

FINAL AS-ADMINISTERED SCENARIOS

FOR THE BRAIDWOOD INITIAL EXAMINATION - JULY 2002

Simulation Facility

Braidwood

Scenario No. 1

Operating Test No. 2002

Examiners:

Applicant:

SRO

RO

BOP

Initial Conditions:

IC-21 , 100% power, BOL, equilibrium Xenon, steady state

Turnover:

93% power following ramp from 100%. 1A CS Pump is OOS for a motor bearing replacement. 1D CD/CB pump is OOS for an alignment and vibration problem. Load was reduced from 100% power due to CB pump suction strainer delta-p. Further load reduction is anticipated to allow isolation and flushing of the 1C CB Pump suction strainer.

Event No.	Malf. No.	Event Type*	Event Description
Preload	RP01	M RO	Failure of RTB A&B to auto AND manual open. (can be opened locally)
	CS01A	SRO	1A CS pump OOS
	FW22D	BOP	Failure of CS and Phase B to Actuate on Hi-3 Cnmt Press. Train B must be manually started from the MCR
			1D CD/CB pump OOS
Preload	(preload note)	C RO	1SI8801A will not auto open nor open from the MCB
		SRO	1SI8801B will not open automatically. Will open manually from MCB
1		N BOP	Ramp down turbine power to 900 Mwe at directed MW/min
		SRO	
		R RO	Lower reactor power using rods and/or boration.
		SRO	
2	NI09A	I RO	Power Range N-41 fails high.
		SRO	
3	FW22B	C BOP	Trip of 1C CD/CB Pump. Standby CD/CB Pump not available
		SRO	
4	RD09, 1	C RO	Automatic rod motion fails at 1 step per minute.
		SRO	
5	RX03E, 4.8	I BOP	Steam Flow Transmitter FT-532 (input to controlling channel) fails high.
		SRO	
6	RPO2A,B	M RO	Reactor Trip Breakers fail to open / ATWS
		BOP	
		SRO	
7	THO6	M RO	Large Break LOCA inside containment. Leads to high-3 containment pressure
		BOP	
		SRO	
8	(OR) CS01B	C BOP	Failure of CS to auto actuate.
	MRF RP63	RO	
		SRO	

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

SCENARIO OVERVIEW

The Unit 1 is at 93% power. 1D CD/CB pump is OOS for alignment and vibration problems. 1A CS Pump is OOS for a motor bearing replacement. Power was recently decreased from 100% due to CB Pump suction strainer delta-p problems. Further load decrease will be required to stop the running CD/CB pump and flush the suction strainer.

Following clearly observable plant response from the reactivity changes, Power Range Nuclear Instrument N-41 will fail high causing a demand for inward rod motion. The crew will diagnose the PR failure and perform actions of 1BwOA INST-1, "NUCLEAR INSTRUMENTATION FAILURE- Attachment A," to defeat the channel and restore Tave=Tref. The SRO will review TS and direct tripping of the associated bistables.

After completion of the actions specified in 1BwOA INST-1 the 1C CD/CD pump will trip on overcurrent. The Crew will enter 1BwOA SEC-1, "SECONDARY PUMP TRIP", and commence a runback to reduce load to within the capacity of the remaining two CD/CB pumps (~700 Mwe). Rod Control is failed such that any auto rod motion will occur only at 1 step per minute, which is less than the expected minimum rod speed for the temperature transient in progress. The crew may elect to perform steps of 1BwOA ROD-1, "UNCONTROLLED ROD MOTION", but it is NOT required. Rod Control will be shifted to manual to match Tave and Tref at the new lower value.

Following completion of actions for the CD/CB pump and rapid load reduction, the 1C S/G selected steam flow channel will fail high, resulting in indications of increased steam flow and initial opening of 1C S/G feed reg valve to attempt to match feed flow with steam flow. An equilibrium level should be reached if manual control of the feed reg valve is not expeditiously taken. The crew will perform the actions of 1BwOA INST-2, "FAILED INSTRUMENT CHANNEL- Attachment H".

After the unit is stabilized following the SF channel malfunction, a large break LOCA of 50,000 gpm occurs, increasing to 400,000 gpm over 2 minutes. The size of the LOCA will result in an automatic SI actuation and lead to the discovery of the failure of the reactor to automatically trip. 1BwFR S.1, "RESPONSE TO NUCLEAR POWER GENERATION / ATWS" will be entered. After dispatching an operator to locally trip Unit 1 reactor, the reactor trip breakers will be opened only after placing the steam dumps in Off/Reset per step 7 of BwFR S.1.

Following the safety injection actuation, cold leg injection valves 1SI8801A&B will fail to open. 1SI8801B must be opened manually from the MCB.

CS will fail to automatically occur at the high-3 pressure setpoints. Manual action by the crew will be required to actuate train B of CS, either while performing the actions of 1BwEP-0 or the SRO may elect to perform 1BwFR Z.1, "RESPONSE TO HIGH CONTAINMENT PRESSURE"

The scenario ends with completion of step 6 in 1BwEP ES-1.3

Critical Tasks

1. FR-S.1 Insert negative reactivity into the core by manually inserting RCCAs before completing step 4 of FR-S.1
2. EP-0--I Manually initiate high head injection flow via 1SI8801B before exiting 1BwEP-0
2. EP-0--E: Manually actuate at least the minimum required complement of containment cooling equipment before an extreme (red path) challenge develops to the containment CSF

SIMULATOR OPERATOR NOTES:

Simulator Setup:

IC-21, 100% power. Complete the 'ready for training' checklist. Hang YELLOW risk placard.
Ensure Delta I limits and Delta I band are correct for 100% power level.
Decrease Unit load to 1150 MW using turbine load decrease and rods only. Allow to stabilize.

Take 1A CS pump OOS. Control switch to PULL OUT. Hang Tag
Take 1D CD/CD pump OOS. Control switch to PULL OUT. Hang Tag.
Take 1D CD/CB pump aux lube oil pump OOS. Control switch to PULL OUT. Hang Tag.

Go to 'Action List' and use the following overrides and malfunctions:

ZLO1SI8801A1 ON

ZLO1SI8801A1 ON (must do both even though they are identical tags to get both indications)

RF EDO53I OPEN (opens breaker for 1SI8801A at 131X1:F4. When used with the overrides it appears the Valve is closed and energized. If operators are dispatched to de-energize and open this valve, then use the Overrides to de-energize the valve, but do NOT open 1SI8801A.

Turn ON annunciator 1-17-A10, CD PUMP SUCT STRN DP HIGH, PN0991 (ON)

Modify Remote Function:

Rp75 (on SDG RP15) to OUT. This prevents slave relay K603 from energizing. Components affected are:

1SI8801B will not stroke open on an SI, but can be manually opened from the MCB

1CV8105 will not automatically close, but can be closed manually.

1B AFW pump lube oil pump won't auto start, will not affect this scenario as the AF Pump will still auto start.

Activate the following malfunctions:

RP02A&B Failure of Reactor Trip Breakers to open in Auto and Manual. May be locally opened after steam Dumps are taken to OFF in 1BwFR S.1

CS01A 1A CS Pump Fail to Start/ Trip.

Modify the following remote functions (after closing the valves):

ED062A OPEN Breaker for 1CS007A

ED053M OPEN Breaker for 1CS019A

ED053A OPEN Breaker for 1CS001A

ED053B OPEN Breaker for 1CS009A

Modify the following remote function:

RP63 OUT to prevent 1B CS pump from starting until 1CS019B is manually opened.

Insert the following overrides to complete the OOS for the 1D CD/CB pump:

ZLO1CB113D(1) OFF Open Light OFF

ZLO1CB113D(2) OFF Close Light OFF

Event 1 Load Ramp to 700 MWe

Event 2 Power Range Channel N-41 fails high (NI09A, 120)

Insert malfunction to fail power range channel N41 high (NI09A, 120) after clearly observing plant response to reactivity Changes, or at the lead examiners direction.

Perform the following to trip PR channel bistables:

On SDG RX4:

Open Protection Cabinet Door #1				RX020	OPEN
OTDT Trip	TB411C	C1-124	BS-3	RX013	TRIP
OTDT Runback	TB411D	C1-124	BS-4	RX135	TRIP
Protection Cab #1 Close Door				RX020	CLOSE

Event 3 Automatic Rod Motion fails at 1 Step per Minute (RD09, 1)

Insert Rod Speed Failure Malfunction (RD09, 1) immediately prior to inserting the CD/CB pump trip

Event 4 Trip of 1C CD/CB Pump with standby CD/CB Pump not available (FW22C)

Insert malfunction to trip 1C CD/CB pump (FW22C) after all actions for the failed NI channel have been competed and MW loading has decreased below 1050 MWe

Event 5 Steam Flow Transmitter FT-532 (controlling channel) fails high

Insert malfunction to fail 1C SG controlling steam flow channel, FT-532 HIGH (RX03E, 4.8) on SDG RX16 after bistables for PR channel N-41 are tripped.

Event 6 Reactor Trip Breakers fail to open (ATWS)

The ATWS malfunction(s) are in Pre-load. When directed as a local operator to open the unit 1 reactor trip breakers, wait until after the steam dumps have been placed in OFF/RESET. DELETE malfunctions RP02A and RP02B. **Important:** If the reactor is still at power after the S/Gs reach 10% wide range level, the RCS pressure will start to rise rapidly above the Pzr Safety setpoints. Use triggers to delete malfunctions **RP02A and RP02B when the steam dumps are taken to off. OR open trip breakers if crew transitions to EP-0 at step 6 of FR-S.1**
DMF RP02A and B

Event 7 Large Break LOCA inside Cnmt. Leads to failure of Hi-3 automatic actuations

Insert LBLOCA malfunction (TH06C, 50K to 400K over 2 minutes) inside containment to ensure the Hi-3 containment pressure setpoint is reached. If asked for ETR on 1A CS, 2-4 hours is optimistic.
INSTRUCTOR NOTE: As STA, do NOT report on any status until AFTER containment pressure has decreased below 20 psig.

Event 8 Failure of CS to automatically actuate

The failure of CS to auto actuate is in the Pre-load. Operators will manually align the CS system for operation.

Scenario No: 02-1		Event No. 1
Event Description: Ramp down turbine and reactor power to 700 Mwe.		
Time	Position	Applicant's Actions or Behavior
	CUE	Turnover. (Reviews and Load Swing Instruction Sheet may have been initiated in classroom)
	US	Implement actions of 1BwGP 100-4 , rev 17, step F.1
	US	Direct load reduction to 700 Mwe at 5 MW/min <ul style="list-style-type: none">Initiate load swing instruction sheet, 1BwGP 100-4T2Contact chemistry and HP for load change >15% in one hour
	CREW	Review applicable Precautions, Limitations and Actions of 1BwGP 100-4
	RO	Verify rod position and boron concentration Initiate boration, if required. (BwOP CV-6) <ul style="list-style-type: none">Determine required boric acid volume<ul style="list-style-type: none">Effects of previously performed borationsBoration / Dilution tablesDetermine required boric acid flow rateSet 1FK-110 BA Flow Control to desired boration rateSet 1FY-0110 BA Blender Preset Counter to desired volume.Place MAKE-UP MODE CONT SWITCH to STOP positionSet MU MODE SELECT to BOR positionPlace MAKE-UP MODE CONT Switch to STARTVerify proper operation of valves and BA transfer pump (1CV110B open, BA Pump running, 1CV110A throttles open, BA flow indicated on recorder.
		OR
		Batch addition of BA: <ul style="list-style-type: none">Open 1CV110BOpen 1CV110AStart the BA Transfer pumpWhen desired amount of BA has been added, Stop the BA Transfer PumpClose 1CV110AClose 1CV110B

Comments: _____

Scenario No: 02-1		Event No. 1
Event Description: Ramp down turbine and reactor power to 700 Mwe.		
Time	Position	Applicant's Actions or Behavior
	BOP	Initiate turbine load reduction: <ul style="list-style-type: none">Depress LOAD RATE MW/MINEnter desired value for rate (5 MW/min)Depress REFEnter desired final turbine loading (700 MW)When ready to begin load decrease, depress GOVerify load reduction occurring
	RO/BOP	Monitor reactor power and load decrease <ul style="list-style-type: none">Monitor NI's, Tave, ΔI, Pzr press/levelMonitor Mwe, turb loading, EHC
	RO	During Boration: <ul style="list-style-type: none">Monitor VCT Level and pressureVerify RCS boron concentration increasingMonitor BA blender counterVerify boration stops at preset value
		NOTE: Following the required plant response, Event 2 may be started

Comments: _____

Scenario No: 02-1		Event No. 2
Event Description: Power Range NI Channel N-41 Fails High		
Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciators: 1-10-A3 PWR RNG HIGH STPT RX TRIP ALERT 1-10-B5 PWR RNG FLUX HIGH ROD STOP 1-10-C3 PWR RNG FLUX RATE RX TRIP ALERT 1-10-C4 PWR RNG CHANNEL DEV Rods moving in response to High Auctioneered Nuclear Power PRNI N41 indications failed high.
	RO/SRO	Identify/report failure of PRNI N41.
	US	Enter 1BwOA INST-1 "NUCLEAR INSTRUMENTATION MALFUNCTION" Attachment A PR Channel Failure, and direct actions.
	RO	Place Rod Control in MANUAL Check Rod Stop (1-10-B5) Lit
	BOP	Bypass the Rod Stop for Channel N-41 at 1PM07J
	RO	Control Tave – Tref to within 1 degree via manual rod control, boration or turbine loading
	BOP	Check S/G Levels normal and stable Bypass/defeat PR N41 at 1PM07J: <ul style="list-style-type: none">• Detector Current Comparator (Upper and Lower Section)• Power Mismatch Bypass• Rod Stop Bypass (if not previously performed)• Comparator Channel defeat• Remove Control Power Fuses for high and low flux and rate trips.
	US/RO	Trip Bistables for OTDT Trip and Runback (2 Bistables: TB411C and TB411D) Select operable Loop DT recorder When conditons are stable and Tave is within 1 degree of Tref, return rod control to automatic
	US	Refer to Tech Specs (3.3.1, 3.2.4, TRM 3.3.h) Request to have risk performance done Notify SM / Maintenance of NI failure

Comments: _____

Scenario No: 02-1		Event No. 3 & 4
Event Description: Trip of 1C CD/CB Pump. Stby not available. Rod speed fails at 1 spm in auto		
Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciators: 1-17-A9 CD/CB PUMP TRIP 1-17-A10 CD PUMP SUCT STRN DP HIGH 1-17-A11 CB PUMP SUCT STRN DP HIGH 1-17-B11 CB PUMP DISCH FLOW HIGH Amber pole disagreement light for 1C CD/CB pump breaker. Increasing flows on running CD/CB pumps.
	BOP/US	Identify / report trip of running 1C CD/CB pump
	US	Implement 1BwOA SEC-1, "SECONDARY PUMP TRIP-Attachment B", and direct operator actions: <ul style="list-style-type: none">o Notify chemistry to monitor secondary chemistry due to transient• Complete applicable steps of 1BwGP 100-4• Have risk assessment performed Notify chemistry and HP if power change > 15% in one hour for tech spec and RETS samples
	BOP	Perform actions of 1BwOA SEC-1 as directed by SRO: <ul style="list-style-type: none">• Check turbine load > 700 Mwe• Determine standby CD/CB pump is NOT available• Depress Turbine Runback pushbutton• Verify turbine load decreasing Verify/Close recirc valve 1CB113C If FW pump flows oscillating: Reduce MFP turbine speed Check alarms NOT LIT/CLEAR: <ul style="list-style-type: none">• 1-17-B11 CB PUMP DSCH FLOW HIGH• 1-16-E1 FW PUMP NPSH LOW If either of the above alarms LIT, perform the following: <ul style="list-style-type: none">• Manually open CP Bypass (1CD210A and 1CD210B)• Verify/CLOSE CD pumps recirc (1CD152)• Verify/Open GS Condenser bypass (1CD157A and 1CD157B)• Verify HDP discharge valves opening in auto (1HD046A and 1HD046B)• Verify CB pump recirc valves closed (1CB113A-D) When load has stabilized and when directed by US, depress turbine runback pushbutton to clear the runback circuit

Comments: _____

Scenario No: 02-1		Event No. 3 & 4
Event Description: Trip of 1C CD/CB Pump. Stby not available. Rod speed fails at 1 spm in auto		
Time	Position	Applicant's Actions or Behavior
	BOP	Verify Controls in Automatic and responding correctly to the load decrease: <ul style="list-style-type: none">• Turbine driven MFPs• HD046A and B• CB113s• CD152• CB157A and B• Shutdown tripped CD/CB pump per BwOP CD/CB-2<ul style="list-style-type: none">o Adjust B/D flows and Calorimetric inputs as necessaryo Verify DEHC feedback loops in service (Impulse and MW)
	NOTE:	At some time during the turbine runback the crew should question the rod control response and discover the rod speed problem. From that time forward they should remain in Manual Rod Control. If they select Auto for rods they should note the rod speed indicator too low for minimum auto rod speed (<8spm) and return to Manual. IF BwOA ROD-2 is entered for failure of rods to move the actions start on page 10 CUE: 1-14-D1 TAVE CONT DEV HIGH - LIT
	RO	Perform actions of 1BwOA SEC-1 as directed by SRO: <ul style="list-style-type: none">• Verify rod control in Automatic.• Initiate Boration as necessary.• Maintain Tave and Tref within 3 degrees F While monitoring rod control response, identify the response is inadequate to maintain Tave = Tref during the load reduction. <ul style="list-style-type: none">• Take manual control of rods• Manually insert rods to maintain Tave and Tref deviation within acceptable limits.• Inform SM of rod control speed failure
	RO	Check PDMS operable as follows: <ul style="list-style-type: none">• 1-10E8 PDMS INOPERABLE not lit• 1BwOS PDMS-1a, PDMS AAR not implemented• 1-10-D7 PDMS LIMIT NOT EXCEEDED not lit Control delta I near target 1-10-B6 ROD BANK LOW INSERTION LIMIT not lit (if lit, borate as necessary, refer to TS 3.1.6) 1-BP-4.6 LOSS OF TURB LOAD INTLK C7 not lit

Comments: _____

Scenario No: 02-1		Event No. 3 & 4
Event Description: Trip of 1C CD/CB Pump. Stby not available. Rod speed fails at 1 spm in auto		
Time	Position	Applicant's Actions or Behavior
		If 1BwOA ROD-2 is entered, the actions are below:
	US	Enter 1BwOA ROD-2 and direct actions:
	US/RO	<div>Perform actions as directed:<ul style="list-style-type: none">• Place Rod Control In MANUAL.o Stop unnecessary Turbine Load and Boron changes• Check Rod Stops NOT Lit:<ul style="list-style-type: none">• PWR RNG FLUX HIGH ROD STOP (1-10-B5)• IR HIGH FLUX ROD STOP (1-10-A2)• TURBINE LOW POWER INTLK C-5• BANK D ROD STOP C-11 (1-10-D5)• Check ROD CONT URGENT FAILURE (1-10-C6) NOT Lit.• Determine if Rod Control Should be placed in AUTOMATIC:<ul style="list-style-type: none">• C-5 Not Lit• Tave-Tref deviation < 1 degree F.• Determine that placing rod control into automatic will result in wrong rod speed response<p>NOTE: When the plant has been stabilized at 700 Mwe, the next event may be inserted</p></div>

Comments: _____

Scenario No: 02-1		Event No. 5
Event Description: Steam Flow Transmitter FT-532 (input to controlling channel) fails high		
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: 1-15-C4 SG 1C FLOW MISMATCH FW FLOW LOW 1FT-532 indication reading high 1FW530 throttling open FW flow increasing SG level increasing above program
	BOP/US	Identify/report steam flow channel FT-532 failure <ul style="list-style-type: none">Take manual control of 1FW530 and balance feed flow with steam flow to stabilize level as necessary.
	US	Implement 1BwOA INST-2, "OPERATION WITH A FAILED INSTRUMENT", Attachment H "STEAMFLOW CHANNEL FAILURE", and direct actions.
	BOP	Perform actions as directed: <ul style="list-style-type: none">Check affected SG levels Normal. IF NOT:<ul style="list-style-type: none">Place FRV in ManualVerify adequate FW DPRestore level to a stable condition.Select operable Steam flow channelEstablish Auto level controlVerify Steam Pressure Channels Normal
	RO	Assist BOP as required to identify failed instrument channel and stabilize SG levels Monitor RCS and stabilize changing parameters resulting from FF/SF imbalance: <ul style="list-style-type: none">RCS TavePzr Pressure
	US	Inform SM and maintenance of failure.

