate in the vicinity of MCC 1A35-SA and MCC 1B35-SB is between 10 MREM/HR and 150 MREM/HR.

☐ 23. Dispatch An Operator To Unlock **AND** Turn ON The Breakers For The CSIP Suction **AND** Discharge Cross-Connect Valves:

(Refer to Attachment 2.)

MCC 1A35-SA		MCC 1B35-SB	
VALVE	CUBICLE	VALVE	CUBICLE
1CS-170	4A	1CS-171	4D
1CS-169	4B	1CS-168	7D
1CS-218	14D	1CS-220	9D
1CS-219	14E	1CS-217	12C

24. Check If C CSIP Should Be Placed In Service:

☐ • **IF** two charging pumps can **NOT** be verified to be running, **AND** C CSIP is available, **THEN** place C CSIP in service in place of the non-running CSIP using OP-107, "CHEMICAL **AND** VOLUME CONTROL SYSTEM, Section 8.5 or 8.7.

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 6 of 8
Safeguards Actuation Verification

25. Start The Spent Fuel Pump Room Ventilation System:

a. At AEP-1, verify the following ESCWS isolation valves - OPEN

1) SLB-11 (Train A)

☐ • AH-17 SUP CH 100 (Window 9-1)

☐ • AH-17 RTN CH 105 (Window 10-1)

2) SLB-9 (Train B)

☐ • AH-17 SUP CH 171 (Window 9-1)

☐ • AH-17 RTN CH 182 (Window 10-1)

b. At AEP-1, start one SFP PUMP ROOM FAN COOLER:

☐ • AH-17 1-4A SA

☐ • AH-17 1-4B SB

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 7 of 8
Safeguards Actuation Verification

NOTE

- Fuel pool levels **AND** temperatures should be monitored approximately every 1 to 2 HOURS.
- Following the initial check of fuel pool levels and temperature, monitoring responsibilities may be assumed by the plant operations staff (including the TSC or STA).
- Only fuel pools containing fuel are required to be monitored.

26. Check Status Of Fuel Pools:

☐ a. Operate spent fuel cooling pumps to maintain fuel pool temperatures between 85°F and 105°F.

b. Monitor fuel pool levels **AND** temperatures:

☐ • Refer to AOP-041, "SPENT FUEL POOL EVENT" Attachments 7, 8, 9, 10 and 11 for SFP parameter monitoring methods.

☐ • Refer to Curves H-X-24, H-X-25 and H-X-26 for SFP time to 200°F.

☐ • Levels - GREATER THAN LO ALARM (284 FT, 0 IN)

☐ • Temperatures - LESS THAN HI TEMP ALARM (105°F)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 8 of 8
Safeguards Actuation Verification

NOTE

IF control room ventilation was previously aligned to an emergency outside air intake for post-accident operations, **THEN** follow-up actions will be required to restore the alignment.

27. Consult Plant Operations Staff Regarding Alignment Of The Control Room Ventilation System:

☐ • Site Emergency Co-ordinator - Control Room

☐ • Site Emergency Co-ordinator - Technical Support Center

(Refer to PEP-230, "CONTROL ROOM OPERATIONS".)

- END -

OWP-ESF-02
Sheet 1 of 8

EIR Number: _____
W/O Number: _____
Clearance Number: _____

1. OWP-ESF-02

2 System: ESFAS

3. Component: SG Steam Pressure Loop 1

4. Scope: LCO Action required due to inoperable SG A Pressure Protection Channels II, III, or IV (PT-474, PT-475, or PT-476)

5. Applicable Requirements: 3.3.1, 3.3.2, 3.3.3.5a and 3.3.3.6

6. Precautions: (1) Ensure only one channel is in TEST at a time. (2) See NOTE on Sheets 3 and 5. (3) The ERFIS Continuous calorimetric may be inoperable.

7. Component lineups completed per attached sheet (s) _____ / _____
Signature Date

8. Testing required on redundant equipment while component is inoperable:
None

9. Testing/Action required to restore operability. (N/A if tracked on EIR)

MST-I0007 for Channel II		/
MST-I0008 for Channel III		/
MST-I0009 for Channel IV		/
	Signature	Date

10. Component lineups restored per attached sheet (s) _____ / _____
Signature Date

11. Remarks:

12. Reviewed by: _____ _____
Superintendent- Shift Operations Date

After receiving the final review signature, this OWP becomes a QA Record and should be submitted to Document Services.

Bistable /Status Light Lineup

Component ID or Number	Position for Maintenance Initial/Verified		Restored Position Initial/Verified	
Steamline Pressure Channel II				
PIC Cabinet 2 on Card C2-846				
NOTE: Concurrent verification is preferred while tripping bistables.				
BS1 (PB/474A Lo Steamline Pressure MSIS & SIAS)	TEST	/	NORMAL	/
BS2 (PB/474C Hi Steamline Pressure Rate MSIS)	TEST	/	NORMAL	/
BS3 (PB/474B1 P1 > P2 for AFW Isolation)	TEST	/	NORMAL	/
BS4 (PB/474B2 P2 > P1 for AFW Isolation)	TEST	/	NORMAL	/
PIC Cabinet 2 on Card C2-848				
BS3 (PB/494B1 P1 > P3 for AFW Isolation)	TEST	/	NORMAL	/
BS4 (PB/494B2 P3 > P1 for AFW Isolation)	TEST	/	NORMAL	/
Trip Status Light Box-1				
STMLN A LO PRESS PB 474A (Window 1-2)	ENERGIZED	/	DE-ENERGIZED	/
STMLN A HP RATE PB 474C (Window 4-2)	ENERGIZED	/	DE-ENERGIZED	/
STMLN B HI DIFF PB 474B1 (Window 7-2)	ENERGIZED	/	DE-ENERGIZED	/
STMLN C HI DIFF PB 494B1 (Window 9-2)	ENERGIZED	/	DE-ENERGIZED	/
STMLN A HI DIFF PB 474B2 (Window 10-2)	ENERGIZED	/	DE-ENERGIZED	/
STMLN A HI DIFF PB 494B2 (Window 12-2)	ENERGIZED	/	DE-ENERGIZED	/
On ERFIS Computer (Using DR Function)				
PMS0474	Deleted from Processing	/	Restored to Processing	/

Bistable /Status Light Lineup

Component ID or Number	Position for Maintenance	Initial/Verified	Restored Position	Initial/Verified
Steamline Pressure Channel III				
NOTE: SG A level Channel I and II Low Level bistables (LB474B and LB475B) must remain OPERABLE and NOT TRIPPED to preclude a SF/FF Mismatch Reactor Trip.				
STM GEN A FW FLOW CONTROL AND RECORDER SELECTOR	CHAN 476	/	(circle position selected) CHAN 476 or CHAN 477	/
STM GEN A STM FLOW CONTROL AND RECORDER SELECTOR	CHAN 475	/	(circle position selected) CHAN 474 or CHAN 475	/
PIC Cabinet 3 on Card C3-864				
NOTE: This switch may be re-positioned for troubleshooting. It is not required to be in TEST to meet Tech Specs. Operating this switch first aids in troubleshooting by maintaining system conditions the same as they were when the trouble occurred.				
SW3 (P-0475 Master Test Switch)	TEST	/	NORMAL	/
PIC Cabinet 3 on Card C3-851				
NOTE: Concurrent verification is preferred while tripping bistables.				
BS1 (PB/475A Lo Steamline Pressure MSIS & SIAS)	TEST	/	NORMAL	/
BS2 (PB/475C Hi Steamline Pressure Rate MSIS)	TEST	/	NORMAL	/
BS3 (PB/475B1 P1 > P2 for AFW Isolation)	TEST	/	NORMAL	/
BS4 (PB/475B2 P2 > P1 for AFW Isolation)	TEST	/	NORMAL	/

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Sheet 4 of 8

Bistable /Status Light Lineup

Component ID or Number	Position for Maintenance	Initial/Verified	Restored Position	Initial/Verified
Steamline Pressure Channel III (continued)				
PIC Cabinet 3 on Card C3-855				
BS3 (PB/495B1 P1 > P3 for AFW Isolation)	TEST	/	NORMAL	/
BS4 (PB/495B2 P3 > P1 for AFW Isolation)	TEST	/	NORMAL	/
PIC Cabinet 3 on Card C3-845				
BS1 (FB/478B SF/FF Mismatch Rx Trip)	TEST	/	NORMAL	/
PIC Cabinet 3 on Card C3-848				
BS1 (FB/478C SF/FF Alarm)	TEST	/	NORMAL	/
Trip Status Light Box-1				
STMLN A LO PRESS PB 475A (Window 1-3)	ENERGIZED	/	DE-ENERGIZED	/
STMLN A HP RATE PB 475C (Window 4-3)	ENERGIZED	/	DE-ENERGIZED	/
STMLN B HI DIFF PB 475B1 (Window 7-3)	ENERGIZED	/	DE-ENERGIZED	/
STMLN C HI DIFF PB 495B1 (Window 9-3)	ENERGIZED	/	DE-ENERGIZED	/
STMLN A HI DIFF PB 475B2 (Window 10-3)	ENERGIZED	/	DE-ENERGIZED	/
STMLN A HI DIFF PB 495B2 (Window 12-3)	ENERGIZED	/	DE-ENERGIZED	/
Trip Status Light Box-2				
SG A FW < STM FB 478B (Window 1-3)	ENERGIZED	/	DE-ENERGIZED	/
On ERFIS Computer (Using DR Function)				
PMS0475	Deleted from Processing	/	Restored to Processing	/

Bistable /Status Light Lineup

Component ID or Number	Position for Maintenance	Initial/Verified	Restored Position	Initial/Verified
Steamline Pressure Channel IV				
NOTE: SG A level Channel I and II Low Level bistables (LB474B and LB475B) must remain OPERABLE and NOT TRIPPED to preclude a SF/FF Mismatch Reactor Trip.				
			(circle position selected)	
STM GEN A FW FLOW CONTROL AND RECORDER SELECTOR	CHAN 477	/	CHAN 476 or CHAN 477	/
			(circle position selected)	
STM GEN A STM FLOW CONTROL AND RECORDER SELECTOR	CHAN 474	/	CHAN 474 or CHAN 475	/
PIC Cabinet 4 on Card C4-863				
NOTE: This switch may be re-positioned for troubleshooting. It is not required to be in TEST to meet Tech Specs. Operating this switch first aids in troubleshooting by maintaining system conditions the same as they were when the trouble occurred.				
SW4 (P-0476 Master Test Switch)	TEST	/	NORMAL	/

Bistable /Status Light Lineup
Steamline Pressure Channel IV (continued)

Component ID or Number	Position for Maintenance Initial/Verified		Restored Position Initial/Verified	
PIC Cabinet 4 on Card C4-834				
BS1 (PB/476A Lo Steamline Pressure MSIS & SIAS)	TEST	/	NORMAL	/
BS2 (PB/476C Hi Steamline Pressure Rate MSIS)	TEST	/	NORMAL	/
BS3 (PB/476B1 P1 > P2 for AFW Isolation)	TEST	/	NORMAL	/
BS4 (PB/476B2 P2 > P1 for AFW Isolation)	TEST	/	NORMAL	/

NOTE: Concurrent verification is preferred while tripping bistables.

CAUTION

If BS3 (PB/476B1) or BS-4 (PS/476B2) are being placed to TEST (tripped condition) to satisfy Tech Spec Table 3.3-3, Action 19, removal of any ONE of the following cards will remove the channel from the tripped condition; thus no longer meeting the action statement to be in the tripped condition: (Reference NCR 350586)

- PIC Cabinet 4 on Card C4-548
- PIC Cabinet 4 on Card C4-834
- PIC Cabinet 4 on Card C4-848

INSTRUCTION

1. **DIRECT** I&C to perform continuity testing of BS3 and BS4 above using the Restoration section of MST-I0009:

   - BS3 continuity check complete /
   - BS4 continuity check complete /

Bistable /Status Light Lineup
Steamline Pressure Channel IV (continued)

Component ID or Number	Position for Maintenance Initial/Verified	Restored Position Initial/Verified

PIC Cabinet 4 on Card C4-843

CAUTION

If BS3 (PB/496B1) or BS-4 (PS/496B2) are being placed to TEST (tripped condition) to satisfy Tech Spec Table 3.3-3, Action 19, removal of any ONE of the following cards will remove the channel from the tripped condition; thus no longer meeting the action statement to be in the tripped condition: (Reference NCR 350586)

- PIC Cabinet 4 on Card C4-549
- PIC Cabinet 4 on Card C4-843
- PIC Cabinet 4 on Card C4-848

PIC Cabinet 4 on Card C4-843

BS3 (PB/496B1 P1 > P3 for AFW Isolation)	TEST	/	NORMAL	/
BS4 (PB/496B2 P3 > P1 for AFW Isolation)	TEST	/	NORMAL	/

INSTRUCTION

2. **DIRECT** I&C to perform continuity testing of BS3 and BS4 above using the Restoration section of MST-I0009:

   - BS3 continuity check complete /
   - BS4 continuity check complete /

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Sheet 8 of 8

Bistable /Status Light Lineup

Component ID or Number	Position for Maintenance	Initial/Verified	Restored Position	Initial/Verified
Steamline Pressure Channel IV (continued)				
PIC Cabinet 4 on Card C4-828				
BS1 (FB/478A SF/FF Mismatch Rx Trip)	TEST	/	NORMAL	/
PIC Cabinet 4 on Card C4-831				
BS1 (FB/478D SF/FF Alarm)	TEST	/	NORMAL	/
Trip Status Light Box-1				
STMLN A LO PRESS PB 476A (Window 1-4)	ENERGIZED	/	DE-ENERGIZED	/
STMLN A HP RATE PB 476C (Window 4-4)	ENERGIZED	/	DE-ENERGIZED	/
STMLN B HI DIFF PB 476B1 (Window 7-4)	ENERGIZED	/	DE-ENERGIZED	/
STMLN C HI DIFF PB 496B1 (Window 9-4)	ENERGIZED	/	DE-ENERGIZED	/
STMLN A HI DIFF PB 476B2 (Window 10-4)	ENERGIZED	/	DE-ENERGIZED	/
STMLN A HI DIFF PB 496B2 (Window 12-4)	ENERGIZED	/	DE-ENERGIZED	/
Trip Status Light Box-2				
SG A FW < STM FB 478A (Window 1-4)	ENERGIZED	/	DE-ENERGIZED	/
On ERFIS Computer (Using DR Function)				
PMS0476	Deleted from Processing	/	Restored to Processing	/

7.0 SHUTDOWN

7.1. Transferring 6.9KV Auxiliary Buses 1A and 1D from UAT 1A to SUT 1A

7.1.1. Initial Conditions

1. All prerequisites in Section 3.0 are met. _____
2. Aux Buses 1A and 1D are powered from UAT 1A per Section 5.11, 8.1, or 8.32 of this procedure. _____
3. Network grid breakers are closed and providing power to SUT 1A (Switchyard Breakers 52-2 or 52-3). _____
4. **IF** Switchyard Grid Breakers 52-2 or 52-3 are **NOT** closed, **THEN CLOSE** the breakers per Section 8.29 if desired. _____

7.1.2. Procedural Steps

NOTE: Steps 7.1.2.1 through 7.1.2.10 are performed at the MCB.

1. **VERIFY** the availability of SUT 1A as indicated by the following voltmeters reading between 6.55 and 7.25KV:
   - EI-503, X WINDG VOLTS (**EACH** phase) _____
   - EI-504, Y WINDG VOLTS (**EACH** phase) _____
2. **PLACE** the START UP AUX XFMR A TO AUX BUSES A & D SYNCHRONIZER switch in the BKR-107 position. _____
3. **VERIFY** synchroscope is at the 12 O'CLOCK position. _____

7.1.2 Procedural Steps (continued)

NOTE: When breaker 107 is placed in the CLOSE position and subsequently released, breaker 108 will open.

CAUTION

If Breaker 108 fails to open, observe Precaution and Limitation 4.0.16. Manual opening of Breaker 108 requires use of the THINK switch.

4. **PLACE** BREAKER 107, START UP XFMR A TO AUX BUS A, to the CLOSE position. _____

5. **VERIFY** the following:

   - Auxiliary Bus A voltage remains between 6.55 and 7.25KV as indicated on EI-560. (**EACH** phase) _____
   - BREAKER 108, UNIT AUX XFMR A TO AUX BUS A, is open. _____

6. **PLACE** the START UP XFMR A TO AUX BUSES A & D SYNCHRONIZER switch to the BKR 101-position. _____

7. **VERIFY** synchroscope is at the 12 O'CLOCK position. _____

NOTE: When breaker 101 is placed in the CLOSE position and subsequently released, breaker 102 will open.

CAUTION

If Breaker 102 fails to open, observe Precaution and Limitation 4.0.16. Manual opening of Breaker 102 requires use of the THINK switch.

8. **PLACE** BREAKER 101, START UP XFMR A TO AUX BUS D, to the CLOSE position. _____

7.1.2 Procedural Steps (continued)

9. **VERIFY** the following:

   - Auxiliary Bus D voltage remains between 6.55 and 7.25KV as indicated on EI-561. (**EACH** phase) _____
   - BREAKER 102, UNIT AUX XFMR A TO AUX BUS D, is open. _____

10. **PLACE** the START UP AUX XFMR A TO AUX BUSES A & D SYNCHRONIZER switch to the OFF position. _____

11. **PERFORM** Attachment 1, Transformer Electrical Lineup Checklist. _____

Rev. 0 – Development Copy / send outline to NRC

Rev. 1 – Outline Revision / Changes made by Exam Team

Rev. 2 – Validation

Rev. 3 – Validation, Final Ops and Training Management comments incorporated

Rev. 4 – NRC 45 day exam submittal review comments incorporated

Rev. FINAL – NRC Prep Week comments incorporated

Facility:	SHEARON-HARRIS	Scenario No.:	2	Op Test No.:	05000400/2014302
Examiners:		Operators:	SRO:		
			OATC:		
			BOP:		

Initial Conditions:
- IC-8, MOL, 3% power, Xenon free startup in progress. The crew transitioned to Mode 1 to start up the Main Turbine when secondary chemistry parameters forced the crew to lower power below 5%. GP-005 Turbine valve testing is complete.
- 'B' Circ Water Pump is Out of Service for motor replacement, expected return to service in 2 hours
- 'B' GS Condenser Exhauster Fan is Out of Service due to high vibrations on the motor bearing.
- 'B' DEH Pump is under clearance for motor repairs.
- FRV Bypass Valves controlling SG level
- Thunderstorms have been forecasted for the area, AP-301 actions are completed.

Turnover:
- The plant is at 3% power, MOL, plant startup in progress. Criticality was achieved 2 hours ago, 72 hours after a trip from 100% power. GP-005, Power Operation (Mode 2 to Mode 1) is being implemented. Plant risk condition is YELLOW due to startup.

Critical Task:
- Manually close 'B' SG PORV prior to exiting EOP-E-3
- Depressurize the RCS to minimize primary to secondary leakage prior to SG 'B' exceeding 100% level

Event No.	Malf. No.	Event Type*	Event Description
1	n/a	R – RO/SRO N – BOP/SRO	Start power escalation to 4 – 8% to raise turbine speed to 1800 rpm.
2	cws01a	C – BOP/SRO	Trip of the A Circ Water Pump and Discharge valve failure
3	ccw19a ccw047	C – RO/SRO TS – SRO	Shaft Shear 'A' CCW Pump with standby CCW pump failure to auto start
4	lt:460	I – RO/SRO	PRZ Level Transmitter for LT-460 fails low which isolates letdown.
5	n/a	N – RO/SRO	Restore letdown IAW OP-107.
6	Lt:990	TS – SRO	Failure of RWST level channel, LI-990 fails high
7	cfw16a cfw16b zr211113 zr211158	C – BOP/SRO	'A' MFP trips with MFP 'B' failure to start. Maintain Rx power <10% and initiate AFW in accordance with AOP-010.
8	sgn05b	M – ALL	'B' SGTR occurs, 420 GPM ramped in over 3 minutes.
9	jpb455d jpb456d xc1i036	C – RO/SRO	Auto SI failure. Failure caused by 2 SI (Train A and B) Low Pressurizer Pressure relay failures. Failure of one MCB SI manual actuate switch
10	pt:308b	I – BOP/SRO	'B' SG PORV fails open in auto due to PT-308B failing high, Operator can close manually

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

SCENARIO SUMMARY: 2014 NRC EXAM SCENARIO 2

The plant is at 3% power, MOL, plant startup in progress. GP-005, Power Operation (Mode 2 to Mode 1) is being implemented. The crew transitioned to Mode 1 to start up the Main Turbine when secondary chemistry parameters forced the crew to lower power below 5%. Criticality was achieved 2 hours ago, 72 hours after a trip from 100% power. The National Weather Service has forecasted thunderstorms for the New Hill area and the actions for AP-301, Seasonal Weather Preparations and Monitoring have been completed by the crew. Plant risk condition is YELLOW due to startup.

The following equipment is under clearance:

- Circulating Water Pump B-NNS is under clearance due to high vibrations on the motor bearing. Has been under clearance for 48 hours. Repairs are expected to be completed within 2 hours.
- 'B' Gland Seal Exhauster Fan is under clearance for motor repairs. Has been under clearance for 8 hours. Repairs are expected to be completed within 24 hours.
- 'B' DEH Pump is under clearance for motor repairs. The pump has been unavailable for 8 hours. Repairs are expected to be completed within 24 hours.

Event 1: Start power escalation to 4 – 8% to raise turbine speed to 1800 rpm. Start power escalation to 6%. The crew performs an ascension in Reactor power and with the Turbine at 1700 rpm, transfers control from the Throttle Valves to the Governor Valves and rolls the turbine up to 1800 rpm. They then prepare to proceed with GP-005.

Event 2: Trip of the 'A' Circ Water Pump and Discharge valve, 1CW-10 fails to automatically shut. This malfunction can be inserted once the lead evaluator is satisfied with the crew's ability to control the escalation of reactor power. The crew should identify the trip of the 'A' Circ Water pump from annunciator ALB-021-4-4 and respond using the APP. The trip of the Circ Water pump is entry conditions for AOP-012, Partial Loss Of Condenser Vacuum, and the crew may enter the AOP without referencing the APP. The BOP should identify that the discharge valve for the 'A' Circ Water pump,1CW-10, did not automatically shut and should attempt to shut the valve by taking the Circ Water pump control switch to stop.

The crew should monitor condenser vacuum for reactor trip criteria and discuss continuing with the GP-005 to raise power with only 1 Circ Water Pump in operation until 'B' Circ Water pump is restored or if GP-006, Normal Plant Shutdown From Power Operation To Hot Standby (Mode 1 To Mode 3) should be implemented to shut down the unit.

SCENARIO SUMMARY: 2014 NRC EXAM SCENARIO 2 (Continued)

Event 3: Shaft Shear 'A' CCW Pump with standby CCW pump failure to auto start. The standby 'B' CCW Pump fails to Auto Start due to a pressure transmitter failure (instrument is isolated therefore pressure decrease is not sensed). The crew should recognize the loss and enter AOP-014, Loss of Component Cooling Water. AOP-014 will direct the restoration of the CCW system. The RO will be directed by the SRO to manually start the 'B' CCW (or will have started it IAW AD-OP-ALL-1000 when it did not auto start). The SRO should also evaluate Tech Spec 3.7.3, Component Cooling Water System.

PLANT SYSTEMS

3/4.7.3 COMPONENT COOLING WATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.3 At least two component cooling water (CCW) pumps*, heat exchangers and essential flow paths shall be OPERABLE.

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

ACTION:

With only one component cooling water flow path OPERABLE, restore at least two flow paths to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

*The breaker for CCW pump 1C-SAB shall not be racked into either power source (SA or SB) unless the breaker from the applicable CCW pump (1A-SA or 1B-SB) is racked out.

The SRO should also prepare OMM-001, Operations Administrative Requirements, Attachment 5 Equipment Problem Checklist for the failure.

Event 4: Pressurizer Level Transmitter for LT-460 fails low which isolates letdown. Must restore letdown per APP – Controlling Pressurizer level channel LT-460 fails low can be inserted. The crew should respond in accordance with alarm response procedure APP-ALB-009. The crew should take Charging FCV-122 to Manual and maintain Pressurizer level within the directed control band and shift level control to an alternate channel. The SRO should evaluate Tech Specs and identify Tech Spec 3.3.1, action 6 is NOT applicable as the unit is below the P-7 setpoint of 10% Reactor power.

The SRO should also prepare OMM-001, Operations Administrative Requirements, Attachment 5 Equipment Problem Checklist for the failure.

SCENARIO SUMMARY: 2014 NRC EXAM SCENARIO 2 (Continued)

Event 5: Restore letdown in accordance with OP-107, Chemical and Volume Control System.

Event 6: Failure of RWST level channel I, LI-990 fails high. RWST level instrument LI-990 will fail high (100%) which will cause annunciator ALB-04-2-1, Refueling Water Storage Tank High Level to alarm. The RO will respond by reviewing the alarm response in the APP.
(NOTE: The RO will not receive credit a competency for an instrument failure since there are not any evaluative actions taken).

The SRO will direct the crew to implement OWP-ESF-05. The SRO will complete OMM-001 Attachment 5 and request assistance from the WCC center. Then evaluate Tech Spec 3.3.2 and 3.3.3.6

Tech Spec 3.3.2

INSTRUMENTATION

3/4.3.2 ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The Engineered Safety Features Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be OPERABLE with their Trip Setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4.

APPLICABILITY: As shown in Table 3.3-3.

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
7. Safety Injection Switchover to Containment Sump					
a. Automatic Actuation Logic and Actuation Relays	2	1	2	1, 2, 3, 4	14
b. RWST Level--Low-Low	4	2	3	1, 2, 3, 4	16
Coincident With Safety Injection	See Item 1. above for all Safety Injection initiating functions and requirements.				

ACTION 16 - With the number of OPERABLE channels one less than the Total Number of Channels, operation may proceed provided the inoperable channel is placed in the bypassed condition within 6 hours and the Minimum Channels OPERABLE requirement is met. One additional channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1.

SCENARIO SUMMARY: 2014 NRC EXAM SCENARIO 2 (Continued)

Event 7: 'A' MFP trips with MFP 'B' failure to start. Maintain Rx power <10% and initiate AFW in accordance with AOP-010, Feedwater Malfunctions – 'A' MFP trip, with the 'B' MFW pump failing to auto start may be inserted once Pressurizer level has been stabilized and letdown restored. Both MDAFW pumps fail to auto start but can be started in the MCR. The crew may need to reduce power to be within AFW flow capacity in order to maintain SG water levels between 52% and 62% in accordance with AOP-010.

The SRO should also prepare OMM-001, Operations Administrative Requirements, Attachment 5 Equipment Problem Checklist for the failure.

Event 8: MAJOR – 'B' SGTR occurs, 420 GPM ramped in over 3 minutes – SGTR on the 'B' SG can be inserted following stabilization of secondary parameters in accordance with AOP-010. A 420 gpm tube leak will develop over 3 minutes. The crew will implement AOP-016, Excessive Primary Plant Leakage, due to the leakage. As the leak progresses, conditions will be met to require a reactor trip. The crew will initiate a reactor trip and implement EOP-E-0, Reactor Trip Or Safety Injection actions.

