

AS-SUBMITTED EXAMINATION
BRAIDWOOD STATION INITIAL EXAMINATION
DECEMBER 2007
SCENARIOS

Simulation Facility Braidwood

Scenario

Operating Test No.: 20070301

No.:

NRC 07-1

Examiners: _____

Applicant: _____

SRO

RO

BOP

Initial Conditions: IC-18

Turnover: Unit 1 is operating at 75% power, steady state, equilibrium xenon, Boron concentration is 890 ppm. Online risk is green. 1C CD/CB pump is OOS for bearing replacement. The 1C CD/CB pump is expected back in service in four days. Following completion of turnover, the crew is to perform 1BwOS FW-W1, UNIT 1 TURBINE DRIVEN MAIN FEEDWATER PUMP STOP VALVE SURVEILLANCE.

Event No.	Malf. No.	Event Type*	Event Description
Preload	IOR ZDI1CD05PC PTL IOR ZDI1CD05PCB PTL IOR ZDI1CB113C CLS		1C CD/CB Pump OOS
1	None	N-BOP, US	Perform 1BwOS FW-W1
2	IMF RX01J 0 30	I-BOP, US	1D SG pressure channel failed low (Tech Spec)
3	IMF TH11B 5 TRGSET 1 "ZLO1RY8000B(2)==0" MRF ED065D (1 10) OPEN	C-RO, US	1RY456 partially opens 1RY8000B block valve breaker trips (Tech Spec)
4	IMF RX18H 650 IMF RX18L 650	I-RO, US	RCS Loop 4 Thot (#2 RTD) failed high (Tech Spec)
5	IMF FW22D	C-BOP R-RO, US	1D CD/CB pump trip.
6	IMF TH03B 450 60	M-ALL	1B Steam Generator Tube Rupture
7	IMF TH11A 0 TRGSET 2 "ZLO1IA066(2)==0" IOR ZDI1IA066 (2 0) CLS IOR ZAO1PIRY018 (2 60) 0 30 IMF PN1555 (2 70) ON	C-RO, US	Loss of instrument air to containment

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

SCENARIO OVERVIEW

Unit 1 is operating at 75% power, steady state, equilibrium xenon, Boron concentration is 890 ppm. Online risk is green. 1C CD/CB pump is OOS for bearing replacement. The 1C CD/CB pump is expected back in service in four days. Following completion of turnover, the crew is to perform 1BwOS FW-W1, UNIT 1 TURBINE DRIVEN MAIN FEEDWATER PUMP STOP VALVE SURVEILLANCE.

After completing shift turnover and relief, the BOP will perform 1BwOS FW-W1, UNIT 1 TURBINE DRIVEN MAIN FEEDWATER PUMP STOP VALVE SURVEILLANCE.

After completing 1BwOS FW-W1, the controlling 1D SG pressure channel will fail low. 1FW540, Feedwater Regulating Valve, will begin to close and 1D SG level will lower. The BOP will take manual control of 1D SG level and stabilize 1D SG level. 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment F, will be implemented. The BOP will restore 1D SG level control to automatic after 1D SG level is restored to normal and an operable 1D SG steam flow control channel is selected. Technical specifications 3.3.1, conditions A and D and 3.3.4, condition A apply. If reactor power exceeds 100% due to the secondary transient, the crew will implement 1BwOA PRI-16, RESPONSE TO REACTOR OVERPOWER CONDITION to restore reactor power below 100%.

NOTE: The event above is required for RO candidates ONLY. The malfunction may be omitted at lead examiners discretion if INSTANT SRO candidate is filling BOP position and the malfunction is not needed to meet the INSTANT SRO candidate's required transients and event total per NUREG 1021 ES-301-5.

After the SG pressure channel failure is addressed, PZR PORV 1RY456 will open to the intermediate position, resulting in a slow RCS pressure drop. The RO will isolate the PZR PORV by closing 1RY8000B, PORV block valve. Once 1RY8000B is closed, its breaker will trip open, removing power from 1RY8000B. 1RY456 will remain unavailable for the remainder of the scenario. Tech spec 3.4.11, conditions A and C apply.

After the PZR PORV failure is addressed, Loop 4 Thot RTD will fail high, causing inward rod motion. The RO crew will place rod control in manual and take actions to stabilize the plant per 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, ATTACHMENT A will be implemented. Tech Spec 3.3.1, conditions A and E apply.

After the Thot RTD failure is addressed, the 1D CD/CB pump will trip. 1BwOA SEC-1, SECONDARY PUMP TRIP, Attachment B will be implemented. The BOP will initiate a turbine runback. The RO will borate the RCS as necessary to stabilize RCS temperature.

After the 1D CD/CB pump trip is addressed, a 450 gpm Steam Generator Tube Rupture will occur on the 1B SG. The crew will implement 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION. When SI actuates, a solenoid failure will cause 11A066 to fail closed, resulting a loss of Instrument Air to containment. IA to containment will remain unavailable for the remainder of the scenario. The crew will transition to 1BwEP-3, STEAM GENERATOR TUBE RUPTURE, based on secondary radiation trends on the 1B SG. After determining RCS pressure control is unavailable, the crew will transition 1BwCA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL.

The scenario is complete when the crew has terminated high head SI in 1BwCA-3.3.

Critical Tasks

1. Isolate feedwater flow into and steam flow from the ruptured SG prior to completing step 4 of 1BwEP-3.
(ERG Critical Task number - E-3--A) (K/A number – 000038EA2.01 importance – 4.1/4.7)
2. Cool down to establish RCS subcooling margin, but prevent entry into 1BwFR-P.1.
(ERG Critical Task number - E-3--B) (K/A number - 000038EA1.36 importance - 4.3/4.5)
3. Terminate high head SI prior to completing step 9 of 1BwCA-3.3.
(ERG Critical Task number – CA-3.3--A) (K/A number – 000038EA1.30 importance – 4.0/3.8)

SIMULATOR SETUP GUIDE:

- Verify/perform TQ-BR-201-0113, BRAIDWOOD TRAINING DEPARTMENT SIMULATOR EXAMINATION SECURITY ACTIONS CHECKLIST.
- Establish the conditions of IC-18, 75% power, steady state, equilibrium xenon.
- Complete items on Simulator Ready for Training Checklist.
- Verify/remove any Equipment Status Tags and Danger Tags not applicable to the scenario.
- Place simulator in RUN and allow simulator to run during board walk down and turnover.
- Start 1B CD/CB pump.
- Secure 1C CD/CB pump.
- Place CD/CB Pumps Standby Select C/S in OFF.
- Place 1C CD/CB Pump in PULL OUT, 1C CD/CB Pump Lube Oil Pump in PULL OUT, and 1CB113C in CLOSED.
- Place danger tags on 1C CD/CB pump, 1C CD/CB Lube Oil pump, and 1CB113C C/Ss.
- Run **caep DEMO NRC 07-1 SETUP** from disk and verify the following actuate:
 - **IOR ZDI1CD05PC PTL**
 - **IOR ZDI1CD05PCB PTL**
 - **IOR ZDI1CB113C CLS**
- Set ΔI Target Curve slopes to 0.025 (+ 2.5%)
- Verify SER and printer are clear of data.
- Provide students with turnover sheets, 1BwOS NR-1, critical parameter sheet, Op Aids, Pre-Job Brief Forms, and copy of 1BwOS FW-W1.

Event 1: Perform 1BwOS FW-W1, UNIT 1 TURBINE DRIVEN MAIN FEEDWATER PUMP STOP VALVE SURVEILLANCE.

If dispatched as Equipment Operator to observe main feedwater pump stop valve operation, report stop valves respond normally as they are tested.

Acknowledge as SM commencement and completion of surveillance.

Event 2: 1B SG pressure channel failed low.

NOTE: This event is required for RO candidates ONLY. The malfunction may be omitted at lead examiners discretion if INSTANT SRO candidate is filling BOP position and the malfunction is not needed to meet the INSTANT SRO candidate's required transients and event total per NUREG 1021 ES-301-5.

Insert **IMF RX01J 0 30** to fail 1PT-544 high over a 30 second period.

If lead examiner desires the bistables tripped, participate in brief and perform the following:

- **MRF RP20 OPEN** (open protection cabinet #1 door)
- **MRF RX094 TRIP** (trip 1D SG low pressure SI/steam line isolation bistable PB544B)
- **MRF RX093 TRIP** (trip 1D SG high steam rate press bistable PB544A)
- **MRF RP20 CLOSE** (close protection cabinet #1 door)

Acknowledge as Shift Manager the failure, LCOAR entry, on line risk assessment, EAL evaluation, request for maintenance support, and IR request.

Acknowledge as Shift Manager reactor overpower condition, on line risk assessment, request for IR, evaluation for reactivity screening, QNE and personnel notifications, and evaluation of return to full power operation.

Event 3: 1RY456 partially opens/1RY8000B block valve breaker trips.