Comments: _____

Scenario No: 02-1		Event No. 6, 7, 8
Event Description:		Large Break LOCA / ATWS / Failure of CS to actuate
Time	Position	Applicant's Actions or Behavior
	CUE	Large Break LOCA results in lowering inventory and Reactor trip RED FIRST OUT
	US	Implement 1BwEP-0 "REACTOR TRIP OR SI"
	RO	Perform immediate operator actions of 1BwEP-0 Verify the reactor is NOT tripped: <ul style="list-style-type: none">• Rod bottom lights NOT LIT• Reactor trip & bypass breakers NOT open• Neutron flux NOT decreasing Manually attempt to trip reactor with both switches at: <ul style="list-style-type: none">• 1PM05J• 1PM06J
	RO	Identify/report that reactor trip breakers did not open.
	US	Transition to 1BwFR-S.1 "RESPONSE TO NUCLEAR POWER GENERATION/ATWS" <ul style="list-style-type: none">o Contact WEC for STA duties
	CREW	Dispatch operator to locally open reactor trip breakers
	RO	Perform immediate operator actions of FR-S.1: <ul style="list-style-type: none">• Verify reactor is NOT tripped<ul style="list-style-type: none">• Rod Bottom lights NOT lit• Reactor trip breakers NOT open; Bypass breakers open (not racked in)• Neutron flux stable/NOT decreasing from Post Trip.• Manually attempt to trip reactor with switch<ul style="list-style-type: none">• 1PM05J• 1PM06J
	RO [CT] FR-S.1-C	Insert control rods at 48 spm in Manual. (Auto is failed to 1 spm)

Comments: _____

Scenario No: 02-1		Event No. 6, 7, 8
Event Description: Large Break LOCA / ATWS / Failure of CS to actuate		
Time	Position	Applicant's Actions or Behavior
	BOP	Verify turbine trip <ul style="list-style-type: none">Turbine throttle valves closedTurbine governor valves closed Check AFW Pumps Running <ul style="list-style-type: none">AF Pump run lights - Lit
	RO/BOP	Verify Emergency Boration of the RCS is occurring (with SI actuation): <ul style="list-style-type: none">1CV112D and E are OPEN1CV112B and C are CLOSEDBoth CV Pumps RUNNING
	RO	Check PZR pressure – Less than 2335
	BOP	Verify Containment Ventilation Isolation <ul style="list-style-type: none">Group 6 CNMT Vent Isol monitor lights –LIT
		(Note: US may assign an operator to verify proper ESF Actuations per OAS as time permits.)
	RO	Verify reactor subcritical <ul style="list-style-type: none">PR channels < 5%IR channels SUR < 0 Determine the power is still above 5% and continue with steps of 1BwFR-S.1. (NOTE: If the values above are satisfied the crew will transition to 1BwEP-0. actions for 1BwEP-0 begin on page 15)
	BOP	Isolate Steam Dumps <ul style="list-style-type: none">Place steam dump BYPASS INTERLOCK switches to OFF/RESET for both Trains. (NOTE: Reactor trip breakers will be locally opened after dumps are in OFF/RESET. If S/G WR levels reach 8% before the reactor is tripped, RCS pressure rapidly rises to the Pzr Safety setpoint.)
	CREW	Check trips have occurred <ul style="list-style-type: none">Reactor trip. If NOT - Direct the operator to locally open the trip breakers by depressing the manual trip buttonsTurbine trip

Comments: _____

Scenario No: 02-1		Event No. 6, 7, 8
Event Description: Large Break LOCA / ATWS / Failure of CS to actuate		
Time	Position	Applicant's Actions or Behavior
	BOP	Check SG levels <ul style="list-style-type: none">Level in at least one SG > 10% If NOT, verify > 900 gpm AF flowControl feed flow to maintain SG levels between 10% (31% adverse) and 50%Check SG blowdown isol valves closed: 1SD002A-H
	RO	Verify all dilution path valves closed <ul style="list-style-type: none">Reactor Makeup dilution valves 1CV111A and 1CV111B closedVerify BTRS Mode Selector in OFFDispatch operator to locally check valves closed per 1BwFR S.1 step 10c:1CV8841, PW to Emergency boration1CV8435 & 1CV8453 CV chemical mixing tank1AB8629A Recycle evap feed pumps to CENT CHG pumps suction
	CREW	Stop reactivity insertion from RCS cooldown <ul style="list-style-type: none">RCS temperature NOT decreasing in uncontrolled mannerNote: RCS temperature may be decreasing due to ECCS injection and AF Flow to SGs.SG pressure, none decreasing in uncontrolled manner
	RO	Check CETCs < 1200°F
	RO	Verify reactor subcritical <ul style="list-style-type: none">PR channels < 5%IR channels SUR < 0
	CREW	Transition to Procedure and step in effect. 1BwEP-0, "RX TRIP OR SI". (Note: Actions of 1BwEP-0 continue on next page)

Comments: _____

Scenario No: 02-1		Event No. 6, 7, 8
Event Description: Large Break LOCA / ATWS / Failure of CS to actuate		
Time	Position	Applicant's Actions or Behavior
	RO	Perform Immediate Actions of 1BwEP-0 Verify reactor trip <ul style="list-style-type: none">Rod bottom lights litRx trip and bypass breakers openFlux decreasing
	BOP	Verify Turbine tripped <ul style="list-style-type: none">TV's closedGV's closed Verify 4KV ESF Busses energized <ul style="list-style-type: none">Bus 141Bus 142
	CREW	Determine SI is actuated/required <ul style="list-style-type: none">SI First Out annunciator Lit (1-11-B/C/D/E1)SI ACTUATED Lit (1BP-4.1)SI Equipment actuated (SI Pumps running) Recognize Adverse Containment conditions exist <ul style="list-style-type: none">Cnmt Pressure >5psig
	RO/US	Trip RCP's per Operator Action Summary <ul style="list-style-type: none">CC Water lost to RCP'sCnmt Phase B actuatedAll of the following exist:<ul style="list-style-type: none">Controlled RCS Cooldown not in progressRCS Pressure <1425 psigHHSI Flow >50 gpm OR SI pump flow >100 gpm
	BOP/US	Verify Feed Water is isolated <ul style="list-style-type: none">FW Pumps trippedIsolation monitor lights litFW discharge valves (1FW002A/B/C) closed
	RO/US [CT] EP-0--I	Verify ECCS pumps running: <ul style="list-style-type: none">CV pumps1SI8801B may be opened at this point while verifying pump alignmentsSI pumpsRH pumps

Comments: _____

Scenario No: 02-1		Event No. 6,7,8
Event Description: Large Break LOCA / ATWS / Failure of CS to actuate		
Time	Position	Applicant's Actions or Behavior
	BOP/US	Verify Containment Conditions: <ul style="list-style-type: none">o RCFC Accident Mode Lights LIT (Group 2)o Phase A Lights LIT (Group 3)o Containment Ventilation Lights LIT (Group 6)
	BOP/US	Verify the following: <ul style="list-style-type: none">• AF Aligned:<ul style="list-style-type: none">• 1A and 1B AFW pumps running• 1AF013A-H Open• 1AF005A-H Throttled• 1A and 1B CCW pumps running• 1A and 1B SX pumps running• MSIVs and B/P Isolated when Cnmt Pressure >8.2 psig or Steam Line Pressure < 640 psig
	BOP/US [CT] EP-0—E	Check If Containment Spray required: <ul style="list-style-type: none">• Cnmt pressure > 20 psig<ul style="list-style-type: none">• Stop All RCPs• Group 6 lights NOT lit• Phase B lights NOT Lit Identifies/reports 1B CS pump failed to start. Identifies/reports failure of Phase B actuation/positioning of Phase B valves <ul style="list-style-type: none">• Manually actuates Both switches for CS and Phase B actuation at 1PM05J and 1PM06J• Determines manual actuation unsuccessful. Performs Attachment B. (Train A CS is OOS)<ul style="list-style-type: none">• Checks 1CS001B open• Opens 1CS007B• Places 1B CS pump TEST switch to TEST• Opens 1CS019B• Returns TEST switch to Normal• Checks 1CS010B open• Verify 1B CS pump running Verifies Eductor Suction flow > 15 gpm (1FI-CS014) Verifies CS Additive flow > 5 gpm (1FI-CS016)

Comments: _____

Scenario No: 02-1		Event No. 6,7,8
Event Description: Large Break LOCA / ATWS / Failure of CS to actuate		
Time	Position	Applicant's Actions or Behavior
		NOTE: At some time CNMT pressure may rise to an ORANGE Path condition (without CS pumps running). If so, performance of 1BwFR Z.1 "RESPONSE TO HIGH CONTAINMENT PRESSURE" may be required. Actions are covered below. CUE will be provided by the STA after monitoring the BwSTs.
	US	Implement and direct as advised by the STA the actions of 1BwFR-Z.1, "RESPONSE TO HIGH CONTAINMENT PRESSURE".
	BOP	Verify Containment Isolations <ul style="list-style-type: none">Phase A Group 3 lights litCnmt Ventilation Group 6 lights lit Check if Containment Pressure has increased to > 20 psig (1PR-937 or 1PI-CS934 thru 937) <ul style="list-style-type: none">Stop all RCPs (previously completed) Verify CS alignment: (previously complete for B Train)
	US/BOP	Verify Group 6 Phase B Isolation lights lit (previously completed) Verify RCFCs running in ACCIDENT MODE (Group 2 lights lit). Verify MS Isolation , MSIVs and B/P closed. (previously completed) Determine NO SGs are faulted: <ul style="list-style-type: none">No Steam Generator pressure decreasing in an uncontrolled mannerNo Steam Generator completely depressurized Return to step and procedure in effect.
		NOTE: Actions below resume from 1BwEP-0.
	BOP	Verify AFW flow <ul style="list-style-type: none">500 >gpmControl SG levels 31-50%Determine no SG level increasing in an uncontrolled manner

Comments: _____

Scenario No: 02-1		Event No. 6,7,8
Event Description:		Large Break LOCA / ATWS / Failure of CS to actuate
Time	Position	Applicant's Actions or Behavior
	RO [CT] EP-0--I	Verify the following: <ul style="list-style-type: none">Group 2 Cold Leg Injection lights lit - OPEN 1SI8801B ECCS Operations: <ul style="list-style-type: none">High Head SI flow > 100 gpmRCS pressure < 1700 psigSI pump flow > 200 gpmRCS pressure < 325 psigRH pump flow > 1000 gpm PZR Porv Relief path available: <ul style="list-style-type: none">At least one block valve energizedPorv in AutoAssociated Block valve open
	BOP	Verify the following: Main Generator Trip: <ul style="list-style-type: none">Output Breakers OpenPMG Breaker Open EDGs running <ul style="list-style-type: none">1SX169A and B OpenDispatch operator for local check of EDG operation Ventilation aligned: <ul style="list-style-type: none">Control roomAux bldgFuel Handling bldg

Comments: _____

Scenario No: 02-1		Event No. 6,7,8
Event Description: Large Break LOCA / ATWS / Failure of CS to actuate		
Time	Position	Applicant's Actions or Behavior
	RO	Check the following: PZR PORVs and Sprays Closed RCPs tripped Secondary Pressure Boundaries are Intact: <ul style="list-style-type: none">No SG pressure decreasing uncontrollablyNo SG completely depressurized
	BOP/US	Check SG Tubes Intact: <ul style="list-style-type: none">NO rads on RM-11 for:<ul style="list-style-type: none">SJAE/GS Exhauster 1PR27JSG Blowdown 1PR08JMain Steam Lines 1AR022, and 23 (all MSIV rooms)
	CREW	Determine RCS is NOT Intact: <ul style="list-style-type: none">CNMT ARMs in alert or alarm 1AR014, 011, 012, 021, 022Cnmt Pressure > 3.4 psigCnmt Floor water level > 5 inches. Transitions to 1BwEP-1, "LOSS OF REACTOR OR SECONDARY COOLANT".
		NOTE: Cooldown from the LOCA may cause entry conditions for 1BwFR-P.1, "RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK", if so the actions are below.

Comments: _____

Scenario No: 02-1		Event No. 6,7,8
Event Description: Large Break LOCA / ATWS / Failure of CS to actuate		
Time	Position	Applicant's Actions or Behavior
	US	Implement and direct actions of 1BwFR-P.1, "RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK" as advised by the STA: <ul style="list-style-type: none">• Check RCS pressure > 325 psig• Return to step and procedure in effect (1BwEP-1)
	US	Enter 1BwEP-1, "LOSS OF REACTOR OR SECONDARY COOLANT" and direct actions.
	RO	Check RCPs all Tripped.
	BOP	Determine NO SGs are Faulted: <ul style="list-style-type: none">• No SG Pressure decreasing uncontrollably• No SG completely depressurized Control Intact SG levels to 10% (31% Adverse) to 50% NR level Check Secondary Radiation levels normal: No evidence of SGTR.
	RO	Check PZR PORVs and Isolation Valves: <ul style="list-style-type: none">• PORV Isolation valves open and energized• PORVs Closed
	CREW	Check if ECCS flow should be reduced: <ul style="list-style-type: none">• RCS Subcooling NOT Acceptable Determine ECCS flow should NOT be reduced.
	US/BOP	Check if RH Pumps should be stopped: <ul style="list-style-type: none">• RESET SI• Check RH suction align to RWST• Check RCS Pressure < 325 psig. DO NOT STOP RH pumps Determine 4KV ESF busses ENERGIZED (Bus 141 and 142) <ul style="list-style-type: none">• Determine 4KV Non ESF Busses Energized (bus 143 and 144)• Stop 1A and 1B EDG and place in standby per BwOP DG-12 DG Shutdown

Comments: _____

Scenario No: 02-1		Event No. 6,7,8
Event Description: Large Break LOCA / ATWS / Failure of CS to actuate		
Time	Position CREW	Applicant's Actions or Behavior Initiate evaluation of plant status <ul style="list-style-type: none">• Determine Cold Leg Recirc Capability exists Power Available to RH pumps and 1SI8811A and B• Aux Bldg rads are normal for plant conditions 1/2PR28J and 1/2PR30J, ECCS Cubicle PRMs.• Reset Containment Isolation Phase A• Place Hydrogen Monitors in service per BwOP PS-9, "POST LOCA H2 MONITORS"• Obtain samples: RCS Activity, RCS Boron, Cnmt Atm, Cnmt Sump• Contact SM for evaluation to place H2 recombiners in operation.• Trip all HDPs• Shutdown 1B and 1C MFP (BwOP FW-2), CD/CB pumps (BwOP CD/CB-2)• Shutdown VC Chiller on Non operating Train. Control switch to trip.
	US	Check next procedure transition: <ul style="list-style-type: none">• RCS pressure < 325 psig• RH pump flow > 1000 gpm• Transition to 1BwEP ES-1.3 when RWST level reaches 46%. (recycle to plant evaluation step if RWST level > 46%.
	US	Implement 1BwEP ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION" when RWST level < 46% and direct actions.