Event 9: Auto SI failure. Failure caused by 2 SI (Train A and B) Low Pressurizer Pressure relay failures. Failure of one MCB SI manual actuate switch – When conditions requiring a safety injection are met, automatic SI will not occur. One manual SI switch is blocked. Manual initiation of SI is possible with the other switch.

Event 10: 'B' SG PORV fails open in auto due to PT-308B failing high, Operator can close manually **(Critical Task)** – When the BOP is directed to energize busses 1A1 and 1B1, the SG 'A' PORV will fail open in automatic. The SG PORV may be closed manually at the MCB. The crew may recognize the PORV being open based on alarms and MCB indications and take pre-emptive action to close the PORV. If the PORV is not closed, MCB indications may require transition to EOP-E-2, Faulted Steam Generator Isolation and then to EOP-E-3, Steam Generator Tube Rupture, to mitigate the ruptured SG. EOP-E-3 will implement actions to isolate the ruptured SG and depressurize the RCS to eliminate break flow. **(Critical Task)**

Terminate scenario once the RCS has been depressurized and all but one CSIP is stopped in accordance with EOP-E-3.

CRITICAL TASK JUSTIFICATION:

1. Manually close 'B' SG PORV prior to improper transition to EOP-ECA-3.3

Failure to isolate the ruptured SG causes a loss of differential pressure between the ruptured SG and the intact SGs. Upon the loss of differential pressure, the crew must transition to an emergency contingency procedure (ECA-3.3) that constitutes an incorrect performance that necessitates the crew taking compensating action which complicates the mitigation strategy.

2. Depressurize the RCS to minimize primary to secondary leakage prior to SG 'B' exceeding 100% level

Failure to depressurize the RCS needlessly complicates mitigation of a SGTR event by allowing the Reactor Coolant leak to continue. It constitutes a significant reduction of safety margin beyond that introduced by the SGTR event analysis.

If primary to secondary leakage is not stopped the SG pressure will increase until either the SG PORV or Safety valve(s) open releasing radioactivity to the environment. If leakage is allowed to continue the increased inventory will result in water release through the PORV once SG overfill conditions are reached.

At the Harris plant, a NR level of 95% is the value at which overfill conditions will start to exist and the adverse effects of the condition may start to manifest themselves. Failure criteria of NR level of 100% is used since an increase in level can no longer be monitored and overfill conditions are occurring including the possibility of filling the steam lines with liquid.

Note: An unanticipated critical task may be created in a scenario should an applicant's action or lack of action cause an unexpected RPS or ESFAS actuation. A critical task may be assigned and graded as unsatisfactory even if corrected by another team member prior to the unanticipated RPS/ESFAS actuation. Should the applicant self-correct the action or inaction prior to the unanticipated plant response, a critical task failure should not be assigned to the applicant.

SIMULATOR SETUP

For the 2014 NRC Exam Simulator Scenario # 2

Reset to IC-162 password “spurs”

Press Start on Scaler / Timer and ensure range set correctly
Go to RUN
Silence and Acknowledge annunciators

Set Boric Acid Pot to 5.08

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner.

Set ERFIS screens

(The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

SPECIAL INSTRUCTIONS:

Post conditions for status board from IC-8
Reactor Power 3% steady state
Control Bank D at 98 steps
RCS boron 1546 ppm
Provide crew marked up copy of GP-005 up to step 84 for turnover (step 2 N/A, step 57 is open)

Update the status board:

None

Align equipment for repairs:

“B” Circ Water Pump, and hang CIT on MCB switch
“B” Gland Seal Exhauster Fan, place pump switch to STOP, and hang CIT on MCB switch
“B” DEH Pump, place pump switch to STOP-PULL-TO-LOCK, and hang CIT on MCB switch
Hang restricted access signs on MCR entry swing gates

Op Test No.: NRC	Scenario # 2	Event # 1	Page 8 of 68
Event Description:	**Start Power Escalation**		

Time	Position	Applicant's Actions or Behavior
Lead Evaluator:		**When the crew has completed their board walk down and are ready to take the shift inform the Simulator Operator to place the Simulator in Run. When the Simulator is in run announce:** **CREW UPDATE – (SRO's Name) Your crew has the shift. END OF UPDATE**
Simulator Operator:		**When directed by the Lead Evaluator, ensure that the annunciator horns are on and place the Simulator in RUN.**
Evaluator Note:		**Crew may either manually withdraw Control rods or perform RCS dilution per Reactivity plan.**
GP-005	CREW	Raise Reactor Power to ~ 6% to support Main Turbine Roll
	BOP	Adjusts steam dump demand signal as necessary.
	RO	Withdraws Control Rods as necessary then initiates dilution per the reactivity plan with SRO concurrence
OP-104	RO	Withdraw Control Rods per OP-104, Section 5.4
	RO	Verifies Initial Conditions: • All shutdown rods have been withdrawn, per Section 5.3, by observing the Group Step Counters and Digital Rod Position Indication System. All Shutdown Rod Group Step Counters must read greater than or equal to 225 steps. • Reactivity evolution signs have been posted to limit MCR access.

Op Test No.: NRC	Scenario # 2	Event # 1	Page 9 of 68
Event Description:	**Start Power Escalation**		

Time	Position	Applicant's Actions or Behavior
Procedure Note:		Reactivity Evolution category to be determined by the CRS.
	RO	Verifies At the MCB, the ROD BANK SELECTOR Switch in MAN.
	RO	VERIFY Rod Speed of 48 steps per minute on SI-408.
Procedure Note:		During a Reactor Startup or testing, Steps 5.4.2.3 through 5.4.2.7 may be repeated multiple times, with rod motion stopped to observe reactivity affects, record 1/M data, or for other reasons. The intent is to initial for these Steps at the completion of the entire evolution, not for each time it is performed.
	RO	At the MCB, POSITION ROD MOTION Switch to WITHDRAW. OBSERVE that the RODS OUT Direction Lamp lights.
	RO	OBSERVE Bank Step Counters for proper rod motion, overlap and sequencing.
	RO	VERIFY the rods are moving out by OBSERVING the Digital Rod Position Indication System Display.
	RO	At the MCB, STOP rod motion by RELEASING the ROD MOTION Switch allowing it to return to the neutral position. VERIFY the RODS OUT Direction Lamp extinguishes.
	RO	IF necessary, THEN REPEAT Steps 5.4.2.3 through 5.4.2.7.

Op Test No.: NRC	Scenario # 2	Event # 1	Page 10 of 68
Event Description:	**Start Power Escalation**		

Time	Position	Applicant's Actions or Behavior
OP-107.01	RO	RCS Temperature Adjustment (Alt Dilution Method) per OP-107.01, Section 5.4
	RO	Verifies Initial Conditions: • The required amount of reactor makeup water is available in the RMW tank to provide adequate dilution without reducing the tank volume below 37.5%. • The Reactor is in steady state power operations and dilution is desired to compensate for fuel depletion. • Normal charging is being maintained per OP-107 Section 5.3. • The reactor makeup water system is available to supply water to the makeup control system per OP-102. • Reactivity evolution signs have been posted to limit MCR access.
	RO	DETERMINE the volume of makeup water to be added (Current OPT-1525 Attachments 4 through 7)
Procedure Note:		FIS-114 may be set for one gallon less than desired. A pressure transient caused by 1CS-151 shutting results in FIS-114 normally indicating one gallon more than actual flow but two gallons more would be unexpected.
Procedure Caution:		If the translucent covers associated with the Boric Acid and Total Makeup Batch counters FIS-113 and FIS-114, located on the MCB, are not closed, the system will not automatically stop at the preset value.

Op Test No.: NRC	Scenario # 2	Event # 1	Page 11 of 68
Event Description:	**Start Power Escalation**		

Time	Position	Applicant's Actions or Behavior
	SRO	Directs Alternate dilution
	RO	SET FIS-114, TOTAL MAKEUP WTR BATCH COUNTER, to obtain the desired quantity.
	RO	VERIFY the RMW CONTROL switch has been placed in the STOP position. VERIFY the RMW CONTROL switch green light is lit.
	RO	IF the current potentiometer setpoint of controller 1CS-151, FK-114 RWMU FLOW, needs to be changed to obtain makeup flow, THEN PERFORM the following: a. RECORD the current potentiometer setpoint of controller 1CS-151, FK-114 RWMU FLOW, in Section 5.4.3. b. SET controller 1CS-151, FK-114 RWMU FLOW, for the desired flow rate.
	RO	PLACE control switch RMW MODE SELECTOR to the ALT DIL position.
Procedure Note:		Alternate Dilution may be manually stopped at any time by turning the control switch RMW CONTROL to STOP.
	RO	START the makeup system as follows:
		a. TURN control switch RMW CONTROL to START momentarily. b. VERIFY the red indicator light is lit. c. IF expected system response is not obtained, THEN TURN control switch RMW CONTROL to STOP.

Op Test No.: NRC	Scenario # 2	Event # 1	Page 12 of 68
Event Description:	**Start Power Escalation**		

Time	Position	Applicant's Actions or Behavior
	RO	VERIFY dilution automatically terminates when the desired quantity has been added.
	RO	IF controller 1CS-151, FK-114 RWMU FLOW, potentiometer was changed in Step 5.4.2.5, THEN PERFORM the following: a. REPOSITION controller, FK-114 RWMU FLOW, in Section 5.4.3.
	BOP	b. INDEPENDENTLY VERIFY FK-114 potentiometer position of Step 5.4.2.9.a is correct.
	RO	MONITOR Tavg and rod control for proper operation.
	RO	WHEN VCT pressure is between 20 – 30 psig, THEN TURN control switch RMW MODE SELECTOR to AUTO.
	RO	START the makeup system as follows:
		a. TURN control switch RMW CONTROL to START momentarily. b. VERIFY the red indicator light is lit. c. IF expected system response is not obtained, THEN TURN control switch RMW CONTROL to STOP.
Procedure Note:		Systems and components operated from the Main Control Board on a daily basis to support normal plant operations do not require Independent Verification. If this evolution is performed daily or more frequently, then Section 5.4.3 is not required to be performed. (Reference OPS-NGGC-1303)
	RO	IF required, THEN COMPLETE Section 5.4.3.

Op Test No.: NRC	Scenario # 2	Event # 1	Page 13 of 68
Event Description:	**Start Power Escalation**		

Time	Position	Applicant's Actions or Behavior
	BOP	IF reactivity evolutions are complete, THEN REMOVE reactivity evolution signs limiting MCR access.
GP-005	CREW	As power is raised above 5% identifies entry into Mode 1
	SRO	Completes step 57 in GP-005 Directs BOP to perform Step 84, TRANSFER control from the Throttle Valves to the Governor Valves
	BOP	Verifies Main Turbine speed on DEH control panel indicates the Turbine is at 1700 RPM then transfers control from the Throttle Valves to the Governor Valves by depressing the TRANSFER TV-GV pushbutton.
	BOP	CHECK that the transfer from the Throttle Valves to the Governor Valves is complete by checking the following indications: • Valve position indicators • TRANSFER TV light extinguished • GV light illuminated • Local observation (Throttle Valves smoothly transition to full open)
Communicator:		**AO's are standing by to monitor the Throttle Valves.** **For local observation of the Throttle Valves as Turbine Building AO report smooth operation to the full open position.**
Evaluator Note:		**If the candidate asks if documentation of PMID 00021983 RQ 01 completion is required inform the candidate the WCC will document PMID 00021983 RQ 01.**

Op Test No.: NRC	Scenario # 2	Event # 1	Page 14 of 68
Event Description:	**Start Power Escalation**		

Time	Position	Applicant's Actions or Behavior
	BOP	ENTER 1800 RPM into the DEMAND display AND VERIFY the HOLD pushbutton is illuminated.
Procedure Note:		The REFERENCE display will count up to 1800 RPM at the previously selected acceleration rate, and then the GO pushbutton will extinguish.
	BOP	Depresses the GO pushbutton.
	BOP	Verifies the Main Turbine speed stops increasing at 1800 rpm AND the GO pushbutton extinguishes.
	BOP	At 1800 RPM, LOWER the Valve Position Limiter, as indicated in the REFERENCE display, until it indicates the percent (%) value read in the DEMAND display plus an additional 2%.
Lead Evaluator:		**Once the BOP has completed the adjustment of the Valve Position Limiter cue Event 2 "Trip of the A Circ Water Pump and Discharge valve failure."**

Op Test No.: NRC	Scenario # 2	Event # 2	Page 15 of 68
Event Description:	**Trip of the A Circ Water Pump and Discharge valve failure."**		

Time	Position	Applicant's Actions or Behavior	
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 2** **"Trip of the A Circ Water Pump and Discharge valve failure."**	
Indications Available:		• **ALB-021-4-4, CIRC WTR PMP A O/C - GND – TRIP**	
	BOP	RESPONDS to alarm ALB-021-4-4.	
Evaluator Note:		**The crew may enter AOP-012, Partial Loss of Condenser Vacuum, without doing the alarm response procedure. The SRO may elect to reduce power to control vacuum.**	
APP-ALB-021	SRO	ENTERS APP-ALB-021-4-4.	
Evaluator Note:		**In accordance with AD-OP-ALL-1000, the operator may take MANUAL actions when automatic actions do not occur and place the CWP 'A' control switch in the stop position to shut the pump discharge valve before being directed by a procedure.**	
	BOP	CONFIRM alarm using:	
		• Circ Water Pump A status lights • Circ Water Pump A discharge valve position	
	BOP	VERIFY Automatic Functions:	
		• CWP A trips	(YES)

Op Test No.: NRC	Scenario # 2	Event # 2	Page 16 of 68
Event Description:	**Trip of the A Circ Water Pump and Discharge valve failure."**		

Time	Position	Applicant's Actions or Behavior	
	BOP	PERFORM Corrective Actions:	
		• IF Circulating Water Pump trips OR Condenser vacuum is degrading, THEN GO TO AOP-012, Partial Loss of Condenser Vacuum. • IF necessary, THEN START the standby CWP.	(YES) (N/A)
	SRO	DISPATCHES AO to investigate.	
Communicator:		**Wait 3 minutes and report the breaker tripped on overcurrent.**	
	BOP	IF STOP signal is not given to CWP 'A' control switch, DISPATCHES AO to manually CLOSE discharge valve. NOTE: they may direct opening the discharge valve breaker prior to manually stoking the valve	
Simulator Operator **Communicator NOTE:**		The crew may direct opening the discharge valve breaker prior to having the valve manually stroked. IF they do, wait 2 minutes, and instead of running Trigger 20 go to the Summary page and **modify** ilo xb2o069b (1CW-10 light status) to **OFF**. Report back that the power has been removed. 5 minutes later report back that the discharge valve has been shut.	
Simulator Operator:		**IF power has been left on the CW pump discharge valve THEN after approximately 5 minutes from when the AO was dispatched actuate Trigger 20. This will time out the discharge valve MCB light indications and provide the BOP indication that the discharge valve is stoking closed.**	

Op Test No.: NRC	Scenario # 2	Event # 2	Page 17 of 68
Event Description:	**Trip of the A Circ Water Pump and Discharge valve failure."**		

Time	Position	Applicant's Actions or Behavior	
Communicator:		**IF the discharge valve has been manually stoked using Trigger 20, report back as the AO assigned the valve is closed when the discharge valve lights indicate the valve is closed.**	
AOP-012	SRO	Enters AOP-012, Partial Loss Of Condenser Vacuum Makes PA announcement for AOP entry Conducts a crew alignment brief	
Procedure Note:		This procedure contains no immediate actions.	
	SRO	CHECK Turbine – IN OPERATION	(YES)
	BOP	CHECK Condenser pressure in both Zones less than:	
	BOP	• 7.5 inches Hg absolute AND Turbine first stage pressure is greater than 60% TURBINE LOAD OR • 5 inches Hg absolute AND Turbine first stage pressure is less than 60% TURBINE LOAD	(NO) (YES)
	SRO	REDUCE Turbine load as necessary to maintain Condenser vacuum using ONE of the following: • GP-006, Normal Plant Shutdown from Power Operation to Hot Standby • AOP-038, Rapid Downpower	
	SRO	CONTINUE Turbine load reduction until directed otherwise by CRS based on the following: • Cause of vacuum loss identified and corrected • Vacuum stable or increasing Plant condition require Reactor or Turbine trip • Plant conditions require Reactor or Turbine trip	(NO) (YES) (NO)

Op Test No.: NRC	Scenario # 2	Event # 2	Page 18 of 68
Event Description:	**Trip of the A Circ Water Pump and Discharge valve failure."**		

Time	Position	Applicant's Actions or Behavior	
	BOP	CHECK ALL available Condenser Vacuum Pumps - OPERATING.	(NO)
	CREW	DISPATCH Operator(s) to locally perform actions of Attachment 1, Local Actions for a Loss of Condenser Vacuum.	(N/A)
	BOP	VERIFY the following valves – SHUT: • 1CE-447, Condenser Vac Breaker • 1CE-475, Condenser Vac Breaker	 (YES) (YES)
	BOP	CONTACT Radwaste Control Room to determine if recent equipment operations using auxiliary steam or condensate may have caused loss of vacuum.	
Communicator:		**Report no auxiliary steam or condensate equipment has been recently operated.**	
	BOP	CHECK Circulating Water Pumps – ANY TRIPPED	(YES)
	BOP	VERIFY associated pump discharge valve – SHUT. • IF STOP signal is not given to CWP 'A' control switch, DISPATCHES AO to CLOSE valve. (If not already done)	(NO)
Procedure Note:		If a Circulating Water Pump has tripped, it is not considered available until the cause of the trip has been identified and corrected.	
	SRO	CHECK ALL available Circulating Water Pumps – RUNNING.	(YES)

Op Test No.: NRC	Scenario # 2	Event # 2	Page 19 of 68
Event Description:	**Trip of the A Circ Water Pump and Discharge valve failure."**		

Time	Position	Applicant's Actions or Behavior
Communicator:		**Call as the AOM shift to get information on the 'A' CWP trip then give permission to allow continued operations with one CWP. The 'B' CWP will be returned to service in the next 30 minutes.**
Evaluator Note:		**AOP-012 does not have to be completed to continue the scenario after the discharge valve is being closed. Cue Event 3 "Shaft Shear 'A' CCW Pump with standby CCW pump failure to auto start" after the valve has been closed.**

Op Test No.: NRC	Scenario # 2	Event # 3	Page 20 of 68
Event Description:	**Shaft Shear 'A' CCW Pump with standby CCW pump failure to auto start**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 3** **"Shaft Shear 'A' CCW Pump with standby CCW pump (B) failure to auto start"**
Evaluator Note:		**The standby 'B' CCW Pump fails to Auto Start due to its pressure transmitter being isolated but can be manually started. The crew should recognize the loss of flow and pressure and enter AOP-014, Loss of Component Cooling Water.**
Available Indications		**Multiple CCW alarms on ALB-005** **Red indicating light on 'A' CCW pump still on** **CCW Pump 'A' discharge header low pressure**
	RO	Diagnosis CCW event to be 'A' CCW Shaft Shear recommends entry to AOP-014 / with no immediate actions *May identify that the 'B' CCW pump has not auto started on low system pressure and may use AD-OP-ALL-1000 guidance to start the 'B' CCW pump prior to procedural directions.
AOP-014	SRO	ENTER AOP-014, Loss of Component Cooling Water Makes PA announcement for AOP entry Conducts a crew alignment brief
Procedure Note:		This procedure contains no immediate actions. Loss of CCW may require implementation of the SHNPP Emergency Plan.
	SRO	Directs SM to REFER TO PEP-110, Emergency Classification And Protective Action Recommendations, AND ENTER the EAL Matrix.

Op Test No.: NRC	Scenario # 2	Event # 3	Page 21 of 68
Event Description:	**Shaft Shear 'A' CCW Pump with standby CCW pump failure to auto start**		

Time	Position	Applicant's Actions or Behavior	
	SRO	EVALUATE plant conditions AND GO TO the appropriate section. (Section 3.3, Loss of a CCW Pump)	
		<table><tr><th>Malfunction</th><th>Section</th><th>Page</th></tr><tr><td>Leakage into CCW System</td><td>3.1</td><td>5</td></tr><tr><td>Leakage from CCW System</td><td>3.2</td><td>15</td></tr><tr><td>Loss of a CCW Pump</td><td>3.3</td><td>34</td></tr></table>	(NO) (NO) (YES)
Procedure Note:		The standby CCW pump starts at 52 psig discharge pressure.	
	RO	CHECK the standby CCW pump has STARTED.	(NO)
		Dispatch an operator to investigate	
Simulator Communicator:		**If dispatched to the field to investigate report back after 2-3 minutes that 'A' CCW Pump shaft is sheared**	
	RO	If 'A' CCW pump has not been secured, it should be secured now.	
	RO	START the standby CCW pump.	
Procedure Note:		IF RHR is in service providing shutdown cooling, RCS temperature control will be impacted by the loss of RCP heat input to the RCS. RHR cooling should be significantly reduced immediately after trip of the RCPs to prevent excessive cooldown of the RCS. RCS pressure control will be via Aux Spray and manual control of Pressurizer heaters.	

Op Test No.: NRC	Scenario # 2	Event # 3	Page 22 of 68
Event Description:	**Shaft Shear 'A' CCW Pump with standby CCW pump failure to auto start**		

Time	Position	Applicant's Actions or Behavior	
	RO	CHECK ALL RCPs operating within the limits of Att 1.	(YES)
	RO	CHECK in-service CCW header(s) pressure greater than 52 psig.	(YES)
	RO	VERIFY adequate ESW cooling water flow to the associated CCW heat exchanger.	(YES)
	RO	CHECK RHR operating.	(NO)
	SRO	REFER TO Technical Specifications 3.5.2 and 3.7.3 • Two independent ECCS subsystem shall be OPERABLE with each subsystem comprised of: b) One OPERABLE RHR heat exchanger • With only one component cooling water flow path OPERABLE restore at least two flow paths to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.	
	SRO	CONTACT Maintenance to determine the cause of the CCW pump failure, AND INITIATE corrective action.	
	SRO	CHECK with Operations Staff to determine the desirability of using the swing CCW pump.	
	SRO	CHECK CCW flow RESTORED to the affected train.	(NO)
	Crew	May dispatch Aux Operator to Open the control power knife switch for the 'A' CCW pump.	
Simulator Communicator /		**Acknowledge request.** **Open control power knife switch on 'A' CCW pump then**	

Op Test No.: NRC	Scenario # 2	Event # 3	Page 23 of 68
Event Description:	**Shaft Shear 'A' CCW Pump with standby CCW pump failure to auto start**		

Time	Position	Applicant's Actions or Behavior
Operator		**contact MCR that control power has been removed.**
Evaluator Note:		**Crew may implement OWP-CC at this point. This OWP will have the crew verify the ESF Status Light Boxes.** **The implementation of the OWP is not required to continue with the scenario.**
	SRO	EXIT this procedure.
Procedure Note:		The crew may choose to not exit the procedure since only one Circulating Water pump is operating.
Lead Evaluator:		**Once the plant has stabilized, cue Simulator Operator to insert Trigger 4** **Event 4 - Pressurizer Level Transmitter for LT-460 fails low**

Op Test No.: NRC	Scenario # 2	Event # 4	Page 24 of 68
Event Description:	**Pressurizer Level Transmitter LI-460 Fails Low**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 4 "Pressurizer Level Instrument, LT-460, fails low"**
Indications Available:		• **ALB-009-4-3, PRESSURIZER LOW LEVEL LTDN SECURED AND HTRS OFF** • **LI-460, Pressurizer Level Indication** • **FI-150.1, Letdown Flow Indication**
	RO	Responds to ALB-009-4-3 or indication of a failed Pressurizer Level Channel on LI-460.
APP-ALB-009	SRO	Enters APP-ALB-009-4-3
Evaluator Note:		Operator may use AD-OP-ALL-1000 guidance to take manual control of charging to avoid a trip or transient prior to the SRO direction.
	RO	CONFIRM alarm using: • Pressurizer level LI-459A1, LI-460, LI-461.1 (LI-460 low) • Letdown flow FI-150.1
	RO	VERIFY Automatic Functions: • All pressurizer heaters off • Letdown isolated
	SRO	Provide level bands and trip levels IAW OMM-001 Att. 13 (controlling band +/- 5% of reference level, trip limits of 10% and 90%)

Op Test No.: NRC	Scenario # 2	Event # 4	Page 25 of 68
Event Description:	**Pressurizer Level Transmitter LI-460 Fails Low**		

Time	Position	Applicant's Actions or Behavior	

	RO	PERFORM Corrective Actions:
		• IF PRZ level is low, THEN VERIFY letdown is isolated AND heaters are off.
		• IF RCS leakage is indicated, THEN GO TO AOP-016, Excessive Primary Plant Leakage.
		• IF alarm is due to malfunction of level control system, THEN MANUALLY RESTORE normal level. (LT-459 is controlling channel for PZR level)
		• IF the alarm is due to a failed level instrument
		  o USING the Pressurizer Level Controller Selector switch, THEN SELECT a position which places the two operable channels into service. (Select channels 459/461)
		  o VERIFY the failed channel is not selected, at the MCB recorder panel.
		  o RESET the control heaters by placing the control switch to OFF and then back to ON.
		• IF maintenance is to be performed, THEN REFER TO OWP-RP, Reactor Protection.
			(YES)
			(NO)
			(NO)
			
			(YES)

	RO	SELECT 459/461 on Pressurizer Level Controller Selector	
	SRO	T.S. 3.3.3.6 (Tracking EIR) Prepares an Equipment Problem Checklist Contacts WCC for assistance. • (WR, EIR and Maintenance support)	
Simulator Communicator		**Acknowledge request.**	

Op Test No.: NRC	Scenario # 2	Event # 5	Page 26 of 68
Event Description:	**Initiate Normal Letdown per OP-107 Section 5.4**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**Once the crew has taken manual control of Charging FCV-122 (to control PZR level) and selects an alternate controlling Pressurizer channel normal letdown flow may be initiated.**
OP-107	RO	OP-107, Section 5.4
	RO	Verifies Initial Conditions: • Charging flow has been established per Section 5.3 • Pressurizer level is greater than 17% • The following valves are shut: o 1CS-7, 45 GPM Letdown Orifice A o 1CS-8, 60 GPM Letdown Orifice B o 1CS-9, 60 GPM Letdown Orifice C
Procedure Caution:		If Charging flow was stopped or greatly reduced prior to letdown being secured, there is a possibility that the Letdown line contains voids due to insufficient cooling. This is a precursor to water hammer, and should be evaluated prior to initiating letdown flow.
	RO	VERIFY 1CC-337, TK-144 LTDN TEMPERATURE, controller is: • In AUTO AND • set for 110 to 120 ˚F (4.0 to 4.7 on potentiometer) normal operation OR • set for 90 to 120 ˚F (2.67 to 4.7 on potentiometer) if operating per Section 8.11
Procedure Note:		PK-145.1 LTDN PRESSURE, 1CS-38, may have to be adjusted to control at lower pressures.