Run **caep DEMO NRC 07-1 EVENT 3** from disk and verify the following actuate:

- **IMF TH11B 20**
- **TRGSET 1 "ZLO1RY8000B(2) = = 0"**
- **MRF ED065D (1 5) OPEN**

If dispatched as Equipment Operator, report 1RY8000B breaker (132X2 C4) is tripped. If breaker reclosure is requested, the breaker will not close.

Acknowledge as Shift Manager the failure(s), LCOAR entry, on line risk assessment, EAL evaluation, request for maintenance support, and IR request.

Event 4: RCS Loop 4 Thot (#2 RTD) failed high

Run caep DEMO NRC 07-1 EVENT 4 from disk and verify the following actuate:

- **IMF RX18H 650**
- **IMF RX18L 650**

If lead examiner desires the bistables tripped, participate in brief and perform the following:

- **MRF RP23 OPEN** (open protection cabinet #4 door)
- **MRF RX026 TRIP** (trip OPΔT Rx trip bistable TB441G)
- **MRF RX142 TRIP** (trip OPΔT Runback bistable TB441H)
- **MRF RX025 TRIP** (trip OTΔT Rx trip bistable TB441C)
- **MRF RX141 TRIP** (trip OTΔT Runback bistable TB441D)
- **MRF RX028 TRIP** (trip Low Tave bistable TB442G)
- **MRF RX027 TRIP** (trip Lo-Lo Tave bistable TB442D)
- **MRF RP23 CLOSED** (close protection cabinet #4 door)

Acknowledge as Shift Manager the failure, LCOAR entry, on line risk assessment, EAL evaluation, request for maintenance support, and IR request.

Events 5 1D CD/CB pump trip.

Insert **IMF FW22D**

Acknowledge as Shift Manager the failure, LCOAR entry, on line risk assessment, EAL evaluation, request for maintenance support, IR request, evaluation for reactivity screening, request for personnel notifications, and evaluation for restoration of full power operation.

If dispatched as Equipment Operator, report 1D CD/CB pump is seized and report ground overcurrent flag at breaker cubicle.

Acknowledge as Power Team load reduction and estimated duration of derate.

Events 6,& 7: 1B Steam Generator Tube Rupture, loss of Instrument Air to Containment

Run caep DEMO NRC 07-1 EVENTS 6, & 7 from disk and verify the following actuate:

- IMF TH11A 0
- IMF TH03B 450 60
- TRGSET 2 "ZLO11A066(2) == 0"
- IOR ZDI11A066 (2 0) CLS
- IOR ZAO1PIRY018 (2 60) 0 30
- IMF PN1555 (2 70) ON

Acknowledge as Shift Manager procedure changes, Emergency Plan evaluations, STA request, and requests for support personnel.

After STA requested, as STA report CSF status: Yellow on inventory when pressurizer level < 17%, yellow on heat sink when ruptured SG level > 88%.

If containment entry requested to attempt to repair 11A066, acknowledge request but do not make air available to containment.

As Equipment Operator, acknowledge request to fill 1B AF pump day tank.

As Shift Manager, acknowledge request for environs teams when 1B SG PORV open.

Scenario No:	NRC 07-1	Event No.	1
Event Description:	Perform 1BwOS FW-W1		
Time	Position	Applicant's Actions or Behavior	
	CUE	○ From turnover, perform 1BwOS FW-W1, UNIT 1 TURBINE DRIVEN MAIN FEEDWATER PUMP STOP VALVE SURVEILLANCE.	
	US	● Direct BOP to perform 1BwOS FW-W1.	
	BOP	<ul style="list-style-type: none"> ● Refer to 1BwOS FW-W1. ● Update data sheet D-2 as each test is performed. ● Test 1B main FW pump at 1PM04J: <ul style="list-style-type: none"> ● Depress left LP stop valve TEST pushbutton. ● Observe left LP stop valve OPEN lamp goes out. ● Observe left LP stop valve TEST button illuminates. ● Observe left LP stop valve OPEN lamp illuminates. ● Depress high pressure stop valve TEST pushbutton. ● Observe high pressure stop valve OPEN lamp goes out. ● Observe high pressure stop valve CLOSED and TEST buttons illuminate. ● Observe high pressure stop valve CLOSED button goes out. ● Observe left LP stop valve OPEN button illuminates. ● Test 1C main FW pump at 1PM04J: <ul style="list-style-type: none"> ● Depress left LP stop valve TEST pushbutton. ● Observe left LP stop valve OPEN lamp goes out. ● Observe left LP stop valve TEST button illuminates. ● Observe left LP stop valve OPEN lamp illuminates. ● Depress high pressure stop valve TEST pushbutton. ● Observe high pressure stop valve OPEN lamp goes out. ● Observe high pressure stop valve CLOSED and TEST buttons illuminate. ● Observe high pressure stop valve CLOSED button goes out. ● Observe left LP stop valve OPEN button illuminates. ● Inform US 1BwOS FW-W1 complete. 	
	US	<ul style="list-style-type: none"> ● Acknowledge report. ○ Notify SM 1BwOS FW-W1 complete. 	
		NOTE: After 1BwOS FW-W1 is complete and with lead examiners concurrence, insert the next event.	

Comments: _____

Scenario No:	NRC 07-1	Event No:	2
Event Description:	1D SG pressure channel failed low		
Time	Position	Applicant's Actions or Behavior	
		EVALUATOR NOTE: This event is required for RO candidates ONLY. The malfunction may be omitted at lead examiners discretion if INSTANT SRO candidate is filling BOP position and the malfunction is not needed to meet the INSTANT SRO candidate's required transients and event total per NUREG 1021 ES-301-5.	
	CUE	<ul style="list-style-type: none"> • Annunciator 1-15-E1, MS PRESS RATE STM LINE ISOL ALERT • Annunciator 1-15-D1, S/G 1D LOW PRESS STEAMLINE ISOL ALERT • Annunciator 1-15-D3 S/G 1D FLOW MISMATCH STM FLOW LOW • S/G 1D feed flow and NR level lowering. ○ Annunciator 1-15-D9 S/G 1D LEVEL DEVIATION HIGH LOW 	
	BOP	<ul style="list-style-type: none"> • Determine SG 1D feed flow and/or NR level lowering at 1PM04J. • Identify 1PI-544 indicates low steam pressure at 1PM04J. • Reference BwARs 1-15-D1/1-15-D3. 	
	CREW	<ul style="list-style-type: none"> • Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL. 	
	US	<ul style="list-style-type: none"> • Notify Shift Manager of SG pressure channel failure. • Implement 1BwOA INST-2 OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment F, STEAM PRESSURE CHANNEL FAILURE, and direct operator actions of 1BwOA INST-2 to establish the following conditions: 	
	BOP	<ul style="list-style-type: none"> • Stabilize 1D SG level at 1PM04J: <ul style="list-style-type: none"> • Place 1FK-540, FW Reg Valve 1FW540 controller, in manual. • Raised demand on 1FK-540 sufficiently t raise feedwater flow to restore 1D SG level. • Operate 1FK-540 in manual to stabilize 1D SG level in the normal operating band. • Verify 1PI-509 indicates approximately 215 psid to ensure adequate feedwater ΔP. <ul style="list-style-type: none"> ○ Manually control FW pump speed to restore ΔP, if necessary. • Select operable steam flow channel. <ul style="list-style-type: none"> • Place 1D SG steam flow channel select C/S to F-543. • Establish automatic level control by placing 1FK-540 in auto. 	

Comments: _____

Scenario No:	NRC 07-1	Event No:	2
Event Description:	1D SG pressure channel failed low		
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> Perform the following: <ul style="list-style-type: none"> Monitor reactor power at 1PM05J. Assist US by making notifications. Refer to BwARs. 	
	US	<ul style="list-style-type: none"> Perform pre-job brief per HU-AA-1211 for bistable tripping. Complete 1BwOL 3.3.1, Attachment A, INSTRUMENT CONDITION TRACKING LOG. 	
	Extra NSO/ BOP	<ul style="list-style-type: none"> Locally trip bistables for 1D steam pressure by placing in TEST/ BOP verifies correct bistable operation. <ul style="list-style-type: none"> PB544B C1-741 BS-2 PB544A C1-741 BS-1 	
	US	<ul style="list-style-type: none"> Determines TS 3.3.2 conditions A and D are applicable. Determines TS 3.3.4 condition A is applicable. Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure. 	
		EVALUATOR NOTE: After the actions for SG pressure channel failure are complete and with lead examiners concurrence, enter next event.	