Comments: _____

Scenario No: 02-1		Event No. 6,7,8
Event Description: Large Break LOCA / ATWS / Failure of CS to actuate		
Time	Position	Applicant's Actions or Behavior
	BOP/RO	<p>Perform actions of 1BwEP ES-1.3 as directed:</p> <p>Open CC to RH Hx isolation valves (1CC9412A and 1CC9412B) Check CC flows to RH Hx > 5000 gpm Verify adequate Containment sump level – 8 inches (13 adverse) 1PI-PC006 or 007 Align RH pump suction to Cnmt Sumps:</p> <ul style="list-style-type: none">• Check Both RH pumps running• Check Open 1SI8811A and 1SI8811B• Close 1SI8812A and 1SI8812B <p>Check SI and CV pumps in injection mode:</p> <ul style="list-style-type: none">• SI pumps both running• Cold Leg Injection valves (1SI8801A/B) OPEN <p>Align SI and CV pumps for Cold Leg Recirculation:</p> <ul style="list-style-type: none">• Dispatch operator to energize 1SI8806 and 1SI8813• Verify CV pump 1A miniflow isolation valves closed (1CV8111 and 1CV8114)• Close SI pump miniflow isolation valves (1SI8814, 1SI8920, and 1SI8813 when power restored)• Close RH Hx Discharge Cross ties (1RH8716A and B)• Open SI and CV pump suction header Cross ties (1SI8807A and B, and 1SI8924)• Check 1A RH pump running• Open 1CV8804A• Check 1B RH pump running• Open 1SI8804B . <p>Start ECCS pumps as necessary Reset SI as necessary Isolate RWST from SI and CV pumps</p> <ul style="list-style-type: none">• Check Open 1CV8804A and/or 1SI8804B• Close 1SI8806 (when power restored)• Close and de-energize 1CV112D and E.• <p>(NOTE: Scenario may be terminated when reaching step to align CC for Post LOCA recovery)</p> <p>Align CC for post LOCA Recovery:</p> <ul style="list-style-type: none">• Establish SX flow to U-0 CC Hx• Open 0SX146• Open 1SX005 <p>Dispatch operator to adjust SX flow to CC Hxs to maintain the following:</p> <ul style="list-style-type: none">• CC Hx outlet temperature > 105 degrees F• SX motor current < 191 amps <p>Initaite alignment of CC for Post LOCA recovery per BwOP CC-1.</p>
Comments:		

SHIFT MANAGER TURNOVER

Weekday, Today, 2001 ONCOMING SHIFT 2

UNIT 1 STATUS		UNIT 0 & 1 MAJOR OOS's	
MODE 1 Rx Pwr. 93 Generator MWe. 1150 Max Load/Power. 100% Min Load/Power 500 MW Max Ramp Rate. 5 MW/Min Desired Delta I Target On-Line Risk. Green Boron @ 934 Control Bank. D @ 175		1A CS Pump 1D CD/CB Pump	
LCOAR ENTRIES PREVIOUS 48 HRS		UNIT 0 & 1 MAJOR SURVEILLANCES	
LCO 3.6.6 1A Containment Spray Pump			
UNIT 0 & 1 IN PROGRESS		UNIT 0 & 1 PENDING	
1A CS Pump bearing replacement. Hour 36 of a 7 day LCOAR. 1D CD/CB Pump alignment. Estimated RTS in 48 hours 1C CB Pump suction strainer delta-p problems. Ramped unit from 100% to 1150 MW over last 15 minutes using EHC and control rods only.		Ramp unit 1 to 700 MW at 5 MW/min in preparation for removing 1C CD/CB pump from service and flushing suction strainer. <	

SHIFT MANAGER TURNOVER

UNIT 2 STATUS		UNIT 2 MAJOR OOS's	
MODE 1 Rx Pwr. 97.6 Generator MWe. 1197 Max Load/Power. 97.6 impulse pressure Min Load/Power 700 Max Ramp Rate. 5 mw/min Desired Delta I Target On-Line Risk. Green Boron @ 1037 Control Bank. D @ 210			
LCOAR ENTRIES PREVIOUS 48 HRS		UNIT 2 MAJOR SURVEILLANCES	
none			
UNIT 2 IN PROGRESS		UNIT 2 PENDING	
		Dose INFO: Dose goal for day 10 mr	
SCHEDULED ACTIVITY CONFLICT			

SHIFT MANAGER TURNOVER

Administrative	
Temporary Procedures / Modifications	T-mod U1 Trn B RVLIS. Jumper Installed on φC U-1 MPT Disconnect. 1FW009A T-Mod for Hyd Pp Press Sw 1PS-FW162.
Daily Orders / Special Op Orders	
Daily Manning Schedule	See sheet for restricted duty personnel and overtime restrictions Oncoming STA Fire Chief
Control Room Rounds	
(GSEP / LER / DVR / ENS)	
Material TS Conditioning	SFP High Level alarm did not alarm during calibration
RWP's / Releases / Precautions / ALARA	
Infrequent Evolution Activities	Lesson learned files L:\shared\lopec then ctrl F to search
SPS0 / Division LD	Alternate BPO Outside # 815-727-5902/5903 Tie # 8-565-5902/5903
Unit 1 Comments	Unit Common Comments
Air line break at 15/16 heaters, temp repair in place, fix A1F34 1HD046A jerky last 30% of travel. Problem on pp swaps Battery 112 cell 32 has floating material in electrolyte, eval'd OK D.O. OOS prevents filling U-1 tanks normally, but BwOP DO-6 can be used to fill tanks. T-MOD is installed allowing U-1 boiler ops	U1 FC Cleanup SFP U2 FC Cleanup OFFLINE (leak) FC Cooling U1 50K DO Tank empty 125K DO Tank and FRAC Tks Certified Aux Steam U-1 ES →U1 HDT U-0 CC Hx U1 U-0 CC Pump Bus 141 U1 Aux boiler Wet lay-up U2 Aux boiler Wet lay-up SAC / Dryer U1/U0 MUDs U-1 CST CW Makeup Running 0A/0B CW Blowdown On Lake Level 5.8'
Unit 2 Comments	General Comments
2AF017A leaking by .3 gpm, AR 990116738 S/G sampling lines/valves at HRSS are not correct. Do not hang OOS on any 2PS181 valves till further notice. 2PS229A still blows fuse 2PA32J Ckt 9 CV seal leakage: 2A Running 200cc/min shutdown about 6 drops/min 2B Running -12 dpm; S/D- none	Conference Call Phone Number – 1-800-232-1234 Teleconference folder ID #-472664085 Meeting Place 630-663-7120 +code Duty Team is located @ SITE APPS, NRC Duty list in book Substation construction (John Strle) Cell phone 815-351-8472
Caution Cards	Abnormal Positioned Components
CCNUM EPN	CCNUM EPN AbnormalPosition

SM BEEPER TURNOVER

Shift 1 To 2 Time Now Date Today Offgoing _____ Oncoming _____.

UNIT ONE - MODES 1, 2, AND 3
SHIFTLY AND DAILY OPERATING SURVEILLANCE DATA SHEET

Critical Parameter Data Sheet (Mode 1 and 2)

Unit 1

Date: Today

Time	ΔI/Target ΔI		VCT Level	Highest PR NI	PZR Press	PZR Lvl	Hi Tavg/Tref		Gen Mwe	Initial
23:00	-9.68	-9.67	53	100.0	2235	60	586.0	586.0	1256	RC
0:00	-9.68	-9.67	53	100.0	2235	60	586.0	586.0	1256	RC
1:00	-9.68	-9.67	53	100.0	2235	60	586.0	586.0	1256	RC
2:00	-9.68	-9.67	53	100.0	2235	60	586.0	586.0	1256	RC
3:00	-9.68	-9.67	53	100.0	2235	60	586.0	586.0	1256	RC
4:00	-9.68	-9.67	53	100.0	2235	60	586.0	586.0	1256	RC
5:00	-9.68	-9.67	53	100.0	2235	60	586.0	586.0	1256	RC
6:00	-9.68	-9.67	53	100.0	2235	60	586.0	586.0	1256	RC

Unit Supervisor: KH

7:00	-9.68	-9.67	53	100.0	2235	60	586.0	586.0	1256	RC
8:00										
9:00										
10:00										
11:00										
12:00										
13:00										
14:00										

Unit Supervisor:

15:00										
16:00										
17:00										
18:00										
19:00										
20:00										
21:00										
22:00										

Unit Supervisor:

(Final)

UNIT ONE
POWER HISTORY HOURLY SURVEILLANCE
DATA SHEET

DATE FOR WHICH THIS SURVEILLANCE IS BEING PERFORMED: TODAY

TIME		AVG NUCLEAR POWER OUTPUT	TIME		AVG NUCLEAR POWER OUTPUT
IDEAL	ACTUAL		IDEAL	ACTUAL	
0100	0100	100.0 %RTP	1300		%RTP
0200	0200	100.0 %RTP	1400		%RTP
0300	0300	100.0 %RTP	1500		%RTP
0400	0400	100.0 %RTP	1600		%RTP
0500	0500	100.0 %RTP	1700		%RTP
0600	0600	100.0 %RTP	1800		%RTP
0700	0700	100.0 %RTP	1900		%RTP
0800		%RTP	2000		%RTP
0900		%RTP	2100		%RTP
1000		%RTP	2200		%RTP
1100		%RTP	2300		%RTP
1200		%RTP	2400		%RTP

TOTAL POWER FOR THE DAY: _____ (Sum of each recorded average Nuclear Power Output)

TOTAL EFPH FOR THE DAY: _____ (Total Power for the day multiplied by 0.01)

PREVIOUS CUMULATIVE EFPH: 2150.177 (Total EFPH to date from previous last run of this surveillance)

EFPH ADJUSTMENT**: _____ Signature: _____

TOTAL EFPH TO DATE: _____ (TRANSFER to next day's surveillance or next run of this surveillance)

☐ "INFO ONLY" copy placed in file (Reviewer).

** MAY ONLY BE MADE AND SIGNED BY THE STATION NUCLEAR ENGINEER OR DESIGNEE. A WRITTEN DESCRIPTION OF THE REASON(S) FOR THE ADJUSTMENT MUST BE ATTACHED.

(Final)

Facility: Braidwood

Scenario No.: 2

Op-Test No.: _____

Examiners: _____

Operators: _____

SRO

RO

BOP

Initial Conditions:

IC-21; 100% power, BOL, equilibrium Xenon, steady state, 1B Diesel Generator OOS, 1C HD pump OOS, U-2 SAC OOS.

Turnover:

100% power, BOL, equilibrium Xenon, steady state. The 1B Diesel Generator is OOS for replacement of Turbo Charger. The DG has been OOS for 18 hours and is expected to be returned to service by the end of the shift. 1C Heater Drain Pump is OOS for motor bearing replacement. Unit 2 SAC is OOS for an oil change and is expected to be returned to service by the end of the shift. The 1B CCW Pump is running for ASME testing. A tube leak being trended on the 1C SG has increased over the last hour and has been confirmed at 5 gpm requiring a unit shutdown.

Event No.	Malf. No.	Event Type*	Event Description
Preload	RF EG09 MAINT_O		1B DG OOS
Preload	Preload - TH03C	RO BOP SRO	Steam Generator 1C Tube Leak (5 gpm)
1		N BOP SRO R RO	Reduce Turbine Load for Unit Shutdown due to SG leakage > Tech Spec Lower reactor power using rods and/or boration
2	RX18A	I RO SRO	1A RCS loop Tcold RTD failed High
3	EG03	C BOP SRO	Voltage Regulator malfunction Field Forcing
4	RX06K	I BOP SRO	Steam Generator 1C controlling level channel 1LT539 Failed High on a 3 sec ramp.
5	CV01A	C RO SRO	Centrifugal Charging Pump Trip
6	TH03C	M RO BOP SRO	Steam Generator 1C Tube Rupture (460 gpm)
7	ED11A	C RO BOP SRO	Loss of Instrument Bus 111 coincident with Reactor Trip
8	RF RP84 RP15D	C RO BOP SRO	1B SI Pump fails to start automatically, Manually start an SI pump and Manually Align train A ECCS for Injection due to failure to auto start from loss of instrument bus 111

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

SCENARIO 02-2 OVERVIEW

The unit is at 100% power, BOL, equilibrium Xenon, steady state. The 1B Diesel Generator is OOS for Turbo Charger replacement. The Diesel Generator has been OOS for 18 hours and is expected to be returned to service by the end of the shift. 1C Heater Drain Pump is OOS for motor bearing replacement. Unit 2 SAC is OOS for an oil change and is expected to be returned to service by the end of the shift.

A known steam generator tube leak on the 1C S/G has just been confirmed to have increased beyond that allowed for continued plant operations and a unit shutdown has been ordered at 5 MW/min. A unit shutdown will be commenced in accordance with 1BwOA SEC-8 step 10 and Tech Spec 3.4.13, "Operational Leakage".

Once the ramp has been initiated a failure of the 1A Tcold narrow range RTD instrument high will occur. The US will enter BwOA INST-2 for the failed instrument. The crew should identify the failed Tcold instrument by abnormal rod motion and place rod control in manual. The crew should identify bistables to be tripped within 6 hours for the failed RTD channel.

After an adequate power change is observed and the actions for failed RTD are completed, a Voltage Regulator malfunction will result in field forcing. The crew should take the Voltage Regulator to OFF and use the Base Adjuster to reduce Exciter field current to less than 100 amps. The Voltage Regulator should remain OFF and control will be manual operation of the Base Adjuster to control main generator voltage.

After the actions for the Voltage Regulator failure are complete, 1C Steam Generator Level Channel 1LT-539 will fail high causing 1FW530 (1C FRV) to close. The operators will take manual control of the 1C FRV and restore feedwater flow to normal. The US will enter BwOA INST-2 and direct actions for failed SG Level channel and establish normal automatic steam generator level control.

After actions are complete for the level channel failure, the 1A CV pump will trip. The operators will perform actions to isolate letdown, then restore charging and restore letdown IAW 1BwOA PRI-15, "LOSS OF NORMAL CHARGING"

After the actions are complete for the CV pump trip, the 1C S/G tube leak will increase to 460 gpm requiring a Reactor Trip and Safety Injection. Coincident with the reactor trip and safety injection a fault of instrument bus 111 will result in de-energization of the bus. The crew will enter 1BwEP-0 and manually align A train of ECCS due to the de-energized instrument bus. The 1B Safety injection pump will fail to auto start and the crew will take actions to manually start 1A and 1B SI pumps.

The US will transition to 1BwEP-3 at step 28 of 1BwEP-0. The crew should take actions of 1BwEP-3 to stabilize the plant by cooling down and depressurizing the RCS.

Completion criteria is the performance of 1BwEP-3 through ECCS termination step 21.

Critical Tasks

1. E-3--A: Isolate feedwater flow into and steam flow from the ruptured S/G before transition to ECA-3.1 occurs.
2. E-3--B: Establish/maintain RCS temperature so that transition from E-3 does not occur because temperature is either of the following: Too high to maintain minimum required subcooling OR Below the RCS temperature that cause an extreme or severe challenge to the subcriticality and/or the integrity CSF.
3. E-0—I: Manually initiate SI flow via 1A or 1B SI Pump before transitioning out of EP-0.
4. E-3--C: Depressurize RCS to meet SI termination criteria before water enters the steamlines.

SCENARIO 2001-3

SIMULATOR OPERATOR NOTES

Simulator Setup:

IC-21, 100% power, BOL, equilibrium Xenon, steady state.

Align switches:

1B DG C/S PTL and OOS

ACB 1423 PTL and OOS

1C HD pump C/S PLT and OOS

U-2 SAC C/S PTL and OOS, ensure U-1 SAC running

Perform “Ready for Training” checklist.

Swap running CC Pumps – 1B in RUN, 1A in STANDBY

Insert PRELOAD Events:

- RF EG09, MAINT_O - 1B DG OOS
- RF RP84 – OPEN - Auto start failure of 1B SI pump
- IMF RP15D - Auto start failure of 1B SI pump
- IMF: TH03C, 5 gpm - SG tube leak in 1C SG is intended to force a unit shutdown based on exceeding allowable limits per Tech Specs and the procedure.

Acknowledge RM-11 Grid 1 alarms

Open 1BwOA SEC-8 and place keep through step 10c

Event 1 Power reduction.

Event 2 1A RCS loop Tcold narrow range RTD failed high

SDG: RX1

Malf: RX18A, 630

Initiate event after clearly observing reactivity change/response of plant to requested power ramp and with lead examiners concurrence.

Acknowledge all info passed to the SM, WEC, and maintenance.

SDG RX4, RX2

Cabinet door #1 open

OPDT Trip	TB411G	C1-124	BS-1	RF	RX014 TRIP
-----------	--------	--------	------	----	------------

OPDT Runback	TB411H	C1-124	BS-2	RF	RX136 TRIP
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OTDT Trip	TB411C	C1-124	BS-3	RF	RX013 TRIP
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OTDT Runback	TB411D	C1-124	BS-4	RF	RX135 TRIP
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Low Tave	TB412G	C1-121	BS-2	RF	RX016 TRIP
----------	--------	--------	------	----	------------

Lo-Lo Tave	TB412D	C1-121	BS-1	RF	RX015 TRIP
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Cabinet door #1 Close	RF	RP20	CLOS
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Event 3 Voltage Regulator malfunction Field Forcing.

SDG: EG1

Malf: EG03, 94%

Initiate malfunction after actions are taken for the failed RTD and with lead examiners concurrence.

If asked role play as U-2 admin and/or extra NSO for Unit 2 Main Generator VARs have decreased.

Acknowledge all info passed to the SM, WEC, and maintenance.

NOTE: Failure to take action to reduce exciter field current will result in a generator trip reactor trip.

Event 4 SG 1C controlling level channel 1LT-539 fails high.

SDG: RX19

Malf: RX06K, 100%

Initiate malfunction after actions are taken to manually control main generator exciter field current and with lead examiners concurrence.

Use the following to trip bistables for the failed channel

Cabinet door #1 open				RF	RP20	OPEN
P14	LB539A	C2-753	BS-1	RF	RX063	TRIP
Lo-2 Rx Trip/AF Pump Start	LB539B	C2-753	BS-2	RF	RX064	TRIP
Cabinet door #1 Close				RF	RP20	CLOSE

Event 5 Centrifugal Charging Pump trip

SDG: CV5

Malf: CV01A

Initiate this event after actions for SG level channel failure are completed and with lead examiners concurrence.

If sent to locally investigate the 1A CV pump and breaker, wait 3 minutes, perform first check, and report no apparent cause at the breaker (bus 141 cub 11).

If sent to check the 1B CV pump, wait 3 minutes, perform first check, and report “normal operating conditions”.

Acknowledge all info passed to the SM, WEC, and maintenance.

Remote Starts or Stops of the Aux Lube Oil pumps can be accomplished by RF CV76

Event 6 SGTR 1C SG. Leakage increases to 460 gpm over 3 minutes.

SDG: TH5

Malf: TH03C, 460 gpm, 180 sec ramp.

Initiate failure after tech specs are investigated for the CV pump and with lead examiners concurrence.

Acknowledge all info passed to the SM, WEC, and chemistry.

Event 7 Loss of Instrument Bus 111

SDG: ED6

Malf: ED11A

Trigger - **When Reactor trip breakers are opened**

The loss of Instrument Bus 111 occurs after the reactor trip and prior to initiation of Safety Injection. This will prevent the auto actuation of Train A ESFAS. The loss of the instrument bus is non-recoverable for the duration of the scenario and probably won't be pursued by the crew. If requested to investigate as NLO wait 3 minutes, perform first check and report that Instrument Bus 111 indicates evidence of electrical damage.

Acknowledge all info passed to the SM, WEC, and maintenance.