Op Test No.: NRC	Scenario # 2	Event # 5	Page 27 of 68
Event Description:	**Initiate Normal Letdown per OP-107 Section 5.4**		

Time	Position	Applicant's Actions or Behavior
	RO	VERIFY 1CS-38 Controller, PK-145.1 LTDN PRESSURE, in MAN with output set at 50%.
	RO	VERIFY open the following Letdown Isolation Valves: • 1CS-2, LETDOWN ISOLATION LCV-459 • 1CS-1, LETDOWN ISOLATION LCV-460
	RO	VERIFY open 1CS-11, LETDOWN ISOLATION.
Procedure Note:		The following table gives the minimum charging flow required to keep the regenerative heat exchanger temperature below the high temperature alarm when letdown is established:

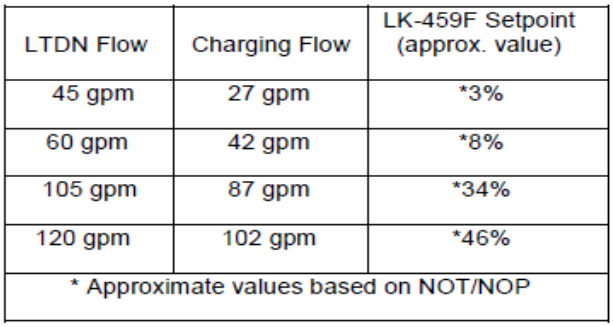
Letdown flow (to be established)	Minimum Charging Flow necessary when letdown is established
45 gpm	20 gpm
60 gpm	26 gpm
105 gpm	46 gpm
120 gpm	53 gpm

Procedure Note:		If Pressurizer level is above the programmed level setpoint, charging flow should be adjusted to a point above the minimum required to prevent regenerative heat exchanger high temperature alarm but low enough to reduce pressurizer level.
	RO	ADJUST controller 1CS-231, FK-122.1 CHARGING FLOW, as required to: • Maintain normal pressurizer level program • Keep regenerative heat exchanger temperature below the high temperature alarm when the desired letdown orifice is placed in service.

Op Test No.: NRC	Scenario # 2	Event # 5	Page 28 of 68
Event Description:	**Initiate Normal Letdown per OP-107 Section 5.4**		

Time	Position	Applicant's Actions or Behavior	
Procedure Note:		If CVCS Demins have cooled from normal operating temperature, an increased reactivity affect may be observed. Consideration may be given to increasing CVCS Demins to operating temperature by flushing them to the RHT prior to restoring letdown. TIS-250, Recycle Evaporator Feed Demineralizer Temperature Switch, can be used to determine temperature during flushing to the RHT.	
	RO	IF flushing CVCS Demins to the RHT is desired for increasing temperature, THEN PERFORM the following:	(NOT Desired)
		a. NOTIFY Radwaste Control Room that letdown flow will be diverted to the RHT. b. PLACE 1CS-120, LETDOWN TO VCT/HOLDUP TANK LCV-115A to the RHT position.	
Procedure Note:		Changes in Letdown flowrate will affect the displayed value for RM-3502A (Channel 2303) due to the detector's proximity to the LTDN line.	
	RO	OPEN additional orifice isolation valves (1CS-7, 1CS-8, 1CS-9) as required.	
	RO	ADJUST charging flow as necessary to: • Prevent high temperature alarm (per table above) • Maintain pressurizer programmed level.	

Op Test No.: NRC	Scenario # 2	Event # 5	Page 29 of 68
Event Description:	**Initiate Normal Letdown per OP-107 Section 5.4**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**Placing LK-459F in AUTO may take several minutes due to matching PRZ level to reference level.** **Once letdown flow is established, event 6 can be initiated without waiting for charging flow control to be restored to AUTO.**
	RO	PLACE PRZ level controller, LK-459F, in AUTO, as follows:
		a. PLACE PRZ level controller, LK-459F, in MAN to cancel any integrated signal. b. RECORD FI-122A.1, CHARGING FLOW. _____GPM
		c. DETERMINE PRZ level controller, LK-459F setpoint by one of the two methods. (Ref 2.7.14) (N/A Step not performed) • DETERMINE LK-459F based on the table below:
		

LTDN Flow	Charging Flow	LK-459F Setpoint (approx. value)
45 gpm	27 gpm	*3%
60 gpm	42 gpm	*8%
105 gpm	87 gpm	*34%
120 gpm	102 gpm	*46%
* Approximate values based on NOT/NOP		

		• CALCULATE PRZ level controller, LK-459F setpoint. (Ref. 2.7.14) LK-459F setpoint = (Desired Charging Flow ÷ 150 GPM)^2 X 100%	
		$\left(\frac{\text{Desired flow}}{150\ \text{gpm}}\right)^2 X\ 100\% = \frac{}{\text{Setpoint}}$	N/A
		d. ADJUST PRZ level controller, LK-459F, to the calculated setpoint.	
		e. PLACE PRZ level controller, LK-459F, in AUTO.	

Op Test No.: NRC	Scenario # 2	Event # 5	Page 30 of 68
Event Description:	**Initiate Normal Letdown per OP-107 Section 5.4**		

Time	Position	Applicant's Actions or Behavior
	RO	WHEN the following occurs:
		• Program pressurizer level is matching the current pressurizer level AND • Letdown and seal return are balanced with seal injection flow and charging flow.
	RO	THEN place controller 1CS-231, FK-122.1 CHARGING FLOW, in AUTO.
	RO	COMPLETE Section 5.4.3. (Position Verification)
Lead Evaluator:		**After the actions to initiate normal letdown is completed, cue Simulator Operator to insert Trigger 6** **Event 6 - Failure of RWST level channel I, LI-990 fails high.**

Op Test No.: NRC	Scenario # 2	Event # 6	Page 31 of 68
Event Description:	**Failure of RWST level channel I, LI-990 fails high**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 6: Failure of RWST level channel I, LI-990 fails high**
Indications Available		• ALB-04-2-1, Refueling Water Storange Tank High Level • LI-990 reads 100%
	RO	Responds to annunciator Identifies LI-990 failed high – reports information to SRO Reviews the APP response Directs SRO to OWP-ESF and provides list of possible applicable Tech Specs from APP response
	SRO	Directs the crew to implement OWP-ESF-05 Complete OMM-001 Attachment 5 and requests assistance from the WCC center Evaluates Tech Specs for the failed channel • Tech Spec 3.3.2 Requires ESF Actuation system instrumentation channels to be OPERABLE Action 16 would apply ACTION 16 - With the number of OPERABLE channels one less than the Total Number of Channels, operation may proceed provided the inoperable channel is placed in the bypassed condition within 6 hours and the Minimum Channels OPERABLE requirement is met. One additional channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1. • Tech Spec 3.3.3.6 Action a (RWST Level LI-990 is an accident monitoring instrument based on OST-1021 Attachment 6 – Post Accident Monitoring Instrumentation Log, Item # 9) Action a applies: ACTION: a. With the number of OPERABLE accident monitoring instrumentation channels, except In Core Thermocouples and Reactor Vessel Level, less than the Total Required Number of Channels requirements shown in Table 3.3-10 restore the inoperable channel(s) to OPERABLE status within 7 days, or be in at least HOT STANDBY within the next 6 hours and in at least HOT SHUTDOWN within the following 6 hours.

Op Test No.: NRC	Scenario # 2	Event # 6	Page 32 of 68
Event Description:	**Failure of RWST level channel I, LI-990 fails high**		

Time	Position	Applicant's Actions or Behavior
Simulator Communicator:		**Acknowledge any requests for assistance including implementation of the OWP.**
Evaluator Note:		**Implementation of the OWP does not have to be completed to continue with the scenario.**
Evaluator Note:		**When the Tech Spec evaluation is complete continue scenario cue Event 7 - 'A' MFW Pump Trip with 'B' MFW Pump Fail to Start**

Op Test No.: NRC	Scenario # 2	Event # 7	Page 33 of 68
Event Description:	**'A' MFW Pump Trip with 'B' MFW Pump Fail to Start**		

Time	Position	Applicant's Actions or Behavior	
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 7 " 'A' MFW Pump Trip with 'B' MFW Pump Fail to Start."**	
Evaluator Note:		The Operator may use AD-OP-ALL-1000 guidance to manually start the AFW pumps following the loss of MFW.	
Indications Available:		• **ALB-016-1-2, FW PUMP A/B LUBE OIL LOW PRESS OR TRIP** • **ALB-016-2-2, LOSS OF BOTH MAIN FW PUMPS** • **Lowering Level on all three Steam Generators**	
	BOP	Identify loss of 'A' MFW pump Identify annunciators	
AOP-010	SRO	Enters AOP-010, Feedwater Malfunctions Makes PA announcement for AOP entry Conducts a crew alignment brief	
Immediate Action	BOP	CHECK ANY Main Feedwater Pump TRIPPED. CHECK initial Reactor power less than 90%. CHECK initial Reactor power less than 80%.	(YES) (YES) (YES)
Procedure Note:		• Turbine runback will automatically terminate at approximately 50% power with DEH in AUTO. • Turbine runbacks are quickly identified by ALB-020-2-2, TURBINE RUNBACK OPERATIVE, in alarm and RUNBACK OPER light LIT as long as the initiating signal is present on DEH Panel A.	
	BOP	CHECK initial Reactor power less than 60%.	(YES)

Op Test No.: NRC	Scenario # 2	Event # 7	Page 34 of 68
Event Description:	**'A' MFW Pump Trip with 'B' MFW Pump Fail to Start**		

Time	Position	Applicant's Actions or Behavior	
	BOP	CHECK DEH controlling Turbine Valves PROPERLY.	(YES)
	BOP	Dispatch operators to investigate the loss of 'A' MFP	
Simulator Communicator:		**Acknowledge communications.**	
	BOP	MAINTAIN ALL of the following: • At least ONE Main Feedwater Pump RUNNING • Main Feedwater flow to ALL Steam Generators • ALL Steam Generator levels greater than 30%	(NO) (NO) (YES)
	SRO	RNO: PERFORM the following: a. IF ANY SG level drops to 30% THEN TRIP the Reactor AND GO TO EOP E-0. b. IF Above POAH AND Reactor power is LESS THAN 10%, THEN: 1) INITIATE AFW flow to maintain Steam Generator levels between 52 and 62%. (AFW is running due to loss of both MFW pumps) 2) REDUCE power as necessary	(NO) (YES)
Procedure Note:		Mode change occurs at 5% Reactor power.	
	SRO	c. IF below POAH, THEN: 1) VERIFY AFW capable of feeding Steam Generators. 2) MAINTAIN Steam Generator levels between 52 and 62%. 3) EXIT this procedure.	(NO)
Lead Evaluator:		**Once AFW is established, or the SRO directs a Reactor Trip, cue Simulator Operator to insert Trigger 8** **Event 8 - 'B' SGTR - 420 gpm**	

Op Test No.: NRC	Scenario # 2	Event # 8	Page 35 of 68
Event Description:		**'B' SGTR**	

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**The SGTR ramps in over 3 min to 420 gpm. IF AOP-016 is entered the crew will perform those actions until the leak size is > makeup capability then manually trip the Reactor and SI then enter EOP-E-0.** **Crew actions are time dependent. The crew may conservatively elect to trip the Reactor after analyzing the event in progress.**
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 8** **'B' SGTR - 420 gpm**
Indications Available:		• **ALB-009-2-2, Pressurizer Control Low Level Deviation** • **ALB-010-4-5, Rad Monitor System Trouble**
Evaluator's Note:		**Alarms associated with RCS leakage will direct implementation of AOP-016, EXCESSIVE PRIMARY PLANT LEAKAGE. The RO may take MANUAL control of FCV-122, Charging Flow Control Valve, at any point after the failure is recognized.** **If the crew elected to trip the Reactor on loss of MFW, the crew will implement EOP-E-0 and not enter AOP-016.**
	RO	Responds to alarms and/or indications of RCS leakage.

Op Test No.: NRC	Scenario # 2	Event # 8	Page 36 of 68
Event Description:	**'B' SGTR**		

Time	Position	Applicant's Actions or Behavior
AOP-016	SRO	Enters AOP-016, Excessive Primary Plant Leakage Makes PA announcement for AOP entry Conducts a crew alignment brief
Procedure Note:		This procedure contains no immediate actions.
	RO	CHECK RHR in operation. (NO)
	SRO	RNO: GO TO Step 3.
	SRO	REFER TO PEP-110, Emergency Classification And Protective Action Recommendations, AND ENTER the EAL Matrix.
	CREW	May identify 'B' SG as the ruptured generator due to rising SG level.
	RO	CHECK RCS leakage within VCT makeup capability. (NO)
	SRO	RNO: Perform the following: • TRIP the Reactor AND GO TO EOP-E-0. (Perform RNO substeps 4.b and 4.c as time permits)
Procedure Note:		If SI Actuation is required, the Reactor and Turbine should be verified tripped in EOP-E-0 before manually actuating SI.
	SRO	• Manually INITIATE Safety Injection • EXIT this procedure
	RO	INITIATES MANUAL Reactor Trip and attempts SI.
	SRO	ENTERS and directs actions of E-0.

Op Test No.: NRC	Scenario # 2	Event # 8	Page 37 of 68
Event Description:	**'B' SGTR**		

Time	Position	Applicant's Actions or Behavior	
EOP-E-0	SRO	Enters E-0, Reactor Trip Or Safety Injection Makes PA announcement for EOP entry Conducts a crew alignment brief	
	RO	Initiates a MANUAL reactor trip.	
	RO/BOP	Performs E-0 immediate actions.	
Immediate Actions	RO	VERIFY Reactor Trip: **REACTOR TRIP CONFIRMATION** Reactor Trip AND Bypass BKRs – OPEN Rod Bottom Lights (Zero Steps – LIT Neutron Flux – DROPPING	(YES) (YES) (YES)
Immediate Actions	BOP	Check Turbine Trip – ALL THROTTLE VALVES SHUT TURB STOP VLV 1 – TSLB-2-11-1 TURB STOP VLV 2 – TSLB-2-11-2 TURB STOP VLV 3 – TSLB-2-11-3 TURB STOP VLV 4 – TSLB-2-11-4	(YES) (YES) (YES) (YES)
Immediate Actions	BOP	Perform The Following: • AC Emergency Buses – AT LEAST ONE ENERGIZED • AC Emergency Buses – BOTH ENERGIZED	(YES) (YES)

Op Test No.: NRC	Scenario # 2	Event # 9	Page 38 of 68
Event Description:	**Auto SI failure**		

Time	Position	Applicant's Actions or Behavior	
Immediate Actions	RO	Safety Injection – ACTUCATED (BOTH TRAINS) BPLP 4-1,"SI ACTUATED" - LIT (CONTINUOUSLY)	(NO)
Immediate Actions	RO	RNO Check Safety Injection – REQUIRED SI ACTUATION CRITERIA PRZ Pressure - LESS THAN OR EQUAL TO 1850 PSIG CNMT Pressure - GREATER THAN OR EQUAL TO 3.0 PSIG Any SG Pressure - LESS THAN OR EQUAL TO 601 PSIG Abnormal Operating Procedure - DIRECTS MANUAL ACTUATION One SI Train - FAILED (BPLP 4-1 FLASHING)	(YES)
(Event 8)	RO	Perform the following: • **IF** Safety Injection actuation is required, **THEN** perform the following: o Manually actuate Safety Injection o GO TO Step 5. (MCB SI switch on Reactor panel does NOT function) **Uses second SI switch to manually actuate SI near SI reset switches (successful SI)**	

Op Test No.: NRC	Scenario # 2	Event # 10	Page 39 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**FOLDOUT** • **RCP TRIP CRITERIA** IF both of the following occur, THEN stop all RCPs: • SI flow - GREATER THAN 200 GPM • RCS pressure - LESS THAN 1400 PSIG • **ALTERNATE MINIFLOW OPEN/SHUT CRITERIA** • IF RCS pressure drops to less than 1800 PSIG, THEN verify alternate miniflow isolation OR miniflow block valves - SHUT • IF RCS pressure rises to greater than 2200 PSIG, THEN verify alternate miniflow isolation AND miniflow block valves - OPEN • **RHR RESTART CRITERIA** IF RCS pressure drops to less than 230 PSIG in an uncontrolled manner, THEN restart RHR pumps to supply water to the RCS. • **RUPTURED SG AFW ISOLATION CRITERIA** IF all of the following occur to any SG, THEN stop feed flow by shutting the isolation valves (preferred) OR flow control valves to that SG: • Any SG level rises in uncontrolled manner OR has abnormal secondary radiation • Narrow range level - GREATER THAN 25% [40%] • **AFW SUPPLY SWITCHOVER CRITERIA** IF CST level drops to less than 10%, THEN switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.
	CREW	If 'B' SG previously identified as the ruptured generator due to rising SG level, then Ruptured SG AFW Isolation foldout will apply
	SRO	Perform The Following:
		a. Review Foldout page. • RO- RCP Trip Criteria, Alternate Miniflow Open/Shut Criteria, RHR Restart Criteria • BOP – Ruptured SG AFW Isolation criteria, AFW Supply Switchover Criteria b. Directs Shift Manager to Evaluate EAL Matrix

Op Test No.: NRC	Scenario # 2	Event # 10	Page 40 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior	
	RO	Verify CSIPs – ALL RUNNING	(YES)
	RO	Verify RHR pumps – ALL RUNNING	(YES)
	RO	Safety Injection flow – GREATER THAN 200 GPM	(YES)
	RO	RCS pressure – LESS THAN 230 PSIG	(NO)
	SRO	RNO: GO TO Step 12.	
	BOP	MAIN Steam Line Isolation – ACTUATED.	(NO)
	SRO	RNO: Perform the following:	
	BOP	• Check MAIN Steam Line Isolation – REQUIRED MAIN STEAM LINE ISOLATION ACTUATION CRITERIA CNMT pressure - GREATER THAN OR EQUAL TO 3.0 PSIG Any SG pressure - LESS THAN OR EQUAL TO 601 PSIG • IF Main Steam Isolation is NOT required , THEN GO TO Step 16.	(NO)
	RO	CHECK CNMT Pressure – HAS REMAINED LESS THAN 10 PSIG	(YES)
	BOP	Verify AFW flow – AT LEAST 210 KPPH ESTABLISHED	(YES)
	BOP	Sequencer Load Block 9 (Manual Loading Permissive) - ACTUATED (BOTH TRAINS)	(YES)

Op Test No.: NRC	Scenario # 2	Event # 10	Page 41 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior
	BOP	Energize AC buses 1A1 AND 1B1
Evaluator Note:		**A linked Simulator command will fail OPEN the 'B' SG PORV when the BOP energizes AC bus 1B1.** **A crew member may identify that the SG PORV is open and manually shut the valve at any time from this point forward.** **Shutting 'B' SG PORV is a critical task on page 46 of this guide.**
Evaluator Note:		**The RO will perform all board actions until the BOP completes Attachment 3. The BOP is permitted to properly align plant equipment in accordance with Attachment 3 without SRO approval. The Scenario Guide still identifies tasks by board position because the time frame for completion of Attachment 3 is not predictable.** **To follow BOP actions E-0 Attachment 3 is located on page 61 of this guide.**
	BOP	VERIFY Alignment of Components From Actuation of ESFAS Signals Using Attachment 3, "Safeguards Actuation Verification", While Continuing with this Procedure.
	BOP	Directs TB AO – Place air compressor 1A and 1B in the Local Control mode.
Simulator Operator:		**When contacted to place A/B air compressors in Local Control mode, run CAEP :\air\ACs_to_local.txt.**
Communicator:		**When CAEP is complete, report that the air compressors are running in local control mode.**

Op Test No.: NRC	Scenario # 2	Event # 10	Page 42 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior
	BOP	Directs RAB AO – Locally unlock and turn on the breakers for the CSIP Suction and Discharge Cross-Connect valves
Simulator Communicator:		**Acknowledge request to Locally unlock and turn on the breakers for the CSIP Suction and Discharge Cross-Connect valves.**
Simulator Operator:		**When RAB AO is contacted to Unlock and Turn ON the breakers for the CSIP suction and discharge cross-connect valves, run CAEP *:*\cvc\path-1 att 6 csip suction valves power.txt.**
Simulator Communicator:		**When the CAEP is complete, report task to the MCR.**

Op Test No.: NRC	Scenario # 2	Event # 10	Page 43 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior
	BOP	Stabilize AND maintain temperature between 555°F AND 559°F using Table 1.

TABLE 1: RCS TEMPERATURE CONTROL GUIDELINES FOLLOWING RX TRIP

- Guidance is applicable until another procedure directs otherwise.
- IF no RCPs running, THEN use wide range cold leg temperature.

	RCS TEMPERATURE TREND		
	LESS THAN 557°F AND DROPPING	GREATER THAN 557°F AND RISING	STABLE AT OR TRENDING TO 557°F
OPERATOR ACTION	• Stop dumping steam • Control feed flow • Maintain total feed flow greater than 210 KPPH until level greater than 25% [40%] in at least one on intact SG • IF cooldown continues, THEN, shut MSIVs AND BYPASS valves	• IF condenser available THEN transfer steam dump to STEAM PRESSURE mode using OP-126, Section 5.3 AND dump steam to condenser - OR - • Dump steam using intact SG PORVs • Control feed flow to maintain SG levels	• Control feed flow and steam dump to establish and maintain RCS temperature between 555°F AND 559°F

		• Control feed flow and steam dump to stabilize temperature between 555 ˚F AND 559 ˚F	
	BOP	Identifies that the cooldown is continuing and the MSIVs need to be shut.	
	BOP	Shuts all MSIVs	
	RO	PRZ PORVs – SHUT	(YES)
	RO	PRZ spray valves – SHUT	(YES)

Op Test No.: NRC	Scenario # 2	Event # 10	Page 44 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior	
	RO	PRZ PORV block valves – AT LEAST ONE OPEN (All OPEN)	(YES)
Evaluator Note:		**If the crew has not shut SG "B" PORV then a transition to E-2 should occur. If SG "B" PORV has been closed in MANUAL then the crew will continue in E-0 to the E-3 transition. (Go to page 48 of this guide)**	
	BOP	ANY SG pressures – DROPPING IN AN UNCONTROLLED MANNER OR COMPLETELY DEPRESSURIZED	(YES) (NO)
	SRO	GO TO E-2, "FAULTED STEAM GENERATOR ISOLATION", Step 1.	
EOP-E-2	SRO	(**IF SG PORV Remains Open**) Enters E-2, Faulted Steam Generator Isolation Makes PA announcement for EOP entry Conducts a crew alignment brief	
Communicator:		**If directed to walk down the system to check for leaks: Wait 3 minutes and then report SG "B" PORV tailpipe is blowing steam.**	
Procedure Note:		At least one SG must be maintained available for RCS cooldown. Any faulted SG OR secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown.	

Op Test No.: NRC	Scenario # 2	Event # 10	Page 45 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior	
	SRO	Initiate Monitoring Of Critical Safety Function Status Trees.	
	BOP	VERIFY all MSIVs – SHUT, BOP shuts all MSIVs here if not previously shut.	(YES)
	BOP	VERIFY all MSIV bypass valves – SHUT	(YES)
	BOP	Check any SG pressure – STABLE OR RISING (NOT FAULTED)	(YES)
	BOP	ANY SG pressures – DROPPING IN AN UNCONTROLLED MANNER OR COMPLETELY DEPRESSURIZED	(YES) (NO)
Procedure Caution:		IF the TDAFW pump is the only available source of feed flow, THEN maintain steam supply to the TDAFW pump from one SG.	
	BOP	ISOLATE Faulted SG(s) (identified in Step 5):	
Critical Task #1	BOP	• VERIFY faulted SG(s) PORV – SHUT **Places SG 'B' PORV in MANUAL and closes to terminate the release** Critical to manually close 'B' SG PORV prior to an improper crew transition to EOP-ECA-3.3	(NO)

Op Test No.: NRC	Scenario # 2	Event # 10	Page 46 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior	
	BOP	• VERIFY Main FW isolation valves – SHUT • VERIFY MDAFW and TDAFW pump isolation valves to faulted SG(s) – SHUT • SHUT faulted SG(s) steam supply valve to TDAFW pump – SHUT SG B: 1MS-70 SG C: 1MS-72 • VERIFY main steam drain isolation(s) before MSIVs – SHUT: SG A: 1MS-231 SG B: 1MS-266 SG C: 1MS-301	(YES) (YES) (YES) (YES)
	BOP	• VERIFY SG Blowdown isolation valves – SHUT SG Blowdown Isolation Valves Process Line / Outside CNMT (MLB-1A-SA) / Inside CNMT (MLB-1B-SB) SG A Blowdown / 1BD-11 / 1BD-1 SG B Blowdown / 1BD-30 / 1BD-20 SG C Blowdown / 1BD-49 / 1BD-39 • VERIFY main steam analyzer isolation valves – SHUT	(YES) (YES)
	BOP	CHECK CST Level – GREATER THAN 10%	(YES)
Procedure Note:		A SG may be suspected to be ruptured if it fails to dry out following isolation of feed flow. Local checks for radiation can be used to confirm primary-to-secondary leakage.	
Evaluator Note:		**The "Check secondary radiation" could be answered YES or NO, depending on the condition of the alarm before SI was initiated.**	

Op Test No.: NRC	Scenario # 2	Event # 10	Page 47 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior
	SRO	Any SG - ABNORMAL RADIATION OR UNCONTROLLED LEVEL RISE (YES /NO) (YES)

Secondary Radiation Monitors And Indications
RM-01MS-3591 SB, Main Steam Line A
RM-01MS-3592 SB, Main Steam Line B
RM-01MS-3593 SB, Main Steam Line C
REM-01TV-3534, Condenser Vacuum Pump Effluent (RM-11: Grid 2 or Group 16)
REM-1BD-3527, Steam Generator Blowdown (RM-11: Grid 2 or Group 16)
RM-1TV-3536-1, Turbine Building Vent Stack Effluent (RM-11: Grid 2 or Group 16)
SG Activity Sample

	SRO	GO TO E-3, "STEAM GENERATOR TUBE RUPTURE", Step 1.
EOP-E-3	SRO	Enters E-3, Steam Generator Tube Rupture Conducts a crew alignment brief
Procedure Note:		**Foldout applies.**

Op Test No.: NRC	Scenario # 2	Event # 10	Page 48 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior

Evaluator Note:		**FOLDOUT**
		• **ALTERNATE MINIFLOW OPEN/SHUT CRITERIA**
		  • **IF** RCS pressure drops to less than 1800 PSIG, **THEN** verify alternate miniflow isolation **OR** miniflow block valves - SHUT
		  • **IF** RCS pressure rises to greater than 2200 PSIG, **THEN** verify alternate miniflow isolation **AND** miniflow block valves - OPEN
		• **RHR RESTART CRITERIA**
		  IF RCS pressure drops to less than 230 PSIG in an uncontrolled manner, **THEN** restart RHR pumps to supply water to the RCS.
		• **SI REINITIATION CRITERIA**
		  IF any of the following occurs:
		  • RCS subcooling - LESS THAN 10° F [40° F] - C
		  20° F [50° F] - M
		  • PRZ level - CAN **NOT** BE MAINTAINED GREATER THAN 10% [30%]
		  THEN perform the following:
		  a. **IF** CSIP suction aligned to VCT, **THEN** realign to RWST.
		  b. Shut charging line isolation valves **AND** open BIT valves.
		  c. Verify normal miniflow isolation valves - SHUT
		  d. **IF** necessary to restore conditions, **THEN** restart standby CSIP.
		  e. **IF** reinitiation occurs after Step 76, **THEN GO TO** ECA-3.1, "SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY", Step 1.
		• **COLD LEG RECIRCULATION SWITCHOVER CRITERIA**
		  IF RWST level drops to less than 23.4% (2/4 Low-Low alarm), **THEN** GO TO ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION", Step 1.
		• **SECONDARY INTEGRITY CRITERIA**
		  IF any of the following occurs, **THEN** GO TO E-2, "FAULTED STEAM GENERATOR ISOLATION", Step 1 (unless faulted SG is needed for RCS cooldown).
		  • Any SG pressure - DROPS IN AN UNCONTROLLED MANNER **AND** THAT SG HAS **NOT** BEEN ISOLATED
		  • Any SG - COMPLETELY DEPRESSURIZED **AND** THAT SG HAS **NOT** BEEN ISOLATED
		• **MULTIPLE TUBE RUPTURE CRITERIA**
		  IF any intact SG level rises in an uncontrolled manner **OR** any intact SG has abnormal radiation levels, **THEN** stop RCS depressurization and cooldown AND GO RETURN TO Step 1.
		• **AFW SUPPLY SWITCHOVER CRITERIA**
		  IF CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.
		No actions should result from FOLDOUT page during the remainder of the scenario.