Comments: _____

Scenario No:	NRC 07-1	Event No:	3
Event Description:	1RY456 partially opens/1RY8000B block valve breaker trips		
Time	Position	Applicant's Actions or Behavior	
	CUE	<ul style="list-style-type: none"> • Annunciator 1-12-B2, PZR PORV OR SAF VLV OPEN ○ Annunciator 1-12-C1 PZR PRESS CONT DEV LOW HTRS ON • Annunciator 1-12-C6 PZR PORV DSCH TEMP HIGH • 1RY456 open and closed lights lit. • PZR pressure dropping on 1PI-455 – 458. 	
	RO	<ul style="list-style-type: none"> • Perform the following at 1PM05J: <ul style="list-style-type: none"> • Recognize 1RY456 PORV has opened prior to reaching lift setpoint. <ul style="list-style-type: none"> ○ Place 1RY456, PZR PORV, C/S to CLOSE. ○ Determine 1RY456 will not close. • Place 1RY8000B, PZR PORV block valve, C/S to close. ○ Report failure to US. • Recognize/reports DNBR LCO 3.2.5 pressure exceeded (<2209 psig) if applicable. ○ Recognize trip of 1RY8000B breaker following valve closure. • Report when DNBR LCO can be exited, if applicable. ○ Dispatch operator to investigate 1RY8000B breaker. 	
	BOP	<ul style="list-style-type: none"> • Perform the following: <ul style="list-style-type: none"> • Dispatch operators to 1RY8000B breaker. • Assist US by making notifications. • Refer to BwARs. 	
	US	<ul style="list-style-type: none"> • Acknowledge PORV failure and concur with actions to close PORV and/or PORV block valve. • Determine LCO 3.4.11 Condition B and C are applicable. <ul style="list-style-type: none"> ○ TRM 3.4.d does not apply. • Acknowledge DNB LCO status (if applicable). • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure. 	
		EVALUATOR NOTE: After the actions for PZR PORV failure are complete and with lead examiners concurrence, enter next event.	

Comments: _____

Time	Position	Applicant's Actions or Behavior
Scenario NRC 07-1 Event 4 No. _____ Event Description: Loop D Thot (#2 RTD) fails high.		
	CUE	<ul style="list-style-type: none"> • Loop D Tave rise. • Loop D ΔT rise. • Control rod inward motion. <ul style="list-style-type: none"> ○ Annunciator 1-9-D3, CHG LINE FLOW HIGH/LOW • Annunciator 1-12-B4, PZR LVL CONT DEV LOW • Numerous annunciators on blocks 10 and 14.
	RO	<ul style="list-style-type: none"> • Perform the following at 1PM05J: <ul style="list-style-type: none"> • Determine control rods inserting. • Identify 1TI-442 is failing high. • Report failure to US. • Determine turbine power stable at 1PM06J or Operator Work Station drop 210 (DEH computer terminal located behind Unit 1 desk). • Place rod bank select switch to manual at 1PM05J to stop uncontrolled rod insertion.
	CREW	<ul style="list-style-type: none"> • Reference BwARs. • Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL.
	US	<ul style="list-style-type: none"> • Notify SM of plant status and procedure entry. • Request evaluation of Emergency Plan conditions. • Implement 1BwOA INST-2 OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment A RCS NARROW RANGE RTD CHANNEL FAILURE, and direct operator actions of 1BwOA INST-2 to establish the following conditions:
	RO	<ul style="list-style-type: none"> • Manually defeat failed RTD channel at 1PM05J: <ul style="list-style-type: none"> • Place Tave DEFEAT switch to 1D position. • Place ΔT DEFEAT switch to 1D position. • Select operable ΔT channel for ΔT recorder at 1PM05J: <ul style="list-style-type: none"> • Place ΔT channel to recorder select switch to 1A, 1B, or 1C. • Check if rod control can be placed in auto. <ul style="list-style-type: none"> • Check Tave/Tref stable and within 1°F. <ul style="list-style-type: none"> • 1TR-412 at 1PM05J • HMI display ○ Adjust Tave – Tref within 1°F by manually withdrawing control rods in 3 step increments at 1PM05J. • Place rod bank select switch in AUTO.

Comments: _____

Scenario No:	NRC 07-1	Event No:	4
Event Description: Loop D Thot (#2 RTD) fails high.			
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> • Check PZR level normal & stable <ul style="list-style-type: none"> • Place 1LK-459, PZR master level controller, <u>OR</u> 1FK-121, CV pumps flow control valve, in manual. • Operate 1LK-459 <u>OR</u> 1FK-121 in manual to restore PZR level to normal operating band and maintain 8-13 gpm RCP seal injection flow. 	
	BOP	<ul style="list-style-type: none"> • Perform the following: <ul style="list-style-type: none"> • Request operations support for tripping bistables. • Assist US by making notifications. • Refer to BwARs. 	
	US	<ul style="list-style-type: none"> • Perform pre-job brief per HU-AA-1211 for bistable tripping • Complete 1BwOL 3.3.1, Attachment A, INSTRUMENT CONDITION TRACKING LOG. 	
	Extra NSO/RO	<ul style="list-style-type: none"> • Locally trip bistables for 1D Loop by placing in TEST/ RO verifies correct bistable operation: <ul style="list-style-type: none"> • TB441G C4-124 BS-1 • TB441H C4-124 BS-2 • TB441C C4-124 BS-3 • TB441D C4-124 BS-4 • TB442G C4-121 BS-2 • TB442D C4-121 BS-1 	
	RO	<ul style="list-style-type: none"> • Check P12 interlock: <ul style="list-style-type: none"> • Check P-12 bypass permissive NOT LIT at 1PM05J. 	
	US	<ul style="list-style-type: none"> • Determines TS 3.3.1 conditions A and E are applicable. • Determine TS 3.3.2 is NOT applicable – minimum channels operable requirement is met. • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure and rod control malfunction. 	
		EVALUATOR NOTE: After the actions for RCS RTD failure are complete and with lead examiners concurrence, enter next event.	

Comments: _____

Time	Position	Applicant's Actions or Behavior
Scenario No: NRC 07-1 Event No: 5 Event Description: 1D CD/CB pump trip.		
	CUE	<ul style="list-style-type: none"> • Annunciator 1-16-E1, FW PUMP NPSH LOW • Annunciator 1-17-A9, CD/CB PUMP TRIP • Annunciator 1-17-B11, CB PUMP DSCH FLOW HIGH • Annunciator 1-17-D3, HD PUMP DSCH FLOW HIGH • Annunciator 1-17-E3, HD PUMP SUCT STRN Δp HIGH
	BOP	<ul style="list-style-type: none"> • Recognize 1D CD/CB pump tripped at 1PM04J. <ul style="list-style-type: none"> ○ Refer to BwAR 1-17-A9. • Report pump trip to US. • Recognize TWO CD/CB pumps running.
	CREW	<ul style="list-style-type: none"> • Identify entry conditions for 1BwOA SEC-1, SECONDARY PUMP TRIP.
	US	<ul style="list-style-type: none"> • Acknowledge 1D CD/CB pump trip. • Contact Shift Manager to perform risk assessment, initiate IR, and contact maintenance to investigate/correct failure. • Implement 1BwOA SEC-1, SECONDARY PUMP TRIP Attachment B CD/CB PUMP TRIP, and direct operator actions of 1BwOA SEC-1 to establish the following conditions:
	BOP	<ul style="list-style-type: none"> • Check turbine load > 700 MW at 1PM02J or Operator Work Station drop 210 (DEH computer terminal located behind Unit 1 desk). • Recognize standby CD/CB pump NOT AVAILABLE at 1PM03J. • Check CD/CB pump status at 1PM03J. <ul style="list-style-type: none"> • ONLY TWO CD/CB pumps running. • Initiate CD/FW turbine runback: <ul style="list-style-type: none"> • Depress CD/FW runback pushbutton at 1PM02J. • Select CD/CB runback on Operator Work Station graphic 5512 at 1PM02J or Operator Work Station drop 210 (DEH computer terminal located behind Unit 1 desk). • Verify turbine load lowering at 1PM02J or Operator Work Station drop 210 (DEH computer terminal located behind Unit 1 desk).
	RO	<ul style="list-style-type: none"> • Verify rod control in automatic at 1PM05J. • Maintain Tave and Tref within 3°F: <ul style="list-style-type: none"> • Manually adjust control rods. • Manually adjust RCS boron concentration.