Event 8 1B SI pump fails to start automatically. Start and Manually Align train A ECCS for Injection due to failure to auto start from loss of instrument bus 111

Malf: (preload) RP15D

RF: (preload) RP84

Acknowledge all info passed to the SM, WEC, and maintenance.

Scenario No.: 02-2		Event No.: 1
Event Description: Plant shutdown due to excessive S/G leakage		
Time	Position	Applicant's Actions or Behavior
	CUE:	As a result of the excessive steam Generator tube leakage, 1BwOA SEC-8 dictates a power reduction to Hot Shutdown within 6 hours of exceeding 150 gpd.
	US	Implement actions of 1BwGP 100-4
	US	Direct load reduction to MODE 3 within 6 hours
	CREW	Review applicable Prerequisites, Precautions, Limitations and Actions of 1BwGP 100-4
	RO	<p>Verify rod position and boron concentration.</p> <p>Initiate boration, if required. (BwOP CV-6)</p> <ul style="list-style-type: none">• Determine required boric acid volume by:<ul style="list-style-type: none">o Effects of previously performed borationso Boration Dilution Tables• Determine required boric acid flow rate.• Set 1FK-110 BA Flow Cont to desired boration rate.• Set 1FY-0110 BA Blender Preset Counter to desired volume.• Place MAKE-UP MODE CONT SWITCH to STOP position.• Set MU MODE SELECT to BOR position.• Place MAKE-UP MODE CONT Switch to START• Verify proper operation of valves and BA transfer pump (CV110B open, BA pump is running, CV110A throttles opens, BA flow on recorder. <p>OR</p> <p>Batch addition:</p> <ul style="list-style-type: none">• Open CV110B.• Open CV110A.• Start BA Transfer pump.• When desired amount of BA added, stop BA Transfer pump.• Close CV110A<ul style="list-style-type: none">o Flush BA line.• Close CV110B.

Comments: _____

Scenario No.: 02-2		Event No.: 1
Event Description: Plant shutdown due to excessive S/G leakage		
Time	Position	Applicant's Actions or Behavior
	BOP	Initiate turbine load reduction: <ul style="list-style-type: none">Depress LOAD RATE MW/MINEnter desired value for rateDepress REFEnter power level 620 MW.When ready to begin load decrease, depress GOVerify load decreases.
	RO/BOP	Monitor power/load decrease: <ul style="list-style-type: none">Monitor reactor power, Tave, ΔI
	RO	During boration: <ul style="list-style-type: none">Monitor VCT levelVerify RCS boron concentration increasingMonitor BA blender counterVerify boration stops at preset value
		NOTE: Following clearly observable plant response from the reactivity changes and with lead examiners cue, Event 2 is entered.

Comments: _____

Scenario No.: 02-2		Event No.: 2
Event Description: 1A RCS loop Tcold failed high		
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: 1-14-D1 TAVE CONTROL DEV HIGH 1-14-B1 OTAT HIGH RX TRIP ALERT 1-14-E2 AUCT TAVE HIGH 1-14-A5 LOOP 1A ΔT DEV LOW 1-14-B3, C3, D3 LOOP 1B,C,D TAVE DEV LOW Control rods stepping in 1A Tave indication high
	RO/US	Identify /report 1A Tave channel failure
	RO	Determine turbine load stable and place rods in Manual.
	US	Implement 1BwOA INST-2, "OPERATION WITH A FAILED INSTRUMENT CHANNEL" Attachment A and direct operator actions.
	RO	Verify rod bank select switch in manual
	RO	Manually defeat failed RTD channel: <ul style="list-style-type: none">• Select failed Tave channel with TAVE DEFEAT switch• Select failed ΔT channel with ΔT DEFEAT switch
	RO	Select an operable RTD channel to the ΔT recorder
	RO	Check if rod control can be placed in auto <ul style="list-style-type: none">• TURBINE LOW POWER INTLK C5 – NOT lit• Tave-Tref deviation – Stable and within 1°F<ul style="list-style-type: none">• IF NOT restore Tave-Tref deviation to within 1°F<ul style="list-style-type: none">• Adjust rods• Place ROD BANK SELECT switch in AUTO
	RO	Check PZR level <ul style="list-style-type: none">• PZR level NORMAL and STABLE
	RO/US	o Dispatch operator to locally trip bistables for failed channel by placing switches to "TEST"

Comments: _____

Scenario No.: 02-2		Event No.: 2
Event Description: 1A RCS loop Tcold failed high		
Time	Position	Applicant's Actions or Behavior
	RO	Check P12 interlock <ul style="list-style-type: none">Tave greater than 550°FLO-2 TAVE STM DUMP INTLK P12 - NOT LIT
	BOP	Monitor secondary plant parameters as a result of the primary transient Assist RO as requested / directed by US <ul style="list-style-type: none">Coordinate bistable trippingInvestigate BwARsMake phone calls as directed by US/ROProvide appropriate peer checks to RO as requestedControl Turbine loading as directed by US/RO
	US	Refer to Tech Spec <ul style="list-style-type: none">3.3.1 Reactor Trip Instrumentation3.3.2 ESFAS InstrumentationTRM 3.3.h
	US	Inform SM/Maint of RCS loop 1A Tcold RTD failure/status.
		NOTE: After actions are complete for failed Tave channel and lead examiners concurrence, Event 3 is entered.

Comments: _____

Scenario No.: 02-2		Event No.: 3
Event Description: Voltage Regulator malfunction Field Forcing		
Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciators: 1-19-B6 GENERATOR FIELD FORCING 1-19-C8 GENERATOR VOLT REG TROUBLE 1-19-E8 TGTMS ALARM SETPOINT EXCEEDED Increasing Exciter Field Current
	BOP	Identify/report main generator field forcing.
	BOP/US	Perform immediate actions of 1BwAR 1-19-B6: <ul style="list-style-type: none"> If Voltage Regulator failure is suspected then, <ul style="list-style-type: none"> SHIFT Voltage Regulator to OFF Using the Base Adjuster, Reduce exciter field current to <100 amps Notify Electric Operations
	BOP/US	Perform subsequent operator actions of 1BwAR 1-19-B6: <ul style="list-style-type: none"> Refer to BwGP 100-3A6/3A7 for MW and VAR limits with regulator out of service
	US	Inform SM/Electrical Operations of Voltage Regulator failure.
	RO	Monitor Primary plant response during the secondary transient Assist BOP as directed/requested by US/BOP <ul style="list-style-type: none"> Determine MW vs VAR loading Investigate BwARs Provided appropriate peer checks to BOP as requested Make phone calls/notifications as directed
		NOTE: IF Exciter field is NOT reduced far enough Turbine Generator Temperature monitoring System may alarm and the following actions might be required.
	CUE:	Annunciators: 1-19-E3 TGTMS GEN TEMP TRIP STPT EXCEEDED 1-19-E8 TGTMS GEN TEMP ALARM STPT EXCEEDED
	US	Implement 1BwOA TG-2, "TGTMS TROUBLE" and direct operator actions.
	CREW	Verify Main Generator operating within limits. <ul style="list-style-type: none"> Refer to 1BwGP 100-3A6/3A7 for excitation limits

Comments:

Scenario No.: 02-2		Event No.: 3
Event Description: Voltage Regulator malfunction Field Forcing		
Time	Position	Applicant's Actions or Behavior
	BOP	Dispatch operator to check proper operation of the following turbine generator support systems: <ul style="list-style-type: none">• Stator water• Hydrogen cooling• Hydrogen seal oil• Exciter cooling• Bus duct cooling• Turbine oil
	BOP/US	Determine that problem is due to excessive VARs and reduce Exciter field current with Base adjuster to clear condition.
		NOTE: When actions are complete for voltage regulator failure and with lead evaluators concurrence, Events 4 is entered

Comments: _____

Scenario No.: 02-2		Event No.: 4
Event Description: Steam Generator 1C controlling level channel 1LT539 Failed High on a 3 sec ramp		
Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciators: 1-15-C4, "S/G 1C FLOW MISMATCH FW FLOW LOW" 1-15-C8, "S/G 1C LVL HI-2 TURB TRIP P-14 ALERT" 1-15-C9, "S/G 1C LEVEL DEVIATION HIGH LOW" FRV 1FW530 closing 1LT-539 meter indicating full scale Feedwater flow decreasing
	BOP/US	Identify/report failure of 1LT-539 1C SG Narrow Range Level Channel
	US	Implement 1BwOA INST-2, "OPERATION WITH A FAILED INSTRUMENT" Attachment E and direct operator actions.
	BOP	Take manual control of 1C SG Feedwater Regulating Valve 1FW530 Increase demand to control feedwater flow greater than steam flow to restore level to normal
	BOP	Check affected SG level: <ul style="list-style-type: none"> SG level normal <ul style="list-style-type: none"> If NOT <ul style="list-style-type: none"> Place feed reg valve in manual Restore SG level to a stable condition Operable SG level control channel selected <ul style="list-style-type: none"> Select 1LT558 as control
	BOP	Dispatch operator to locally trip bistable for failed channel by placing indicated switches to test <ul style="list-style-type: none"> 1LT-539 1C SG Narrow Range Level Channel <ul style="list-style-type: none"> P14 LB539A Lo-2 Rx Trip/AF pump start LB 539B
	US	Determine Status of AMS System to be ok for this failure

Comments:

Scenario No.: 02-2		Event No.: 4
Event Description: Steam Generator 1C controlling level channel 1LT539 Failed High on a 3 sec ramp		
Time	Position	Applicant's Actions or Behavior
	RO	Monitor changing primary plant parameters as a result of changing feedwater flows <ul style="list-style-type: none">• Reactor Power• Tave• Pzr pressure Assist BOP as directed/requested by US/BOP <ul style="list-style-type: none">• Provide appropriate peer checks as requested• Investigate BwARs• Make phone calls/notifications as directed
	US	Refer to Technical Specifications <ul style="list-style-type: none">• 3.3.1 trip bistables within 6 hours• 3.3.2 trip bistables within 6 hours• 3.3.3 PAM Instrumentation
	US	Inform SM/Maint of 1LT-539 failure/status.
		NOTE: After the actions for failed level channel are complete and with lead examiners concurrence, Event 5 is entered.

Comments: _____

Scenario No.: 02-2		Event No.: 5
Event Description: Centrifugal Charging Pump Trip		
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciator: 1-9-A3 CHG PUMP TRIP 1-9-D3 CHG LINE FLOW HIGH LOW Charging pump trip indication Loss of seal injection flow indication
	RO	Identify/report trip of the 1A CV pump
	RO/US	Refer to BwAR for charging pump trip for immediate operator actions: Initiate and direct the actions of 1BwOA PRI-15 "LOSS OF NORMAL CHARGING"

Comments: _____

Scenario No.: 02-2		Event No.: 5
Event Description: Centrifugal Charging Pump Trip		
Time	Position	Applicant's Actions or Behavior
	RO	<p>Perform actions of 1BwOA PRI-15:</p> <p>Identify neither CV pump is running</p> <ul style="list-style-type: none"> Place 1A CV Pump CS in PTL <p>Isolate normal letdown</p> <ul style="list-style-type: none"> Close 1CV8149A,B,C Close 1CV459 and 1CV460 <p>Check VCT suction valves open</p> <ul style="list-style-type: none"> 1CV112B and 1CV112C <p>Monitor and maintain VCT level greater than 20%</p> <p>Check VCT Temperature High alarm (1-9-C2) not lit</p> <p>Check previously running CV pump was not gas bound</p> <ul style="list-style-type: none"> #1 Seal leakoff flow not fluctuating prior to pump trip CV pump flows not fluctuating prior to the pump trip CV discharge press not fluctuating prior to the pump trip CV pump amps not fluctuating prior to the pump trip <p>Restore normal charging flow</p> <ul style="list-style-type: none"> Check miniflows open 1CV8110 and 1CV8116 Check RCS pressure at NOP <p>Start the standby 1B CV pump</p> <p>Check CV alignment</p> <ul style="list-style-type: none"> 1CV8146 OR 1CV8147 open 1CV8324A OR 1CV8324B open 1CV8105 AND 1CV8106 open Check charging flow established
	RO/US	Refer to BwAR for charging pump trip for subsequent operator actions:

Comments:

Scenario No.: 02-2		Event No.: 5
Event Description: Centrifugal Charging Pump Trip		
Time	Position	Applicant's Actions or Behavior
	BOP/RO	<p>Restore normal letdown flow per 1BwOA ESP-2 "REESTABLISHING CV LETDOWN DURING ABNORMAL CONDITIONS.</p> <ul style="list-style-type: none">• Verify CLOSED 1CV8149A, B, C, letdown orifice isolation valves• Verify CLOSED 1CV459 & 1CV460 letdown line isolation valves• Check 1CV8401A letdown Hx isolation valve OPEN• Verify 1CV8324A and 1CV8389A regen Hx isol valves OPEN• Verify 1CV8152 and 8160 letdown Cnmt Isolation valves OPEN• Verify BTRS mode select switch OFF• Place 1CV131 controller in MANUAL at 40% demand• Place 1CC130A/B flow controller in MANUAL at 60% demand• Check CV flow established – 1CV8105 and 1CV8106 open• Throttle 1CV182 and 1CV121 to establish 8-13 gpm seal inj and 100 gpm charging flows• Open 1CV459 and 1CV460 if closed• Simultaneously perform the following:<ul style="list-style-type: none">• Open orifice isolation valves 1CV8149A/B/C for desired flow• Adjust 1CV131 controller to maintain letdown header pressure at 360 psig and place in AUTO• Ensure 1CC130A/B controller maintains letdown temperature 90° to 115°F and place in AUTO• Verify 1PR06J in service
	RO/US	Dispatch operator to investigate cause of 1A CV pump trip.
	US	<p>Refer to Tech Specs for tripped CV pump.</p> <ul style="list-style-type: none">• 3.5.2 Restore in 72 hours• TRM 3.1.a thru d• 3.8.1 DG Required Action B.3 declare both CV pumps inop if condition of DG and opposite train CV pump exists for 4 hours.
	US	Inform SM/Maint of 1A CV pump trip/status.
		NOTE: After the actions for charging pump trip are complete and with lead examiners concurrence, Events 6-8 are entered.

Comments: _____

Scenario No.: 02-2		Event No.: 6, 7 and 8
Event Description: Steam Generator 1C Tube Rupture (460 gpm).(7) Instrument Bus 111 fault when the reactor is tripped (8) 1B SI Pump fails to start automatically, Manually start an SI pump and Manually Align train A ECCS for Injection due to failure to auto start from loss of instrument bus 111 (9)		
Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciators: 1-12-B4 PZR LEVEL CONT DEV LOW 1-12-C1 PZR PRESS CONT DEV LOW HTRS ON SG blowdown radiation monitor 1PR08J increasing SJAEGland Steam Exhauster radiation monitor 1PR 27J increasing Increased charging flow PZR level dropping PZR pressure dropping FW flow/Steam flow mismatch for 1D SG
	CREW	Identify/report increase in RCS leakage
	RO	Report inability to maintain PZR level > 17%
	US	Direct reactor trip and Safety Injection initiation
	RO	Manually trip reactor Manually actuate SI
	US	Implement 1BwEP-0 "REACTOR TRIP OR SAFETY INJECTION" and direct operator actions.
	RO	Perform immediate operator actions of 1BwEP-0: Verify reactor trip <ul style="list-style-type: none">• Rod bottom lights LIT• Reactor trip & Bypass breakers open• Neutron flux decreasing

Comments: _____

Scenario No.: 02-2		Event No.: 6, 7 and 8
Event Description: Steam Generator 1C Tube Rupture (460 gpm).(7) Instrument Bus 111 fault when the reactor is tripped (8) 1B SI Pump fails to start automatically, Manually start an SI pump and Manually Align train A ECCS for Injection due to failure to auto start from loss of instrument bus 111 (9)		
Time	Position	Applicant's Actions or Behavior
	BOP	Perform immediate operator actions of 1BwEP-0: Verify turbine trip <ul style="list-style-type: none">• Turbine throttle valves closed• Turbine governor valves closed
	BOP	Verify power to 4KV busses <ul style="list-style-type: none">• Bus 141 alive light lit• Bus 142 alive light lit
	CREW	Check SI status: <ul style="list-style-type: none">• SI First OUT annunciator lit (1-11-C1)• SI ACTUATED lit (1-BP-4.1)• SI Equipment actuated (CV Cold leg injection SI8801B open) Determine SI actuated Identify/report train A ESFAS components did NOT actuate due to instrument bus 111 de-energized. Actuate SI by taking either SI switch to ACTUATE <ul style="list-style-type: none">o 1PM05Jo 1PM06J
	BOP	Verify FW isolated <ul style="list-style-type: none">• FW pumps tripped• FW Isolation Monitor lights lit• FW pump discharge valves stroking closed 1FW002A-C
	RO	Verify ECCS pumps running <ul style="list-style-type: none">• CENT Chg pumps – 1A CV pump is unavailable / 1B running• RH pumps – manually start 1A RH pump
	[CT] E-0--I	<ul style="list-style-type: none">• SI pumps – manually start 1A SI pump and/or 1B SI pump

Comments: _____

Scenario No.: 02-2		Event No.: 6, 7 and 8
Event Description: Steam Generator 1C Tube Rupture (460 gpm).(7) Instrument Bus 111 fault when the reactor is tripped (8) 1B SI Pump fails to start automatically, Manually start an SI pump and Manually Align train A ECCS for Injection due to failure to auto start from loss of instrument bus 111 (9)		
Time	Position	Applicant's Actions or Behavior
	BOP	Verify RCFCs running in Accident Mode <ul style="list-style-type: none">Group 2 RCFC Accident Mode Status lights NOT lit<ul style="list-style-type: none">Manually align RCFCs in accident mode as necessary:<ul style="list-style-type: none">Stop A and C RCFC high speedClose 1SX112A and 1SX114AOpen 1SX147AVerify open 1SX016A and 1SX027AStart A and C RCFCs in low speed
	BOP	Verify Phase A isolation <ul style="list-style-type: none">Group 3 Monitor lights NOT litManually actuate Phase A<ul style="list-style-type: none">Close train A valves as required:<ul style="list-style-type: none">1PR001A1PR0661PS228A1PS228B1WO006A1WO020A1WO056B1CV81521CV81001IA065
	BOP	Verify CNMT Ventilation isolation <ul style="list-style-type: none">Group 6 Monitor lights lit