	SRO	Assigns RO and BOP Foldout items: RO- Alternate Miniflow Open/Shut Criteria, RHR Restart Criteria, SI Reinitiation Criteria, Cold Leg Recirculation Switchover Criteria BOP – Secondary Integrity Criteria, Multiple Tube Rupture Criteria, AFW Supply Switchover Criteria Initiates Monitoring Of Critical Safety Function Status Trees.

Op Test No.: NRC	Scenario # 2	Event # 10	Page 49 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior	
	RO	Any RCP – RUNNING	(YES)
Procedure Note:		The RCP Trip Criteria is in effect until an RCS cooldown is initiated.	

	RO	CHECK RCP Trip Criteria:
		• Check all of the following:
		  • SI flow - GREATER THAN 200 GPM
		  • Check RCS pressure - LESS THAN 1400 PSIG
			(YES)
			(NO)

	SRO	RNO: GO TO Step 4.	
	BOP	CHECK Ruptured SG(s) - IDENTIFIED **Ruptured SG Identification (Any of the following)** SG level - RISING IN AN UNCONTROLLED MANNER SG Sample - HIGH RADIATION Main Steamlines - HIGH RADIATION • RM-01MS-3591 SB, Main Steam Line A • RM-01MS-3592 SB, Main Steam Line B • RM-01MS-3593 SB, Main Steam Line C	(YES)
	BOP	ADJUST ruptured SG PORV controller setpoint to 88% (1145 PSIG) AND place in AUTO.	

Op Test No.: NRC	Scenario # 2	Event # 10	Page 50 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior	
Evaluator Note:		**Places SG "B" PORV in MANUAL and closes (if not already performed earlier). It should NOT be placed in AUTO. If it is placed in AUTO then the operator should determine that it has opened, place it in MANUAL, close it, and leave it in MANUAL.**	
	BOP	CHECK ruptured SG PORV – SHUT.	(YES/NO)
	BOP	Check Feed Flow To Intact SG(s) - AVAILABLE FROM MDAFW PUMP	(YES)
	BOP	SHUT ruptured SG steam supply valve to TDAFW pump: SG B: 1MS-70 SG C: 1MS-72 May be closed previously in E-2	
	BOP	VERIFY blowdown isolation valves from ruptured SG – SHUT SG Blowdown Isolation Valves Process Line / Outside CNMT (MLB-1A-SA) / Inside CNMT (MLB-1B-SB) SG A Blowdown: 1BD-11 / 1BD-1 SG B Blowdown: 1BD-30 / 1BD-20 SG C Blowdown: 1BD-49 / 1BD-39	(YES)
	BOP	SHUT ruptured SG main steam drain isolation before MSIV: SG A: 1MS-231 SG B: 1MS-266 SG C: 1MS-301	(YES)

Op Test No.: NRC	Scenario # 2	Event # 10	Page 51 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior	
	BOP	SHUT ruptured SG MSIV AND BYPASS valve.	(YES)
	SRO	Ruptured SG - FAULTED	(NO)
	BOP	Ruptured SG Level – GREATER THAN 25%	(YES)
	BOP	Check Feed Flow To Ruptured SG(s) - ISOLATED	(YES)
	SRO	GO TO Step 18.	
	BOP	Check Steam Supply Valve From Ruptured SG To TDAFW Pump - SHUT **OR** ISOLATED (STEP 8)	(YES)
	BOP	CHECK Ruptured SG(s) Pressure – GREATER THAN 260 PSIG	(YES)
Evaluator Note:		**The "Check PRZ Pressure" could be answered YES or NO, depending on the pace at which the SRO progresses through the EOP network.**	
	RO	Check PRZ Pressure - LESS THAN 2000 PSIG	(NO)
	SRO	RNO: When LESS THAN 2000 then Block Low Steam Pressure SI.	

Op Test No.: NRC	Scenario # 2	Event # 10	Page 52 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior	
	RO	Check Steamline High Pressure Rate Bistables - CLEAR (**NOT** LIT)	(YES)

TSLB-1		
STMLN A HP RATE PB 474C (4-2)	STMLN B HP RATE PB 484C (5-2)	STMLN C HP RATE PB 494C (6-2)
STMLN A HP RATE PB 475C (4-3)	STMLN B HP RATE PB 485C (5-3)	STMLN C HP RATE PB 495C (6-3)
STMLN A HP RATE PB 476C (4-4)	STMLN B HP RATE PB 486C (5-4)	STMLN C HP RATE PB 4956 (6-4)

Procedure Note:		After the low steam pressure SI signal is blocked, main steamline isolation will occur if the high steam pressure rate setpoint is exceeded.	
	RO	Block Low Steam Pressure SI.	
	SRO	At least one intact SG - AVAILABLE FOR RCS COOLDOWN	(YES)
	SRO	GO TO Step 28.	

Op Test No.: NRC	Scenario # 2	Event # 10	Page 53 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior
	SRO	Determine required core exit temperature based on lowest ruptured SG pressure:

LOWEST RUPTURED SG PRESSURE (PSIG)	ERFIS AVAILABLE: CORE EXIT TEMPERATURE (°F)	ERFIS NOT AVAILABLE: HIGHEST CORE EXIT TC (PREFERRED) OR ACTIVE LOOP WIDE RANGE T-HOT (°F)
ABOVE 1100	530 [495]	520 [490]
1000 TO 1100	515 [485]	505 [475]
900 TO 1000	505 [470]	495 [465]
800 TO 900	490 [460]	480 [450]
700 TO 800	475 [445]	465 [435]
600 TO 700	460 [425]	450 [420]
500 TO 600	440 [410]	430 [400]
400 TO 500	420 [385]	410 [380]
300 TO 400	390 [360]	380 [350]
200 TO 300	360 [NA]	350 [NA]

Evaluator Note:		**The MSIVs should have been previously shut. IF the crew transitioned to EOP-E-2 or exercised the 'continuing cooldown' step in table 1, they may have closed all MSIVs. IF so this would require using the SG 'A' and 'C' PORVs to perform the cool down.**	
	BOP	Condenser Available For Steam Dump:	(NO)

Condenser Available Requirements
Any Intact SG MSIV - OPEN
Condenser Available (C-9)- LIT (BPLB 3-3)
Steam Dump Control - AVAILABLE

Op Test No.: NRC	Scenario # 2	Event # 10	Page 54 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior	
	SRO	Directs the BOP to dump steam from intact SGs at maximum rate using any of the following (Listed in order of preference): • SG PORVs • Locally operate SG PORVs using OP-126, "MAIN STEAM,EXTRACTION STEAM, AND STEAM DUMP SYSTEMS", Section 8.2. • TDAFW pump	
	BOP	Opens the 'A' and 'C' SG PORVs fully	
	BOP	Opens MS-72 to start the TDAFW pump and feeds the C S/G	
	SRO	Core Exit TCs - LESS THAN REQUIRED TEMPERATURE	(NO)
	SRO	RNO: WHEN core exit TCs less than required temperature, THEN perform Steps 37 AND 38. • Observe CAUTION Prior To Step 39 AND Continue with Step 39.	
Procedure Caution:		If no RCPs running, the following actions may cause a false indication for the INTEGRITY CSFST. Disregard ruptured SG wide range cold leg temperature until Step 94 complete.	
	RO	Maintain RCP Seal Injection Flow Between 8 GPM And 13 GPM.	

Op Test No.: NRC	Scenario # 2	Event # 10	Page 55 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior	
Procedure Caution:		• If an AFW isolation to an intact SG occurs, the signal may be reset to allow restoration of AFW. (An AFW isolation will occur if a main steam line isolation signal is present AND one SG pressure decreases 100 PSIG below the other two SGs.) • If the steam supply valve from the ruptured SG to TDAFW pump reopens due to decreasing SG level, it must be restored to the shut position. (Two out of three SG levels decreasing below 25% will open both steam supply vales to the TDAFW pump.)	
	BOP	Any Intact SG Level - GREATER THAN 25%	(YES)
	BOP	AFW flow - AT LEAST 210 KPPH AVAILABLE	(YES)
	BOP	Control Feed Flow To Maintain Intact SG Levels Between 25% And 50%	
	RO	Verify Power To PORV Block Valves - AVAILABLE	(YES)
	RO	PRZ PORVs - SHUT	(YES)
	RO	Check block valves - AT LEAST ONE OPEN	(YES)
	RO	Reset SI.	
	SRO	Manually Realign Safeguards Equipment Following A Loss Of Offsite Power. (Direct BOP)	
	RO	Reset Phase A AND Phase B Isolation Signals. (Phase A only is actuated)	

Op Test No.: NRC	Scenario # 2	Event # 10	Page 56 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior
	RO	Open Instrument Air **AND** Nitrogen Valves To CNMT: 1IA-819 (ISOL VALVE CONT. BLDG 236' PENETRATION (M-80)) 1SI-287 (ACCUMULATOR & PRZ PORV N2 SUPPLY ISO VLV)
	RO	Check RHR pump suction - ALIGNED TO RWST (YES) RWST SUCTION (OPEN) RHR A: 1SI-322 RHR B: 1SI-323
	RO	RCS pressure - GREATER THAN 230 PSIG (YES)
	RO	Stop RHR pumps.
	RO	Core exit TCs - LESS THAN REQUIRED TEMPERATURE (YES)
	BOP	Stop RCS cooldown
	BOP	Maintain core exit TCs less than required temperature.
	BOP	Check ruptured SG pressure - STABLE OR RISING (YES)
	RO	Check RCS Subcooling - GREATER THAN 30 ˚F (YES)

Op Test No.: NRC	Scenario # 2	Event # 10	Page 57 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior	
	RO	Normal PRZ spray - AVAILABLE (INCLUDING INSTRUMENT AIR TO CNMT) **Normal PRZ Spray Valves** 1RC-107 (PCV-444C) 1RC-103 (PCV-444D)	(YES)
	RO	Check PRZ level - LESS THAN OR EQUAL TO 75%	(YES)
Critical Task #2	RO	Manually Open All Available Normal PRZ Spray Valves AND Spray At Maximum Rate (Until ANY Of The RCS Depressurization Termination Criteria in Step 61 Satisfied). **Minimize primary to secondary leakage prior to SG 'B' exceeding 100% level** Critical to depressurize the RCS to minimize primary to secondary leakage preventing the SG 'B' NR level from exceeding 100%	
Evaluator Note:		**Crew will maintain the spray valves open until RCS pressure is less than SG pressure. They may close the spray valves if they do not meet PRZ level or subcooling conditions.**	

Op Test No.: NRC	Scenario # 2	Event # 10	Page 58 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior	
	RO	Check RCS Depressurization Termination Criteria – SATISFIED **RCS Depressurization Termination Criteria Using Normal Spray** (1) RCS pressure - LESS THAN RUPTURED SG(s) PRESSURE AND OR PRZ level - GREATER THAN 10% [30%] (2) RCS pressure - WITHIN 300 PSIG OF RUPTURED SG(s) PRESSURE AND OR PRZ level - GREATER THAN 40% [50%] (3) PRZ level - GREATER THAN 75% [60%] OR (4) RCS subcooling - LESS THAN 10°F [40°F}- C 20°F [50°F] - M	(NO)
	SRO	RNO: Continue to monitor termination criteria. • WHEN criteria satisfied, THEN GO TO Step 62.	
	RO	Shut spray valve used for depressurization:	
	SRO	GO TO Step 70.	
	RO	RCS subcooling – GREATER THAN 10°F	(YES)
	BOP	Level In At Least One Intact SG - GREATER THAN 25%	(YES)
	SRO	GO TO Step 74.	
	RO	RCS pressure - STABLE OR RISING	(YES)
	RO	PRZ level - GREATER THAN 10%	(YES)

Op Test No.: NRC	Scenario # 2	Event # 10	Page 59 of 68
Event Description:	**'B' SG PORV fails open / 'B' SGTR continues**		

Time	Position	Applicant's Actions or Behavior
	RO	Stop All But One CSIP.
	RO	Check CSIP Suction - ALIGNED TO RWST (YES) VCT OUTLET (SHUT): 1CS-165 (LCV-115C), 1CS-166 (LCV-115E) RWST SUCTION (OPEN): 1CS-291 (LCV-115B), 1CS-292 (LCV-115D)
	RO	Open Normal Miniflow Isolation Valves: CSIP A: 1CS-182 CSIP B: 1CS-196 CSIP C: 1CS-210 COMMON: 1CS-214
	RO	Shut BIT outlet valves: 1SI-3 1SI-4
Lead Evaluator:		**Terminate the scenario after BIT outlet valves 1SI-3 and 1SI-4 are SHUT.** **Announce 'Crew Update' End of Evaluation.** **Have crew remain in the Simulator without discussing the exam. Examiners will formulate any follow-up questions.**
Simulator Operator:		**When directed by Lead Evaluator place the Simulator in FREEZE.**

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 1 of 8
Safeguards Actuation Verification

NOTE

- General guidance for verification of safeguards equipment is contained in Attachment 4 of this procedure.
- ERFIS displays of safeguards equipment status are not reliable while any associated safety-related electrical buses are de-energized.

☐ 1. Verify Two CSIPs - RUNNING

☐ 2. Verify Two RHR Pumps - RUNNING

☐ 3. Verify Two CCW Pumps - RUNNING

☐ 4. Verify All ESW **AND** ESW Booster Pumps - RUNNING

☐ 5. Verify SI Valves - PROPERLY ALIGNED

(Refer to Attachment 1.)

☐ 6. Verify CNMT Phase A Isolation Valves - SHUT

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 4.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 2 of 8
Safeguards Actuation Verification

☐ 7. Verify SG Blowdown **AND** SG Sample Isolation Valves In Table 1 - SHUT

Table 1: SG Blowdown And Sample Isolation Valves

Process Line	Outside CNMT (MLB-1A-SA)	Inside CNMT (MLB-1B-SB)
SG A Sample	1SP-217	1SP-214/216
SG B Sample	1SP-222	1SP-219/221
SG C Sample	1SP-227	1SP-224/226
SG A Blowdown	1BD-11	1BD-1
SG B Blowdown	1BD-30	1BD-20
SG C Blowdown	1BD-49	1BD-39

8. **IF** Main Steam Line Isolation Actuated **OR** Is Required By Any Of The Following, **THEN** Verify MSIVs **AND** MSIV Bypass Valves - SHUT

☐ • Steam line pressure - LESS THAN 601 PSIG

☐ • CNMT pressure - GREATER THAN 3.0 PSIG

9. **IF** CNMT Spray Actuation Signal Actuated **OR** Is Required, **THEN** Verify The Following:

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 9.)

☐ • CNMT spray pumps - RUNNING

☐ • CNMT spray valves - PROPERLY ALIGNED

☐ • Phase B isolation valves - SHUT

☐ • All RCPs - STOPPED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 3 of 8
Safeguards Actuation Verification

☐ 10. Verify Both Main FW Pumps - TRIPPED

☐ 11. Verify FW Isolation Valves - SHUT

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 6.)

☐ 12. Verify both MDAFW pumps - RUNNING

13. **IF** any of the following conditions exist, **THEN** verify the TDAFW pump - RUNNING

☐ • Undervoltage on either 6.9 KV emergency bus

☐ • Level in two SGs - LESS THAN 25%

☐ • Manual actuation to control SG level

14. Verify AFW Valves - PROPERLY ALIGNED

☐ • **IF** no AFW Isolation Signal, **THEN** verify isolation and flow control valves - OPEN

NOTE

An AFW Isolation signal signal requires a Main Steam Line Isolation coincident with one SG pressure 100 PSIG below the other two SGs.

☐ • **IF** AFW Isolation Signal present, **THEN** verify MDAFW and TDAFW isolation and flow control valves to affected SG - SHUT

☐ 15. Verify Both EDGs - RUNNING

☐ 16. Verify CNMT Fan Coolers - ONE FAN PER UNIT RUNNING IN SLOW SPEED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 4 of 8
Safeguards Actuation Verification

☐ 17. Verify CNMT Ventilation Isolation Valves - SHUT

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 7.)

☐ 18. Verify Control Room Area Ventilation - MAIN CONTROL ROOM ALIGNED FOR EMERGENCY OPERATION

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 5, Sheets 1 and 2, Sections for MAIN CONTROL BOARD, SLB-5 and SLB-6.)

19. Verify Essential Service Chilled Water System Operation:

☐ • Verify both WC-2 chillers - RUNNING

☐ • Verify both P-4 pumps - RUNNING

☐ (Refer to AOP-026, "LOSS OF ESSENTIAL SERVICE CHILLED WATER SYSTEM" for loss of any WC-2 chiller.)

20. Verify CSIP Fan Coolers - RUNNING

☐ AH-9 A SA
☐ AH-9 B SB
☐ AH-10 A SA
☐ AH-10 B SB

NOTE

Security systems are powered by bus 1A1 (normal supply) or bus 1B1 (alternate supply). Backup power will be available for approximately 30 MINUTES after the supplying bus is de-energized. (Refer to OP-115, "CENTRAL ALARM STATION ELECTRICAL SYSTEMS", Section 8.9 and 8.10.)

☐ 21. Verify AC buses 1A1 **AND** 1B1 - ENERGIZED

☐ 22. Place Air Compressor 1A **AND** 1B In The LOCAL CONTROL Mode.

(Refer to Attachment 7.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 5 of 8
Safeguards Actuation Verification

CAUTION

The maximum calculated dose rate in the vicinity of MCC 1A35-SA and MCC 1B35-SB is between 10 MREM/HR and 150 MREM/HR.

☐ 23. Dispatch An Operator To Unlock **AND** Turn ON The Breakers For The CSIP Suction **AND** Discharge Cross-Connect Valves:

(Refer to Attachment 2.)

MCC 1A35-SA		MCC 1B35-SB	
VALVE	CUBICLE	VALVE	CUBICLE
1CS-170	4A	1CS-171	4D
1CS-169	4B	1CS-168	7D
1CS-218	14D	1CS-220	9D
1CS-219	14E	1CS-217	12C

24. Check If C CSIP Should Be Placed In Service:

☐ • **IF** two charging pumps can **NOT** be verified to be running, **AND** C CSIP is available, **THEN** place C CSIP in service in place of the non-running CSIP using OP-107, "CHEMICAL **AND** VOLUME CONTROL SYSTEM, Section 8.5 or 8.7.

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 6 of 8
Safeguards Actuation Verification

25. Start The Spent Fuel Pump Room Ventilation System:

a. At AEP-1, verify the following ESCWS isolation valves - OPEN

1) SLB-11 (Train A)

☐ • AH-17 SUP CH 100 (Window 9-1)

☐ • AH-17 RTN CH 105 (Window 10-1)

2) SLB-9 (Train B)

☐ • AH-17 SUP CH 171 (Window 9-1)

☐ • AH-17 RTN CH 182 (Window 10-1)

b. At AEP-1, start one SFP PUMP ROOM FAN COOLER:

☐ • AH-17 1-4A SA

☐ • AH-17 1-4B SB

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 7 of 8
Safeguards Actuation Verification

NOTE

- Fuel pool levels **AND** temperatures should be monitored approximately every 1 to 2 HOURS.
- Following the initial check of fuel pool levels and temperature, monitoring responsibilities may be assumed by the plant operations staff (including the TSC or STA).
- Only fuel pools containing fuel are required to be monitored.

26. Check Status Of Fuel Pools:

☐ a. Operate spent fuel cooling pumps to maintain fuel pool temperatures between 85°F and 105°F.

b. Monitor fuel pool levels **AND** temperatures:

☐ • Refer to AOP-041, "SPENT FUEL POOL EVENT" Attachments 7, 8, 9, 10 and 11 for SFP parameter monitoring methods.

☐ • Refer to Curves H-X-24, H-X-25 and H-X-26 for SFP time to 200°F.

☐ • Levels - GREATER THAN LO ALARM (284 FT, 0 IN)

☐ • Temperatures - LESS THAN HI TEMP ALARM (105°F)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 8 of 8
Safeguards Actuation Verification

NOTE

IF control room ventilation was previously aligned to an emergency outside air intake for post-accident operations, **THEN** follow-up actions will be required to restore the alignment.

27. Consult Plant Operations Staff Regarding Alignment Of The Control Room Ventilation System:

☐ • Site Emergency Co-ordinator - Control Room

☐ • Site Emergency Co-ordinator - Technical Support Center

(Refer to PEP-230, "CONTROL ROOM OPERATIONS".)

- END -

Rev. 0 – Development Copy / send outline to NRC

Rev. 1 – Outline Revision / Changes made by Exam Team

Rev. 2 – Validation

Rev. 3 – Validation, Final Ops and Training Management comments incorporated

Rev. 4 – NRC 45 day exam submittal review comments

Rev. FINAL – NRC Prep Week review comments incorporated

Appendix D	Scenario Outline	Form ES-D-1

HARRIS 2014 NRC SCENARIO 3

Facility: SHEARON-HARRIS Scenario No.: 3 Op Test No.: 05000400/2014302

Examiners: _____ Operators: SRO: _____

_____ OATC: _____

_____ BOP: _____

Initial Conditions: IC-26, MOL, 88% power

- 'A' MDAFW Pump Out of Service due to high vibrations, due back in 24 hours, awaiting motor bearing parts from vendor
- 'B' DEH Pump is under clearance for motor repairs
- 1CS-9, Orifice Isolation Valve, Out of Service for solenoid repairs
- Thunderstorms have been forecasted for the area, AP-301 actions are completed.

Turnover:
- Plant is at 88% power. AH-3 has been leaking for the last 5 days. Service water tube plugging plans have been developed and Maintenance is ready to plug the leaking tube. To allow personnel to enter Containment and work on the air handler the unit will be reduced to 60% power. Plant risk condition is YELLOW due to the downpower.
- The power reduction is in progress IAW with GP-006, Normal Plant Shutdown step 9.
- The desired load rate change is 4 DEH units per minute.

Critical Tasks:
- Manually trip all RCPs within 10 minutes of a Phase B isolation signal
- Align one train of Containment Spray System for operation
- Transition to Cold Leg Recirculation

Event No.	Malf. No.	Event Type*	Event Description
1	n/a	R – RO N – BOP	Start power reduction to 85 – 83%
2	ft:497 imf cfw19c	I - BOP/SRO TS - SRO	Feed flow transmitter on 'C' SG FT-497 Channel IV (selected for 1C SG) fails low – additionally, FRV 'C' fails in Auto
3	lt:115	I – RO/SRO	VCT Level Channel 115 fails low
4	idii xd1i142 ilo xd1o142w ian xn27e05	C - BOP/SRO	Reactor Primary Shield Fan Trip
5	cvc05a	C - RO/SRO TS - SRO	CSIP Trip - 1 available, requiring AOP-018 entry ASI Pump start / Respond to Boron addition to RCS from ASI
6	n/a	N - RO/SRO	Restore letdown IAW OP-107.
7	rcs01b	M – ALL	Large Break LOCA
8	zdsq2:52a	C – RO/SRO	"A" RHR Fails to auto-start on Safety Injection (preset)
9	zrpk643a/b zrpk644a/b zrpk645a/b	C – RO/SRO	BOTH Containment Spray Pumps Fail to auto-start (preset)
10	zrpk740a	C – RO/SRO	RWST swap-over fails, 1SI-300 and 1SI-310, Containment Sump To RHR Pump A-SA, valves fail to open when RWST level reaches 23.4% (preset)

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

SCENARIO SUMMARY: 2014 NRC EXAM SCENARIO 3

The plant is at 88% power with middle of life core conditions and the turbine in HOLD. AH-3 has been leaking for the last 5 days. Service water tube plugging plans have been developed and Maintenance is ready to plug the leaking tube. To allow personnel to enter Containment and work on the air handler the unit will be reduced to 60% power.

A power reduction is in progress IAW with GP-006, Normal Plant Shutdown From Power Operation To Hot Standby (Mode 1 To Mode 3) step 9.

The desired load rate change is 4 DEH units per minute. Load is set at 120, and the turbine is in hold.

The National Weather Service has forecasted thunderstorms for the New Hill area and the actions for AP-301, Seasonal Weather Preparations and Monitoring have been completed by the crew. Plant risk condition is YELLOW due to the downpower.

The following equipment is under clearance:

- AFW Pump A-SA is under clearance due to high vibrations on the motor bearing. The pump has been inoperable for 4 hours due back in 24 hours, awaiting motor bearing parts from vendor. Tech Spec 3.7.1.2 LCO Action **a**.

PLANT SYSTEMS

AUXILIARY FEEDWATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.2 At least three independent steam generator auxiliary feedwater pumps and associated flow paths shall be OPERABLE with:

a. Two motor-driven auxiliary feedwater pumps, each capable of being powered from separate emergency buses, and

b. One steam turbine-driven auxiliary feedwater pump capable of being powered from an OPERABLE steam supply system.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one auxiliary feedwater pump inoperable, restore the required auxiliary feedwater pumps to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

- 'B' DEH Pump is under clearance for motor repairs. The pump has been unavailable for 8 hours. Repairs are expected to be completed within 24 hours.

SCENARIO SUMMARY: 2014 NRC EXAM SCENARIO 3 (Continued)

- Letdown Orifice Isolation Valve 1CS-9 is under clearance for breaker inspection. Tech Spec 3.6.3 LCO Action **b** applies. OWP-CS-09 has been completed.