Comments: _____

Scenario No:	NRC 07-1	Event No:	5
Event Description: 1D CD/CB pump trip.			
Time	Position	Applicant's Actions or Behavior	
		EVALUATOR NOTE: The following step may be repeated as necessary to borate the RCS during the turbine load reduction.	
	RO	<p>Initiate RCS boration at 1PM05J:</p> <ul style="list-style-type: none"> • Determine required boric acid volume (approximate band: 50 gal – 300 gal). <ul style="list-style-type: none"> ○ Perform boration boundary calculation per 1BwGP 100-4T2. ○ Determine from Operator Aid Book. • Determine desired boric acid flow rate. • Set 1FK-110 BA Flow Control to desired boration rate. • Set 1FY-0110 BA Blender Predet Counter to desired volume. • Place MAKE-UP MODE CONT SWITCH to STOP position. • Place MODE SELECT SWITCH to BORATE position. • Place MAKE-UP MODE CONT SWITCH to START. • Verify proper operation of valves and BA transfer pump (1CV110B open, Boric Acid Transfer Pump running, 1CV110A throttles open, proper BA flow indicated on recorder). <ul style="list-style-type: none"> ○ Turn on PZR backup heaters. <p>OR</p> <p>Batch addition of Boric Acid:</p> <ul style="list-style-type: none"> • Open 1CV110B. • Open 1CV110A. • Start the BA Transfer pump. • When desired amount of BA has been added, stop the BA Transfer Pump. • Close 1CV110A. • Close 1CV110B. 	
	BOP	<ul style="list-style-type: none"> • Verify running CB pump recirc valves in auto: <ul style="list-style-type: none"> • 1CB113A-D in auto on running CD/CB pumps. • Dispatch operators to perform BwOP HD-2 for 1B HD pump. • Shutdown CD/CB pump (if started during procedure performance). 	
	BOP	<ul style="list-style-type: none"> • Check CD/CB flow restored: <ul style="list-style-type: none"> • Check annunciator 1-16-E1, FW PUMP NPSH LOW – NOT LIT. • Check annunciator 1-17-B11, CB PUMP DCSH FLOW HIGH – NOT LIT. ○ If either annunciator is lit, perform the following at 1PM03J: <ul style="list-style-type: none"> • Manually open 1CD210A & B, CP bypass valves. • Verify/close 1CD152, CD pumps recirc valve. • Verify/open 1CD157A & B, GS condenser bypass valves. • Verify 1HD046A & B, HD pump discharge valves, are opening in auto. • Verify/close 1CB113A-D, CB pump recirc valves. 	

Comments: _____

Scenario **NRC 07-1** Event **5**
 No: No.

Event Description: **1D CD/CB pump trip.**

Time	Position	Applicant's Actions or Behavior
	RO	<ul style="list-style-type: none"> • Check PDMS operable: <ul style="list-style-type: none"> • Annunciator 1-10-E8, PDMS INOPERABLE – NOT LIT. • 1BwOS PDMS-1A not implemented. • Annunciator 1-10-D7, PDMS LIMIT EXCEEDED – NOT LIT. • Control ΔI near target: <ul style="list-style-type: none"> • Operate control rods in manual as necessary to restore ΔI to desired value at 1PM05J. ○ If control rods < low – 2 rod insertion limit, notify US to enter TS 3.1.6, Control Bank Insertion Limits.
	BOP	<ul style="list-style-type: none"> • Deactivate turbine runback: <ul style="list-style-type: none"> ○ Pull out runback pushbutton at 1PM02J. ○ Depress STOP HD RUNBACK softkey at Operator Work Station graphic 5512 at 1PM02J or Operator Work Station drop 210 (DEH computer terminal located behind Unit 1 desk).
	RO	<ul style="list-style-type: none"> • Check C7 Bypass-Permissive at 1PM05J - NOT LIT. <ul style="list-style-type: none"> ○ If C7 is lit, verify all steam dump valves closed and place steam dump mode selector C/S to RESET at 1PM03J. ○ Continue RCS boration at 1PM05J.
	BOP	<ul style="list-style-type: none"> • Verify running equipment in auto at 1PM03J and 1PM04J: <ul style="list-style-type: none"> • Turbine driven FW pump speed controllers. • 1CD210A & B, CP bypass valves. • 1CD152, CD pumps recirc valve. • CD157A & B, GS condenser bypass valves. • 1HD046A & B, HD pump discharge valves. • 1CB113A & B, CB pump recirc valves. • Dispatch operators to perform BwOP CD/CB-2 for 1D CD/CB pump. • Verify DEHC in auto and feedback loops in service at 1PM02J or Operator Work Station drop 210 (DEH computer terminal located behind Unit 1 desk)..

Comments: _____

Scenario No:	NRC 07-1	Event No:	5
Event Description: 1D CD/CB pump trip.			
Time	Position	Applicant's Actions or Behavior	
	US	<ul style="list-style-type: none"> • Notify chemistry to monitor secondary plant chemistry. • Check reactor power change > 15% in one hour. <ul style="list-style-type: none"> ○ Notify chemistry to perform TS 3.4.16 sampling. ○ Notify rad protection to perform RETS 12.4.1.A sampling. ○ Refer to BwOP FW-26 to evaluate FW venturi fouling. • Notify Shift Manager to perform risk assessment, initiate IR, evaluate for reactivity screening, notify QNE, make personnel notifications, and evaluate for restoration of full power operation. <ul style="list-style-type: none"> ○ Determine TS 3.1.6, condition A entry required if control rods below low – 2 rod insertion limit. • Contact Power Team and inform Power Team of load reduction and estimated duration of power derate. 	
		EVALUATOR NOTE: After the actions for CD/CB pump trip are complete and with lead examiners concurrence, enter next event.	

Comments: _____

Scenario No:	NRC 07-1	Event No:	6, & 7
Event	1B Steam Generator Tube Rupture, loss of Instrument Air to Containment		
Description:			
Time	Position	Applicant's Actions or Behavior	
	CUE	<ul style="list-style-type: none"> ○ Annunciator CHARGING LINE FLOW HIGH LOW (1-9-D3). ● RM-11 Rad Monitor ALERT/Hi RAD Alarms. <ul style="list-style-type: none"> ○ 1PR08J SG Blowdown. ○ 1PR27J SJAE/GS. ○ 1AR 22/23B & 1AR22/23C, 1B & 1C main steam line. ● PZR pressure lowering in an uncontrolled manner. ● Inability to maintain > 17% PZR level. ○ Level rise/FW flow drop noted on 1B S/G. 	
	CREW	Identify entry conditions for 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION.	
	RO	<ul style="list-style-type: none"> ● Initiate a manual reactor trip. ● Initiate a manual SI. 	
	US	<ul style="list-style-type: none"> ● Notify SM of plant status and procedure entry. ● Request evaluation of Emergency Plan conditions. ● Enter/Implement 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION, and direct operator actions of 1BwEP-0 to establish the following conditions: 	
	RO	Perform immediate operator actions of 1BwEP-0 at 1PM05J: <ul style="list-style-type: none"> ● Verify reactor trip. <ul style="list-style-type: none"> ● Rod bottom lights - ALL LIT. ● Reactor trip & Bypass breakers – OPEN. ● Neutron flux – DROPPING. 	
	BOP	Perform immediate operator actions of 1BwEP-0 at 1PM02J or Operator Work Station drop 210 (DEH computer terminal located behind Unit 1 desk): <ul style="list-style-type: none"> ● Verify Turbine Trip. <ul style="list-style-type: none"> ● All Turbine throttle valves – CLOSED. ● All Turbine governor valves – CLOSED. 	
	BOP	Perform immediate operator actions of 1BwEP-0 at 1PM01J: <ul style="list-style-type: none"> ● Verify power to 4KV busses. <ul style="list-style-type: none"> ● ESF Buses – BOTH ENERGIZED (141 & 142). 	

Comments: _____

Scenario No:	NRC 07-1	Event No:	6, & 7
Event Description:	1B Steam Generator Tube Rupture, loss of Instrument Air to Containment		
Time	Position	Applicant's Actions or Behavior	
	CREW	<ul style="list-style-type: none"> • Perform immediate operator actions of 1BwEP-0 at 1PM04J, 1PM05J, & 1PM06J: <ul style="list-style-type: none"> • Check SI actuated at 1PM05J and 1PM06J: <ul style="list-style-type: none"> • Annunciator 1-11-C1, PZR PRESS LO SI/RX TRIP – LIT. • STEAMLINE LOW PRESS SI/RX TRIP – LIT. • SI ACTUATED Bypass Permissive – LIT. • SI equipment automatically actuated: <ul style="list-style-type: none"> • 1A or 1B SI pump – NOT RUNNING. • 1SI8801A or B, CV pump cold leg injection valve – CLOSED. • Check if SI required: <ul style="list-style-type: none"> • PZR pressure cannot be maintained > 1829 psig. • Steamline pressure < 640 psig. • Containment pressure > 3.4 psig. • PZR level cannot be maintained > 4%. • Manually actuate SI. 	
	BOP	<ul style="list-style-type: none"> • Verify FW isolated at 1PM04J: <ul style="list-style-type: none"> • FW pumps – TRIPPED. • Isolation monitor lights – LIT. • FW pumps discharge valves - CLOSED (or going closed) 1FW002A-C. 	
	RO/ BOP	<ul style="list-style-type: none"> • Verify ECCS pumps running at 1PM05J/1PM06J: <ul style="list-style-type: none"> • Both CV pumps - RUNNING. • Both RH pumps – RUNNING. • Both SI pumps – RUNNING. 	
	RO/ BOP	<ul style="list-style-type: none"> • Verify RCFCs running in Accident Mode at 1PM06J: <ul style="list-style-type: none"> • Group 2 RCFC Accident Mode lights – ALL LIT. 	
	RO/ BOP	<ul style="list-style-type: none"> • Verify Phase A isolation at 1PM06J: <ul style="list-style-type: none"> • Group 3 Cnmt Isol monitor lights – ALL LIT. 	
	RO/ BOP	<ul style="list-style-type: none"> • Verify Cnmt Vent isolation at 1PM06J: <ul style="list-style-type: none"> • Group 6 Cnmt Vent Isol monitor lights – ALL LIT. 	