Comments: _____

Scenario No.: 02-2		Event No.: 6, 7 and 8
Event Description: Steam Generator 1C Tube Rupture (460 gpm).(7) Instrument Bus 111 fault when the reactor is tripped (8) 1B SI Pump fails to start automatically, Manually start an SI pump and Manually Align train A ECCS for Injection due to failure to auto start from loss of instrument bus 111 (9)		
Time	Position	Applicant's Actions or Behavior
	BOP	Verify AF system: <ul style="list-style-type: none">1B AF pumps running<ul style="list-style-type: none">Manually start 1A AF pumpAF isolation valves open (AF13A-H)AF flow control valves throttled (AF005E-H) NOTE: The A train AF005A-D will be closed due to loss of instrument bus 111. Verify CC Pumps running <ul style="list-style-type: none">Manually start 1A CC pump (may have previously started) Verify SX Pumps running <ul style="list-style-type: none">Manually start 1A SX pump (may have previously started) Check Main Steamline Isolation NOT required <ul style="list-style-type: none">Check SG pressure > 640 psigCheck CNMT pressure <8.2 psig
	BOP	Check if CNMT Spray is required <ul style="list-style-type: none">CNMT pressure < 20 psig Determine/report CNMT Spray NOT required
	BOP	Verify total AF flow <ul style="list-style-type: none">AF flow > 500 gpmSG levels maintained between 10% and 50%
	BOP/US [CT] E-3—A	Check for NR level NOT increasing in uncontrolled manner Identify/report 1C as ruptured SG. If ruptured SG suspected, isolate AF Isol valves: <ul style="list-style-type: none">1AF013C1AF013G

Comments: _____

Scenario No.: 02-2		Event No.: 6, 7 and 8
Event Description: Steam Generator 1C Tube Rupture (460 gpm).(7) Instrument Bus 111 fault when the reactor is tripped (8) 1B SI Pump fails to start automatically, Manually start an SI pump and Manually Align train A ECCS for Injection due to failure to auto start from loss of instrument bus 111 (9)		
Time	Position	Applicant's Actions or Behavior
	RO	Verify ECCS valve alignment <ul style="list-style-type: none">Group 2 CL Injection monitor lights NOT all lit<ul style="list-style-type: none">Manually align train A valves as required:<ul style="list-style-type: none">1CV112B CLOSED1CV112D OPEN1CV8106 CLOSED1SI8801A OPEN
	RO	Verify ECCS flow: <ul style="list-style-type: none">High Head SI flow >100 gpmRCS pressure is NOT <1700 psig
	RO	Check at least ONE PZR PORV relief path available: <ul style="list-style-type: none">PORV Isol valves at least one energizedPORV relief path at least one available<ul style="list-style-type: none">PORV in auto and isolation open
	BOP	Verify Generator trip <ul style="list-style-type: none">Main Transformer output breakers open<ul style="list-style-type: none">OCB 1-8OCB 7-8PMG output breaker open
	BOP	Verify DG running <ul style="list-style-type: none">Manually start 1A DG (1B DG OOS)SX valve open 1SX169ADispatch operator locally to check operation

Comments: _____

Scenario No.: 02-2		Event No.: 6, 7 and 8
Event Description: Steam Generator 1C Tube Rupture (460 gpm).(7) Instrument Bus 111 fault when the reactor is tripped (8) 1B SI Pump fails to start automatically, Manually start an SI pump and Manually Align train A ECCS for Injection due to failure to auto start from loss of instrument bus 111 (9)		
Time	Position	Applicant's Actions or Behavior
	BOP	Verify Control Room ventilation aligned for emergency operations: <ul style="list-style-type: none">• Check RM-11 Grid 2 Control Room outside air rad monitors less than alert alarm setpoint.• Operating VC train equipment running Train A<ul style="list-style-type: none">• Supply fan• Return fan• M/U fan – manually start 0A VC M/U fan• Chilled water pump• MCR chiller 0A• M/U fan outlet damper NOT full closed 0VC24Y• VC train M/U filter light LIT• Operating VC train Charcoal Adsorber aligned for train A<ul style="list-style-type: none">• Place Recirc Charcoal Adsorber selector switch to Adsorb<ul style="list-style-type: none">• 0VC43Y closed• 0VC21Y open• 0VC22Y open• Control Room pressure greater than +0.125 inches water on 0PDI-VC038
	BOP	Verify Auxiliary Building ventilation aligned <ul style="list-style-type: none">• Two inaccessible filter plenums aligned<ul style="list-style-type: none">• Plenum A fan 0VA03CB running<ul style="list-style-type: none">• Damper 0VA023Y open• Damper 0VA436Y closed• Plenum C fan 0VA03CE running<ul style="list-style-type: none">• Damper 0VA067Y open• Damper 0VA052Y closed
	BOP	Verify FHB ventilation aligned <ul style="list-style-type: none">• Train B fan 0VA04CB running• 0VA055Y open• 0VA062Y open• 0VA435Y closed
	RO	Check PZR spray valves and PORVs <ul style="list-style-type: none">• Normal spray valves closed• PORVs closed

Comments: _____

Scenario No.: 02-2		Event No.: 6, 7 and 8
Event Description: Steam Generator 1C Tube Rupture (460 gpm).(7) Instrument Bus 111 fault when the reactor is tripped (8) 1B SI Pump fails to start automatically, Manually start an SI pump and Manually Align train A ECCS for Injection due to failure to auto start from loss of instrument bus 111 (9)		
Time	Position	Applicant's Actions or Behavior
	RO	Maintain RCS temperature control <ul style="list-style-type: none">• Check RCPs any running• Tave Stable or trending to 557 °F
	RO/US	Check status of RCPs and determine RCPs can remain running <ul style="list-style-type: none">• If any running, apply trip criteria<ul style="list-style-type: none">o High Head SI flow >100 gpm on 1FI-917ORo SI flow > 200 gpm on 1FI-918/922o RCS pressure < 1425 psig
	BOP	Check if SG secondary pressure boundaries are intact <ul style="list-style-type: none">• Check pressure in all SGs• No SG pressure decreasing in an uncontrolled manner• No SG completely depressurized
	CREW	Identify ruptured SG <ul style="list-style-type: none">o Unexpected rise in NR level on 1C Steam Generatoro Main steamline rad monitors NOT normal for plant conditions on 1C Steam Line<ul style="list-style-type: none">o RT-AR022 Grid 1 4AD322o RT-AR023 Grid 1 4AD323o High activity for any SG sample
	CREW	Identify/report 1C SG as ruptured
	US	Implement 1BwEP-3 "STEAM GENERATOR TUBE RUPTURE" WOG-1C and direct operator actions.
	RO/US	Check status of RCPs and determine RCPs can remain running <ul style="list-style-type: none">• If any running, apply trip criteria<ul style="list-style-type: none">o High Head SI flow >100 gpm on 1FI-917ORo SI flow > 200 gpm on 1FI-918/922o RCS pressure < 1425 psig

Comments: _____

Scenario No.: 02-2		Event No.: 6, 7 and 8
Event Description: Steam Generator 1C Tube Rupture (460 gpm).(7) Instrument Bus 111 fault when the reactor is tripped (8) 1B SI Pump fails to start automatically, Manually start an SI pump and Manually Align train A ECCS for Injection due to failure to auto start from loss of instrument bus 111 (9)		
Time	Position	Applicant's Actions or Behavior
	CREW	Identify ruptured SG <ul style="list-style-type: none">o Unexpected rise in NR levelo Main steamline rad monitor<ul style="list-style-type: none">o 1RT-AR022 Grid 1 4AD322o 1RT-AR023 Grid 1 4AD323o High activity for any SG sample Identify/report 1C SG as ruptured SG
	BOP	Isolate flow from rupture SG <ul style="list-style-type: none">• SG PORV 1MS018C in AUTO• Check SG PORV 1MS018C closed<ul style="list-style-type: none">• Verify closed when SG pressure < 1115 psig• Verify SG blowdown isolation valves closed<ul style="list-style-type: none">• 1SD002G• 1SD002H
	[CT] E-3--A	<ul style="list-style-type: none">• Close MSIV and MSIV bypass valves for 1C SGo Check PORVs on intact SGs available for RCS cooldown
	BOP/US [CT] E-3--A	Check ruptured SG level <ul style="list-style-type: none">• Narrow Range >10%• Verify/close AF isol valves (should have been closed in 1BEP-0)<ul style="list-style-type: none">• 1AF013C (Close if flow is present indicating leakage past the closed 1AF005)• 1AF013G
	BOP	Check Rupture SG pressure <ul style="list-style-type: none">• Ruptured SG pressure greater than 320 psig<ul style="list-style-type: none">• If NOT go to 1BwCA 3.1

Comments: _____

Scenario No.: 02-2		Event No.: 6, 7 and 8
Event Description: Steam Generator 1C Tube Rupture (460 gpm).(7) Instrument Bus 111 fault when the reactor is tripped (8) 1B SI Pump fails to start automatically, Manually start an SI pump and Manually Align train A ECCS for Injection due to failure to auto start from loss of instrument bus 111 (9)		
Time	Position	Applicant's Actions or Behavior
	BOP [CT] E-3--B	<p>Initiate RCS Cooldown</p> <ul style="list-style-type: none">• Determine required core exit temperature from table based on current ruptured SG pressure• Check PZR pressure < 1930 psig<ul style="list-style-type: none">• PZR LOW PRESS SI BLOCK PERMISSIVE P-11 Lit<ul style="list-style-type: none">• If NOT continue with procedure until P-11 Lit before blocking STM LINE SI• Block Steamline Isol SI @ P-11<ul style="list-style-type: none">• Place STM LINE SI BLOCK switches to BLOCK for train A and B• Dump Steam to condenser from intact SGs at maximum rate <p>NOTE: After cooldown is initiated the operators may hold the Steam Dump Interlock switches in Bypass as temperature approaches the P-12 setpoint to prevent interruption of the cooldown. If the interlock occurs the operator will have to place the main steam pressure controller in manual and at minimum demand, bypass P-12 using both switches and then re-establish the cooldown.</p> <ul style="list-style-type: none">• Check average of ten highest CETCs less than required temperature<ul style="list-style-type: none">• If NOT continue with procedure and stop cooldown when less than required temperature• Stop RCS cooldown (continuous action in effect) when < required temperature
	BOP	<p>Check intact SG levels:</p> <ul style="list-style-type: none">• Narrow range levels > 10%.• Control feed flow to maintain narrow range levels between 10% and 50%.• Check narrow range levels not increasing in an uncontrolled manner.
	RO	<p>Check PZR PORVs and isolation valves</p> <ul style="list-style-type: none">• Power to PORV Isol valves<ul style="list-style-type: none">• 1RY8000A• 1RY8000B• PORVs closed<ul style="list-style-type: none">• 1RY455A• 1RY456• At least ONE PORV Isol valve OPEN<ul style="list-style-type: none">o 1RY8000Ao 1RY8000B
	BOP/RO	Reset SI if necessary

Comments: _____

Scenario No.: 02-2		Event No.: 6, 7 and 8
Event Description: Steam Generator 1C Tube Rupture (460 gpm).(7) Instrument Bus 111 fault when the reactor is tripped (8) 1B SI Pump fails to start automatically, Manually start an SI pump and Manually Align train A ECCS for Injection due to failure to auto start from loss of instrument bus 111 (9)		
Time	Position	Applicant's Actions or Behavior
	BOP	Reset CNMT Isolation: <ul style="list-style-type: none">• Reset CNMT Isolation Phase A.• Check SACs – any running• Open instrument air CNMT isolation valves.• 1IA065• 1IA066
	BOP	Verify all AC busses energized by offsite power
	BOP	Check if RH pumps should be stopped: <ul style="list-style-type: none">• Suction aligned to RWST• RCS pressure greater than 325 psig• Stop RH pumps and place in standby
	RO	Check if RCS cooldown should be stopped <ul style="list-style-type: none">• Check average of ten highest CETCs less than required temperature<ul style="list-style-type: none">• If NOT then do NOT proceed until required temperature achieved.• Stop RCS cooldown• Maintain average of ten highest CETCs less than required temperature
	BOP	Check ruptured SG pressure: <ul style="list-style-type: none">• Stable or increasing
	RO	Check RCS subcooling: <ul style="list-style-type: none">• Acceptable per Attachment A and Figure 1BwEP 3-2 (+20°F)

Comments: _____

Scenario No.: 02-2		Event No.: 6, 7 and 8
Event Description: Steam Generator 1C Tube Rupture (460 gpm).(7) Instrument Bus 111 fault when the reactor is tripped (8) 1B SI Pump fails to start automatically, Manually start an SI pump and Manually Align train A ECCS for Injection due to failure to auto start from loss of instrument bus 111 (9)		
Time	Position	Applicant's Actions or Behavior
	RO [CT] E-3--C	Depressurize RCS using PZR sprays to minimize break flow and refill PZR: <ul style="list-style-type: none">• Normal sprays available• Spray PZR with maximum spray until any of the following are satisfied<ul style="list-style-type: none">o BOTH:<ul style="list-style-type: none">• RCS pressure less than ruptured pressure• PZR level greater than 12%o PZR level greater than 69%o RCS subcooling NOT acceptable• Close normal spray valves• Check PZR Aux spray valve closed Use ONE PZR PORV if normal PZR spray is inadequate
	RO/BOP	Check if ECCS flow should be terminated <ul style="list-style-type: none">• RCS subcooling acceptable• Secondary heat sink<ul style="list-style-type: none">o Narrow range level in at least ONE SG >10%OR<ul style="list-style-type: none">o >500 pgm total feed flow to SGs• RCS Pressure stable or increasing• PZR level >12%
	RO/BOP	Stop ECCS pumps and place in standby <ul style="list-style-type: none">• SI pumps• All but one CV pump
		NOTE: The scenario can be terminated once ECCS termination steps are complete with lead examiners concurrence

Comments: _____

SHIFT MANAGER TURNOVER

Weekday, Today, 2001 ONCOMING SHIFT 2

UNIT 1 STATUS		UNIT 0 & 1 MAJOR OOS's	
MODE 1		1B Emergency Diesel Generator	1C Heater Drain Pump
Rx Pwr. 100			
Generator MWe. 1256			
Max Load/Power. 100%			
Min Load/Power 700 MW			
Max Ramp Rate. 5 MW/Min			
Desired Delta I Target			
On-Line Risk. Green			
Boron @ 934			
Control Bank. D @ 214			
LCOAR ENTRIES PREVIOUS 48 HRS		UNIT 0 & 1 MAJOR SURVEILLANCES	
3.8.1 Condition B for 1B EDG 18 hours ago. Est RTS by end of shift		BwOSR 3.8.1.1 – due in 6 hours	
3.4.13 RCS Leakage – 1C Steam Generator at 5 gpm			
UNIT 0 & 1 IN PROGRESS		UNIT 0 & 1 PENDING	
1B EDG turbo charger replacement		Following step 10.c RNO of 1BwOA SEC-8, Shutdown Unit 1 per 1BwGP 100-4 due to increased operational leakage – 1C SG. Shutdown unit to MODE 3 within 6 hours using 1BwGP 100-4 and 1BwGP 100-4T1, normal plant shutdown.	
1C HDP bearing replacement			
1B CCW Pump run for ASME Testing			
1BwOA SEC-8 has been in progress and has been performed up to and including step 10.c			
		Focus Areas:	
		▪ Verification Practices	
		▪ Command and Control Standard for Execution of Critical Steps	
		THINK CONFIGURATION CONTROL and SAFETY!!!	
SCHEDULED ACTIVITY CONFLICT			

SHIFT MANAGER TURNOVER

UNIT 2 STATUS		UNIT 2 MAJOR OOS's	
MODE 1 Rx Pwr. 97.6 Generator MWe. 1197 Max Load/Power. 97.6 impulse pressure Min Load/Power 700 Max Ramp Rate. 5 mw/min Desired Delta I Target On-Line Risk. Green Boron @ 1037 Control Bank. D @ 210		Unit 2 SAC – Oil change	
LCOAR ENTRIES PREVIOUS 48 HRS		UNIT 2 MAJOR SURVEILLANCES	
"lcoar_num" "Affected_Equipment"			
UNIT 2 IN PROGRESS		UNIT 2 PENDING	
Oil change on Unit 2 Station Air Compressor. RTS by end of shift today.		Dose INFO: Dose goal for day 10 mr	
SCHEDULED ACTIVITY CONFLICT			

SHIFT MANAGER TURNOVER

Administrative	
Temporary Procedures / Modifications	T-mod U1 Trn B RVLIS. Jumper Installed on φC U-1 MPT Disconnect. 1FW009A T-Mod for Hyd Pp Press Sw 1PS-FW162. T-mod for drain on 1B AF casing. Tmod for no disc in 2CC9502B installed.
Daily Orders / Special Op Orders	
Daily Manning Schedule	See sheet for restricted duty personnel and overtime restrictions Oncoming STA Fire Chief
Control Room Rounds	
(GSEP / LER / DVR / ENS)	
Material TS Conditioning	SFP High Level alarm did not alarm during calibration
RWP's / Releases / Precautions / ALARA	
Infrequent Evolution Activities	Lesson learned files L:\shared\loper then ctrl F to search
SPS0 / Division LD	Alternate BPO Outside # 815-727-5902/5903 Tie # 8-565-5902/5903
Unit 1 Comments	Unit Common Comments
Battery 112 cell 32 has floating material in electrolyte, eval'd OK D.O. OOS prevents filling U-1 tanks normally, but BwOP DO-6 can be used to fill tanks. T-MOD is installed allowing U-1 boiler ops. 1AF006A is leaking by from CST.	U1 FC Cleanup SFP U2 FC Cleanup OFFLINE (leak) FC Cooling U1 50K DO Tank empty 125K DO Tank and FRAC Tks Certified Aux Steam U-1 ES →U1 HDT U-0 CC Hx U1 U-0 CC Pump Bus 141 U1 Aux boiler Wet lay-up U2 Aux boiler Wet lay-up SAC / Dryer U1/U0 MUDs U-1 CST CW Makeup Running 0A/0B CW Blowdown On Lake Level 5.8'
Unit 2 Comments	General Comments
2AF017A leaking by .3 gpm, AR 990116738 S/G sampling lines/valves at HRSS are not correct. Do not hang OOS on any 2PS181 valves till further notice. 2PS229A still blows fuse 2PA32J Ckt 9 CV seal leakage: 2A Running 200cc/min shutdown about 6 drops/min 2B Running -12 dpm; S/D- none	Conference Call Phone Number – 1-800-232-1234 Teleconference folder ID #=472664085 Meeting Place 630-663-7120 +code Duty Team is located @ SITE APPS, NRC Duty list in book Substation construction (John Strle) Cell phone 815-351-8472
Caution Cards	Abnormal Positioned Components
CCNUM EPN	CCNUM EPN AbnormalPosition