CONTAINMENT SYSTEMS

3/4.6.3 CONTAINMENT ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.3 Each containment isolation valve specified in the Technical Specification Equipment List Program, plant procedure PLP-106, shall be OPERABLE with isolation times less than or equal to required isolation times.

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

ACTION:

With one or more of the containment isolation valve(s) inoperable, maintain at least one isolation valve OPERABLE in each affected penetration that is open and:

b. Isolate each affected penetration within 4 hours by use of at least one deactivated automatic valve secured in the isolation position, or

Event 1: Crew performs a power reduction IAW GP-006. For this reactivity manipulation it is expected that the SRO will conduct a reactivity brief, the RO will borate per the reactivity plan and the BOP will operate the DEH Controls as necessary to lower power. After approximately a 3-5% power reduction 85 to 83% Event 2 will begin.

Event 2: Feed flow transmitter on 'C' SG FT-497 Channel IV (selected for 1C SG) fails low – additionally, FRV 'C' fails in Auto. When the plant is in a stable condition, the Lead Evaluator can cue the SG 'C' Feed Flow channel failure. The crew should respond in accordance with the alarm response procedure and AD-OP-ALL-1000. The BOP will be controlling SG 'C' level with the FRV in MANUAL and may switch controlling FF channels to restore control to AUTO. The crew will take the channel out of service using OWP-RP-10, Reactor Protection, SF/FF Loop 3. IF FRV 'C' is placed back into Auto the controller will fail to 60% output and the valve will respond by placing the FRV controller back to MANUAL and adjusting Feed Flow accordingly. The SRO should evaluate the following Tech Specs for failure of FT-497:

T.S. 3.3.1: As a minimum, the Reactor Trip System instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE

SCENARIO SUMMARY: 2014 NRC EXAM SCENARIO 3 (Continued)

T.S. 3.3.1 (continued)

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
14. Steam Generator Water Level--Low Coincident With Steam/ Feedwater Flow Mismatch	2 stm. gen. level and 2 stm./feed-water flow mismatch in each stm. gen.	1 stm. gen. level coincident with 1 stm./feedwater flow mismatch in same stm. gen.	1 stm. gen. level and 2 stm./feed-water flow mismatch in same stm. gen. or 2 stm. gen. level and 1 stm./feedwater flow mismatch in same stm. gen.	1, 2	6

ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours, and

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1.

The crew should implement OWP-RP-10 for this failure.

The SRO should also prepare OMM-001, Operations Administrative Requirements, Attachment 5 Equipment Problem Checklist for the failure.

Event 3: VCT Level Channel 115 fails low. This failure will cause automatic make up to the VCT to initiate. The crew should enter AOP-003, Malfunction of Reactor Makeup Control, identify the failed level transmitter, and secure the automatic makeup caused by the failed instrument.

Event 4: Reactor Primary Shield Cooling Fan S2-1A trips. The crew will respond to ALB 027-5-5 and evaluate the condition. The standby fan will be started in accordance with the alarm response. A fan is required to be in operation anytime RCS temperature is greater than 140°F.

The SRO should also prepare OMM-001, Operations Administrative Requirements, Attachment 5 Equipment Problem Checklist for the failure.

Event 5: Trip of the running 'A' Charging Pump breaker. The crew will enter AOP-018, Reactor Coolant Pump Abnormal Conditions and carry out the immediate actions. The crew should isolate letdown and then implement actions to place the 'B' Charging Pump in service. The crew will have to secure the ASI pump after the CSIP is started and evaluate the boration caused by the ASI pump running. The efficiency that the crew has in progressing through AOP-018 to the point of securing the ASI pump will determine the amount of boric acid added to the RCS through the RCP seals. This could require the SRO to direct the RO and BOP to coordinate Reactor and Turbine controls (dilute, rod movement and / or Turbine reduction) to accommodate the boron addition for Tavg/Tref stabilization.

SCENARIO SUMMARY: 2014 NRC EXAM SCENARIO 3 (Continued)

The SRO should evaluate the loss of the CSIP in accordance with Tech Specs 3.1.2.2, 3.1.2.4 and 3.5.2

TS 3.1.2.2 - At least two of the following three boron injection flow paths shall be OPERABLE:

b. Two flow paths from the refueling water storage tank via charging/safety injection pumps to the RCS.

ACTION: With only one of the above required boron injection flow paths to the RCS OPERABLE, restore at least two boron injection flow paths to the RCS to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN as specified in the CORE OPERATING LIMITS REPORT (COLR), plant procedure PLP-I06 at 200°F within the next 6 hours; restore at least two flow paths to OPERABLE status within the next 7 days or be in HOT SHUTDOWN within the next 6 hours.

TS 3.1.2 4 - With only one Charging/safety injection pump OPERABLE restore at least two charging/safety injection pumps to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN as specified in the CORE OPERATING LIMITS REPORT (COLR) plant procedure PLP-106 at 200°F within t he next 6 hours: restore at least two charging/safety injection pumps to OPERABLE status within the next 7 days or be in HOT SHUTDOWN within the next 6 hours.

TS 3.5.2 - Two independent Emergency Core Cooling System (ECCS) subsystems shall be OPERABLE with each subsystem comprised of:

One OPERABLE Charging/safety injection pump
One OPERABLE RHR heat exchanger
One OPERABLE RHR pump and
An OPERABLE flow path capable of taking suction from the refueling water storage tank on a Safety Injection signal and. upon being manually aligned transferring suction to the containment sump during the recirculation phase of operation.

ACTION: a. With one ECCS subsystem inoperable restore the inoperable subsystem to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

The SRO should also prepare OMM-001, Operations Administrative Requirements, Attachment 5 Equipment Problem Checklist for the failure.

Event 6: Restore letdown IAW OP-107, Chemical and Volume Control System (Evaluators discretion) - once the 'B' Charging Pump is in service, the crew will restore letdown IAW OP-107 Section 5.4 to establish inventory control. Once letdown has been restored, Tech Specs have been evaluated for the loss of the 'A' CSIP, and the crew response to the boron addition from the ASI system have been addressed to the satisfaction of the Lead Examiner the next event can be initiated.

SCENARIO SUMMARY: 2014 NRC EXAM SCENARIO 3 (Continued)

Event 7: MAJOR – LBLOCA. The crew should implement EOP-E-0, Reactor Trip or Safety Injection, and transition to EOP-E-1, Loss of Reactor or Secondary Coolant.

During the implementation of EOP-E-1 plant conditions will require the CRS to transition to EOP-FR-P.1, Response To Imminent Pressurized Thermal Shock. Plant conditions will also require the crew to evaluate the need to transition to EOP-FR-C.2 based on RVLIS level fluctuations from the LOCA and input from the ECCS components. After implementation of the FR procedures the crew will return to EOP-E-1.

Event 8: The 'A' RHR Pump will fail to auto start on sequencer operation but may be started manually from the MCB after Load Block 9 manual permissive is available.

Event 9: Shortly after entering EOP-E-0, the crew should recognize that the Foldout Criteria for securing all RCPs has been met and carry out that action. The RCPs must be manually tripped within 10 minutes of receiving a Phase B isolation signal. **(Critical Task)**.

Pressure in Containment will continue to rise due to the LOCA and a Containment Spray Actuation setpoint will be reached. Both Containment Spray Pumps will fail to automatically start and at least one pump will need to be manually started with a flow path established to Containment **(Critical Task)**.

Without Containment Spray in service, an ORANGE path will be met for Containment. The crew will not be required to make the transition to EOP-FR-Z.1, Response to High Containment Pressure, if they start and align at least on Containment Spray pump.

Event 10: When RWST level reaches 23.4%, the crew will transition to EOP-ES-1.3, Transition to Cold Leg Recirculation. 1SI-300 and 1SI-310 will fail to automatically open when RWST level reaches 23.4% and will need to be manually opened **(Critical Task)**.

Once cold leg recirculation has been established, the scenario may be terminated.

CRITICAL TASK JUSTIFICATION:

1. Manually trip all RCPs within 10 minutes of a Phase B isolation signal

Securing RCPs during a large break LOCA inside Containment is procedurally required when Containment pressure has exceeded the High 3 setpoint of 10 psig. Exceeding this pressure causes a Phase B actuation that isolates CCW flow to the RCP heat exchangers. If the RCPs are left operating they will overheat and become inoperable. Due to the rapid pressure increase in Containment from this event EOP-E-0 continuous action step 16 RNO b requires the crew to secure ALL RCPs. This action should be accomplished within 10 minutes of the Phase B actuation and prior to transitioning out of EOP-E-0.

2. Align one train of Containment Spray (CT) System for operation

The CT System at HNP is designed to remove iodine from the Containment internal atmosphere. Actuating at least one train of CT is critical on the basis of iodine removal assumptions made in the FSAR. Since the event in this scenario is a large break LOCA this task should be completed prior to exiting E-0 based on continuous action step step 16 “Check CNMT Pressure – HAS REMAINED LESS THAN 10 PSIG”. RNO statement is to verify CNMT spray – ACTUATED. It will not be actuated and require the crew will manually start at least one Containment Spray pump and then align the system for operation prior to exiting EOP-E-0. NOTE: the WOG Critical Task analysis states that this task should be completed prior to transition out of EOP-FR-Z.1 but since the event will cause the Containment pressure to quickly rise the continuous action statement in EOP-E-0 would be applicable. EOP-FR-Z.1 would not apply until the crew exits EOP-E-0 and transitions to EOP-E-1, step 1 where they would initiate monitoring of Critical Safety Function Status Trees. At this step the crew would identify that an ORANGE path condition to enter EOP-FR-Z.1 is present and at step 3.e they would verify CNMT spray pumps – RUNNING then align the system for injection.

3. Transition to Cold Leg Recirculation

Improper performance or omission by an operator to correctly establish a RCS Cold Leg Recirculation line up will result in direct adverse consequences or a significant degradation in the mitigative capability of the plant. The establishment of the Cold Leg Recirculation lineup must be completed after the RWST level has lowered to < 23.4% and prior to the depletion of the RWST to a level <3%. This task is expected to be completed while performing the actions of EOP-ES-1.3, Transfer to cold leg recirculation. If the ‘A’ RHR pump suction source remains aligned to both the Containment Recirc Sump and the empty RWST the RHR pump suction and discharge pressures will rapidly drop. Critical to complete suction lineup prior to the ‘A’ RHR pump loss of suction which could potentially damage the pump and cause the pump to become inoperable at a time that it may be required to be in operation. (Suction and discharge pressure will rapidly reduce to ~0 psig upon loss of pump suction).

Note: An unanticipated critical task may be created in a scenario should an applicant’s action or lack of action cause an unexpected RPS or ESFAS actuation. A critical task may be assigned and graded as unsatisfactory even if corrected by another team member prior to the unanticipated RPS/ESFAS actuation. Should the applicant self-correct the action or inaction prior to the unanticipated plant response, a critical task failure should not be assigned to the applicant.

SIMULATOR SETUP

For the 2014 NRC Exam Simulator Scenario # 3

Reset to IC-163 password “spurs”

Go to RUN

Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner.

Set ERFIS screens

(The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

SPECIAL INSTRUCTIONS

Post conditions for status board from IC-163, MOL, 88% power
Hang restricted access signs on MCR entry swing gates
Ensure that DEH is set to 4 DEH Units / Min
Set Boron FK-113 to 3.26

Provide a marked up copy of GP-006 Rev 72 through Section 5.2. step 8
Provide Reactivity Plan for down power

Place CIT on ‘A’ MDAFW Pump and Protected Train Placard on ‘B’ MDAFW Pump switch
Place Protected Train Placard on TDAFW Pump 1MS-70/72 switch
Place CIT on ‘A’ DEH Pump and place switch in pull to lock
Place Protected Train Placard on ‘B’ DEH Pump switch
Place CIT on 1CS-9
Place OWP-CS-09 in OWP book

Update the status board:
AFW Pump A-SA, Tech Spec 3.7.1.2, 72 hour LCO. OOS for 4 hours.

Op Test No.: NRC	Scenario # 3	Event # 1	Page 9 of 81
Event Description:	**Perform a power reduction in accordance with GP-006**		

Time	Position	Applicant's Actions or Behavior
Lead Evaluator:		**When the crew has completed their board walk down and are ready to take the shift inform the Simulator Operator to place the Simulator in Run. When the Simulator is in run announce:** **CREW UPDATE – (SRO's Name) Your crew has the shift. END OF UPDATE**
Simulator Operator:		**When directed by the Lead Evaluator, ensure that the annunciator horns are on and place the Simulator in RUN.**
Lead Evaluator:		**When the evaluating team has completed their evaluation of the power change Cue Event 2 "FT-497 'C' SG fails low." The crew should place the Turbine on HOLD.**
Evaluator Note:		**The crew has been directed to shut down the plant IAW GP-006, Normal Plant Shutdown due to the leak on AH-3. GP-006 is signed off through Section 5.2, step 8, and the power reduction is on hold for turnover.** **The crew should have briefed GP-006 prior to entering the Simulator and be ready to proceed with the power change.**
GP-006	SRO	GP-006, Step 5.2 Step 9 **WHEN** Turbine load is less than 75%, **THEN VERIFY** the SGBD Regenerative Heat Exchanger Condensate Outlet is aligned to the CPD effluent per OP-127, Section 7.1.
Evaluator Note:		**The SRO will evaluate RCS Tavg conditions with recommendations from the RO direct a boration. The crew may elect to perform the boration prior to placing the Turbine in GO. The boration steps are located on page 13 of this guide.**
	SRO	DIRECTS BOP to start power reduction at 4 Units/Min with target value set at 120. May direct initiation of a boration before the power reduction begins.

Op Test No.: NRC	Scenario # 3	Event # 1	Page 10 of 81
Event Description:	**Perform a power reduction in accordance with GP-006**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**The following steps will initiate turbine load reduction IAW GP-006 section 5.2 step 5. These steps should be validated prior to commencing the power reduction.**
Procedure Note:		**Routine load changes should be coordinated with the Load Dispatcher to meet system load demands.**
Procedure Caution:		A failure of the Vidar in the DEH computer has resulted in a plant trip in the past. This failure would affect operation in Operator Auto, and can be detected in either of the following ways: • If OSI-PI is available, the process book PLANTSTATUS.PIW, DEH Trends function of the Plant Process Computer: DEH (menu) contains a point for DEH MEGAWATTS. With a failure of the Vidar, this point will not be updating. • If OSI-PI is NOT available, accessing the ANALOG INPUTS screen on the Graphics display computer (in the Termination Cabinet room near the ATWS panel) will show several points, most of which should be updating if the Vidar is functioning properly. • If the DEH graphics computer is out of service, VIDAR can be checked as updating on the operator panel as follows: 1) DEPRESS TURBINE PROGRAM display button. 2) CHECK TURBINE PROGRAM display button is illuminated. 3) CHECK REFERENCE and DEMAND displays indicate 0000. 4) DEPRESS 1577. 5) DEPRESS "ENTER". 6) If the DEMAND display indicates 0000 then VIDAR is updating. 7) If the DEMAND display indicates 0001 then VIDAR is not updating.

Op Test No.: NRC	Scenario # 3	Event # 1	Page 11 of 81
Event Description:	**Perform a power reduction in accordance with GP-006**		

Time	Position	Applicant's Actions or Behavior
	BOP	• DEPRESS the LOAD RATE MW/MIN push-button. • ENTER the desired rate, **NOT** to exceed 5 MW/MIN, in the DEMAND display. (4 DEH Units/minute) • DEPRESS the ENTER push-button. • DEPRESS the REF push-button. • ENTER the desired load (120 MW per CRS) in the DEMAND display. • DEPRESS the ENTER push-button. The HOLD push-button should illuminate. • Requests PEER check prior to manipulations of DEH Control
	RO	Peer checks DEH settings
Procedure Note:		The unloading of the unit can be stopped at any time by depressing the HOLD push-button. The HOLD lamp will illuminate and the GO lamp will extinguish. The load reduction can be resumed by depressing the GO push-button. The HOLD lamp will extinguish and the GO lamp will illuminate.
	BOP	Requests PEER check prior to depressing 'GO' pushbutton DEPRESS the GO push-button to start the load reduction and inform crew through 'Crew Update' Turbine in 'GO'. • VERIFY the number in the REFERENCE display decreases. • VERIFY Generator load is decreasing. WHEN Turbine load is less than 95%, THEN VERIFY the 3A and 3B Feedwater Vents have been opened per OP-136, Feedwater Heaters, Vents, and Drains, Section 7.2
	RO	Provides PEER check for BOP After 'GO' depressed, MONITORS primary systems response.
	RO	INITIATES boration, as necessary (with SRO direction) per OP-107.01, CVCS Boration, Dilution, and Chemistry Control.

Op Test No.: NRC	Scenario # 3	Event # 1	Page 12 of 81
Event Description:	**Perform a power reduction in accordance with GP-006**		

Time	Position	Applicant's Actions or Behavior
	SRO	Directs RO to perform a boration per reactivity plan
OP-107.01	RO	OP-107.01, CVCS Boration, Dilution, and Chemistry Control, Section 5.2
	RO	• DETERMINE the volume of boric acid to be added (Current OPT-1525 Attachments 4 through 7 or approved reactivity plan from Engineering may be used.)
Procedure Note:		FIS-113, BORIC ACID BATCH COUNTER, has a tenths position.
Procedure Caution:		If the translucent covers associated with the Boric Acid and Total Makeup Batch counters FIS-113 and FIS-114, located on the MCB, are not closed, the system will not automatically stop at the preset value.
	RO	SET FIS-113, BORIC ACID BATCH COUNTER, to obtain the desired quantity.
	RO	• SET controller 1CS-283, FK-113 BORIC ACID FLOW, for the desired flow rate. • VERIFY the RMW CONTROL switch has been placed in the STOP position. • VERIFY the RMW CONTROL switch green light is lit.
Procedure Note:		NOTE: Boric Acid flow controller must be set between 0.2 and 6 (1 and 30 gpm.). NOTE: Performing small borations at high flow rates may result in an over boration based on equipment response times. Boration flow should be set such that the time required to reach the desired setpoint will happen after release of the control switch.

Op Test No.: NRC	Scenario # 3	Event # 1	Page 13 of 81
Event Description:	**Perform a power reduction in accordance with GP-006**		

Time	Position	Applicant's Actions or Behavior
	RO	**IF** the current potentiometer setpoint of controller 1CS-283, FK-113 BORIC ACID FLOW, needs to be changed to obtain makeup flow, **THEN**: a. **RECORD** the current potentiometer setpoint of controller 1CS-283, FK-113 BORIC ACID FLOW, in Section 5.2.3. **b. SET** controller 1CS 283, FK-113 BORIC ACID FLOW, for the desired flow rate.
	RO	**PLACE** control switch RMW MODE SELECTOR to the BOR position.
Procedure Note:		**NOTE:** Boration may be manually stopped at any time by turning control switch RMW CONTROL to STOP. **NOTE:** During makeup operations following an alternate dilution, approximately 10 gallons of dilution should be expected due to dilution water remaining in the primary makeup lines.
	RO	**START** the makeup system as follows: a. **TURN** control switch RMW CONTROL to START momentarily. b. **VERIFY** the red indicator light is lit. c. **IF** expected system response is not obtained, **THEN TURN** control switch **RMW CONTROL to STOP.**
	RO	**VERIFY** boration automatically terminates when the desired quantity of boron has been added.
	RO	**IF** controller 1CS-283, FK-113 BORIC ACID FLOW, was changed in Step 5.2.2.5, **THEN**: a. **REPOSITION** controller 1CS-283, FK-113 BORIC ACID FLOW, to the position recorded in Step 5.2.2.5.a. **b. INDEPENDENTLY VERIFY** controller 1CS-283, FK-113 BORIC ACID FLOW, position.

Op Test No.: NRC	Scenario # 3	Event # 1	Page 14 of 81
Event Description:	**Perform a power reduction in accordance with GP-006**		

Time	Position	Applicant's Actions or Behavior
	RO	**MONITOR** Tavg and rod control for proper operation.
	RO	**WHEN VCT** pressure is between 20 – 30 psig, **THEN TURN** control switch **RMW MODE SELECTOR** to **AUTO.**
	RO	**START** the makeup system as follows: a. **TURN** control switch RMW CONTROL to START momentarily. b. **VERIFY** the red indicator light is lit.
Lead Evaluator:		• **After the evaluation team is satisfied with the crews performance of the power reduction initiate Event 2.** • **A good initiation point for Event 2 is after either one or two borations are completed and following the return of RMW CONTROL to START.** • **Cue the Simulator Operator to insert Trigger 2** **Event 2 - FT-497 'C' SG Feed Flow transmitter fails low.**

Op Test No.: NRC	Scenario # 3	Event # 2	Page 15 of 81
Event Description:	**FT-497 Channel IV Feed flow transmitter on 'C' SG fails low**		

Time	Position	Applicant's Actions or Behavior
Lead Evaluator:		• **After the evaluation team is satisfied with the crews performance of the power reduction initiate Event 2.** • **A good initiation point for Event 2 is after either one or two borations are completed and following the return of RMW CONTROL to START.** • **Cue the Simulator Operator to insert Trigger 2** **Event 2 - FT-497 'C' SG Feed Flow transmitter fails low.**
Simulator Operator:		**When directed by the Lead Evaluator Actuate Trigger 2** **SG 'C' FF Channel fails LO** **FT:497 SG 'C' - feed flow controlling channel**
Indications Available:		**ALB-014-6-1B, SG C STM > FW FLOW MISMATCH** **FI-497 decreases to 0 MPPH**
	BOP	Performs actions of APP-ALB-014-6-1B/6-1A/3-1B or per AD-OP-ALL-1000 to take manual control of a failed controller.

	BOP	• CONFIRM alarm using:
		  • FI-496, FI-497, SG C Feed Flow
		  • FI-494, FI-495, SG C Steam Flow (YES)
		  • Reports FI-497 failed LOW
		• PERFORM Corrective Actions: (OMM-001 and AD-OP-ALL-1000)
		  • IF FCV-498, Feedwater Reg Valve, is NOT controlling SG level, THEN MANUALLY CONTROL FK-498 AND REDUCE feed flow.
		  • DISPATCH an operator to check for indications of feedwater leaks.

Simulator Communicator:		**Acknowledge requests for assistance.**
	SRO	DIRECTS BOP to maintain SG level within control band and within trip limits of OMM-001 Attachment 13

Op Test No.: NRC Scenario # 3 Event # 2 Page 16 of 81

Event Description: **FT-497 Channel IV Feed flow transmitter on 'C' SG fails low**

Time	Position	Applicant's Actions or Behavior
		<table><tr><th rowspan="2">Controller</th><th rowspan="2">Control Band</th><th colspan="2">Trip Limit</th></tr><tr><th>Low</th><th>High</th></tr><tr><td>Steam Generator Level</td><td>52% to 62%</td><td>30%</td><td>73%</td></tr></table>
	SRO	Refers to Tech Spec 3.3.1: As a minimum, the Reactor Trip System instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE REACTOR TRIP SYSTEM INSTRUMENTATION <table><tr><th>FUNCTIONAL UNIT</th><th>TOTAL NO. OF CHANNELS</th><th>CHANNELS TO TRIP</th><th>MINIMUM CHANNELS OPERABLE</th><th>APPLICABLE MODES</th><th>ACTION</th></tr><tr><td>14. Steam Generator Water Level--Low Coincident With Steam/ Feedwater Flow Mismatch</td><td>2 stm. gen. level and 2 stm./feed-water flow mismatch in each stm. gen.</td><td>1 stm. gen. level coincident with 1 stm./feedwater flow mismatch in same stm. gen.</td><td>1 stm. gen. level and 2 stm./feed-water flow mismatch in same stm. gen. or 2 stm. gen. level and 1 stm./feedwater flow mismatch in same stm. gen.</td><td>1, 2</td><td>6</td></tr></table> **ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:** **a. The inoperable channel is placed in the tripped condition within 6 hours, and** **b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1.**
	SRO	• **DIRECT** Maintenance to investigate and repair the instrument malfunction. • Completes an Equipment Problem Checklist and contacts WCC and I&C support for OWP implementation. (WR, EIR and Maintenance support)
Simulator Communicator:		**Acknowledge any request for assistance. When I&C requested Sim communicator can come down and implement OWP as I&C. Return to booth and run AMS file: rps/OWP-RP-10-III-TST**

Op Test No.: NRC	Scenario # 3	Event # 2	Page 17 of 81
Event Description:	**FT-497 Channel IV Feed flow transmitter on 'C' SG fails low**		

Time	Position	Applicant's Actions or Behavior
		If an additional Operator is requested them they will be here as soon as they can.
	CREW	Implements OWP-RP-10
Evaluator Note:		OWP-RP-10

OWP-RP-10
Sheet 1 of 2

EIR Number: _____
W/O Number: _____
Clearance Number: _____

1. OWP - RP-10

2. System: Reactor Protection

3. Component: SP/FP LOOP 3

4. Scope: LCO action required due to inoperable Loop 3 steam flow/feed flow mismatch protection circuits of channel III or IV.

5. Applicable Requirements: 3.3.1 (Modes 1 and 2)

6. Precautions: 1) To prevent a Reactor Trip insure only one channel is taken out of service at a time, by verifying corresponding Trip Status Lights for the other channels are de-energized. 2) Both associated SG level channels must remain OPERABLE (LB/494B & LB/495B not tripped) and SG level must be maintained greater than the low level setpoint. (3) The ERFIS continuous calorimetric is inoperable.

7. Component lineup completed per attached sheet(s). _____ / _____ (Signature / Date)

8. Testing required on redundant equipment while the component is inoperable. None

9. Testing/Action required to restore operability. (N/A if tracked on EIR)

- MST-I0020 for Chan III or _____ / _____
- MST-I0021 for Chan IV _____ / _____
- Channel Check _____ / _____

(Signature / Date)

10. Component lineups restored per attached sheet(s). _____ / _____ (Signature / Date)

11. Remarks: _____

12. Reviewed By: _____ _____
(Superintendent - Shift Operations / Date)

After receiving the final review signature, this OWP becomes a QA RECORD and should be submitted to Document Services.