Comments: _____

Scenario No:	NRC 07-1	Event No.	6, & 7
Event Description:	1B Steam Generator Tube Rupture, loss of Instrument Air to Containment		
Time	Position	Applicant's Actions or Behavior	
	BOP	<ul style="list-style-type: none"> • Verify AF system at 1PM06J: <ul style="list-style-type: none"> • AF pumps – BOTH RUNNING. • AF isolation valves – OPEN: <ul style="list-style-type: none"> • 1AF13A-H • AF flow control valves – THROTTLED: <ul style="list-style-type: none"> • 1AF005A-H 	
	RO/ BOP	<ul style="list-style-type: none"> • Verify CC pumps at 1PM06J: <ul style="list-style-type: none"> • CC pumps – BOTH RUNNING. 	
	RO/ BOP	<ul style="list-style-type: none"> • Verify SX pumps at 1PM06J: <ul style="list-style-type: none"> • SX pumps – BOTH RUNNING. 	
	RO/ BOP	<ul style="list-style-type: none"> • Check if Main Steamline Isolation required at 1PM04J and 1PM06J: <ul style="list-style-type: none"> • SG pressures – ALL < 640 psig. • CNTM pressure - < 8.2 psig. 	
	RO/ BOP	<ul style="list-style-type: none"> • Check if CS is required at 1PM06J: <ul style="list-style-type: none"> • CNMT pressure remained < 20 psig. 	
	BOP/ RO	<ul style="list-style-type: none"> • Verify Total AF flow at 1PM04J and 1PM06J: <ul style="list-style-type: none"> • AF flow > 500 gpm. • SG levels maintained between 10% and 50%. • Check status of S/G NR levels. <ul style="list-style-type: none"> ○ 1B S/G level rising in an uncontrolled manner. <ul style="list-style-type: none"> • Close 1AF013B & F. 	
	RO/ BOP	<ul style="list-style-type: none"> • Verify ECCS valve alignment at 1PM06J: <ul style="list-style-type: none"> • Group 2 Cold Leg Injection monitor lights required for injection – LIT. • Verify ECCS flow at 1PM05J: <ul style="list-style-type: none"> • High Head SI flow >100 gpm (1FI-917). <ul style="list-style-type: none"> ○ RCS pressure < 1700 psig. ○ SI pump discharge flow > 200 gpm. 	

Comments: _____

Scenario No:	NRC 07-1	Event No:	6, & 7
Event Description: 1B Steam Generator Tube Rupture, loss of Instrument Air to Containment			
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> • Check at least ONE PZR PORV relief path available at 1PM05J: <ul style="list-style-type: none"> • PORV isolation valves: <ul style="list-style-type: none"> • 1RY8000A – ENERGIZED • 1RY8000B - DEENERGIZED • PORV relief paths: <ul style="list-style-type: none"> • 1RY455A – C/S in AUTO • 1RY456 – partially open • 1RY800A – OPEN • 1RY8000B - CLOSED 	
	BOP	<ul style="list-style-type: none"> • Verify Generator Trip at 1PM02J: <ul style="list-style-type: none"> • OCB 1-8 and 7-8 open. • PMG output breaker open. 	
	BOP	<ul style="list-style-type: none"> • Verify DGs running at 1PM01J: <ul style="list-style-type: none"> • Both DGs - RUNNING. • 1SX169A/B – BOTH OPEN. • Dispatch operator locally to check operation. 	

Comments: _____

Scenario No:	NRC 07-1	Event No:	6, & 7
Event Description:	1B Steam Generator Tube Rupture, loss of Instrument Air to Containment		
Time	Position	Applicant's Actions or Behavior	
		EVALUATOR NOTE: The US and RO will likely continue in 1BwEP-0 while BOP is performing the next 3 ventilation steps:	
	BOP	<ul style="list-style-type: none"> • Verify Control Room ventilation aligned for emergency operations at 0PM02J: <ul style="list-style-type: none"> • VC Rad Monitors – LESS THAN HIGH ALARM SETPOINT. • Operating VC train equipment – RUNNING. <ul style="list-style-type: none"> • 0B Supply fan • 0B Return fan • 0B M/U fan • 0B Chilled water pump • 0B Chiller • Operating VC train dampers – ALIGNED: <ul style="list-style-type: none"> • M/U fan outlet damper – 0VC08Y NOT FULLY CLOSED • 0B VC train M/U filter light – LIT • 0VC09Y OPEN • 0VC313Y CLOSED • Operating VC train Charcoal Absorber aligned for train B: <ul style="list-style-type: none"> • 0VC44Y CLOSED • 0VC05Y OPEN • 0VC06Y OPEN • Control Room pressure greater than +0.125 inches water on 0PDI-VC038. 	
	BOP	<ul style="list-style-type: none"> • Verify Auxiliary Building ventilation aligned at 0PM02J: <ul style="list-style-type: none"> • Two inaccessible filter plenums aligned. <ul style="list-style-type: none"> • Plenum A: <ul style="list-style-type: none"> • 0VA03CB – RUNNING • 0VA023Y – OPEN • 0VA436Y – CLOSED • Plenum C: <ul style="list-style-type: none"> • 0VA03CF - RUNNING • 0VA072Y – OPEN • Damper 0VA438Y – CLOSED 	
	BOP	<ul style="list-style-type: none"> • Verify FHB ventilation aligned at 0PM02J: <ul style="list-style-type: none"> • 0VA04CB – RUNNING • 0VA055Y – OPEN • 0VA062Y – OPEN • 0VA435Y – CLOSED 	

Comments: _____

Scenario No:	NRC 07-1	Event No:	6, & 7
Event Description:	1B Steam Generator Tube Rupture, loss of Instrument Air to Containment		
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> • Check PZR sprays & PORVs at 1PM05J: <ul style="list-style-type: none"> • BOTH PZR spray valves – CLOSED • PZR PORVs: <ul style="list-style-type: none"> • 1RY455A – CLOSED • 1RY456 – partially open, 1RY8000B – CLOSED 	
	RO	<ul style="list-style-type: none"> • Maintain RCS temperature control at 1PM05J: <ul style="list-style-type: none"> • RCPs – ALL RUNNING: <ul style="list-style-type: none"> • Verify RCS average temperature stable at or trending to 557°F. <ul style="list-style-type: none"> ○ Throttle AF flow. 	
	RO	<ul style="list-style-type: none"> • Check status of RCPs at 1PM05J <ul style="list-style-type: none"> • All RCPs – RUNNING. • Check RCP trip criteria: <ul style="list-style-type: none"> • Phase B isolation NOT actuated. • RCS pressure > 1425 psig – continue on in 1BwEP-0. 	
	BOP/ RO	<ul style="list-style-type: none"> • Check if SG secondary pressure boundaries are intact at 1PM04J: <ul style="list-style-type: none"> • Check pressure in all SGs: <ul style="list-style-type: none"> • None dropping in an uncontrolled manner. • None completely depressurized. 	
	CREW	<ul style="list-style-type: none"> • Determine 1B S/G tubes are NOT intact: <ul style="list-style-type: none"> • RM-11 ALERT/HI RAD Alarms: <ul style="list-style-type: none"> ○ 1PR08J SG Blowdown ○ 1PR27J SJAEGS ○ 1AR 22/23B 1B Main Steam Line 	
	CREW	Transition to 1BwEP-3, STEAM GENERATOR TUBE RUPTURE.	
	US	<ul style="list-style-type: none"> • Notify SM of plant status and procedure entry. • Request evaluation of Emergency Plan conditions. • Request STA evaluation of status trees. • Enter/Implement 1BwEP-3, STEAM GENERATOR TUBE RUPTURE, and direct operator actions of 1BwEP-3 to establish the following conditions: 	

Comments: _____

Scenario No: NRC 07-1		Event No: 6, & 7
Event Description: 1B Steam Generator Tube Rupture, loss of Instrument Air to Containment		
Time	Position	Applicant's Actions or Behavior
	BOP/RO	<ul style="list-style-type: none"> • Check status of RCPs at 1PM05J: <ul style="list-style-type: none"> • All RCPs – RUNNING. • Check RCP trip criteria at 1PM05J: <ul style="list-style-type: none"> • High head ECCS flow > 100 gpm • RCS pressure > 1425 psig – continue on in 1BwEP-3.
	BOP/RO [CT] E-3--A	<ul style="list-style-type: none"> • Identify ruptured SG 1A: <ul style="list-style-type: none"> ○ 1B Main steam line rad monitor ABNORMAL for plant conditions. • Isolate ruptured SG at 1PM04J & 1PM06J: <ul style="list-style-type: none"> • Verify 1MS018B in AUTO ○ Check 1MS018B CLOSED <ul style="list-style-type: none"> ○ Verify closed when SG pressure < 1115 psig. ○ Notify SM to dispatch Environmental Monitoring Teams. ○ Announce condition on plant page. • Verify 1SD002A & B CLOSED. • Place 1MS001B, Loop 1B MSIV, C/S to CLOSE. • Verify 1MS101B, 1B MSIV Bypass Valves - CLOSED. • Check PORVs on 1A, 1C, & 1D SGs available for RCS cool down.
	BOP/RO	<ul style="list-style-type: none"> • Perform the following at 1PM04J: <ul style="list-style-type: none"> • Check 1B SG level - Narrow Range > 10%. • Check 1B SG pressure > 320 psig.