SM BEEPER TURNOVER

Shift 1 To 2 Time Now Date Today Offgoing_____Oncoming_____

UNIT 1 NSO TURNOVER

Weekday, Today, Oncoming Shift 2

Unit 1 Status			
Mode	1	Max load/power	100%
Power	100.0%	Max ramp rate	5 mw/min.
Mw electric	1256 MWe	Unit Risk	Green
Min load/power	900 MWe	Control Rods	214
Desired Delta-I	Target	Boron concentration	934 PPM
IN PROGRESS		PENDING	
1B EDG turbo charger replacement. RTS by end of shift today 1C Heater Drain Pump bearing replacement 1B Component Cooling Water Pump run for ASME Testing 1BwOA SEC-8 is in progress at step 10.		BwOSR 3.8.1.1 Per Step 10.c RNO of 1BwOA SEC-8, shutdown Unit 1 due to RCS operational leakage to MODE 3 within the next 6 hours. 1C Steam Generator leakage at 5 gpm Perform a normal plant shutdown using 1BwGP 100-4 and 1BwGP 100-4T1.	
LONG TERM			
ADMINISTRATIVE			
Temporary procedures			
Temporary alterations			
New caution cards			
Unit logbook			
Unit routine		BDPS lcoar in mode 3.	
Aux. Electric room access			
Daily orders			
Control board walk down			
LCO/TLCO		RETS	DEQUIP/AAR
3.8.1 1B EDG 3.4.13 Leakage			

TURNOVER ITEMS				
ISO SHIFTLY/DAILY SURVEILLANCE				
2) SSPS CHANNELS/BISTABLES		B train SSPS logic ground to chassis ground had higher than expected readings during SSPS, AR written.		
3) SYS – SAFEGUARDS				
4) SYS – PRIMARY		CC to spent fuel pool hx is at 2800 gpm.		
5) SYS – BALANCE OF PLANT		Spent fuel pool cooling now on Unit 1.		
6) ALARMS-SER/ANNUNCIATOR				
7) ALARMS – PROCESS/RM-11				
8) ALARMS - FP/OTHERS				
9) CHEMISTRY		Max flow through condensate polishers at full power is ~2000 gpm without causing a low npsh alarm. This is only a guideline and not an absolute value.		
10) RADIATION PRECAUTIONS				
11) NUCLEAR INSTRUMENTATION				
12) MCB INSTRUMENTATION				
13) MCB CONTROLLERS				
14) ELECTRICAL DISTRIBUTION – AC		MPT transformer disconnects has bad seat on one phase. Jumper installed, SOC on disconnect - do not operate.		
15) ELECTRICAL DISTRIBUTION – DC				
16) EGC STATUS				
17) BWOP_ (PROCEDURE AND STEP IN EFFECT)				
COMMENTS				
13 gals of PW will Raise RCS .1 F 1FW009B has small nitrogen leak on 1PS-FW165, AR written.				
POST REVIEW		US	FS	SM
TIME: NOW		SHIFT 1	OFF GOING	
DATE:	TODAY	SHIFT 2	ONCOMING	

Simulation Facility	Braidwood	Scenario No. 3	Operating Test No. 2002
Examiners:		Applicant:	SRO
			RO
			BOP

Initial Conditions: IC-18, 76% power MOL. Equil. Xe.

Turnover: Steady state with 1A CS Pump OOS for motor bearing replacement and 1D CD/CB pump OOS for an alignment and vibration problem. Electric Operations requests Bwd Unit-1 increase power to 1250 Mwe @ 3 MW/min to meet grid demand.

Event No.	Malf. No.	Event Type*	Event Description
Preload	SI12A SI01B	C RO BOP SRO	1A SI Pump fails to Auto start, can be manually started 1B SI Pump fails to Auto start, cannot be manually started
1		N BOP SRO	Ramp up turbine power to 1250 MWe at directed MW/min.
		R RO SRO	Raise reactor power using rods and/or dilution
2	RX05, 0 5 min ramp	I BOP SRO	Main Steam Header Pressure controller (PT-507) fails low
3	CV17, 0	I RO SRO	Volume Control Tank (VCT) level channel 1LT-112 fails high
4	RX21A	I RO SRO	PT-455 Controlling Pressurizer Pressure channel fails high
5	MSO4B, 100	C BOP SRO	1MS018B, 1B Steam Generator PORV fails open
6	MRF RP61	M RO SRO BOP	All MSIV's fail closed at power
7	MS03B/F 100	M RO SRO BOP	Pressure surge causes Main Steam Safety valves (2) to stick open, Loop 1B
8	FWOO9B	C RO BOP	FRV-520 fails to close as required on FWI signal. Cannot be manually closed.
9	TH03B 600 gpm	M RO BOP SRO	SGTL occurs on 1B Steam Generator after Steam Generator has reached dry out conditions.

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

SCENARIO OVERVIEW

The Unit is at 76% power, MOL, equilibrium xenon. 1D CD/CB pump is OOS for alignment and vibration problems. 1A CS Pump is OOS for a motor bearing replacement. Power is to be increased at direction of Electric Operations using normal procedures. On-Line Risk is YELLOW because of the CS Pump OOS.

Following clearly observable plant response from the reactivity changes, the Main Steam Line pressure controller (PT-507) will fail low, resulting in decreased MFP speed and lowering main feedwater flow to the SGs. The crew should take manual control of MFP speed and adjust /increase MFW to the SGs. The Crew should match steam flow and feed flow and control MFP speed in manual.

After the secondary plant is stabilized, Volume Control Tank (VCT) Lever Controller (LT-112) will fail high. This will result in diverting letdown flow from the VCT to the Holdup Tank (HUT). The failure of 1LT-112 level channel will result in the loss of automatic level control and makeup to the VCT.

After actions have been taken to restore normal letdown flow, the controlling Pzr Pressure channel (PT-455) will fail high, causing a Pzr PORV (1RY-455A) and Pzr Spray valves to open, decreasing actual RCS pressure. The RO will diagnose the pressure malfunction from alarms, meter indications, and decreasing Pzr pressure. The RO must close the PORV or PORV block valve to stop the pressure decrease. Manual action will also be required to close the Pzr spray valves which will open due to the master pressure controller demand. The SRO will enter and direct actions of 1BwOP INST-2, Attachment B, "PRESSURIZER PRESSURE CHANNEL FAILURE", to select an operable controlling channel and restore automatic pressurizer pressure control, trip TS bistables, and identify TS Action requirements.

After actions have been completed for the failed Pzr Pressure channel, the 1B SG PORV controller will cause the 1B SG PORV to open. RCS Tave will decrease causing control rod motion in the outward direction. The crew will investigate the cause of the temperature decrease and diagnose the inadvertent PORV opening. Emergency closure of the PORV will be available. The PORV may be isolated locally by closure of the manual upstream isolation valve, 1MS019B.

After the unit is stabilized following the open SG PORV, a failed capacitor in Instrument Inverter 111 will generate a spurious Main Steam Line Isolation signal (Bwd LER). All 4 MSIV's will automatically close at power, resulting in a Reactor Trip and Safety Injection. The Crew will enter and perform the immediate actions of 1BwEP-0, "REACTOR TRIP OR SAFETY INJECTION".

The resultant pressure increase following the spurious MSIV closure causes 2 Main Steam Line Safety valves on Loop 1B to open and stick open. The Operators will diagnose a fault on the 1B Steam Line while performing the actions of 1BwEP-0 as a faulted steam generator and transition to 1BwEP-2, "FAULTED STEAM GENERATOR ISOLATION", and will take actions to isolate the 1B Steam Generator. FRV-520 has failed to close following the Feedwater Isolation signal and the operators will have to take actions of step 4d RNO to manually close the upstream isolation valve, 1FW006B.

Comments: _____

Once the faulted steam generator has been depressurized and dried out, the pressure delta P will cause a steam generator tube leak of 600gpm on the 1B SG. The crew will diagnose this by decreasing RCS pressure and inventory. They must perform the actions of 1BwEP-3, “STEAM GENERATOR TUBE RUPTURE”, and finally transition to 1BwCA-3.1, “SGTR WITH LOSS OF REACTOR COOLANT – SUBCOOLED RECOVERY DESIRED”, when it is noted that the ruptured SG pressure is less than 320psig. The Scenario ends with the establishment of RCS Cooldown in 1BwCA-3.1.

Critical Tasks

- 1. E-0-J Establish flow from at least 1 intermediate head SI pump before transition out of EP-0
- 2. EP-2-A Isolate the faulted SG before transition out of EP-2
- 3. ECA-3.1-B Take necessary operator actions to control the RCS cooldown rate at the highest rate achievable but less than 100 degrees F per hour in all RCS cold legs.

SIMULATOR OPERATOR NOTES:

Simulator Setup:

IC-18, 76% power. Complete the ‘ready for training’ checklist. Hang YELLOW risk placard.
Take 1A CS pump OOS. Control switch to PULL OUT. Hang Tag
Take 1D CD/CD pump OOS. Control switch to PULL OUT. Hang Tag.
Take 1D CD/CB pump aux lube oil pump OOS. Control switch to PULL OUT. Hang Tag.
IOR ZLO1CB113D(1) OFF Open Light OFF
IOR ZLO1CB113D(2) OFF Close Light OFF

Setup the following overrides/malfunctions for the 1A CS OOS:

- IMF CS01A to fail 1A CS pump from starting
- MRF ED062A OPEN Breaker for 1CS007A
- MRF ED053M OPEN Breaker for 1CS019A
- MRF ED053A OPEN Breaker for 1CS001A
- MRF ED053B OPEN Breaker for 1CS009A

Setup the following overrides/malfunctions:

- IMF FW22D to fail 1D CD/CB pump from starting
- IMF SI12A 1A SI pump fails to auto start, can be manually started
- IMF SI01B 1B SI pump fails to auto start, cannot be manually started

Comments: _____

Event 1

Power Increase – ramp power from 76% to 100%

As SM acknowledge ramp initiation

As RP/HP/Chemistry acknowledge sample requirements for power change >15% in one hour

Event 2

Main Steam Pressure Controller PT-507 Failure low

SDG: RX22

IMF RX05, 0, 600sec

Initiate malfunction after clearly observable reactivity changes/plant response from requested ramp and/or wi concurrence from lead examiner

Acknowledge all info passed to SM, WEC, and maintenance

Event 3

VCT Level Channel LT-112 Failure High

SDG: CV3

IMF CV16, 100

Initiate malfunction after actions for PT-507 have been completed and with concurrence from lead examiner.

Acknowledge all info passed to SM, WEC, and maintenance

Event 4

Pzr Pressure Channel PT-455 failure high (2500#)

IMF RX21A, 2500

Initiate malfunctions after actions are complete for LT-112 failure and with concurrence of lead examiner.

Role Play as U-2 admin/extra NSO to accomplish bistable tripping.

Acknowledge all info passed as SM, WEC, and maintenance.

Perform the following to trip Pressurizer channel bistables:

On SDG RX10:

Open Protection Cabinet Door #1				RX020	OPEN
Pzr Press Hi Trip	PB455A	C1-153	BS-1	RX032	TRIP
Pzr Press Lo Trip	PB455C	C1-153	BS-4	RX034	TRIP
Pzr Lo Press SI	PB455D	C1-153	BS-3	RX035	TRIP
Pzr Press P-11	PB455B	C1-153	BS-2	RX033	TRIP

On SDG RX4:

OTDT Trip	TB411C	C1-124	BS-3	RX013	TRIP
OTDT Runback	TB411D	C1-124	BS-4	RX135	
Protection Cab #1 Close Door				RX020	CLOSE

Comments:

Event 5 1MS018B, 1B Steam Generator PORV fails open

SDG MS4

Initiate after actions are completed for the PT-455 failure and with concurrence of lead examiner.

IMF MS04B, 100, no ramp

If dispatched to controller box in AEER, report no obvious problems. If sent to locally close 1MS019B, wait 5 minutes, call CR for first check, and close 1MS019B

Acknowledge all info passed to SM, WEC, and maintenance

Event 6-8 ARE SIMULTANEOUS EVENTS.

FRV-520 fails to close on FWI signal, MSIV auto closure occurs (all 4 MSIVs), Steam Line Fault outside containment (Loop 1B)

Initiate events after actions are completed for S/G PORV failure and with concurrence of lead examiner.

IOR ZLO1SLFW520, OFF FWI Status light to OFF

IOR ZLO1FW5202, ON FRV 520 Open light to ON

IMF FW09B, As Is – FRV 520 failure

MRF RP61, IN - Closure of all MSIVs

IMF MS03B and MS03F, 100 MS Safeties (2) to OPEN

Insert malfunctions after actions are completed for PORV failure and with concurrence of lead examiner.

Acknowledge all info passed to SM, WEC, and maintenance

Event 9 Steam Generator Tube Rupture, 1B SG, after 1BwEP-2 transition and SG dryout is reached

SDG TH6

IMF TH03B, 600gpm, 1 minute ramp

Initiate malfunction after 1B SG Wide Range level is <10% and transition has occurred out of 1BwEP-2, and with concurrence of lead examiner

Acknowledge all info passed to SM, WEC, and maintenance

Comments:

Scenario No: 02-3		Event No. 1
Event Description: Raise turbine load and reactor power		
Time	Position	Applicant's Actions or Behavior
	CUE	Turnover information includes request from Electric Operations for an increase in Unit 1 MW to full load (1260 MW) to begin ASAP at 3 MWe/minute.
	US	Implement actions of 1BwGP 100-3 step 61. <ul style="list-style-type: none">• Initiate load swing instruction sheet (1BwGP 100-4T2 Boration Dilution Boundary Calculation).○ Contact chemistry and Health Physics for load change > 15% in one hr.• Inform SM of plant Status, and Elec Ops of ramp start.
	CREW	Review applicable Precautions, Limitations and Actions of 1BwGP 100-3
	RO	Verify rod position and boron concentration. Perform reactivity manipulation calculation to determine amount of RCS dilution and expected rod outward movement to maintain Delta I within the limits of BwCB-1 Fig. 19. Determine required dilution volume by: <ul style="list-style-type: none">○ Effects of previously performed dilutions.○ Braidwood Boration Dilution Tables. Initiate Dilution in accordance with BwOP CV-5: <ul style="list-style-type: none">• Determine required Primary Water flow rate.• Set 1FK-111 Pw/Total Flow Control to desired dilution rate.• Set 1FY-0111 Primary Water Control Preset Counter to desired volume.• Place MAKE-UP CONT Switch to STOP position.• Set MU MODE SELECT Switch to ALT DIL position.• Place MAKE-UP CONT Switch to START.○ Verify proper operation of valves (1CV111A throttles open, PW flow indicated on recorder). OR Batch Addition: <ul style="list-style-type: none">• OPEN 1CV110B.• OPEN 1CV111A. When desired amount of Primary Water added: <ul style="list-style-type: none">• CLOSE 1CV111A.• CLOSE 1CV110B.

Comments: _____

Scenario No: 02-3		Event No. 1
Event Description: Raise turbine load and reactor power		
Time	Position	Applicant's Actions or Behavior
	BOP	Initiate turbine load increase: <ul style="list-style-type: none">• VERIFY the DEHC IMP IN, SPEED IN, and MW IN half of the pushbuttons are illuminated.• DEPRESS the LOAD RATE MW/MIN pushbutton.• ENTER the desired load rate (≤ 3).• DEPRESS the ENTER pushbutton.• DEPRESS the REF pushbutton.• ENTER the desired MW on the REFERENCE DEMAND Window using the numbered pushbuttons (1120).• DEPRESS the ENTER pushbutton.• DEPRESS the GO pushbutton when directed by the US/RO.• VERIFY load begins to increase.
	RO	Monitor power increase: <ul style="list-style-type: none">• Monitor Reactor power, Tave, and Delta I.• Verify control rods automatically move to maintain Tave within ± 1.0 degree F of Tref. If Diluting: <ul style="list-style-type: none">• Monitor VCT level.<ul style="list-style-type: none">◦ Verify RCS boron concentration decreasing.• Monitor PW/Total counter.• Verify dilution auto stops at preset value.• Return Reactor Makeup system to blended flow at current boron concentration.
		NOTE: Following clearly observable plant response from the reactivity changes, and with concurrence of the lead examiner, event 2 may be entered.