Op Test No.: NRC	Scenario # 3	Event # 2	Page 18 of 81
Event Description:	**FT-497 Channel IV Feed flow transmitter on 'C' SG fails low**		

Time	Position	Applicant's Actions or Behavior

OWP-RP-10
Sheet 2 of 2

Bistable/Status Light Lineup

Component ID or Number	Position for Inoperability Initial/Verified		Restored Position Initial/Verified	
PROTECTION CHANNEL III				
STEAM FLOW (FT-494) AND/OR FW FLOW (FT-497)				
In PIC 3 on Card C3-847:				
NOTE: Concurrent verification is preferred while tripping bistables.				
BS1 (PB/498B SP/FF Mismatch RX Trip)	TEST	_____/_____	NORMAL	_____/_____
On Main Control Board:				
FS-498Y (SG C FW Flow Recorder and Control Selector Switch)	496	_____/_____	496 or 497 (circle position selected)	_____/_____
FS-498Z (SG C Steam Flow Recorder and Control Selector Switch)	495	_____/_____	494 or 495 (circle position selected)	_____/_____
On TSLB-2 (Check the following):				
SG C FW < STM PB 498B (Window 3-3)	ENERGIZED	_____/_____	DE-ENERGIZED	_____/_____
PROTECTION CHANNEL IV				
STEAM FLOW (FT-495) AND/OR FW FLOW (FT-496)				
In PIC 4 on Card C4-830:				
NOTE: Concurrent verification is preferred while tripping bistables.				
BS1 (PB/498A SP/FF Mismatch Rx Trip)	TEST	_____/_____	NORMAL	_____/_____
On Main Control Board:				
FS-498Y (SG C FW Flow Recorder and Control Selector Switch)	497	_____/_____	496 or 497 (circle position selected)	_____/_____
FS-498Z (SG C Steam Flow Recorder and Control Selector Switch)	494	_____/_____	494 or 495 (circle position selected)	_____/_____
On TSLB-2 (Check the following):				
SG C FW < STM PB 498A (Window 3-4)	ENERGIZED	_____/_____	DE-ENERGIZED	_____/_____

Simulator Operator:	When directed to implement OWP-RP-10 run AMS file: rps/OWP-RP-10-III-TST. An I&C Tech will need to come to the MCR for a brief on OWP implementation.
Simulator Communicator:	Contact MCR when complete

Op Test No.: NRC	Scenario # 3	Event # 2	Page 19 of 81
Event Description:	**FT-497 Channel IV Feed flow transmitter on 'C' SG fails low**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**When the 'C' FRV is placed back into Auto the controller will fail to 60% output and the valve will OPEN causing more flow than required and increasing SG level. The BOP should identify the malfunction and respond by placing the FRV controller back to MANUAL and adjusting Feed Flow accordingly.**
	BOP	(When the 'C' SF FRV controller is returned to AUTO control Feed Flow will increase as the valve drifts open to ~ 60%.) Recognizes that Feed Flow is rising and has lost control of 'C' SG level control in Automatic. Returns the FRV control back to MANUAL. Informs the SRO that 'C' SG FRV control has malfunctioned and will not control level in automatic.
	SRO	May direct BOP to control SG 'C' level within OMM-001 Attachment 13 limits again. Limits were already in effect when FRV was initially taken to manual. Contacts WCC and requests assistance for 'C' FRV failure to control in Automatic.
Simulator Communicator:		**Acknowledge request for support.**
Evaluator Note:		**Wait for OWP-RP-10 to be completed and the BOP to identify the FRV problem and place the valve in MANUAL prior to next event.** **Once the SG level has been restored to within the normal operating band and the Tech Spec has been identified, direct initiation of Event 3, VCT Level Channel 115 fails low.**

Op Test No.: NRC	Scenario # 3	Event # 3	Page 20 of 81
Event Description:	**VCT Level Channel 115 failure low**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**Wait for OWP-RP-10 to be completed and the BOP to identify the FRV problem and place the valve in MANUAL prior to next event.** **Once the SG level has been restored to within the normal operating band and the Tech Spec has been identified, direct initiation of Event 3, VCT Level Channel 115 fails low.**
Simulator Operator:		**When directed by Lead Evaluator: Actuate Trigger 3** **VCT Level Channel 115 failure low**
Indications Available		• Auto Makeup initiates • ALB-007-4-3, VCT HIGH-LOW LEVEL • ALB-007-5-5, COMPUTER ALARM CHEM & VOL SYSTEMS
	RO	RESPONDS to alarm ALB-007-4-3 or enters AOP-003 directly
	SRO	Crew may immediately secure auto makeup based on AD-OP-ALL-1000, Conduct of Operations, guidance since the makeup is due solely to the instrument failure.
Evaluator Note:		**The SRO is likely to direct the Turbine to be placed to HOLD and go directly to AOP-003, MALFUNCTION OF REACTOR MAKEUP CONTROL, while the RO references the APP.**
	BOP	At the DEH controls, depresses the Turbine "HOLD" push button and places the Turbine in HOLD
APP-ALB-007	RO	ENTERS and performs APP-ALB-007-4-3. If not in AOP-003.
	RO	CONFIRM alarm using
		• LI-115-1, Vol Control Tank Level (MCB-1A2).

Op Test No.: NRC	Scenario # 3	Event # 3	Page 21 of 81
Event Description:	**VCT Level Channel 115 failure low**		

Time	Position	Applicant's Actions or Behavior	
	RO	DETERMINES LT-115 failed LOW.	
	RO	VERIFY Automatic Functions: AT 5% VCT level, the following occurs: • 1CS-291, Suction from RWST (LCV-115B) opens. • 1CS-292, Suction from RWST (LCV-115D) opens • 1CS-165, VCT Outlet/Dilution (LCV-115C) shuts • 1CS-166, VCT Outlet/Dilution (LCV-115E) shuts • AT 20% VCT level, auto makeup from the Reactor Makeup System starts. • AT 40% VCT level, auto makeup from the Reactor Makeup System stops. AT 80% VCT level, 1CS-120, VCT Level Control Vlv, fully diverts letdown flow to the RHT.	(N/A) (YES) (N/A) (N/A)
Procedure Caution:		Low VCT level is a precursor to gas binding the CSIPs.	
	RO	PERFORM Corrective Actions: • MATCH charging and letdown flows. • IF charging flow is lost, THEN GO TO AOP-018, Reactor Coolant Pump Abnormal Conditions.	
Procedure Note:		If either LT-112 or LT-115 fails high, the automatic CSIP suction swapover from the VCT to the RWST will not function if required. (Reference 1)	
	SRO	IF EITHER of the following occurs: • VCT level is less than 20% AND automatic makeup is NOT in progress • VCT level is greater than 40% AND automatic makeup is still in progress THEN GO TO AOP-003, Malfunction of Reactor Makeup Control.	
AOP-003	SRO	Holds crew alignment brief Enters AOP-003, Malfunction Of Reactor Makeup Control.	

Op Test No.: NRC	Scenario # 3	Event # 3	Page 22 of 81
Event Description:	**VCT Level Channel 115 failure low**		

Time	Position	Applicant's Actions or Behavior	
Procedure Note:		This procedure contains no immediate actions.	
	CREW	CHECK instrument air available.	(YES)
	RO	CHECK BOTH LT-112 and LT-115 functioning properly.	(NO)
	SRO	RNO: GO TO Section 3.1, LT-112 or LT-115 Malfunction.	
	SRO	REFER TO Attachment 1, VCT Level Control Channels Operation, as necessary to assess the effects of an LT-112 or LT-115 malfunction.	

Op Test No.: NRC	Scenario # 3	Event # 3	Page 23 of 81
Event Description:	**VCT Level Channel 115 failure low**		

Time	Position	Applicant's Actions or Behavior	
Evaluator Note:		**Crew may brief on AOP-003, Attachment 1.**	
Procedure Note:		An instrument malfunction may manifest itself as a slow drift rather than a "full high" or "full low" failure. Until the instrument has failed fully high or fully low, all steps should be reviewed for applicability periodically, even if not continuously applicable.	
	RO	CHECK that LT-115 is FAILING.	(YES)
	RO	MONITOR VCT level using either of the following: • ERFIS point LCS0112 • LI-112 (local)	
Simulator Communicator:		**If AO is dispatched to take local readings on LI-112 wait 1-2 minutes and report current ERFIS reading to MCR. If prompted report no leaks.**	
	RO	CHECK LT-115 FAILING LOW.	(YES)
	RO	PLACE RMW CONTROL Switch in STOP. (May already have been performed.)	
Procedure Note:		Normally, VCT level is maintained between 20 and 40% by auto makeup.	
	RO	CONTROL VCT level as follows: • MAINTAIN level BELOW 70% • MAINTAIN level ABOVE 20% OR DESIRED MINIMUM	
	SRO	GO TO Step 12.	
	RO	MAINTAIN VCT level GREATER THAN 5%.	

Op Test No.: NRC	Scenario # 3	Event # 3	Page 24 of 81
Event Description:	**VCT Level Channel 115 failure low**		

Time	Position	Applicant's Actions or Behavior	
	SRO	OBSERVE the note prior to Step 19 AND GO TO Step 19.	
Procedure Note:		Lifting leads in the following step will simulate a low-low level signal from the failed instrument. This is to allow a valid low-low level signal one instrument to initiate emergency makeup.	
	RO	CHECK the malfunctioning instrument FAILING LOW.	(YES)
	SRO	DIRECT Maintenance to investigate and repair the instrument malfunction.	
	SRO	CHECK that the instrument malfunction has been repaired.	(NO)
	SRO	RNO: WAIT until repairs are complete before proceeding.	
	SRO	Reviews/prepares OMM-001, Attachment 5 Equipment Problem Checklist. Contacts WCC and support personnel for repairs.	
Simulator Communicator:		**Respond to crew requests.**	
Lead Evaluator:		**After the crew has VCT level sufficiently controlled Cue the Simulator Operator to insert Trigger 4** **Event 4 - "Reactor Primary Shield Cooling Fan Trip".**	

Op Test No.: NRC	Scenario # 3	Event # 4	Page 25 of 81
Event Description:	**Reactor Primary Shield Cooling Fan Trip**		

Time	Position	Applicant's Actions or Behavior	
Lead Evaluator:		**After the crew has VCT level sufficiently controlled Cue the Simulator Operator to insert Trigger 4** **Event 4 - "Reactor Primary Shield Cooling Fan Trip".**	
Simulator Operator:		**When directed by Lead Evaluator: Actuate Trigger 4** **Reactor Primary Shield Cooling Fan Trip**	
Indications Available		• ALB-027-5-5, REACTOR PRIMARY SHIELD CLG FANS S2 LOW FLOW-O/L • Fan control switch indicating lights: o White light on indicates thermal overload	
APP-ALB-027	BOP	ENTERS and performs APP-ALB-027-5-5	
	BOP	**CONFIRM** alarm using	
		Control switch indicating lights: • White light ON indicates thermal overload • All indication lost indicates power supply de-energized	
	SRO	**VERIFY** Automatic Functions: None	
	BOP	**PERFORM** Corrective Actions: • **START** the standby Primary Shield Cooling fan per OP-169, Containment Cooling and Ventilation.	(YES)
	BOP	• **DISPATCH** an operator to check the status of the following breakers: o 1A21-SA-4C, S-2 (1A-SA) Primary Shield Cooling Fan (both breakers)	
Simulator Communicator:		**If dispatched to investigate the breaker, report back (in 1- 2 mins) that both breakers for 1A21-SA-4C, S-2 (1A-SA) Primary Shield Cooling Fan are tripped with no apparent cause evident.**	

Op Test No.: NRC	Scenario # 3	Event # 4	Page 26 of 81
Event Description:	**Reactor Primary Shield Cooling Fan Trip**		

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	• **IF** the breaker has tripped, **OR** has a thermal overload, **THEN ENSURE** that the cause of the trip has been investigated and corrected prior to resetting breaker.
	SRO	Reviews/prepares OMM-001, Attachment 5 Equipment Problem Checklist. Contacts WCC for assistance. (WR, EIR and Maintenance support) Initiates OWP-HVAC (no Tech. Spec. implications)
Lead Evaluator:		**After the crew has restored Reactor Primary Shield Cooling Cue the Simulator Operator to insert Trigger 5** **Event 5 - "Trip of the 'A' CSIP"**

Op Test No.: NRC	Scenario # 3	Event # 5 / 6	Page 27 of 81
Event Description:	**"A" CSIP trip / Restore Letdown**		

Time	Position	Applicant's Actions or Behavior
Lead Evaluator:		**After the crew has restored Reactor Primary Shield Cooling Cue the Simulator Operator to insert Trigger 5** **Event 5 - "Trip of the 'A' CSIP"**
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 5** **"A" CSIP trip**
Indications Available:		ALB-06-1-1 Charging Pump Discharge Header High-Low Flow ALB-06-1-2 Chrg Pump A Trouble ALB-06-1-3 Chrg Pump A Trip Or Close Ckt Trouble ALB-08-2-1 RCP Seal Water Injection Low Flow ALB-08-2-2 ASI Pump Auto Start Timer Initiated
	RO	• RESPONDS to multiple alarms on ALB-06 (1-1, 1-2, 1-3) and ALB-08 (2-1 & 2-2). • REPORTS CSIP 'A' tripped.
	CREW	Identifies Entry Conditions met for AOP-018, Reactor Coolant Pump Abnormal Conditions
AOP-018		Reactor Coolant Pump Abnormal Conditions
Immediate Action	RO	PERFORMS immediate actions. • CHECK ANY CSIP RUNNING. (NO) • ISOLATE letdown by verifying the following valves SHUT: o 1CS-7, 45 GPM Letdown Orifice A o 1CS-8, 60 GPM Letdown Orifice B o 1CS-9, 60 GPM Letdown Orifice C
	SRO	ENTERS AOP-018, RCP Abnormal Conditions Makes PA announcement for AOP entry Conducts a plant alignment brief

Op Test No.: NRC	Scenario # 3	Event # 5 / 6	Page 28 of 81
Event Description:	**"A" CSIP trip / Restore Letdown**		

Time	Position	Applicant's Actions or Behavior
	BOP	Dispatch operators to investigate cause of trip
Simulator Communicator:		**If dispatched to investigate, wait 3-4 minutes then report a breaker overcurrent trip flag on Phase A. Report as second AO that there are no obvious problems at the pump.**
	SRO	Informs SM to REFER to PEP-110, Emergency Classification and Protective Action Recommendations, AND ENTER the EAL Matrix.
Procedure Note:		**Minimum allowable flow for a CSIP is 60 gpm which is provided by normal miniflow during normal operation and alternate miniflow during safety injection. Maintaining CSIP flow greater than or equal to 60 gpm also satisfies this requirement.**
	SRO	EVALUATE plant conditions AND GO TO the appropriate section:
		MALFUNCTION / SECTION / PAGE Loss of CCW and/or Seal Injection to RCPs / 3.1 / 5
	RO	CHECK ALB-5-1-2A, RCP Thermal Bar HDR High Flow, alarm CLEAR. (YES)
	SRO	CHECK ALL RCPs operating within the limits of Attachment 1. (YES)
	RO	• CHECK the following NORMAL for ALL RCPs: o CCW flow (YES) o Seal Injection flow (NO)

Op Test No.: NRC	Scenario # 3	Event # 5 / 6	Page 29 of 81
Event Description:	**"A" CSIP trip / Restore Letdown**		

Time	Position	Applicant's Actions or Behavior
	SRO	RESTORE using the applicable attachment:
		MALFUNCTION / ATTACHMENT
		Loss of Seal Injection flow only / Attachment 4
Procedure Note:		**The ASI System will actuate in 2 minutes and 45 seconds from timer initiation. ALB-8-2-4 ASI pump start will alarm**
Evaluator Note:		**The ASI system when actuated will provide RCP seal injection of highly borated water. During the time the ASI pump is running a negative reactivity addition is being conducted in the form of boration. The sooner the system is shut down the less effect it will have on reactivity.**
	RO	• CHECK at least one CSIP RUNNING. (NO) • Dispatch an operator to monitor operation of the ASI System
Simulator Communicator:		**Acknowledge request.**
Simulator Operator:		**Be prepared to STOP the ASI pump when requested to.** **Either use RF CVC 195 STOP** **OR** **Drawing CVC ASI 01. ASI Pump Switch**
	RO	• PLACE controller FK-122.1, Charging Flow in MANUAL AND SHUT. • SHUT HC-186.1, RCP Seal WTR INJ Flow. • VERIFY a suction path for the standby CSIP by performing the following:

Op Test No.: NRC	Scenario # 3	Event # 5 / 6	Page 30 of 81
Event Description:	**"A" CSIP trip / Restore Letdown**		

Time	Position	Applicant's Actions or Behavior	
	RO	○ VERIFY CSIP suction flowpath from VCT as follows: ▪ VERIFY greater than 5% level is established in VCT. ▪ VERIFY the following valves are OPEN: • LCV-115C, VCT Outlet (1CS-165) • LCV-115E, VCT Outlet (1CS-166)	(YES) (YES) (YES)
	SRO	Provide Pressurizer level control bands and trip limits per OMM-001 Att. 13 – Control band - Maintain level within 5% of Reference level – trip limits of 10% low and 90% high	
Procedure Caution:		**Low VCT level is a precursor to gas binding the CSIPs**	
	RO	CHECK VCT level is greater than 5%, AND STABLE OR RISING	(YES)
	RO	MAINTAIN CCW HX outlet temperature less than 105°F.	
	RO	START the standby CSIP. (Starts 'B' CSIP)	
	RO	CHECK seal injection flow being supplied by the ASI System.	(YES)
	RO	OPEN HC-186.1, RCP Seal WTR INJ Flow. DIRECT the operator monitoring the ASI System to STOP the ASI Pump by placing CS-210.1, ASI PUMP MOTOR CONTROL SWITCH, in STOP. (At the ASI Control Panel)	
Simulator Communicator:		**Acknowledge request to secure the ASI pump**	

Op Test No.: NRC	Scenario # 3	Event # 5 / 6	Page 31 of 81
Event Description:	**"A" CSIP trip / Restore Letdown**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**Secure the ASI pump when communications are complete** **CVC 195 STOP**
Evaluator Note:		**ALB-8-2-3 ASI system Trouble will alarm when ASI pump is stopped**
Simulator Communicator:		**Report back that the ASI pump is secured**
	RO	ADJUST HC-186.1, RCP Seal WTR INJ Flow, to establish seal injection flow as necessary to maintain the following: • Less than 31 gpm total flow to all RCPs. • Between 8 and 13 gpm to all RCPs.
	RO	DIRECT the operator monitoring the ASI System to PLACE CS-210.1, ASI PUMP MOTOR CONTROL SWITCH, in AUTO. (At the ASI System Control Panel)
Simulator Communicator:		**Acknowledge request**
Simulator Operator:		**Place ASI control back to AUTO** **CVC 195 AUTO report back to MCR when back in AUTO.** **Drawing CVC ASI 01. ASI Pump Switch.**
	BOP	START CSIP room ventilation per OP-172, Reactor Auxiliary Building HVAC System. IF B Train is being started, THEN PLACE the following Air Handling Units control switches to START AND VERIFY proper damper and valve operation (if they start): • CSIP SB AREA FAN COOLER AH-9 B SB
	RO	RESTORE Charging and Letdown flow per OP-107, Chemical and Volume Control System.

Op Test No.: NRC	Scenario # 3	Event # 5 / 6	Page 32 of 81
Event Description:	**"A" CSIP trip / Restore Letdown**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**Restoration of Letdown is not required to be completed prior to initiation of Event 7 and is up to the Lead Evaluator discretion on whether it should be completed.** **OP-107, Chemical and Volume Control System, section 5.4 is included on page 58 of this scenario guide.**
	BOP	Start 'B' Chiller per OP-148, section 5.2. Contact AO for Chiller pre-start checks (NOTE: At this time the crew may start Pump P-4 B)
Evaluator Note:		**OP-148, section 5.2 is included on page 64 of this scenario guide. It is NOT intended to wait for the crew to place the standby Chiller in service – Continue with scenario. There is also the potential for the SRO to call for a train swap. Judgment call by SRO.**
	RO	MONITOR Tavg to Tref. (ASI injection has added negative reactivity)
	SRO	INITIATE action to determine and correct the cause of the loss of the CSIP.
	RO	CHECK seal injection flow between 8 and 13 gpm has been established to all RCPs.
	RO	WHEN seal injection flow has been established between 8 and 13 gpm, THEN PERFORM OST-1126, Reactor Coolant Pump Seals Controlled Leakage Evaluation Monthly Interval Modes 1-4. Note: OST-1126 may not be performed promptly.

Op Test No.: NRC Scenario # 3 Event # 5 / 6 Page 33 of 81

Event Description: **"A" CSIP trip / Restore Letdown**

Time	Position	Applicant's Actions or Behavior
	RO	CHECK CCW flow is established to the RCPs.
	SRO	EXIT this procedure. (AOP-018)
	SRO	Reviews/prepares OMM-001, Attachment 5 Equipment Problem Checklist for the failure of the CSIP. Contacts support personnel for repairs.
Simulator Communicator:		**Acknowledge request for support.**
	SRO	Addresses Technical Specifications: • 3.1.2.4 - CSIP's 3.1.2.4 At least two charging/safety injection pumps shall be OPERABLE. APPLICABILITY: MODES 1, 2, and 3. ACTION: With only one charging/safety injection pump OPERABLE, restore at least t charging/safety injection pumps to OPERABLE status within 72 hours or be least HOT STANDBY and borated to a SHUTDOWN MARGIN as specified in the CO OPERATING LIMITS REPORT (COLR), plant procedure PLP-106 at 200°F within t next 6 hours; restore at least two charging/safety injection pumps to OPE status within the next 7 days or be in HOT SHUTDOWN within the next 6 hou • 3.5.2 Action a.- ECCS Subsystems 3.5.2 Two independent Emergency Core Cooling System (ECCS) subsystems shal be OPERABLE with each subsystem comprised of: a. One OPERABLE Charging/safety injection pump. b. One OPERABLE RHR heat exchanger. c. One OPERABLE RHR pump, and d. An OPERABLE flow path capable of taking suction from the refuel water storage tank on a Safety Injection signal and, upon being manually aligned, transferring suction to the containment sump during the recirculation phase of operation. APPLICABILITY: MODES 1, 2, and 3. ACTION: a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in at least STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours. Both are 72 hours to restore action statements.
Lead Evaluator:		**After the Plant has stabilized cue Simulator Operator to insert Event 7 Large Break LOCA.**

Op Test No.: NRC	Scenario # 3	Event # 7	Page 34 of 81
Event Description:	**Large Break LOCA**		

Time	Position	Applicant's Actions or Behavior
Lead Evaluator:		**After the Plant has stabilized cue Simulator Operator to insert Event 7 Large Break LOCA.**
Simulator Operator		**When directed by Lead Evaluator: Activate Trigger 7 "Large Break LOCA"**
Indications Available		• RCS Pressure rapid decrease • Charging flow increasing • Pressurizer level decreasing • ALB-09-5-1 PRESSURIZER HIGH-LOW PRESS • ALB-09-2-2 PRESSURIZER CONTROL LOW LEVEL DEVIATION • ALB-09-3-3 PRZ CONT LOW PRESS AND HEATERS ON • ALB-10-8-5a CMPTR ALARM RX COOLANT • Radiation monitors in alarm
Evaluator Note:		**The 'A' RHR Pump will not auto start when SI is initiated.**
	CREW	RESPONDS to RCS inventory alarms.
	RO	Initiate a MANUAL reactor trip. (Due to the rapid decrease in RCS pressure an automatic Reactor Trip/SI is likely)

Op Test No.: NRC	Scenario # 3	Event # 7	Page 35 of 81
Event Description:	**Large Break LOCA**		

Time	Position	Applicant's Actions or Behavior

EOP-E-0		Reactor Trip Or Safety Injection	
	SRO	Enters E-0 Conducts an Alignment brief Makes a PA announcement	
	RO/BOP	Performs E-0 immediate actions.	
Immediate Actions	RO	VERIFY Reactor Trip: REACTOR TRIP CONFIRMATION Reactor Trip AND Bypass BKRs - OPEN Rod Bottom Lights (Zero Steps) - LIT Neutron Flux - DROPPING	(YES) (YES) (YES)
Immediate Actions	BOP	Check Turbine Trip – ALL THROTTLE VALVES SHUT TURB STOP VLV 1 – TSLB-2-11-1 TURB STOP VLV 2 – TSLB-2-11-2 TURB STOP VLV 3 – TSLB-2-11-3 TURB STOP VLV 4 – TSLB-2-11-4	(YES) (YES) (YES) (YES)
Immediate Actions	BOP	Perform The Following: a. AC Emergency Buses – AT LEAST ONE ENERGIZED b. AC Emergency Buses – BOTH ENERGIZED	(YES) (YES)
Immediate Actions	RO	Safety Injection – ACTUCATED (BOTH TRAINS) BPLP 4-1,"SI ACTUATED" - LIT (CONTINUOUSLY)	(YES/ NO)

Op Test No.: NRC	Scenario # 3	Event # 7	Page 36 of 81
Event Description:	**Large Break LOCA**		

Time	Position	Applicant's Actions or Behavior	
Immediate Actions	RO	RNO Perform the following: • Check Safety Injection – REQUIRED SI ACTUATION CRITERIA PRZ Pressure - LESS THAN OR EQUAL TO 1850 PSIG CNMT Pressure - GREATER THAN OR EQUAL TO 3.0 PSIG Any SG Pressure - LESS THAN OR EQUAL TO 601 PSIG Manual - DEGRADATION TOWARDS AUTOMATIC ACTUATION Abnormal Operating Procedure - DIRECTS MANUAL ACTUATION One SI Train - FAILED (BPLP 4-1 FLASHING) • **IF** Safety Injection actuation is required **THEN** perform the following: o **MANUALLY actuate Safety Injection.** o **GO TO** Step 5.	(YES)
Evaluator's Note:		**Once Containment Pressure exceeds 3 psig the crew should apply adverse CNMT values for the remainder of the scenario.**	
	SRO	Perform The Following: • Review Foldout page. • Evaluate EAL Matrix.	
Evaluator's Note:		**The crew may brief on the foldout criteria and stop the RCP's at this time dependent on RCS conditions and leak progression.**	
	RO	VERIFY CSIPs – ALL RUNNING.	(YES/ NO)

Op Test No.: NRC	Scenario # 3	Event # 8	Page 37 of 81
Event Description:	**Large Break LOCA (continued)**		

Time	Position	Applicant's Actions or Behavior	
Event 8	RO	VERIFY RHR pumps – ALL RUNNING. • ('A' RHR Pump is not running) ○ **STARTS 'A' RHR Pump**	(NO)
	RO	Safety Injection flow – GREATER THAN 200 GPM.	(YES)
Evaluator's Note:		**RCS pressure may be greater than 230 PSIG if crew progression is quicker than the validation crew. IF this is the case the RNO actions will apply.**	
	RO	RCS pressure – LESS THAN 230 PSIG. • GO TO Step 12	(YES)
Critical Task #1	RO	Foldout - RCP trip criteria is met or PHASE B Actuation Stops ALL RCPs RCP Trip Criteria: IF both of the following occur, THEN stop all RCPs: • SI flow - GREATER THAN 200 GPM • RCS pressure – LESS THAN 1400 PSIG Critical to trip ALL 3 RCPs within 10 minutes of a Phase B isolation signal (ALB-001-5-1)	
		Time ALB-001-5-1, Containment Isolation Phase B, received _____	
	BOP	MAIN Steam Line Isolation – ACTUATED. MAIN STEAM LINE ISOLATION ACTUATION CRITERIA CNMT pressure - GREATER THAN OR EQUAL TO 3.0 PSIG Any SG pressure - LESS THAN OR EQUAL TO 601 PSIG	(YES)

Op Test No.: NRC	Scenario # 3	Event # 8	Page 38 of 81
Event Description:	**Large Break LOCA (continued)**		

Time	Position	Applicant's Actions or Behavior	
	BOP	VERIFY all MSIVs and Bypass Valves - SHUT	(YES)
	BOP	Any SG pressure - 100 PSIG LOWER THAN PRESSURE IN TWO OTHER SGs • GO TO Step 16	(NO)
Critical Task #2	RO	CHECK CNMT Pressure – HAS REMAINED LESS THAN 10 PSIG. • Perform the following: o Verify CNMT spray – ACTUATED o May refer to FR-Z.1 o Start at least one CNMT spray pump ▪ Starts 'B' CT Pump ▪ OPENS 1CT-88 and 1CT-11 **OR** ▪ Starts 'A' CT Pump ▪ OPENS 1CT-50 and 1CT-12 (Critical to start and align one Train of Containment Spray prior to exiting EOP-E-0)	(NO) (NO)
	RO	Stop all RCPs (if not performed previously)	
	BOP	Verify AFW flow - AT LEAST 210 KPPH ESTABLISHED	(YES)
	BOP	Sequencer Load Block 9 (Manual Loading Permissive) - ACTUATED (BOTH TRAINS)	(YES)
	BOP	Energize AC buses 1A1 **AND** 1B1.	