Comments: _____

Scenario No: **NRC 07-1** Event No: **6, & 7**

Event Description: **1B Steam Generator Tube Rupture, loss of Instrument Air to Containment**

Time	Position	Applicant's Actions or Behavior
	CREW [CT] E-3--B	<ul style="list-style-type: none"> • Initiate RCS cooldown: <ul style="list-style-type: none"> • Determine required core exit temperature: <ul style="list-style-type: none"> • Lowest 1B SG pressure at 1PM04J. • Average of 10 highest CETC's at 1PM05J. • Check P-11 status at 1PM05J: <ul style="list-style-type: none"> • RCS pressure < 1930 psig: <ul style="list-style-type: none"> • Verify P-11 Bypass Permissive light – LIT. • Place BOTH Steam Line SI Reset/Block C/S to BLOCK. • RCS pressure > 1930: <ul style="list-style-type: none"> • Continue RCS cooldown and block steamline SI in accordance with above steps when RCS pressure < 1930 psig. • Dump steam to condenser at maximum rate: <ul style="list-style-type: none"> • Check C-9 Bypass Permissive – NOT LIT at 1PM05J. • Check 1A, 1C, & 1D MSIVs – OPEN at 1PM06J. • Perform the following at 1PM04J: <ul style="list-style-type: none"> • Place 1PK-507, MS Header Pressure Controller, in MANUAL. • Lower 1PK-507, MS Header Pressure Controller, demand to 0%. • Place Steam Dump Mode Selector C/S to STM PRESS. • Raise demand on 1PK-507, MS Header Pressure Controller, to initiate RCS cooldown. • When P-12 permissive is LIT, bypass P-12 interlock to continue cool down by placing steam dump switches to BYP-INTLK. • Check average of 10 highest CETC's: <ul style="list-style-type: none"> ○ CETC < required temperature determined in step 6a - stop RCS cooldown by lowering demand on MS Header Pressure Controller and throttling AF flow. ○ CETC > required temperature determined in step 6a – continue with 1BwEP-3 steps 7-13 and stop RCS cooldown when CETC < required temperature. • Check 1A, 1C, & 1D SG levels at 1PM04J: <ul style="list-style-type: none"> • Control SG levels between 30% - 50%. • Check narrow range levels not increasing in an uncontrolled manner.

Comments: _____

Scenario No:	NRC 07-1	Event No:	6, & 7
Event Description:	1B Steam Generator Tube Rupture, loss of Instrument Air to Containment		
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> • Check PZR PORVs and isolation valves at 1PM05J: <ul style="list-style-type: none"> • PORV isolation valves: <ul style="list-style-type: none"> • 1RY8000A - ENERGIZED • 1RY8000B - DEENERGIZED • PORVs: <ul style="list-style-type: none"> • 1RY455A – CLOSED • 1RY456 – partially open • 1RY800B – CLOSED • 1RY8000A – OPEN 	
	BOP/RO	<ul style="list-style-type: none"> • Reset SI at 1PM06J: <ul style="list-style-type: none"> • Depress both SI reset pushbuttons. • Verify SI actuated permissive light – NOT LIT. • Verify auto SI blocked permissive light – LIT. • Reset CNMT isolations at 1PM06J: <ul style="list-style-type: none"> • Reset phase A isolation. • Check Station Air Compressors – one running. • Open 1IA065, Instrument Air Outside Isolation Valve. • 1IA066, Instrument Air Inside Isolation Valve, will NOT open. • Verify all AC buses energized at 1PM01J: <ul style="list-style-type: none"> • All 4 KV ESF buses energized. • All 4KV non-ESF buses energized. • All 6.9 KV buses energized. • Check if RH pumps should be stopped at 1PM06J: <ul style="list-style-type: none"> • 1SI8812A & B open. • RCS pressure > 325 psig and stable. • Stop both RH pumps and place in standby. • Check average of 10 highest CETC's: <ul style="list-style-type: none"> ○ CETC < required temperature determined in step 6a - stop RCS cooldown by lowering demand on MS Header Pressure Controller and throttling AF flow. ○ CETC > required temperature determined in step 6a – continue cooldown and DO NOT proceed further in with 1BwEP-3 until CETC < required temperature. • Maintain CETC < required temperature. • Check 1B SG pressure at 1PM04J – stable or rising. • Check RCS subcooling acceptable per Figure 1BwEP 3-2. 	

Comments: _____

Scenario No:	NRC 07-1	Event No:	6, & 7
Event Description: 1B Steam Generator Tube Rupture, loss of Instrument Air to Containment			
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> • Attempt to depressurize RCS: <ul style="list-style-type: none"> • Determine normal PZR spray at 1PM05J – NOT available (1IA066 will not open) • Check PZR PORVs at 1PM05J: <ul style="list-style-type: none"> • 1RY455A is available. • Attempt to open 1RY455A. • Determine 1RY455A will not open. 	
	CREW	Transition to 1BwCA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL.	
	US	<ul style="list-style-type: none"> • Notify SM of plant status and procedure entry. • Request evaluation of Emergency Plan conditions. • Enter/Implement 1BwCA-3.3 and direct operator actions of 1BwCA-3.3 to establish the following conditions: 	
		EVALUATOR NOTE: If 1B SG level is > 88% in the next step, the crew will proceed to 1BwCA-3.3, step 7. 1BwCA-3.3 step 7 actions begin on the 4th row of the next page (page 27).	
	BOP	<ul style="list-style-type: none"> • Check 1B SG NR level: <ul style="list-style-type: none"> ○ Greater than 88%, GO TO Step 7 (CHECK IF ECCS FLOW CAN BE TERMINATED). ○ Less than 88% NR, continue with next step. 	
	CREW	<ul style="list-style-type: none"> • Determine normal PZR spray unavailable until IA can be restored to CNMT. 	
	CREW	<ul style="list-style-type: none"> ○ Attempt to restore PZR PORV: <ul style="list-style-type: none"> ○ Dispatch Equipment Operator to MCC breaker for 1RY8000B. ○ Attempt to restore power and open 1RY8000B. 	
	CREW	<ul style="list-style-type: none"> • Try to establish aux spray: <ul style="list-style-type: none"> ○ Verify at least one SI and one CV pump running. ○ Terminate Hi Head ECCS: <ul style="list-style-type: none"> ○ Reset SI recirc sump isol valves/CV pump miniflow valves. ○ Verify CV pump miniflow valves OPEN - 1CV8110, 1CV8111, 1CV8114, & 1CV8116. ○ Close CV pump cold leg injection valves - 1SI8801A & B. ○ Place 1CV182 at 0%. ○ Open 1CV8105 & 1CV8106. • Determine aux spray unavailable without IA to CNMT. 	

Comments: _____

Scenario No:	NRC 07-1	Event No.	6, & 7
Event Description:	1B Steam Generator Tube Rupture, loss of Instrument Air to Containment		
Time	Position	Applicant's Actions or Behavior	
	BOP	<ul style="list-style-type: none"> • Check intact SG levels - Narrow range levels > 10%: <ul style="list-style-type: none"> • Maintain narrow range levels between 23% and 50%. • Check narrow range levels not increasing in an uncontrolled manner. 	
	RO	<ul style="list-style-type: none"> • Check PZR level: <ul style="list-style-type: none"> ○ Less than 12%, return to step 1 of 1BwCA-3.3 (Terminate scenario). ○ Greater than 12%, continue to next procedure step. 	
		EVALUATOR NOTE: 1BwCA-3.3, step 7 actions are contained in the row below.	
	CREW	<ul style="list-style-type: none"> ○ Check if ECCS flow can be terminated: (Step 7) <ul style="list-style-type: none"> • Subcooling - acceptable per Iconics or Attachment A and Fig 1BwCA-3.3-1. • Secondary heat sink established. • RVLIS Plenum 15% or greater. • Ruptured SG 1B rising in an uncontrolled manner or off scale high. 	
	BOP	<ul style="list-style-type: none"> • Stop BOTH SI pumps. • Stop 1 CV pump. 	
	CREW [CT] CA-3.3 --A	<ul style="list-style-type: none"> • Terminate high head ECCS: <ul style="list-style-type: none"> • CV pump suction aligned to RWST - 1CV112D & E open. • Reset SI recirc sump isol valves/CV pump miniflow valves. • Verify CV pump miniflow valves OPEN - 1CV8110, 1CV8111, 1CV8114, & 1CV8116. • Close CV pump cold leg injection valves - 1SI8801A & B. 	
	CREW	<ul style="list-style-type: none"> • Establish charging flow: <ul style="list-style-type: none"> • Place 1CV182 at 0%. • Open 1CV8105 & 1CV8106. • Throttle 1CV121 & 1CV182 to maintain RCS inventory and RCP seal injection. 	
		EVALUATOR NOTE: At this point the scenario is terminated.	
	US	<ul style="list-style-type: none"> • US to determine EAL at conclusion of scenario: <ul style="list-style-type: none"> • Alert FA1 <ul style="list-style-type: none"> • Loss of RCS. <ul style="list-style-type: none"> • Steam Generator Tube Rupture that results in entry to BwEP-3. 	