Comments: _____

Scenario No: 02-3		Event No. 2
Event Description: Main Steam Header Pressure Controller (IPT-507) Fails low over 5 minutes.		
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: 1-18-B7 MSR SHELL DRAIN TANK LEVEL HIGH LOW 1-18-A7 MSR SHELL DRAIN TANK EMER DRAIN VALVE OPEN 1-15-A/B/C/D4 SG 1A/B/C/D FLOW MISMATCH FW FLOW LOW 1-15-A/B/C/D9 SG 1A/B/C/D LEVEL DEVIATION HIGH LOW Indications: Feed flow indication decreasing Feed Pumps Speed Decreasing SG levels decreasing Feed Reg Valves Position Demand Increasing 1PI-507 Decreasing
	BOP/US	Diagnose/Report decreasing feed pump speed and SG levels as a result of IPT-507 failing low.
	RO	Monitor Reactor power and primary parameters. Refer to BwARs as directed by US. Assist BOP as directed/necessary.
	US	Direct actions stabilize the plant and restore normal feedwater conditions: <ul style="list-style-type: none">Place Master feed pump speed control in Manual and Increase feed pumps speed to increase feed flow.Direct flagging of Master Feed pump speed controller, 1PI-507, and Steam Dumps Steam Pressure.Review effect of failure with crew with regard to Steam Dumps.Inform SM of plant status, and direct WEC to write AR, CR, and get maintenance involved.
	BOP	Perform actions as directed by US: <ul style="list-style-type: none">Place Master feed pump speed control in Manual and Increase feed pumps speed to increase feed flow.Control feed flow to recover SG levels in a controlled manner without over cooling the RCS.Stabilize feed flow/ pump speed to maintain SG levels at ~60%.
		NOTE: After crew stabilizes SG levels, initiate event 3

Comments: _____

Scenario No: 02-3		Event No. 3
Event Description: Volume Control Tank (VCT) level channel 1LT-112 fails high		
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: 1-9-A2 VCT LEVEL HIGH 1LT112 CVT Level indication full scale high 1CV112A VCT Inlet valve diverting to the HUT
	RO/US	Identify/report failure of 1LT-CV112
	RO	Refer to 1BWAR 1-9-A2 for operator actions Place 1LCV CV-112A to the VCT position to restore letdown flow to the VCT via the control switch on 1PM05J or using manual on the level controller.
	BOP	Assist RO as directed by US / requested by RO <ul style="list-style-type: none">• Investigate BwARs• Make phone notifications as directed by US/RO• Provide appropriate peer checks as requested by RO Control turbine loading as directed by US
	CREW	Identify loss of auto makeup capabilities to the VCT Identify loss of auto suction swapover to the RWST on low VCT level
		NOTE: When actions have been completed for the failed VCT level channel, and with the lead examiners concurrence event 4 is entered

Comments: _____

Scenario No: 02-3		Event No. 4
Event Description: PT-455 Controlling Pressurizer Pressure Channel fails high		
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: 1-12-B2 PZR PORV OR SAF VLV OPEN 1-12-C6 PZR PORV DSCH TEMP HIGH 1-12-D2 PZR PRESS CONT DEV HIGH Porv 1RY455A OPEN Position Indicating Light Lit. 1PI-455 Indicating 2500 psig. Decreasing PZR pressure
	RO/US	Diagnose/Announce PZR Pressure Transmitter failure, 1RY455A and Pzr sprays open: <ul style="list-style-type: none">• Verify PZR Pressure is decreasing, Identify open PORV and spray valves• Close 1RY455A• Manually Close spray valves.
	US	Implement 1BwOA INST-2 "OPERATION WITH A FAILED CHANNEL", ATTACHMENT B, "PZR PRESSURE CHANNEL FAILURE", and direct actions: <ul style="list-style-type: none">• Get acknowledgements from RO and BOP.• Inform SM of plant status, evaluate for GSEP.• Direct WEC to write AR, CR, and get maintenance involved.• Briefs Unit 1 NSO and Unit 2 Admin NSO on Bistable tripping.

Comments: _____

Scenario No: 02-3		Event No. 4
Event Description: PT-455 Controlling Pressurizer Pressure Channel fails high		
Time	Position	Applicant's Actions or Behavior
	RO	<p>Perform actions of 1BwOA INST-2 as directed:</p> <ul style="list-style-type: none">• Determine PZR Pressure NOT NORMAL, and take Manual Control to restore Pressure.• Determine Operable Channel NOT selected, Place the Master PZR Pressure Controller in Manual, Control PZR Pressure, and Select an Operable Channel.• Check PZR Porvs, Spray Valves and Heaters:<ul style="list-style-type: none">•PORVS Closed. If NOT, and PZR Pressure < 2315 psig, manually close PORV (1RY455A).•PZR Spray Valves NORMAL. If not, then manually control.•PZR Heaters NORMAL.• Check PZR Pressure Control In Auto:<ul style="list-style-type: none">•1RY455 returned to Auto•1RY456 in Auto.•Sprays in Auto (after operable channel selected for control).•Master PZR Pressure Controller in Auto.• Select Operable Channels to Recorders:<ul style="list-style-type: none">•PZR Pressure.•Loop DT.• Coordinates Bistable Tripping:<ul style="list-style-type: none">•Places colored dots on bistable, indications, and annunciators.•Maintains communications with NSO tripping bistables.
	RO	<p>Ensures the following Bistables are tripped:</p> <ul style="list-style-type: none">• PB455A• PB455C• PB455D• PB455B• TB411C• TB411D <p>Checks PZR Pressure > 1930 psig and P-11 permissive is NOT Lit (Bypass Permissive 3.3).</p>
	US	<p>Refers to Tech Specs, and determines the following:</p> <ul style="list-style-type: none">• 3.3.1. Conditions E and K apply – Trip channel within 6 hrs.• 3.3.2 Condition D applies – Trip channel within 6 hrs.• 3.3.4 Condition A applies – Restore within 30 days• 3.4.1 Condition A applies – Restore DNB within 2 hrs.

Comments: _____

Scenario No: 02-3		Event No. 4
Event Description: PT-455 Controlling Pressurizer Pressure Channel fails high		
Time	Position	Applicant's Actions or Behavior
	BOP	<p>Perform actions as directed:</p> <ul style="list-style-type: none">o Assist Unit NSO in monitoring panels and parameters.o Investigate BwARs.o Make phone calls as directed to WEC and maintenance.o Control load ramp <p>NOTE: after completion of all actions and TS determination for the Pzr Instrument failure, and with the concurrence of the lead examiner, the next event may be initiated</p>

Comments: _____

Scenario No: 02-3		Event No. 5
Event Description: 1B Steam Generator PORV fails open, IMS018B		
Time	Position	Applicant's Actions or Behavior
	CUE	Indications: RCS Tave decreasing Control rods stepping out Reactor Power increasing Reactor power/ turbine power mismatch increasing Red Porv OPEN position indication light lit. LVDT meter indication increasing above 0%.
	BOP	Diagnoses 1B SG PORV OPEN, determines SG pressure is below setpoint (1115 psig) and reports failure to US. Performs actions directed by US: <ul style="list-style-type: none">• Take MANUAL control at the M/A Station and attempt to reduce demand.• Report MANUAL control has no effect to US.• PLACE EMERGENCY CLOSE switch to CLOSE.<ul style="list-style-type: none">o Report/Acknowledge SG 1B PORV TROUBLE annunciator (1-15-B10) as expected alarm.• REPORT 1B SG PORV CLOSED.<ul style="list-style-type: none">o Dispatch operator to AEER to PORV controller box.o Dispatch operator to locally isolate IMS018B by closing IMS019B.• Report status to US.
	US	Diagnose/Acknowledge failure of 1B SG PORV OPEN and direct actions: <ul style="list-style-type: none">o Determine SG pressure < PORV setpoint.• Attempt MANUAL Control via M/A station to CLOSE PORV.• PLACE EMERGENCY CLOSE switch to CLOSE.<ul style="list-style-type: none">o Dispatch operator to isolate PORV by closing IMS019B.• Inform SM of plant status.• Order WEC to generate AR, CR, and get maintenance involved for repairs.• Refer to Tech Spec 3.7.4. (30 days to restore operability).o May refer to Tech Spec 3.6.3. (not applicable, porv is in its isolation positon.)

Comments: _____

Scenario No: 02-3		Event No. 5
Event Description: 1B Steam Generator PORV fails open, 1MS018B		
Time	Position	Applicant's Actions or Behavior
	RO	Diagnose/Acknowledge failure of 1B SG PORV OPEN. Monitor Reactor and Primary parameters for effects and expected response: <ul style="list-style-type: none">• Reactor Power• Tave, Delta I and rod motion.• Assist as directed by US.• Investigate BwARs.
		NOTE: After PORV is closed/isolated, TS actions have been identified, and with concurrence with the lead examiner the next event may be initiated.

Comments: _____

Scenario No: 02-3		Event No. 6 - 9
Event Description: MSIV Closure (all), MS Safeties stick open (2), FRV-520 fails to isolate on FWI, faulted-ruptured SG		
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: MSIV Closed Steam Flows all 4 Steam Generators decreasing All MSIV position indicators closing/closed
	CREW	Identify closure of MSIVs Initiate a manual reactor trip / respond to an automatic reactor trip
	US	Implement and direct actions of 1BwEP-0 "Reactor Trip or Safety Injection"
	RO	Perform Immediate actions of 1BwEP-0: Verify reactor trip <ul style="list-style-type: none">Rod bottom lights litReactor trip and bypass breakers openNeutron flux decreasing Check SI Status <ul style="list-style-type: none">Determines that Pzr pressure is decreasing abnormallyDetermines Pzr level can not be maintained >4% levelAnnounces automatic SI actuation has occurredManually actuates SI
	BOP	Perform Immediate actions of 1BwEP-0: Verify Turbine trip <ul style="list-style-type: none">All throttle valves closedAll governor valves closed Verify 4KV ESF Busses energized <ul style="list-style-type: none">Bus 141 bus alive light litBus 142 bus alive light lit

Comments: _____

Scenario No: 02-3		Event No. 6 - 9
Event Description: MSIV Closure (all), MS Safeties stick open (2), FRV-520 fails to isolate on FWI, faulted-ruptured SG		
Time	Position	Applicant's Actions or Behavior
	BOP	<p>Performs subsequent automatic actions of 1BwEP-0, as directed:</p> <p>Verify FW Isolation:</p> <ul style="list-style-type: none">•FW pumps TRIPPED.•FW Isolation monitor lights LIT.•FW pumps discharge valves (1FW002A, B, and C) CLOSED.•FW Isolation monitor lights NOT ALL LIT<ul style="list-style-type: none">• Identify failure of FRV-520 to close• Attempt manual closure of 1FRV-520• Manually close upstream isolation valve 1FW-006B <p>Verify RCFCs Running in Accident Mode:</p> <ul style="list-style-type: none">•Group 2 RCFC Accident Mode status lights LIT. <p>Verify Cnmt Isolations:</p> <ul style="list-style-type: none">•Cnmt Isolation Phase A:<ul style="list-style-type: none">• Group 3 CNMT Isol monitor lights LIT.•Cnmt Ventilation Isolation:<ul style="list-style-type: none">• Group 6 CNMT Vent Isol monitor lights LIT. <p>Verify AF System:</p> <ul style="list-style-type: none">•AF Pumps BOTH RUNNING.•AF Isol valves (1AF013A-H) OPEN•AF Flow Control valves (1AF005A-H) THROTTLED. <p>Verify CC Pumps BOTH RUNNING.</p> <p>Verify SX Pumps BOTH RUNNING.</p> <p>Verify all MSIVs are Closed</p> <p>Determine CS DOES NOT need to be actuated:</p> <ul style="list-style-type: none">•CNMT Pressure has remained < 20 psig. <p>Verify Total AF Flow:</p> <ul style="list-style-type: none">•AF Flow > 500 gpm.•Control feed flow to maintain narrow range level BETWEEN 10% and 50%.

Comments: _____

Scenario No: 02-3		Event No. 6 - 9
Event Description: MSIV Closure (all), MS Safeties stick open (2), FRV-520 fails to isolate on FWI, faulted-ruptured SG		
Time	Position	Applicant's Actions or Behavior
	RO CT: E-0—J.	Performs subsequent automatic actions of 1BwEP-0, as directed: <ul style="list-style-type: none">o Verify ECCS Pumps Running:o CV Pumps BOTH RUNNING• SI Pumps:<ul style="list-style-type: none">• Determines NEITHER RUNNING, and MANUALLY STARTS 1A SI pump. (1B SI pump fails to start.)o RH Pumps BOTH RUNNINGo Reports SI pump failure to US.o Dispatches operators to investigate 1B SI pump and breaker.
	RO	Performs subsequent actions of 1BwEP-0, as directed: Verify ECCS Valve Alignment: <ul style="list-style-type: none">• Group 2 Cold Leg Injection monitor lights LIT. Verify ECCS Flow: <ul style="list-style-type: none">• High head SI Flow (1FI-917) > 100 gpm.• IF RCS Pressure < 1700 psig (1PI-403A/405), THEN verify 1A SI Pump Discharge Flow (1FI-922) > 200 gpm.o IF RCS Pressure < 325 psig, THEN verify RH Pump Discharge Flow (1FI-618/619) > 1000 gpm. Check at Least One PZR PORV Relief Path Available: <ul style="list-style-type: none">• PORV Isol valves (1RY8000A and 1RY8000B) AT LEAST ONE ENERGIZED.• PORV Relief Path AT LEAST ONE AVAILABLE:<ul style="list-style-type: none">• PORV in AUTO.• Associated isol valve OPEN.
	BOP	Performs subsequent actions of 1BwEP-0, as directed: Verify Generator Trip: <ul style="list-style-type: none">• Main Transformer output breakers (OCB1-8 and OCB7-8) OPEN.• PMG Output Breaker OPEN. Verify DGs Running: <ul style="list-style-type: none">• DGs BOTH RUNNING.• DGs BOTH SX Cooling Valves (1SX169A and 1SX169B) OPEN.• Dispatch operator to LOCALLY check operation.

Comments: _____

Scenario No: 02-3		Event No. 6 - 9
Event Description: MSIV Closure (all), MS Safeties stick open (2), FRV-520 fails to isolate on FWI, faulted-ruptured SG		
Time	Position	Applicant's Actions or Behavior
	BOP	<div>Verify Control Room Ventilation Aligned for Emergency Operation:</div> <ul style="list-style-type: none">•Checks RM-11, Grid 2, 0PR31J-0PR34J < high alarm setpoint.•Checks operating VC train equipment running:<ul style="list-style-type: none">• Supply fan• Return fan• M/U fan• Chilled Water pump• MCR Chiller•Checks Operating VC train dampers aligned:<ul style="list-style-type: none">• M/U fan outlet damper (0VC024Y/0VC08Y) NOT FULLY CLOSED.• VC train M/U Filter Light Lit•Checks Operating VC Train Charcoal Absorber Aligned:<ul style="list-style-type: none">• Bypass damper closed (0VC43Y/0VC44Y)• Inlet damper Open (0VC21Y/0VC05Y)• Outlet Damper Open (0VC22Y/0VC06Y)•Control Room pressure (MCR/TB DP, 0PDI-VC038) > +0.125" H2O.
	BOP	<div>Verify Aux Bldg Ventilation Aligned for Emergency Operation:</div> <ul style="list-style-type: none">•Inaccessible Filter Plenums – Only TWO Aligned with Charcoal Absorbers On Line:<ul style="list-style-type: none">o Plenum A:<ul style="list-style-type: none">o Fan 0VA03CA Running with Flow Control Damper (0VA022Y) Open and Byp Isol Damper (0VA020Y) Closed.o Fan 0VA03CB Running with Flow Control Damper (0VA023Y) Open and Byp Isol Damper (0VA436Y) Closed.o Plenum B:<ul style="list-style-type: none">o Fan 0VA03CC Running with Flow Control Damper (0VA024Y) Open and Byp Isol Damper (0VA021Y) Closed.o Fan 0VA03CD Running with Flow Control Damper (0VA025Y) Open and Byp Isol Damper (0VA437Y) Closed.o Plenum C:<ul style="list-style-type: none">o Fan 0VA03CE Running with Flow Control Damper (0VA067Y) Open and Byp Isol Damper (0VA052Y) Closed.o Fan 0VA03CF Running with Flow Control Damper (0VA072Y) Open and Byp Isol Damper (0VA438Y) Closed.

Comments: _____

Scenario No: 02-3		Event No. 6 - 9
Event Description: MSIV Closure (all), MS Safeties stick open (2), FRV-520 fails to isolate on FWI, faulted-ruptured SG		
Time	Position	Applicant's Actions or Behavior
	BOP	Verify FHB Ventilation Aligned for Emergency Operation: <ul style="list-style-type: none">•FHB Charcoal Absorbers -One Train Aligned:<ul style="list-style-type: none">o Train A:<ul style="list-style-type: none">• Fan 0VA04CA Running• 0VA060Y Charcoal Absorber Inlet Isol Damper – Open.• 0VA057Y Filter Flow Control Damper – Open.• 0VA051Y Charcoal Absorber Bypass Isolation Damper – Closed.o Train B:<ul style="list-style-type: none">• Fan 0VA04CB Running• 0VA055Y Charcoal Absorber Inlet Isol Damper – Open.• 0VA062Y Filter Flow Control Damper – Open.• 0VA435Y Charcoal Absorber Bypass Isolation Damper – Closed.
	RO	Check PZR Spray Valves and Porvs: <ul style="list-style-type: none">• Spray valves (1RY455B and 1RY455C) Closed.• Porvs: 1RY455A and 1RY456 Closed Attempt to Maintain RCS Temperature Control: <ul style="list-style-type: none">• With ANY RCPs running – RCS average temperature STABLE AT OR TRENDING TO 557 Degrees F.o Maintains > 500 gpm AF flow until at least one SG is 10% (31% Adverse). Check RCP Status: <ul style="list-style-type: none">• Determines RCPs RUNNING.• Check If RCPS should be Stopped:<ul style="list-style-type: none">•ECCS Flow > 100 gpm on 1FI-917 or SI pump Flow > 200 gpm on 1FI-922.•RCS Pressure NOT LESS THAN 1425 psig. Check Secondary Pressure Boundaries Intact: <ul style="list-style-type: none">• Identify the 1B Steam Generator pressure decreasing in a uncontrolled manner
	US	Diagnoses/Announces Faulted Steam Generator, Transitions to 1BwEP-2, “FAULTED STEAM GENERATOR ISOLATION”, and directs actions: <ul style="list-style-type: none">• Gets acknowledgement from RO and BOP.• Informs SM of plant status, and evaluates for GSEP.• Contacts WEC to have the STA commence monitoring Status Trees.