Op Test No.: NRC	Scenario # 3	Event # 8	Page 39 of 81
Event Description:	**Large Break LOCA (continued)**		

Time	Position	Applicant's Actions or Behavior
	SRO	ASSIGNS a crew member to perform the following: • VERIFY alignment of components from actuation of ESFAS Signals using Attachment 3, "Safeguards Actuation Verification", while continuing with implementation of EOPs. (Copy of Att. 3 contained in back of the guide)
	BOP	STABILIZE AND maintain temperature between 555°F AND 559°F using Table 1.

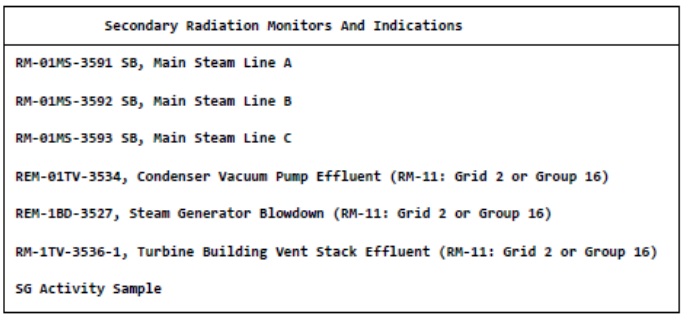
TABLE 1: RCS TEMPERATURE CONTROL GUIDELINES FOLLOWING RX TRIP

- Guidance is applicable until another procedure directs otherwise.
- IF no RCPs running, THEN use wide range cold leg temperature.

LESS THAN 557°F AND DECREASING	GREATER THAN 557°F AND INCREASING	STABLE AT OR TRENDING TO 557°F
• Stop dumping steam	• IF condenser available THEN transfer steam dump to STEAM PRESSURE mode using OP-126, Section 5.3 AND dump steam to condenser	• Control feed flow and steam dump to establish and maintain RCS temperature between 555°F AND 559°F
• Control feed flow	OR	
• Maintain total feed flow greater than 210 KPPH until level greater than 25% [40%] in at least one on intact SG	• Dump steam using intact SG PORVs • Control feed flow to maintain SG levels	

	RO	PRZ PORVs – SHUT. PRZ spray valves – SHUT PRZ PORV Block Valves – AT LEAST ONE OPEN.	(YES) (YES) (YES)

Op Test No.: NRC	Scenario # 3	Event # 8	Page 40 of 81
Event Description:	**Large Break LOCA (continued)**		

Time	Position	Applicant's Actions or Behavior	
	BOP	ANY SG pressures – DROPPING IN AN UNCONTROLLED MANNER **OR** COMPLETELY DEPRESSURIZED • GO TO Step 27	(NO) (NO)
	BOP	ANY SG – ABNORMAL RADIATION **OR** UNCONTROLLED LEVEL RISE • GO TO Step 30 	(NO) (NO)
	RO	CNMT pressure – NORMAL.	(NO)
	SRO	GO TO E-1, "LOSS OF REACTOR OR SECONDARY COOLANT", Step 1. Initiate monitoring of CSFSTs	
Evaluator Note:		**Due to RCS conditions a RED on EOP-FR-P.1 will require a transition to the function restoration procedures. EOP-FR-P.1 does NOT contain any significant actions for the current plant conditions. The crew will return to procedure and step in effect.** **The following steps encompass the EOP-FR-P.1 actions with return to EOP-E-1.**	

Op Test No.: NRC	Scenario # 3	Event # 8	Page 41 of 81
Event Description:	**Large Break LOCA (continued)**		

Time	Position	Applicant's Actions or Behavior

EOP FR-P.1		Response to Imminent Pressurized Thermal Shock	
	SRO	• Initiates FR-P.1, Response to Imminent Pressurized Thermal Shock • Conducts an Alignment brief	
	SRO	Check RCS Pressure: • Check for both of the following: ○ RCS pressure – LESS THAN 230 PSIG ○ Any RHR HX header flow - GREATER THAN 1000 GPM • RETURN to procedure and step in effect. (E-1)	(YES) (YES)
	SRO	Return to EOP-E-1 (or condition dependent – EOP-FR-C.2)	

Evaluator Note:	**Due to RVLIS level fluctuations (<39%) caused by lowering inventory of RCS from the LOCA and input from the ECCS components an ORANGE condition will toggle in/out and finally remain on for Core Cooling. This will require the crew to implement EOP-FR-C.2.** **The following steps encompass the EOP-FR-C.2 actions with return to EOP-E-1.**

Op Test No.: NRC	Scenario # 3	Event # 8	Page 42 of 81
Event Description:	**Large Break LOCA (continued)**		

Time	Position	Applicant's Actions or Behavior
EOP FR-C.2		Response to Degraded Core Cooling
	SRO	Implements EOP-FR-C.2 Conducts an Alignment brief
	SRO	INFORMS Crew that EOP-FR-C.2 Foldouts apply.
Evaluator Note:		**The crew may brief on the foldout criteria.**
	BOP	Verify SI Valves - PROPERLYALIGNED
Evaluator Note:		A copy of EOP-E-0 Attachment 1 is attached to the back of this guide.
	CRS	**CAUTION** ☐ To prevent damage to the RCP seals, the ASI pump should **NOT** be manually started. **NOTE** ☐The ASI pump starts on a time delay of 2 MINUTES and 45 SECONDS after loss of RCP seal injection. Seal injection from the ASI pump is **NOT** sufficient to be considered an alternate source of high head injection.
	RO	Verify SI Flow In All Trains: SI flow - GREATER THAN 200 GPM (YES)
	RO	RCS pressure - LESS THAN 230 PSIG (YES)
	RO	Check for all of the following: • RHR HX Train A header flows - > 1000 GPM (YES) • RHR HX Train B header flows - > 1000 GPM (YES)

Op Test No.: NRC	Scenario # 3	Event # 8	Page 43 of 81
Event Description:	**Large Break LOCA (continued)**		

Time	Position	Applicant's Actions or Behavior	
	RO	Check RCS Vent Paths: Check Power to PRZ PORV block valves – AVAILABLE PRZ PORVs – SHUT PRZ Block valves - AT LEAST ONE OPEN	(YES) (YES) (YES)
	RO	Verify reactor vessel vent valves - SHUT: • 1RC-900 • 1RC-901 • 1RC-904 • 1RC-905	(YES) (YES) (YES) (YES)
	RO	Verify PRZ vent valves - SHUT: • 1RC-902 • 1RC-903	(YES) (YES)
	RO	Verify PRZ PORV closure following any subsequent opening of the valve to prevent primary plant depressurization.	
	RO	Check RCP Status: Check RCPs - AT LEAST ONE RUNNING	(NO)
	RO	Check Core Cooling: RVLIS full range – GREATER THAN 39% (YES/NO – RVLIS level will be fluctuating) YES - Core exit TCs - < 730°F Return to procedure and step in effect (E-1) NO – continue with Step 8	
Evaluator Note:		**Since RVLIS is fluctuating the crew may / may not see level the same. IF they are at a condition where level is < 39% then they will continue with EOP-FR-C.2 until the RWST level is < 23.4% at which time they will transition to ES-1.3 and align for Cold Leg Recirc.** **The remaining steps of EOP-FR-C.2 are located in the back of this guide (page 79) to follow along with IF RVLIS level is < 39% at this decision point. The next page of this guide continues with EOP-E-1.**	

Op Test No.: NRC	Scenario # 3	Event # 8	Page 44 of 81
Event Description:	**Large Break LOCA (continued)**		

Time	Position	Applicant's Actions or Behavior

EOP-E-1		Loss Of Reactor Or Secondary Coolant	
	SRO	Implements EOP-E-1 Conducts an Alignment brief	
	SRO	INFORMS Crew that EOP-E-1 Foldouts apply.	
Evaluator Note:		**The crew may brief on the foldout criteria.**	
	CREW	Initiate Monitoring Of Critical Safety Function Status Trees.	
	RO	MAINTAIN RCP Seal Injection flow between 8 GPM AND 13 GPM.	
	BOP	CHECK Intact SG Levels: • ANY level – GREATER THAN 25% **[40%].** (YES) • CONTROL feed flow to maintain all intact levels between 25% AND 50% **[40% AND 50%].** • Any level - RISING IN AN UNCONTROLLED MANNER (NO)	
	SRO	GO TO Step 4.	
	RO	CHECK PRZ PORV AND Block Valves: • VERIFY AC buses 1A1 AND 1B1 – ENERGIZED. (YES) • CHECK PRZ PORVs – SHUT. (YES) • CHECK block valves – AT LEAST ONE OPEN. (YES)	
	RO	IF a PRZ PORV opens on high pressure, THEN verify it shuts after pressure decreases to less than opening setpoint.	

Op Test No.: NRC	Scenario # 3	Event # 8	Page 45 of 81
Event Description:	**Large Break LOCA (continued)**		

Time	Position	Applicant's Actions or Behavior	
	RO	CHECK SI Termination Criteria: • RCS subcooling – GREATER THAN o 10°F [40°F] – C o 20°F [50°F] – M	 (NO) (NO)
	SRO	GO TO Step 6.	
Simulator Operator / Communicator		**When contacted to place A/B air compressors in Local Control mode, run CAEP :*air\ACs_to_local.txt*. When CAEP is complete, report that the air compressors are running in local control mode.** **When contacted to Unlock and Turn ON the breakers for the CSIP suction and discharge cross-connect valves, run CAEP *:\cvc\E-0 Att 3 CSIP suct & disch valve power*. When the CAEP is complete, report completion to the MCR.**	
	RO	Check CNMT Spray Status: • CHECK any CMT Spray Pump – RUNNING.	 (YES)
	SRO	• CONSULT plant operations staff to determine if CNMT spray should be placed in standby.	
Simulator Communicator:		**If contacted as plant operations staff, provide the following direction: "Unless directed by procedure, leave CNMT Spray in service until the TSC has completed an evaluation".**	
	SRO	**WHEN** plant operations staff directs, CNMT Spray be placed in standby alignment, **THEN** do Steps 6d, e AND f. o Continue with Step 7.	

Op Test No.: NRC	Scenario # 3	Event # 8	Page 46 of 81
Event Description:	**Large Break LOCA (continued)**		

Time	Position	Applicant's Actions or Behavior	
	RO	WHEN flux less than $5x10^{-11}$ AMPS, THEN do Steps 52b AND c. • VERIFY source range detectors – ENERGIZED. • TRANSFER nuclear recorder to source range scale.	
	RO	CHECK RHR Pump Status:	
		• RCS Pressure – GREATER THAN 230 PSIG.	(NO)
	SRO	GO TO Step 10.	
	SRO	Establish CCW flow to the RHR Heat Exchanger:	
	RO	• Verify both CCW pumps – RUNNING • Open the following valves: o TRAIN A: 1CC-147 o TRAIN B: 1CC-167 • Verify CCW flow to the RHR heat exchangers • Perform one of the following to establish two independent CCW systems o Shut train A CCW non-essential supply AND return valves ▪ 1CC-99 (SHUTS) ▪ 1CC-128 (SHUTS) **OR** o Shut train B CCW non-essential supply AND return valves ▪ 1CC-113 ▪ 1CC-127	(YES) (YES)
	BOP	CHECK EDG Status: • CHECK AC emergency buses 1A-SA AND 1B-SB – ENERGIZED BY OFFSITE POWER	(YES)

Op Test No.: NRC	Scenario # 3	Event # 8	Page 47 of 81
Event Description:	**Large Break LOCA (continued)**		

Time	Position	Applicant's Actions or Behavior	
	SRO	GO TO Step 11e.	
	BOP	• CHECK any EDG – RUNNING UNLOADED	(YES)
	RO	RESET SI.	
	SRO	Manually realign safeguards equipment following a loss of offsite power.	
	SRO	Shutdown any unloaded EDGs using OP-155 "DIESEL GENERATOR EMERGENCY POWER SYSTEM" Section 7.0.	
	SRO	Initiate Evaluation of Plant Status	
	RO	• RHR system – CAPABLE OF COLD LEG RECIRCULATION • Check Auxiliary AND Radwaste Processing Building radiation – NORMAL	(YES) (YES)
	SRO	GO TO Step 13.	
	SRO	Check RCS status	
	RO	• Check for both of the following: o RCS pressure – LESS THAN 230 psig o ANY RHR HX header flow – GREATER THAN 1000 GPM	(YES) (YES)
Evaluator Note:		**The following step may have RWST level less than 23.4%, requiring transition to ES-1.3 dependent on RWST conditions. Otherwise, the crew will return to step 12 of E-1 until RWST level drops to 23.4% and apply foldout criteria to transition to establish cold leg recirculation.**	

Op Test No.: NRC	Scenario # 3	Event # 8	Page 48 of 81
Event Description:	**Large Break LOCA (continued)**		

Time	Position	Applicant's Actions or Behavior	
	SRO	Check Cold Leg Recirculation Switchover Criteria:	
	RO	• Check SI System – ALIGNED FOR COLD LEG RECIRCULATION	(NO)
	SRO	GO TO Step 14c.	
	SRO	• Perform a brief on EOP-ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION" to prepare for transfer to cold leg recirculation.	
	RO	• RWST level – LESS THAN 23.4% (2/4 LOW-LOW ALARM	(YES)
	SRO	GO TO EOP-ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION", Step 1. (Evaluating RCS conditions).	

Op Test No.: NRC	Scenario # 3	Event # 8	Page 49 of 81
Event Description:	**RWST swap-over failure (1SI-300 and 1SI-310 fail to open)**		

Time	Position	Applicant's Actions or Behavior
EOP ES-1.3		Transfer To Cold Leg Recirculation
	SRO	Implements EOP-ES-1.3 Conducts an Alignment brief
Procedure Caution		• Perform Steps 1 through 9 without delay. Do NOT implement Function Restoration Procedures prior to completion of these steps. • SI recirculation flow to RCS must be maintained at all times. • Switchover to recirculation may cause high radiation levels in the reactor auxiliary building. Radiation levels must be assessed prior to performance of local actions in the affected areas.
Procedure Note		• Foldout applies. • A minimum of 142 INCHES CNMT wide range sump level ensures the recirculation sump strainers are completely submerged AND assures a long term recirculation suction source. • The following sequence of steps to transfer to cold leg recirculation assumes operability of at least one train of safeguards equipment.

Op Test No.: NRC	Scenario # 3	Event # 8	Page 50 of 81
Event Description:	**RWST swap-over failure (1SI-300 and 1SI-310 fail to open)**		

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**The crew may identify that 1SI-300 and 1SI-310 will not open due to failed relay based on the following indications:** • **Bypass Permissive Light Box 4-8 flashing** • **No white light on SI Suction Auto Switchover Reset Train A switch**
	SRO	Check RHR Pump Recirculation Alignment:
	RO	• Verify both RHR pumps – RUNNING (YES) • Verify CNMT sump to RHR pump suction valves - OPEN: o Train A RHR pump: ▪ 1SI-300 AND 1SI-310 (NO) ▪ **Open 1SI-300 AND 1SI-310** o Train B RHR pump: ▪ 1SI-301 AND 1SI-311
	SRO	Establish RHR Pump Recirculation Alignment:
Critical Task #3	RO	• Shut RWST to RHR pump suction valves: o 1SI-322 (Train A) (SHUTS) o 1SI-323 (Train B) (SHUTS) • Shut low head SI Train A to cold leg valve: o 1SI-340 (SHUTS) • Check RHR pump recirculation alignment – AT LEAST ONE TRAIN ESTABLISHED (YES) Critical to complete lineup prior to RSWT level depleting to < 0% and prior to the 'A' RHR pump suction and discharge pressure rapidly reducing to ~0 psig.
	SRO	Establish CSIP Recirculation Alignment:

Op Test No.: NRC	Scenario # 3	Event # 8	Page 51 of 81
Event Description:	**RWST swap-over failure (1SI-300 and 1SI-310 fail to open)**		

Time	Position	Applicant's Actions or Behavior	
	RO	• Shut CSIP alternate miniflow isolation valves: o 1CS-746 (Train A CSIP) (Already SHUT) o 1CS-752 (Train B CSIP) (Already SHUT) • Verify normal miniflow isolation valves – SHUT o 1CS-182 o 1CS-196 o 1CS-210 o 1CS-214 • Open RHR discharge to CSIP suction valves: o 1RH-25 (OPENS) o 1RH-63 (OPENS)	(YES)
	RO	• Reset SI. (Already RESET) • Manually realign safeguards equipment following a loss of offsite power. (Refer to E-0, "REACTOR TRIP OR SAFETY INJECTION", Attachment 6.) • Shut RWST to CSIP suction valves AND place in pull-to-lock position (PTL): o 1CS-291 (LCV-115B) (SHUTS and places in PTL) o 1CS-292 (LCV-115D) (SHUTS and places in PTL)	
	SRO	Check Charging AND SI System Status:	
	RO	• Check any charging line isolation valves – SHUT o 1CS-235 o 1CS-238 • Verify Both Charging Pumps – RUNNING o Train A CSIP o Train B CSIP • Check alternate cold leg **AND** hot leg injection valves – SHUT o 1SI-52 o 1SI-86 o 1SI-107	(YES) (NO) (YES)
	SRO	Establish Recirculation Injection Flowpath:	

Op Test No.: NRC	Scenario # 3	Event # 8	Page 52 of 81
Event Description:	**RWST swap-over failure (1SI-300 and 1SI-310 fail to open)**		

Time	Position	Applicant's Actions or Behavior	
	RO	• Open alternate high head SI to cold leg valve: o 1SI-52 (OPENS) • Check any BIT outlet valve - OPEN o 1SI-3 o 1SI-4 • Check power for CSIP discharge cross-connect valves - AVAILABLE o 1CS-219 (MCC 1A35-SA-14E) o 1CS-217 (MCC 1B35-SB-12C) o 1CS-218 (MCC 1A35-SA-14D) o 1CS-220 (MCC 1B35-SB-9D)	(YES) (YES)
	RO	• Shut CSIP discharge cross connect-valves based on Table:	

NOTE: Two valves are specified to be SHUT for each pump combination for redundancy; however, a single valve provides satisfactory isolation in the event one or more of the specified valves can NOT be SHUT.

CSIPs Running	Discharge Cross Connect Valves To Be Shut
A AND B	Any 2: 1CS-217, 1CS-218 1CS-219, 1CS-220
A AND C	1CS-217, 1CS-219
B AND C	1CS-218, 1CS-220

EVALUATOR NOTE:		**1CS-217 and 1CS-218 SHUT when placed in SHUT**	
	SRO	Check High Head SI Flow:	
	RO	• Alternate header flow (Train A): o FI-940 • Normal header flow (Train B): o FI-943	(NO) (YES)
	SRO	Verify CCW Alignment To The RHR Heat Exchangers:	

Op Test No.: NRC	Scenario # 3	Event # 8	Page 53 of 81
Event Description:	**RWST swap-over failure (1SI-300 and 1SI-310 fail to open)**		

Time	Position	Applicant's Actions or Behavior	
	RO	• Verify both CCW pumps – RUNNING • Verify the following valves OPEN o 1CC-147 o 1CC-167 • Verify CCW flow to the RHR heat exchanger(s). Shut train A CCW non-essential supply AND return valves: o 1CC-99 (Already SHUT) o 1CC-128 (Already SHUT) Shut train B CCW non-essential supply AND return valves: o 1CC-113 (SHUTS) o 1CC-127 (SHUTS)	(YES) (YES) (YES) (YES)
	SRO	Observe NOTE prior to Step 10 AND GO TO Step 10.	
Procedure Note:		• Additional foldout item, "AFW SUPPLY SWITCHOVER CRITERIA", applies.	
	SRO	Initiate Monitoring Of Critical Safety Function Status Trees.	
	SRO	Align CNMT Spray For Recirculation:	
	RO	• Any CNMT spray pump – RUNNING • Verify CNMT sump to CNMT spray suction valves – OPEN o 1CT-105 o 1CT-102 • Verify RWST to CNMT spray pump suction valves - SHUT o 1CT-26 o 1CT-71	(YES) (YES) (YES)

Op Test No.: NRC	Scenario # 3	Event # 8	Page 54 of 81
Event Description:	**RWST swap-over failure (1SI-300 and 1SI-310 fail to open)**		

Time	Position	Applicant's Actions or Behavior
	Lead Evaluator:	**After crew has verified the alignment of Containment Spray for Recirculation the evaluation of this scenario is complete.** **Announce 'Crew Update' End of Evaluation** **Have crew remain in the Simulator without discussing the exam and await any follow-up questions the Evaluators may have.**
	Simulator Operator:	**When directed by the Lead Examiner place the Simulator in FREEZE.**

OP-107 Section 5.4 – Initiating Normal Letdown

5.4. Initiating Normal Letdown

5.4.1. Initial Conditions

1. Charging flow has been established per Section 5.3. _____
2. Pressurizer level is greater than 17%. _____
3. The following valves are shut:
   - 1CS-7, 45 GPM LETDOWN ORIFICE A _____
   - 1CS-8, 60 GPM LETDOWN ORIFICE B _____
   - 1CS-9, 60 GPM LETDOWN ORIFICE C _____

5.4.2. Procedural Steps

CAUTION

If Charging flow was stopped or greatly reduced prior to letdown being secured, there is a possibility that the Letdown line contains voids due to insufficient cooling. This is a precursor to water hammer, and should be evaluated prior to initiating letdown flow.

1. **VERIFY** 1CC-337, TK-144 LTDN TEMPERATURE, controller is:
   - In AUTO _____

   AND
   - Set for 110 to 120°F (4.0 to 4.7 on potentiometer) normal operation _____

   OR
   - Set for 90 to 120°F (2.67 to 4.7 on potentiometer) if operating per Section 8.11 _____

NOTE: PK-145.1 LTDN PRESSURE, 1CS-38, may have to be adjusted to control at lower pressures.

2. **VERIFY** 1CS-38 Controller, PK-145.1 LTDN PRESSURE, in MAN with output set at 50%. _____

OP-107 Section 5.4 – Initiating Normal Letdown

5.4.2 Procedural Steps (continued)

3. **VERIFY OPEN** the following Letdown Isolation Valves:
   - 1CS-2, LETDOWN ISOLATION LCV-459 _____
   - 1CS-1, LETDOWN ISOLATION LCV-460 _____

4. **VERIFY OPEN** 1CS-11, LETDOWN ISOLATION. _____

NOTE: The following table gives the minimum charging flow required to keep the regenerative heat exchanger temperature below the high temperature alarm when letdown is established

Letdown flow (to be established)	Minimum Charging Flow necessary when letdown is established
45 gpm	20 gpm
60 gpm	26 gpm
105 gpm	46 gpm
120 gpm	53 gpm

NOTE: If Pressurizer level is above the programmed level setpoint, charging flow should be adjusted to a point above the minimum required to prevent regenerative heat exchanger high temperature alarm but low enough to reduce pressurizer level. (Reference ESR 9500066)

5. **ADJUST** controller 1CS-231, FK-122.1 CHARGING FLOW, as required to:
   - Maintain normal pressurizer level program. _____
   - Keep regenerative heat exchanger temperature below the high temperature alarm when the desired letdown orifice is placed in service. _____

OP-107 Section 5.4 – Initiating Normal Letdown

5.4.2 Procedural Steps (continued)

NOTE: If CVCS Demins have cooled from normal operating temperature, an increased reactivity affect may be observed. Consideration may be given to increasing CVCS Demins to operating temperature by flushing them to the RHT prior to restoring letdown. TIS-250, Recycle Evaporator Feed Demineralizer Temperature Switch, can be used to determine temperature during flushing to the RHT.

6. **IF** flushing CVCS Demins to the RHT is desired for increasing temperature,
THEN PERFORM the following:

   a. **NOTIFY** Radwaste Control Room that letdown flow will be diverted to the RHT. _____

   b. **PLACE** 1CS-120, LETDOWN TO VCT/HOLDUP TANK LCV-115A to the RHT position. _____

NOTE: Changes in Letdown flowrate will affect the displayed value for RM-3502A (Channel 2303) due to the detector's proximity to the LTDN line.

7. **OPEN** an Orifice Isolation Valve (1CS-7, 1CS-8, 1CS-9) for the orifice to be placed in service. _____

8. **ADJUST** 1CS-38 position by adjusting PK-145.1 output as necessary to control LP LTDN Pressure (PI-145.1) at 340 to 360 psig, to prevent lifting the LP Letdown Relief. _____

9. **WHEN** Letdown pressure has stabilized at 340 to 360 psig on PI-145.1, LP LTDN PRESS,
THEN PERFORM the following:

   a. **ADJUST** PK-145.1 LTDN PRESSURE setpoint to 58%. _____

   b. **PLACE** the controller in AUTO. _____

10. **VERIFY** PK-145.1 LTDN PRESSURE Controller maintains Letdown pressure stable at 340 to 360 psig. _____

OP-107 Section 5.4 – Initiating Normal Letdown

5.4.2 Procedural Steps (continued)

11. **IF** Step 5.4.2.6 was performed
AND CVCS Demin temperature is at normal operating temperature,
THEN PERFORM the following:

    a. **PLACE** 1CS-120, LETDOWN TO VCT/HOLDUP TANK LCV-115A to the AUTO position. _____

    b. **NOTIFY** Radwaste Control Room that diversion to the RHT has been terminated. _____

NOTE: Changes in Letdown flowrate will affect the displayed value for RM-3502A (Channel 2303) due to the detector's proximity to the LTDN line.

12. **OPEN** additional orifice isolation valves (1CS-7, 1CS-8, 1CS-9) as required. _____

13. **ADJUST** charging flow as necessary to:

    - Prevent high temperature alarm (per table above) _____
    - Maintain pressurizer programmed level. _____

14. **PLACE** PRZ level controller, LK-459F, in AUTO, as follows:

    a. **PLACE** PRZ level controller, LK-459F, in MAN to cancel any integrated signal. _____

    b. **RECORD** FI-122A.1, CHARGING FLOW.