Comments: _____

Simulation Facility Braidwood

Scenario Operating Test No.: 20070301

No.:

NRC 07-2

Examiners: _____

Applicant: _____ SRO

_____ RO

_____ BOP

Initial Conditions: IC-16

Turnover: Unit 1 is operating at 53% power, steady state, equilibrium xenon, Boron concentration is 676.0 ppm. Online risk is yellow. Following completion of turnover, the crew is to perform 1BwOS FW-M2, TURBINE DRIVEN MAIN FEEDWATER PUMP OIL RESERVOIR HI/LO LEVEL ALARM SURVEILLANCE. Power Team has requested Unit 1 prepare to raise power 200 MW at 0.6 MW/min due to grid demand.

Event No.	Malf. No.	Event Type*	Event Description
Preload	IOR ZDI1RH01PB PTL IMF TC03 IMF MS01A 100 IMF MS01B 100 IMF MS01C 100 IMF MS01D 100 IMF SI01B		1B RH Pump OOS Turbine auto trip failure MSIVs fail to close 1B SI pump fails to start
1	None	N-BOP, US	1BwOS FW-M2
2	None	R-RO, US	Raise power 200 MW @ 0.6 MW/minute
3	IMF RX13A 100 10	I-RO, US	PZR level channel 1LT-459 fails high (Tech Spec)
4	IMF RX10A 0 30	I-RO, US	Turbine impulse pressure channel 1PT-505 fails low (Tech Spec)
5	IMF ED11A	C-ALL	Loss of instrument bus 111 (Tech Spec)
6	IMF NI09C 120 5	C-ALL	Spiking PR channel/reactor trip
7	Preload	C-BOP	Turbine auto trip failure
8	IMF TH01 0.5 30	M-ALL	PZR vapor space LOCA
9	Preload	C-RO, US	1B SI pump fails to start
10	IMF SW01B	C-BOP, US	1B SX pump trip

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

SCENARIO OVERVIEW

Unit 1 is operating at 53% power, steady state, equilibrium xenon, Boron concentration is 676.0 ppm. Online risk is yellow. Following completion of turnover, the crew is to perform 1BwOS FW-M2, TURBINE DRIVEN MAIN FEEDWATER PUMP OIL RESERVOIR HI/LO LEVEL ALARM SURVEILLANCE. Power Team has requested Unit 1 prepare to raise power 200 MW at 0.6 MW/min due to grid demand.

After completing shift turnover and relief, the crew will perform 1BwOS FW-M2, TURBINE DRIVEN MAIN FEEDWATER PUMP OIL RESERVOIR HI/LO LEVEL ALARM SURVEILLANCE.

After completing 1BwOS FW-M2, Power Team will request Unit raise power 200 MW at 0.6 MW/min due to grid demand. The crew will commence a power ascension at 0.6 mw/min.

After a measurable change in power, PZR level channel 1LT-459 will fail high. 1CV121, charging header flow control valve, will lower charging flow and pressurizer level will lower. The RO will take manual control of PZR level and stabilize PZR level. 1BWOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment C, will be implemented. The RO will restore PZR level control to automatic after PZR level is restored to normal and an operable PZR level control channel is selected. Technical specifications 3.3.1 conditions A and K apply.

After the 1LT-459 failure is addressed, turbine impulse pressure channel 1PT-505 will fail low. Control rods will begin automatically inserting. After recognizing the instrument failure and checking turbine power stable, the RO will place rod control in manual to stop the inward rod motion. 1BWOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment A, will be implemented. The crew will defeat the failed instrument and the RO will restore Tave – Tref deviation. Technical specification 3.3.1, conditions A and P apply.

After the 1PT-505 failure is addressed, a loss of instrument bus 111 will occur. The crew will enter 1BWOA ELEC-2, LOSS OF INSTRUMENT BUS, and determine that instrument bus 111 is damaged and cannot be energized from the CVT.

Three minutes after instrument bus 111 deenergizes, PR channel N-43 will momentarily spike high, causing an automatic reactor trip. The crew will implement 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION. When the reactor trips, the turbine will not automatically trip. The crew will manually trip the turbine. The MSIVs will not close. The resultant rapid RCS cooldown will cause a weld break on the PZR causing a PZR vapor space LOCA. The 1B SX pump will trip when the reactor trips. When SI actuates, the 1B SI pump will not start. The crew will manually start the 1A SI pump and 1A SX pump. 1A Train ECCS components will be manually aligned due to the loss of instrument bus 111. The crew will transition to 1BwEP-1, LOSS OF REACTOR OR SECONDARY COOLANT, based on primary plant conditions.

The scenario is complete when the crew has determined RCS subcooling in 1BwEP-1.

Critical Tasks

1. Manually trip the main turbine prior to completion of step 2 of 1BwEP-0.
(ERG Critical Task number - E-0--Q) (K/A number - 045000A4.01 importance – 3.1/2.9)
2. Manually start 1B SI pump prior to completion step 6 of 1BwEP-0.
(ERG Critical Task number - E-0--D) (K/A number - 013000A4.01 importance – 4.5/4.8)
3. Manually start 1A SX Pump prior to completion of step 12 of 1BwEP-0.
(ERG Critical Task number - E-0--L) (K/A number - 008000A4.01 importance – 2.9/2.9)

SIMULATOR SETUP GUIDE:

Verify/perform TQ-BR-201-0113, BRAIDWOOD TRAINING DEPARTMENT SIMULATOR EXAMINATION SECURITY ACTIONS CHECKLIST.

- Establish the conditions of IC 16, 52% power, steady state, equilibrium xenon.
- Complete items on Simulator Ready for Training Checklist.
- Verify/remove any Equipment Status Tags and Danger Tags not applicable to the scenario.
- Place simulator in RUN and allow simulator to run during board walk down and turnover.
- Start 1B SX pump and secure 1A SX pump.
- Run **caep DEMO NRC 07-2 SETUP** from disk and verify the following actuate:
 - **IMF TC03**
 - **IMF MS01A 100**
 - **IMF MS01B 100**
 - **IMF MS01C 100**
 - **IMF MS01D 100**
 - **IMF SI01B**
- Set ΔI Target Curve slopes to 0.02 (+2.0%)
- Verify SER and printer are clear of data.
- Provide students with turnover sheets, 1BwOS NR-1, critical parameter sheet, Op Aids, Load Swing Instruction Sheet, Pre-Job Brief Forms, and copy of 1BwOS FW-M2.

Event 1: Perform 1BwOS FW-M2.

If dispatched as Equipment Operator to observe FW pumps during surveillance performance, report all system parameters are normal throughout the surveillance.

Acknowledge as Shift Manager commencement and completion of procedure.

Event 2: Raise power 200 MW at 0.6 MW/min

As Power Team, contact the MCR by phone and request Unit 1 raise power to 200 MW at 0.6 MW/min due to grid demand.

Acknowledge as chemistry/rad protection requests for RCS samples (if required).

Acknowledge as Power Team initiation of ramp.

Events 3: PZR level channel 1LT-459 fails high.

Insert **IMF RX13A 100 10** to fail 1LT-459 high over a 10 second period.

If lead examiner desires the bistables tripped, participate in brief and perform the following:

- As extra NSO contact Unit 1 (X-2209)
- Insert the following:
 - **MRF RP20 OPEN** (open protection cabinet #1 door)
 - **MRF RX029 TRIP** (trip PZR hi water level Rx trip bistable LB459A)
 - **MRF RP20 CLOSE** (close protection cabinet #1 door)

Acknowledge as Shift Manager the failure, LCOAR entry, on line risk assessment, EAL evaluation, request for maintenance support, and IR request.

Event 4: Turbine impulse pressure channel 1PT-505 fails low

Insert **IMF RX10A 0 30** to fail 1PT-505 low over a 30 second period.

If lead examiner desires the bistables tripped, participate in brief and perform the following:

- As extra NSO contact Unit 1 (X-2209)
- Insert the following:
 - **MRF RP20 OPEN** (open protection cabinet #1 door)
 - **MRF RX143 TRIP** (trip turbine power P-13 bistable PB505A)
 - **MRF RP20 CLOSE** (close protection cabinet #1 door)

If lead examiner desires the AMS bistables tripped, participate in brief and perform the following:

- As extra NSO contact Unit 1 (X-2209)
- Report operating bypass switch (SW-12) is in OFF.
- Insert the following:
 - **PN0470 ON** (place operating bypass switch in TIP 1 position) (On annunciator tab of Action List)
 - **MRF RX149 TRIP** (place operating bypass input switch to test-trip)

Acknowledge as Shift Manager the failure, LCOAR entry, on line risk assessment, EAL evaluation, request for maintenance support, and IR request.