Comments: _____

Scenario No: 02-3		Event No. 6,7,8
Event Description: MSIV Closure (all), MS Safeties stick open (2), FRV-520 fails to isolate on FWI		
Time	Position	Applicant's Actions or Behavior
	BOP	Acknowledge transition to IBwEP-2 and performs actions: Re-verify all MSIV's closed Check if any Steam Generator secondary pressure boundary is intact: <ul style="list-style-type: none">Identify 1A,1C, and 1D steam generator pressures appear stable or increasing Identify 1B Steam Generator as faulted <ul style="list-style-type: none">Pressure decreasing in an uncontrolled manner and/or completely depressurized
	BOP [CT] E-2--A	Isolate Faulted SG <ul style="list-style-type: none">1AF013B Closed1AF013F Closed Check FW to faulted SG isolated <ul style="list-style-type: none">Associated row of FW ISOLATION MONITOR LIGHTS panel lit for faulted SG.1FW009B Closed1FW034B Closed1FW035B Closed1FW039B Closed1FW520 NOT Closed <ul style="list-style-type: none">1FW006B closedVerify SG PORV on faulted SG closed 1MS018B Verify SG blowdown isolation valves on faulted SG – closed <ul style="list-style-type: none">1SD002E1SD002F Verify SG blowdown sample isolation valve on faulted SG – closed <ul style="list-style-type: none">1SD005C
	BOP	Monitor AF Pump Suction Pressure <ul style="list-style-type: none">AF PUMP SX SUCT VLVS ARMED alarm - NOT LIT Check secondary radiation <ul style="list-style-type: none">No radiation monitors in alarm indicating steam generator tube rupture

Comments: _____

Scenario No: 02-3		Event No. 6,7,8
Event Description: MSIV Closure (all), MS Safeties stick open (2), FRV-520 fails to isolate on FWI		
Time	Position	Applicant's Actions or Behavior
	US	Diagnoses/Announces transition to 1BwEP-1, "LOSS OF REACTOR OR SECONDARY COOLANT", and directs actions: <ul style="list-style-type: none">• Gets acknowledgement from RO and BOP.• Informs SM of plant status, and evaluates for GSEP.• Directs STA to continue monitoring Status Trees.
		NOTE: Upon transition to 1BwEP-1 and after 1B SG Wide Range level reaches <10% level, the SGTR on 1B Steam Generator will occur resulting in a faulted / ruptured Steam Generator via the 2 open MS Safety valves on the 1B loop
	CUE	Increasing Radiation / Radiation alarms on 1B MS Rad Monitors Indicated pressure increase in 1B Steam Generator Indicated steam flow from 1B Steam Generator Decreasing RCS Pressure and level
	CREW	<ul style="list-style-type: none">• Identify increased radiation sensed on the 1B Steam Generator MS Line• Identify decreasing RCS pressure and level• Identify indicated pressure increase and steam flow on the 1B Steam Generator
	US	Diagnose by use of board indications and/or: <ul style="list-style-type: none">• Operator Action Summary page of 1BwEP-1for abnormal secondary radiation• Step 4 of 1BwEP-1 for abnormal secondary radiation That 1B SG is faulted and ruptured and make the transition to 1BwEP-3 "STEAM GENERATOR TUBE RUPTURE" <ul style="list-style-type: none">• Gets acknowledgement from RO and BOP.• Informs SM of plant status, and to evaluate for GSEP.
	RO	Performs actions of 1BwEP-3, "SGTR" as directed: <ul style="list-style-type: none">• Check If RCPS should be Stopped if not previously stopped<ul style="list-style-type: none">• ECCS Flow > 100 gpm on 1FI-917 or SI pump Flow > 200 gpm on 1FI-922.• RCS Pressure NOT LESS THAN 1425 psig.

Comments: _____

Scenario No: 02-3		Event No. 6,7,8
Event Description: MSIV Closure (all), MS Safeties stick open (2), FRV-520 fails to isolate on FWI		
Time	Position	Applicant's Actions or Behavior
	BOP	Performs actions of 1BwEP-3, "SGTR", as directed: <ul style="list-style-type: none">• Identify Ruptured SG fom any of the following means:<ul style="list-style-type: none">•Unexpected level rise in 1B SG.•MS Line Rad 1B MSL/ MSIV room NOT NORMAL FOR PLANT CONDITIONS.•High Activity from 1B SG sample.•Indicated steam flow and pressure on faulted / isolated steam generator
	BOP	Isolate Flow from 1B SG: <ul style="list-style-type: none">• Verify 1B SG PORV CLOSED• Verify 1B SG Blowdown isolation valves (1SD002E and 1SD002F) CLOSED.• Verify 1B MSIV and Bypass valves CLOSED Determine PORVs on intact Steam Generators are available (1MS018A, 1MS018C, 1MS018D)
	US/BOP	Identify ruptured Steam Generator level is <10% Narrow Range DO NOT initiate AFW flow to ruptured / faulted Steam Generator Verify AF Isol Valves remain CLOSED <ul style="list-style-type: none">• 1AF013B• 1AF013F
	US	Evaluate Ruptured Steam Generator pressure less than 320 psig and transition to 1BwCA-3.1, "SGTR WITH LOSS OF REACTOR COOLANT – SUBCOOLED RECOVERY DESIRED" <ul style="list-style-type: none">• Gets acknowledgement from RO and BOP.• Informs SM of plant status, and to evaluate for GSEP.
	RO/BOP:	Perform actions of 1BwCA-3.1 as directed: <ul style="list-style-type: none">• Reset SI<ul style="list-style-type: none">o Reset Cnmt Isolations (Previously performed)• Verify all AC buses Energized• Check if CS should be stopped (CS is not initiated)
	BOP	Perform actions as directed: <ul style="list-style-type: none">• Check ruptured SG (1B) Narrow Range level < 10%.• DOES NOT Initiate feed to 1B SG Level.• Stop RH pumps if RCS pressure >325 psig, stable or increasing

Comments: _____

Scenario No: 02-3		Event No. 6,7,8
Event Description: MSIV Closure (all), MS Safeties stick open (2), FRV-520 fails to isolate on FWI		
Time	Position	Applicant's Actions or Behavior
	BOP	Perform subsequent actions as directed to initiate plant status evaluation: <ul style="list-style-type: none">• Check Aux Bldg Rad Trends for both Unit 1 and Unit 2 on RM-11 or HMI:<ul style="list-style-type: none">• Vent Stack effluent 1PR28J, 1PR30J, 2PR28J, 2PR30J.• ECCS Pump Cubicles – 1PR13J through 1PR18J.• Grid 4 Aux Bldg Area.• Place Hydrogen Monitors in service per BwOP PS-9, POST LOCA CNMT H2 MONITORING SYSTEM OPERATION.
	US	Perform actions of 1BwCA-3.1: <ul style="list-style-type: none">• Call Chemistry for samples:<ul style="list-style-type: none">• RCS Activity• RCS Boron Concentration• RCS Hydrogen Concentration• Ruptured SG (1D) Activity• Cnmt Atmosphere• Evaluate equipment needed in CC and RH systems to assist in plant recovery.
	US	Get Concurrence from SM that the Hydrogen Recombiners DO NOT need to be run.
		Note: Crew will decide that they have accomplished the Isolation of the Faulted 1D SG in accordance with 1BwEP-2, “FAULTED SG ISOLATION”
	BOP	Performs actions as directed to continue in 1BwCA-3.1: <ul style="list-style-type: none">• Controls Intact SG levels between 10% and 50%. (23% and 50%)• Verifies NO INTACT SG level INCREASING IN AN UNCONTROLLED MANNER.
	RO CT: CA3.1— B.	Performs actions as directed to continue in 1BwCA-3.1: <ul style="list-style-type: none">• Determines Cooldown in RCS Cold Legs is NOT LESS THAN 100 Degrees F in any 1 hr period.• DOES NOT Initiate any further Operator Controlled Cooldown of the RCS if the Cooldown rate in the RCS Cold Legs is > 100 degrees F in any 1 hr.
	BOP	Check if Subcooled Recovery is appropriate: <ul style="list-style-type: none">• Determines RWST level is > 67%.• Determines 1B SG level < 93%
	RO/US	Checks RCS Subcooling: <ul style="list-style-type: none">• Determines RCS Subcooling is acceptable by Iconic or Attachment A.

Comments: _____

SHIFT MANAGER TURNOVER

Weekday, Today, 2001 ONCOMING SHIFT 2

UNIT 1 STATUS		UNIT 0 & 1 MAJOR OOS's	
MODE	1	1A Containment Spray Pump	
Rx Pwr.	77		
Generator MWe.	942	1D CD/CB Pump	
Max Load/Power.	100%		
Min Load/Power	700 MW		
Max Ramp Rate.	5 MW/Min		
Desired Delta I	Target		
On-Line Risk.	Yellow		
Boron @	926		
Control Bank.	D @ 169		
LCOAR ENTRIES PREVIOUS 48 HRS		UNIT 0 & 1 MAJOR SURVEILLANCES	
3.6.6 Condition A for 1A CS Pump hour 36 of 7 day LCOAR			
UNIT 0 & 1 IN PROGRESS		UNIT 0 & 1 PENDING	
1A CS Pump motor bearing replacement.		Unit 1 load increase to 1250 Mwe to meet load demand @ 3 MW/min per electric operations	
Alignment on 1D CD/CB Pump. Est. RTS by end of shift today		Focus Areas: ▪ Verification Practices ▪ Command and Control Standard for Execution of Critical Steps 	

SHIFT MANAGER TURNOVER

UNIT 2 STATUS		UNIT 2 MAJOR OOS's	
MODE 1 Rx Pwr. 97.6 Generator MWe. 1197 Max Load/Power. 97.6 impulse pressure Min Load/Power 700 Max Ramp Rate. 5 mw/min Desired Delta I Target On-Line Risk. Green Boron @ 1037 Control Bank. D @ 210			
LCOAR ENTRIES PREVIOUS 48 HRS		UNIT 2 MAJOR SURVEILLANCES	
"lcoar_num" "Affected_Equipment"			
UNIT 2 IN PROGRESS		UNIT 2 PENDING	
		Make sure that equipment such as ladders, fans, hoses, electrical cords either have tags on them, are put away, or notify SM so they can help get responsible persons out. Safety: Electrical: SH-AA-131 Inspecting & Testing Extension Cords and Generators Dose INFO: Dose goal for day 10 mr	
SCHEDULED ACTIVITY CONFLICT			

SHIFT MANAGER TURNOVER

Administrative	
Temporary Procedures / Modifications	T-mod U1 Trn B RVLIS. Jumper Installed on φC U-1 MPT Disconnect. 1FW009A T-Mod for Hyd Pp Press Sw 1PS-FW162. T-mod for drain on 1B AF casing. Tmod for no disc in 2CC9502B installed.
Daily Orders / Special Op Orders	
Daily Manning Schedule	See sheet for restricted duty personnel and overtime restrictions Oncoming STA Fire Chief
Control Room Rounds	
(GSEP / LER / DVR / ENS)	
Material TS Conditioning	SFP High Level alarm did not alarm during calibration
RWP's / Releases / Precautions / ALARA	
Infrequent Evolution Activities	Lesson learned files L:\shared\opex then ctrl F to search
SPS0 / Division LD	Alternate BPO Outside # 815-727-5902/5903 Tie # 8-565-5902/5903
Unit 1 Comments	Unit Common Comments
Battery 112 cell 32 has floating material in electrolyte, eval'd OK D.O. OOS prevents filling U-1 tanks normally, but BwOP DO-6 can be used to fill tanks. T-MOD is installed allowing U-1 boiler ops. 1AF006A is leaking by from CST.	U1 FC Cleanup SFP U2 FC Cleanup OFFLINE (leak) FC Cooling U1 50K DO Tank empty 125K DO Tank and FRAC Tks Certified Aux Steam U-1 ES →U1 HDT U-0 CC Hx U1 U-0 CC Pump Bus 141 U1 Aux boiler Wet lay-up U2 Aux boiler Wet lay-up SAC / Dryer U1/U0 MUDs U-1 CST CW Makeup Running 0A/0B CW Blowdown On Lake Level 5.8'
Unit 2 Comments	General Comments
2AF017A leaking by .3 gpm, AR 990116738 S/G sampling lines/valves at HRSS are not correct. Do not hang OOS on any 2PS181 valves till further notice. 2PS229A still blows fuse 2PA32J Ckt 9 CV seal leakage: 2A Running 200cc/min shutdown about 6 drops/min 2B Running -12 dpm; S/D- none	Conference Call Phone Number – 1-800-232-1234 Teleconference folder ID #-472664085 Meeting Place 630-663-7120 +code Duty Team is located @ SITE APPS, NRC Duty list in book Substation construction (John Strle) Cell phone 815-351-8472
Caution Cards	Abnormal Positioned Components
CCNUM EPN	CCNUM EPN AbnormalPosition

SM BEEPER TURNOVER

Shift 1 To 2 Time Now Date Today Offgoing_____Oncoming_____.

SHIFT MANAGER TURNOVER

.OPERATORS CONCERN LIST

Equipment	Unit 0 BwAP 330-10 Compensatory Actions	Operability Determination
Equipment	Unit 1 BwAP 330-10 Compensatory Actions	Operability Determination
PZR PORV	Verify PZR PORV's Open at Setpoint or Open PZR PORV – Spurious SI Concern	97-159
Equipment	Unit 2 BwAP 330-10 Compensatory Actions	Operability Determination
PZR PORV	Verify PZR PORV's Open at Setpoint or Open PZR PORV – Spurious SI Concern	97-159
2B CV Pump	Monitor seal leakage shiftly – Notify System Engineering if > 0.5 gpm	98-049

UNIT 0 CONTROL ROOM ANNUNCIATORS LIT

Annunciator	Annunciator Description	Problem	AR#/WR#	Status

UNIT 1 CONTROL ROOM ANNUNCIATORS LIT

Annunciator #	Annunciator Description	Problem	AR#/WR#	Status

UNIT 2 CONTROL ROOM ANNUNCIATORS LIT

Annunciator #	Annunciator Description	Problem	AR#/WR#	Status

Concerns and/or Pending OP-AA-101-301 Evaluations

EPN	Unit 0	Resolution
EPN	Unit 1	Resolution
EPN	Unit 2	Resolution

UNIT 1 NSO TURNOVER

Weekday, Today, Oncoming Shift 2

Unit 1 Status			
Mode	1	Max load/power	100%
Power	77%	Max ramp rate	5 mw/min.
Mw electric	942 MW	Unit Risk	Yellow
Min load/power	900	Control Rods	169
Desired Delta-I	Target	Boron concentration	926 PPM
IN PROGRESS		PENDING	
Containment Spray Pump 1A motor bearing replacement Alignment of 1D CD/CB Pump		Unit 1 load increase to 1250 Mwe per electric operations at 3 MW/min	
LONG TERM			
ADMINISTRATIVE			
Temporary procedures			
Temporary alterations			
New caution cards			
Unit logbook			
Unit routine		BDPS lcoar in mode 3.	
Aux. Electric room access			
Daily orders			
Control board walk down			
LCO/TLCO		RETS	DEQUIP/AAR
3.6.6 1A CS Pump			

TURNOVER ITEMS				
ISO SHIFTLY/DAILY SURVEILLANCE				
2) SSPS CHANNELS/BISTABLES		B train SSPS logic ground to chassis ground had higher than expected readings during SSPS, AR written.		
3) SYS – SAFEGUARDS				
4) SYS – PRIMARY		1. CC to spent fuel pool hx is at 2800 gpm.		
5) SYS – BALANCE OF PLANT		Spent fuel pool cooling now on Unit 1.		
6) ALARMS-SER/ANNUNCIATOR				
7) ALARMS – PROCESS/RM-11				
8) ALARMS - FP/OTHERS				
9) CHEMISTRY		Max flow through condensate polishers at full power is ~2000 gpm without causing a low npsh alarm. This is only a guideline and not an absolute value.		
10) RADIATION PRECAUTIONS				
11) NUCLEAR INSTRUMENTATION				
12) MCB INSTRUMENTATION				
13) MCB CONTROLLERS				
14) ELECTRICAL DISTRIBUTION – AC		MPT transformer disconnects has bad seat on one phase. Jumper installed, SOC on disconnect - do not operate.		
15) ELECTRICAL DISTRIBUTION – DC				
16) EGC STATUS				
17) BWOP_ (PROCEDURE AND STEP IN EFFECT)				
COMMENTS				
15 gals PW will raise RCS Temps .1 F 1FW009B has small nitrogen leak on 1PS-FW165, AR written.				
POST REVIEW		US	FS	SM
TIME: NOW	SHIFT 1	OFF GOING		
DATE: TODAY	SHIFT 2	ONCOMING		

UNIT ONE

POWER HISTORY HOURLY SURVEILLANCE
DATA SHEET

DATE FOR WHICH THIS SURVEILLANCE IS BEING PERFORMED: TODAY

TIME		AVG NUCLEAR POWER OUTPUT	TIME		AVG NUCLEAR POWER OUTPUT
IDEAL	ACTUAL		IDEAL	ACTUAL	
0100	0100	76.1 %RTP	1300		%RTP
0200	0200	76.1 %RTP	1400		%RTP
0300	0300	76.1 %RTP	1500		%RTP
0400	0400	76.1 %RTP	1600		%RTP
0500	0500	76.1 %RTP	1700		%RTP
0600	0600	76.1 %RTP	1800		%RTP
0700	0700	76.1 %RTP	1900		%RTP
0800		%RTP	2000		%RTP
0900		%RTP	2100		%RTP
1000		%RTP	2200		%RTP
1100		%RTP	2300		%RTP
1200		%RTP	2400		%RTP

TOTAL POWER FOR THE DAY: _____ (Sum of each recorded average Nuclear Power Output)

TOTAL EFPH FOR THE DAY: _____ (Total Power for the day multiplied by 0.01)

PREVIOUS CUMULATIVE EFPH: 5750.177 (Total EFPH to date from previous last run of this surveillance)

EFPH ADJUSTMENT**: _____ Signature: _____

TOTAL EFPH TO DATE: _____ (TRANSFER to next day's surveillance or next run of this surveillance)

☐ "INFO ONLY" copy placed in file (Reviewer).

** MAY ONLY BE MADE AND SIGNED BY THE STATION NUCLEAR ENGINEER OR DESIGNEE. A WRITTEN DESCRIPTION OF THE REASON(S) FOR THE ADJUSTMENT MUST BE ATTACHED.

(Final)

UNIT ONE - MODES 1, 2, AND 3
SHIFTLY AND DAILY OPERATING SURVEILLANCE DATA SHEET

Critical Parameter Data Sheet (Mode 1 and 2)

Unit 1

Date: Today

Time	Δ /Target Δ I		VCT Level	Highest PR NI	PZR Press	PZR Lvl	Hi Tav/Tref		Gen Mwe	Initial
23:00	-2.13	-2.14	49	77.1	2235	51	577.5	577.4	942	RC
0:00	-2.13	-2.14	49	77.1	2235	51	577.5	577.4	942	RC
1:00	-2.13	-2.14	49	77.1	2235	51	577.5	577.4	942	RC
2:00	-2.13	-2.14	49	77.1	2235	51	577.5	577.4	942	RC
3:00	-2.13	-2.14	49	77.1	2235	51	577.5	577.4	942	RC
4:00	-2.13	-2.14	49	77.1	2235	51	577.5	577.4	942	RC
5:00	-2.13	-2.14	49	77.1	2235	51	577.5	577.4	942	RC
6:00	-2.13	-2.14	49	77.1	2235	51	577.5	577.4	942	RC

Unit Supervisor: KH

7:00	-2.13	-2.14	49	77.1	2235	51	577.5	577.4	942	RC
8:00										
9:00										
10:00										
11:00										
12:00										
13:00										
14:00										

Unit Supervisor:

15:00										
16:00										
17:00										
18:00										
19:00										
20:00										
21:00										
22:00										

Unit Supervisor:

(Final)