    _____ GPM _____

OP-107 Section 5.4 – Initiating Normal Letdown

5.4.2 Procedural Steps (continued)

c. **DETERMINE** PRZ level controller, LK-459F setpoint by one of the two methods. (Ref 2.7.14) (N/A Step not performed)

- **DETERMINE** LK-459F based on the table below: _____

LTDN Flow	Charging Flow	LK-459F Setpoint (approx. value)
45 gpm	27 gpm	*3%
60 gpm	42 gpm	*8%
105 gpm	87 gpm	*34%
120 gpm	102 gpm	*46%
* Approximate values based on NOT/NOP		

- **CALCULATE** PRZ level controller, LK-459F setpoint. (Ref. 2.7.14)

LK-459F setpoint = (Desired Charging Flow ÷ 150 GPM)^2 X 100%

$$\left(\frac{\text{Desired flow}}{150\text{ gpm}}\right)^2 X\ 100\% = \text{Setpoint}$$

_____

_____
Verified

d. **ADJUST** PRZ level controller, LK-459F, to the calculated setpoint. _____

e. **PLACE** PRZ level controller, LK-459F, in AUTO. _____

OP-107 Section 5.4 – Initiating Normal Letdown

5.4.2 Procedural Steps (continued)

15. **WHEN** the following occurs:

    - Program pressurizer level is matching the current pressurizer level _____

    AND

    - Letdown and seal return are balanced with seal injection flow and charging flow. _____

    THEN place controller 1CS-231, FK-122.1 CHARGING FLOW, in AUTO. _____

16. **COMPLETE** Section 5.4.3. _____

5.0 STARTUP

5.1. Startup Train A-SA (B-SB) from Main Control Room or Local Panel

5.1.1. Initial Conditions

NOTE: Section 5.2, Placing Standby Train in Operation, should be used when swapping Trains of ESCWS.

1. No Chiller Train is in service. _____
2. System filled and vented per Section 8.1. _____
3. System lineup Attachments 1 and 2 are complete. _____
4. For non-emergency starts the prestart checks of Attachment 5 have been performed and an operator should be present to observe start of chiller. _____
5. Section 8.12 Manual Chiller Reset has been performed, if necessary due to chiller trip. _____
6. The L.O. heaters have been in service for twelve hours. (See Precaution and Limitation 4.0.3 for applicability of this Initial Condition) _____

NOTE: The requirement to run the ESW Pump for 30 minutes does not apply if WC-2 Chiller start is due to AOP/EOP direction.

NOTE: If service water header temperature is greater than 85°F and the ESW pump is available startup of ESW **is required**. The pump should run for approximately 30 minutes before chiller start. ESW provides additional flow at typically lower temperatures when used for service water supply. Starting ESW prior to a chiller start minimizes condenser pressure. Historically, High Condenser Pressure alarms have been received during summer months due to high service water temperatures and high chilled water loads.

7. **IF** desired due to Service Water temperatures being high,
   THEN VERIFY a same train ESW Pump is running. Pump should run for approximately 30 minutes before chiller start. _____

5.1.2. Procedural Steps

NOTE: Whenever an "A" Train component is referred to in the body of this procedure it's "B" Train counterpart will immediately follow, enclosed by parentheses.

NOTE: ESR 99-00142 has evaluated and determined that long-term closure of the supply and return valves to the NNS AH units will not affect operability of the Essential Services Chiller system. The next two steps will align the NNS AH units however, if it is desired to maintain the NNS isolation valves shut, then steps 5.1.2.1 and 5.1.2.2 may be skipped.

1. **ISOLATE** the supply and return valves to the NNS AH units from the train that will not be placed in service by shutting the following valves:

1CH-125 SB (1CH-196 SB)	CHILLED WATER FROM NESSR FAN CLRS ISOL.	_____
1CH-126 SA (1CH-197 SA)	CHILLED WATER FROM NESSR FAN CLRS ISOL.	_____
1CH-115 SA (1CH-148 SB)	CHILLED WATER TO NESSR FANS CLR ISOL	_____
1CH-116 SB (1CH-149 SA)	CHILLED WATER TO NESSR FAN CLRS ISOL	_____

2. **ALIGN** the supply and return valves to the NNS AH units associated with the train that will be placed in service by opening the following valves:

1CH-125 SB (1CH-196 SB)	CHILLED WATER FROM NESSR FAN CLRS ISOL.	_____
1CH-126 SA (1CH-197 SA)	CHILLED WATER FROM NESSR FAN CLRS ISOL.	_____
1CH-115 SA (1CH-148 SB)	CHILLED WATER TO NESSR FANS CLR ISOL	_____
1CH-116 SB (1CH-149 SA)	CHILLED WATER TO NESSR FAN CLRS ISOL	_____

5.1.2 Procedural Steps (continued)

NOTE: The local alarm indication for low chilled water flow and low chilled water temperature will lock in until manually reset at the WC-2 control panel.

3. **START** WC-2 Chiller 1A-SA (1B-SB) Chilled water pump P-4 to establish chilled water flow. _____

4. At the Local Control panel, **RESET** the Low Chilled Water Flow alarm using the CHILLED WATER NO FLOW TRIP INDICATION RESET push-button. _____

5. **IF** starting the chiller for the first time following maintenance where the chiller lube oil heater circuit was under clearance.
THEN PERFORM the following:

   a. Locally **START** the oil pump on the 1A-SA (1B-SB) compressor by taking the control switch on the local panel to the MAN position. _____

   b. **RUN** pump for 5 minutes. _____

   c. **STOP** the oil pump on the 1A-SA (1B-SB) chiller compressor by taking the control switch on the local panel to the AUTO position. _____

6. At the Local Control Panel, **CHECK** that all alarm lights are **NOT** lit. _____

7. **IF** any alarm light(s) is lit,
THEN PERFORM the following:

   a. **IF** the Local Select switch is in the LOCAL position,
THEN locally **DEPRESS** the STOP push-button. _____

   b. **IF** the Local Select switch is in the MCB HVAC position,
THEN place the 1A-SA (1B-SB) compressor control switch on AEP-1 to STOP. _____

   c. **IF** any alarm light is still lit,
THEN PERFORM the following:

      (1) **DECLARE** the chiller inoperable. _____

      (2) **INITIATE** corrective actions. _____

5.1.2 Procedural Steps (continued)

NOTE: If the unit cycles off due to low chilled water flow or low chilled water temperature, the unit will automatically restart if all start permissive conditions exist.

NOTE: An anti-recycle feature prevents more than one normal start within a 30 minute period. This anti-recycle feature is bypassed upon any automatic start signal from the ESF sequencer.

NOTE: After going to START on the Chiller Control Switch, the oil pump will start and bring oil pressure up to normal operating pressure prior to chiller start.

NOTE: OPT-1512 rotates the Temperature Control Point potentiometer to clean the surfaces. While OPT-1512 restores the potentiometer to its original position, it is possible that due to the surface cleaning the characteristics of the potentiometer have changed sufficiently to require a manual temperature adjustment per Section 8.14 of this procedure. This will be determined by monitoring temperature after chiller start in the following Step.

NOTE: ALB-023/1-14 (2-14), WC-2 CH 1A (1B) CNDSR REFRIG HI PRESS, may alarm during startup of the Chillers. High chiller condenser pressure is caused by inadequate cooling of the refrigerant. Causal factors for high condenser pressure include high chiller service water inlet temperature, condenser tube fouling, condenser shell air binding, or reduction of service water flow.

8. **START** the chiller by performing one of the following:

   a. At AEP-1, **PLACE** Water Chiller Compressor WC-2 A-SA (WC-2 B-SB) control switch to the START position and release. _____

   OR

   b. **DEPRESS** the START push-button at the local control panel with the Local Select switch in the LOCAL position. _____

NOTE: Engineering recommends running ESW for about 5-10 minutes after the chiller starts to ensure it reaches steady state operation. Operator judgment should be used to determine if continuing to run the ESW pump to prevent the High Condenser Pressure alarm is warranted. There is no operability impact, but a nuisance alarm can be prevented.

9. **IF** desired,
   THEN STOP the ESW Pump started in Step 5.1.1.7. _____

5.2. Placing Standby Train In Operation

NOTE: It is necessary to shift associated trains of HVAC units when shifting trains of Essential Services Chilled Water.

NOTE: This Section is written for swapping from Train B ESCW to Train A ESCW, with components for swapping from Train A ESCW to Train B ESCW in parentheses.

5.2.1. Initial Conditions

1. Service water is being supplied to the non-operating chiller WC-2 1A-SA (WC-2 1B-SB). _____
2. One train of ESCW is already in operation. _____
3. For non-emergency starts the prestart checks of Attachment 5 have been performed and an operator should be present to observe start of chiller. _____
4. Section 8.12, Manual Chiller Reset performed if necessary for non-operating chiller. _____
5. The L.O. heaters have been in service for twelve hours. (See Precaution and Limitation 4.0.3 for applicability of this Initial Condition) _____

NOTE: The requirement to run the ESW Pump for 30 minutes does not apply if WC-2 Chiller start is due to AOP/EOP direction.

NOTE: If service water header temperature is greater than 85°F and the ESW pump is available startup of ESW **is required**. The pump should run for approximately 30 minutes before chiller start. ESW provides additional flow at typically lower temperatures when used for service water supply. Starting ESW prior to a chiller start minimizes condenser pressure. Historically, High Condenser Pressure alarms have been received during summer months due to high service water temperatures and high chilled water loads.

6. **IF** desired due to Service Water temperatures being high, **THEN VERIFY** a same train ESW Pump is running. Pump should run for approximately 30 minutes before chiller start. _____

5.2.2. Procedural Steps

NOTE:	The local alarm indication for low chilled water flow and low chilled water temperature will lock in until manually reset at the WC-2 control panel.
NOTE:	If starting the chiller compressor is delayed following the start of the P-4 Pump in the next Step, the compressor oil could cool down to the point that the compressor will trip on low oil pressure.
NOTE:	In Winter months (December - February) Step 5.2.2.7 can be performed anytime after Step 5.2.2.1. It is preferable to start the fans before the chiller. This allows the chill water to heat up and prevents the chiller cycling on and off on low temperature.

1. At AEP-1, **START** the non-operating Chiller WC-2 A-SA (B-SB) Chilled Water Pump P-4 A-SA (B-SB) to establish chilled water flow in the non-operating train. _____

2. At the Local Control panel, **RESET** the Low Chilled Water Flow alarm using the CHILLED WATER NO FLOW TRIP INDICATION RESET push-button. _____

3. **IF** starting the chiller for the first time following maintenance where the chiller lube oil heater circuit was under clearance,
THEN PERFORM the following:

   a. Locally **START** the oil pump on the standby chiller compressor by taking the control switch on the local panel to the MAN position. _____

   b. **RUN** pump for 5 minutes. _____

   c. **STOP** the standby chiller compressor oil pump by taking the control switch on the local panel to the AUTO position. _____

4. At the Local Control Panel, **CHECK** that all alarm lights are **NOT** lit. _____

5. **IF** any alarm light(s) is lit,
THEN PERFORM the following:

   a. **IF** the Local Select switch is in the LOCAL position,
   THEN locally **DEPRESS** the STOP push-button. _____

   b. **IF** the Local Select switch is in the MCB HVAC position,
   THEN place the standby chiller compressor control switch on AEP-1 to STOP. _____

5.2.2 Procedural Steps (continued)

c. **IF** any alarm light is still lit,
THEN PERFORM the following:

(1) **DECLARE** the chiller inoperable. _____

(2) **INITIATE** corrective actions. _____

NOTE: OPT-1512 rotates the Temperature Control Point potentiometer to clean the surfaces. While OPT-1512 restores the potentiometer to its original position, it is possible that due to the surface cleaning the characteristics of the potentiometer have changed sufficiently to require a manual temperature adjustment per Section 8.14 of this procedure. This will be determined by monitoring temperature after chiller start in the following Step.

NOTE: ALB-023/1-14 (2-14), WC-2 CH 1A (1B) CNDSR REFRIG HI PRESS, may alarm during startup of the Chillers. High chiller condenser pressure is caused by inadequate cooling of the refrigerant. Causal factors for high condenser pressure include high chiller service water inlet temperature, condenser tube fouling, condenser shell air binding, or reduction of service water flow.

6. **START** the chiller by performing **ONE** of the following:

a. At AEP-1, **PLACE** Water Chiller Compressor WC-2 A-SA (WC-2 B-SB) control switch to the START position **AND RELEASE**. _____

OR

b. **DEPRESS** the START push-button at the local control panel with the local select switch in the LOCAL position. _____

7. **START** Train A (B) ESF Equipment Cooling System per OP-172, Section 5.6. _____

5.2.2 Procedural Steps (continued)

NOTE: ESR 99-00142 has evaluated and determined that long-term closure of the supply and return valves to the NNS AH units will not affect operability of the Essential Services Chiller system. The next two Steps will align the NNS AH units however, if it is desired to maintain the NNS isolation valves shut, then steps 5.2.2.8 and 5.2.2.9 may be skipped.

8. **ISOLATE** the supply and return valves to the NNS AH units from the train that was already operating by shutting the following valves:

1CH-196 SB (1CH-125 SB)	CHILLED WATER FROM NESSR FAN CLRS ISOL	_____
1CH-197 SA (1CH-126 SA)	CHILLED WATER FROM NESSR FAN CLRS ISOL	_____
1CH-148 SB (1CH-115 SA)	CHILLED WATER TO NESSR FANS CLR ISOL	_____
1CH-149 SA (1CH-116 SB)	CHILLED WATER TO NESSR FAN CLRS ISOL	_____

9. **ALIGN** NNS AH units to the train that will remain operating by opening the following valves:

1CH-125 SB (1CH-196 SB)	CHILLED WATER FROM NESSR FAN CLRS ISOL.	_____
1CH-126 SA (1CH-197 SA)	CHILLED WATER FROM NESSR FAN CLRS ISOL.	_____
1CH-115 SA (1CH-148 SB)	CHILLED WATER TO NESSR FANS CLR ISOL	_____
1CH-116 SB (1CH-149 SA)	CHILLED WATER TO NESSR FAN CLRS ISOL	_____

10. **IF** shifting chillers to support placing the standby safety equipment train in service,
THEN PERFORM Attachment 8. _____

5.2.2 Procedural Steps (continued)

NOTE: Service water to the chiller condenser will isolate 90 seconds after the chiller has stopped, SW FROM WC-2 B-SB (A-SA) CONDENSER 1SW-1208 SB (1SW-1055 SA) will close.

NOTE: ALB-23/1-15 and ALB-23/1-16 (ALB-23/2-15 and ALB-23/2-16) are expected alarms when securing A (B) Chiller.

CAUTION

Failure of equipment to secure in the following step will result in the associated EDG being inoperable. Tech Spec 3.8.1.1 is applicable until the breaker for the affected load is opened.

11. **STOP** the chiller by performing one of the following:

    a. At AEP-1, **PLACE** Water Chiller Compressor WC-2 B-SB (A-SA) control switch to the STOP position and release. _____

    OR

    b. **DEPRESS** the STOP push-button at the local control panel with the local select switch in the LOCAL position. _____

12. At AEP-1, **STOP** the Chiller WC-2 B-SB (A-SA) Chilled Water Pump P-4 B-SB (A-SA) in the train just secured. _____

NOTE: Engineering recommends running ESW for about 5-10 minutes after the chiller starts to ensure it reaches steady state operation. Operator judgment should be used to determine if continuing to run the ESW pump to prevent the High Condenser Pressure alarm is warranted. There is no operability impact, but a nuisance alarm can be prevented.

13. **IF** desired,
    THEN STOP the ESW Pump started in Step 5.2.1.6. _____

14. **NOTIFY** the following to update the protected train placards:

    - Security _____
    - WCC _____
    - Maintenance Shop _____
    - Operations (Update the Protected Train placard in the Operations Turnover area) _____

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 1 of 8
Safeguards Actuation Verification

NOTE

- General guidance for verification of safeguards equipment is contained in Attachment 4 of this procedure.
- ERFIS displays of safeguards equipment status are not reliable while any associated safety-related electrical buses are de-energized.

☐ 1. Verify Two CSIPs - RUNNING

☐ 2. Verify Two RHR Pumps - RUNNING

☐ 3. Verify Two CCW Pumps - RUNNING

☐ 4. Verify All ESW **AND** ESW Booster Pumps - RUNNING

☐ 5. Verify SI Valves - PROPERLY ALIGNED

(Refer to Attachment 1.)

☐ 6. Verify CNMT Phase A Isolation Valves - SHUT

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 4.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 2 of 8
Safeguards Actuation Verification

☐ 7. Verify SG Blowdown **AND** SG Sample Isolation Valves In Table 1 - SHUT

Table 1: SG Blowdown And Sample Isolation Valves

Process Line	Outside CNMT (MLB-1A-SA)	Inside CNMT (MLB-1B-SB)
SG A Sample	1SP-217	1SP-214/216
SG B Sample	1SP-222	1SP-219/221
SG C Sample	1SP-227	1SP-224/226
SG A Blowdown	1BD-11	1BD-1
SG B Blowdown	1BD-30	1BD-20
SG C Blowdown	1BD-49	1BD-39

8. **IF** Main Steam Line Isolation Actuated **OR** Is Required By Any Of The Following, **THEN** Verify MSIVs **AND** MSIV Bypass Valves - SHUT

☐ • Steam line pressure - LESS THAN 601 PSIG

☐ • CNMT pressure - GREATER THAN 3.0 PSIG

9. **IF** CNMT Spray Actuation Signal Actuated **OR** Is Required, **THEN** Verify The Following:

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 9.)

☐ • CNMT spray pumps - RUNNING

☐ • CNMT spray valves - PROPERLY ALIGNED

☐ • Phase B isolation valves - SHUT

☐ • All RCPs - STOPPED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 3 of 8
Safeguards Actuation Verification

☐ 10. Verify Both Main FW Pumps - TRIPPED

☐ 11. Verify FW Isolation Valves - SHUT

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 6.)

☐ 12. Verify both MDAFW pumps - RUNNING

13. **IF** any of the following conditions exist, **THEN** verify the TDAFW pump - RUNNING

☐ • Undervoltage on either 6.9 KV emergency bus

☐ • Level in two SGs - LESS THAN 25%

☐ • Manual actuation to control SG level

14. Verify AFW Valves - PROPERLY ALIGNED

☐ • **IF** no AFW Isolation Signal, **THEN** verify isolation and flow control valves - OPEN

NOTE

An AFW Isolation signal signal requires a Main Steam Line Isolation coincident with one SG pressure 100 PSIG below the other two SGs.

☐ • **IF** AFW Isolation Signal present, **THEN** verify MDAFW and TDAFW isolation and flow control valves to affected SG - SHUT

☐ 15. Verify Both EDGs - RUNNING

☐ 16. Verify CNMT Fan Coolers - ONE FAN PER UNIT RUNNING IN SLOW SPEED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 4 of 8
Safeguards Actuation Verification

☐ 17. Verify CNMT Ventilation Isolation Valves - SHUT

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 7.)

☐ 18. Verify Control Room Area Ventilation - MAIN CONTROL ROOM ALIGNED FOR EMERGENCY OPERATION

(Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 5, Sheets 1 and 2, Sections for MAIN CONTROL BOARD, SLB-5 and SLB-6.)

19. Verify Essential Service Chilled Water System Operation:

☐ • Verify both WC-2 chillers - RUNNING

☐ • Verify both P-4 pumps - RUNNING

☐ (Refer to AOP-026, "LOSS OF ESSENTIAL SERVICE CHILLED WATER SYSTEM" for loss of any WC-2 chiller.)

20. Verify CSIP Fan Coolers - RUNNING

☐ AH-9 A SA
☐ AH-9 B SB
☐ AH-10 A SA
☐ AH-10 B SB

NOTE

Security systems are powered by bus 1A1 (normal supply) or bus 1B1 (alternate supply). Backup power will be available for approximately 30 MINUTES after the supplying bus is de-energized. (Refer to OP-115, "CENTRAL ALARM STATION ELECTRICAL SYSTEMS", Section 8.9 and 8.10.)

☐ 21. Verify AC buses 1A1 **AND** 1B1 - ENERGIZED

☐ 22. Place Air Compressor 1A **AND** 1B In The LOCAL CONTROL Mode.

(Refer to Attachment 7.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 5 of 8
Safeguards Actuation Verification

CAUTION

The maximum calculated dose rate in the vicinity of MCC 1A35-SA and MCC 1B35-SB is between 10 MREM/HR and 150 MREM/HR.

☐ 23. Dispatch An Operator To Unlock **AND** Turn ON The Breakers For The CSIP Suction **AND** Discharge Cross-Connect Valves:

(Refer to Attachment 2.)

MCC 1A35-SA		MCC 1B35-SB	
VALVE	CUBICLE	VALVE	CUBICLE
1CS-170	4A	1CS-171	4D
1CS-169	4B	1CS-168	7D
1CS-218	14D	1CS-220	9D
1CS-219	14E	1CS-217	12C

24. Check If C CSIP Should Be Placed In Service:

☐ • **IF** two charging pumps can **NOT** be verified to be running, **AND** C CSIP is available, **THEN** place C CSIP in service in place of the non-running CSIP using OP-107, "CHEMICAL **AND** VOLUME CONTROL SYSTEM, Section 8.5 or 8.7.

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 6 of 8
Safeguards Actuation Verification

25. Start The Spent Fuel Pump Room Ventilation System:

a. At AEP-1, verify the following ESCWS isolation valves - OPEN

1) SLB-11 (Train A)

☐ • AH-17 SUP CH 100 (Window 9-1)

☐ • AH-17 RTN CH 105 (Window 10-1)

2) SLB-9 (Train B)

☐ • AH-17 SUP CH 171 (Window 9-1)

☐ • AH-17 RTN CH 182 (Window 10-1)

b. At AEP-1, start one SFP PUMP ROOM FAN COOLER:

☐ • AH-17 1-4A SA

☐ • AH-17 1-4B SB

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 7 of 8
Safeguards Actuation Verification

NOTE

- Fuel pool levels **AND** temperatures should be monitored approximately every 1 to 2 HOURS.
- Following the initial check of fuel pool levels and temperature, monitoring responsibilities may be assumed by the plant operations staff (including the TSC or STA).
- Only fuel pools containing fuel are required to be monitored.

26. Check Status Of Fuel Pools:

☐ a. Operate spent fuel cooling pumps to maintain fuel pool temperatures between 85°F and 105°F.

b. Monitor fuel pool levels **AND** temperatures:

☐ • Refer to AOP-041, "SPENT FUEL POOL EVENT" Attachments 7, 8, 9, 10 and 11 for SFP parameter monitoring methods.

☐ • Refer to Curves H-X-24, H-X-25 and H-X-26 for SFP time to 200°F.

☐ • Levels - GREATER THAN LO ALARM (284 FT, 0 IN)

☐ • Temperatures - LESS THAN HI TEMP ALARM (105°F)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 8 of 8
Safeguards Actuation Verification

NOTE

IF control room ventilation was previously aligned to an emergency outside air intake for post-accident operations, **THEN** follow-up actions will be required to restore the alignment.

27. Consult Plant Operations Staff Regarding Alignment Of The Control Room Ventilation System:

☐ • Site Emergency Co-ordinator - Control Room

☐ • Site Emergency Co-ordinator - Technical Support Center

(Refer to PEP-230, "CONTROL ROOM OPERATIONS".)

- END -

Op Test No.: NRC	Scenario # 3	Event # 8	Page 78 of 81
Event Description:	**Large Break LOCA (FR-C.2 continued from Step 8)**		

Time	Position	Applicant's Actions or Behavior

FR-C.2		Response to Degraded Core Cooling – continued, Step 8	
	RO	Check SI Accumulator Isolation Valve Status: a. Locally unlock **AND** close both breakers for each SI accumulator discharge valve while continuing with this procedure: 1SI-246 (MCC-1A21-SA-5C) 1SI-247 (MCC-1B21-SB-5C) 1SI-248 (MCC-1A21-SA-3D) Contacts AO to perform action	
Simulator Communicator:		Acknowledge request to unlock and close Accumulator discharge valve breakers	
Simulator Operator:		**When contacted to Unlock and Close both breakers for the accumulator discharge valves, run CAEP *:\sis\SI_ACCUM_POWER_APPLY*** **When the CAEP is complete, report that the accumulator discharge valve breakers have been unlocked and closed to the MCR.**	
	RO	OPENs ALL accumulator isolation valves	
	BOP	Check Intact SG Levels: Any level > 40% (Maintains total FF > 210 KPPH until level > 40% in at least 1 intact SG.) Controls FF to ALL intact SG's and maintains levels between 40% to 50%	
	RO	Check PRZ Pressure: < 2000 PSIG Block low steam pressure SI	(YES)

Op Test No.: NRC	Scenario # 3	Event # 8	Page 79 of 81
Event Description:	**Large Break LOCA (FR-C.2 continued from Step 8)**		

Time	Position	Applicant's Actions or Behavior	
	BOP	Depressurize All Intact SGs To 130 PSIG: a. Maintain RCS cooldown rate less than 100°F/HR. b. Dump steam to condenser or SG PORV's c. SG pressures < 130 psig + at least 2 RCS HL temps < 390°F then STOP SG depressurization	
	RO	Verify RHR Pumps RUNNING	(YES)
	RO	Check If SI Accumulators Should Be Isolated:	
		RCS hot leg temperatures - AT LEAST TWO < 390°F	(YES)
	RO	Reset SI Shut SI accumulator discharge valves: • 1SI-246 • 1SI-247 • 1SI-248 Dispatch an AO to Locally open **AND** lock both breakers for each SI accumulator discharge valve. • 1SI-246 (MCC-1A21-SA-5C) • 1SI-247 (MCC-1B21-SB-5C) • 1SI-248 (MCC-1A21-SA-3D)	
Simulator Communicator:		**Acknowledge request**	
Simulator Operator:		**When contacted to Open and Lock both breakers for the accumulator discharge valves, run CAEP *:\sis\SI_ACCUM_POWER_REMOVE*** **When the CAEP is complete, report that the accumulator discharge valve breakers have been Opened and Locked to the MCR.**	
	RO	Stop All RCPs. (ALL OFF)	
	BOP	Depressurize All Intact SGs To Atmospheric Pressure: Maintain RCS cooldown rate less than 100°F/HR. Dump steam to condenser or use SG PORVs	

Op Test No.: NRC	Scenario # 3	Event # 8	Page 80 of 81
Event Description:	**Large Break LOCA (FR-C.2 continued from Step 8)**		

Time	Position	Applicant's Actions or Behavior
	RO	Verify SI Flow By Observing Any Of The Following: SI flow > 200 GPM Any RHR HX header flow - > 1000 GPM
	RO	Check Core Cooling - Check for both of the following: ☐ RVLIS full range – > 63% ☐ RCS hot leg temperatures – AT LEAST TWO <350°F
	SRO	Go to E-1, "Loss of Reactor or Secondary Coolant", step 12

Rev. 0 – Development Copy / send outline to NRC

Rev. 1 – Outline Revision / Changes made by Exam Team

Rev. 2 – Validation

Rev. 3 – Validation, Final Ops and Training Management comments incorporated

Rev. 4 – NRC 45 day exam submittal review comments incorporated

Rev. FINAL – NRC Prep Week comments incorporated