Event 5, 6, & 7: Loss of instrument bus 111/Spiking PR channel/reactor trip/turbine auto trip failure

Run **caep DEMO NRC 07-2 EVENT 5 6 8 & 10** from disk and verify the following actuate:

- **IMF ED11A**
- **IMF NI09C (0 180) 120 10**
- **TRGSET 1 "ZLO52BRKA(2)" = = 1**
- **DMF NI09C (1 0)**
- **IMF SW01B (1 0)**
- **IMF TH01 (1 0) 0.5 30**

When dispatched as Equipment Operator/NSO to instrument bus 111, wait one minute and report instrument bus 111 has faint acrid smell coming from bus panel, there are burn marks on bus panel door but no active fire exists.

When dispatched as Equipment Operator to instrument inverter 111, wait two minutes and report inverter 111 output breaker is tripped open. Inverter 111 otherwise appears normal.

Acknowledge as Shift Manager the failure, LCOAR entry, on line risk assessment, EAL evaluation, request for maintenance support, and IR request.

Events 8, 9, &10: PZR vapor space LOCA/1B SI pump fails to start

Acknowledge as Shift Manager procedure changes, Emergency Plan evaluations, STA request, and requests for support personnel.

After STA requested, as STA report CSF status: yellow on core cooling if RCS subcooling is unacceptable, yellow on inventory when PZR level > 92%

If dispatched as Equipment Operator to throttle/close 1AF005A-D, perform the following

- Modify malfunction **FW45A** (severity as directed by MCR request)
- Modify malfunction **FW45B** (severity as directed by MCR request)
- Modify malfunction **FW45C** (severity as directed by MCR request)
- Modify malfunction **FW45D** (severity as directed by MCR request)

If dispatched as Equipment Operator to 1B SI pump and/or breaker, report no abnormal indications present at pump and/or breaker.

If dispatched as Equipment Operator to 1B SX pump, report no abnormal indications present at pump.

If dispatched as Equipment Operator to 1B SX pump breaker, report phase C overcurrent flag present.

If dispatched as Equipment Operator to 1B SX pump, report no abnormal indications present at pump.

As Equipment Operator, acknowledge request to fill 1B AF pump day tank.

Scenario No:	NRC 07-2	Event No:	1
Event Description:	Perform 1BwOS FW-M2.		
Time	Position	Applicant's Actions or Behavior	
	CUE	<ul style="list-style-type: none"> ○ From turnover, perform 1BwOS FW-M2, TURBINE DRIVEN MAIN FEEDWATER PUMP OIL RESERVOIR HI/LO LEVEL ALARM SURVEILLANCE. 	
	US	<ul style="list-style-type: none"> ● Direct BOP to perform 1BwOS FW-M2. 	
	BOP	<ul style="list-style-type: none"> ● Refer to 1BwOS FW-M2. ○ Notify Equipment Operator at FW pumps of commencement of surveillance. ● Perform the following for 1B FW pump at 1PM04J: <ul style="list-style-type: none"> ● Place and hold the Lube Oil Reservoir Level Test C/S in the LOW LEVEL position. ● Verify the LEVEL LOW light above the C/S is LIT. ● Verify annunciator 1-16-D3, FW PUMP TURB BRNG LEVEL HIGH LOW, is LIT. ● Release the Lube Oil Reservoir Level Test C/S. ● Record YES on Data Sheet D-2. ● Place and hold the Lube Oil Reservoir Level Test C/S in the HIGH LEVEL position. ● Verify the LEVEL LOW light above the C/S is NOT LIT. ● Verify annunciator 1-16-D3, FW PUMP TURB BRNG LEVEL HIGH LOW, is NOT LIT. ● Verify the LEVEL HIGH light above the C/S is LIT. ● Verify annunciator 1-16-D3, FW PUMP TURB BRNG LEVEL HIGH LOW, is LIT. ● Release the Lube Oil Reservoir Level Test C/S. ● Verify the LEVEL HIGH light above the C/S is NOT LIT. ● Verify annunciator 1-16-D3, FW PUMP TURB BRNG LEVEL HIGH LOW, is NOT LIT. ● Record YES on Data Sheet D-2. 	

Comments: _____

Scenario No:	NRC 07-2	Event No:	1
Event Description: Perform 1BwOS FW-M2.			
Time	Position	Applicant's Actions or Behavior	
	BOP	<ul style="list-style-type: none"> ● Perform the following for 1C FW pump at 1PM04J: <ul style="list-style-type: none"> ● Place and hold the Lube Oil Reservoir Level Test C/S in the LOW LEVEL position. ● Verify the LEVEL LOW light above the C/S is LIT. ● Verify annunciator 1-16-D3, FW PUMP TURB BRNG LEVEL HIGH LOW, is LIT. ● Release the Lube Oil Reservoir Level Test C/S. ● Record YES on Data Sheet D-2. ● Place and hold the Lube Oil Reservoir Level Test C/S in the HIGH LEVEL position. ● Verify the LEVEL LOW light above the C/S is NOT LIT. ● Verify annunciator 1-16-D3, FW PUMP TURB BRNG LEVEL HIGH LOW, is NOT LIT. ● Verify the LEVEL HIGH light above the C/S is LIT. ● Verify annunciator 1-16-D3, FW PUMP TURB BRNG LEVEL HIGH LOW, is LIT. ● Release the Lube Oil Reservoir Level Test C/S. ● Verify the LEVEL HIGH light above the C/S is NOT LIT. ● Verify annunciator 1-16-D3, FW PUMP TURB BRNG LEVEL HIGH LOW, is NOT LIT. ● Record YES on Data Sheet D-2. ● Inform US 1BwOS FW-M2 is complete. 	
	US	<ul style="list-style-type: none"> ● Acknowledge report. ○ Notify SM 1BwOS FW-M2 is complete. 	
EVALUATOR NOTE: After 1BwOS FW-M2 is complete and with lead examiners concurrence, enter next event.			

Comments: _____

Scenario No:	NRC 07-2	Event No.	2
Event Description:	Raise power 200 MW at 0.6 MW/min		
Time	Position	Applicant's Actions or Behavior	
	CUE	<ul style="list-style-type: none"> ○ Call from Power Team to raise power 200 MW at 0.6 Mw/min. 	
	US	<ul style="list-style-type: none"> ● Acknowledge request to raise power to 200 MW at 0.6 Mw/min. ● Implement actions of 1BwGP 100-3. ○ Perform pre-job brief per HU-AA-1211 PRE-JOB, HEIGHTENED LEVEL OF AWARENESS, INFREQUENT PLANT ACTIVITY, AND POST JOB BRIEFINGS for load ramp. 	
	US	<ul style="list-style-type: none"> ● Direct raising load 200MW at 0.6 MW/min. <ul style="list-style-type: none"> ● Initiate 1BwGP 100-4T2, load swing instruction sheet. 	
	CREW	<ul style="list-style-type: none"> ● Review applicable Precautions, and Limitations and Actions. 	
		EVALUATOR NOTE: The following step may be repeated as necessary to dilute the RCS during the power ascension.	
	RO	<ul style="list-style-type: none"> ● Verify rod position and boron concentration. ● Perform dilution boundary calculation per 1BwGP 100-4T2. ● Initiate dilution at 1PM05J, if required, in accordance with BwOP CV-5. ● Determine required PW volume: (approximate band: 1000 gal – 4000 gal). <ul style="list-style-type: none"> ○ Effects of previously performed dilutions. ○ Braidwood Boration Dilution Tables. ● Determine required PW flow rate. ● Set 1FK-111 PW/Total Flow Cont POT to the desired PW flow rate. ● Set 1FY-0111 PW Control Predet Counter to desired PW volume. ● Place MAKE-UP CONT SWITCH to STOP position. ● Set MODE SELECT to DIL/ALT DIL position. ● Place MAKE-UP CONT Switch to START. ○ Verify proper operation of valves and PW makeup pump(1CV111B open, 1CV111A throttled, 1CV110B open (ALT DIL only), PW pump running, PW flow on recorder). ○ Turn on PZR backup heaters. <p>OR</p>	

Comments: _____

Scenario No:	NRC 07-2	Event No.	2
Event Description:	Raise power 200 MW at 0.6 MW/min		
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> Batch addition of PW: <ul style="list-style-type: none"> Open CV110B. Open CV111A. When desired amount of primary water added: <ul style="list-style-type: none"> Close CV111A. Close CV110B. 	
	BOP	<ul style="list-style-type: none"> Raise turbine load at 1PM02J by performing the following: <ul style="list-style-type: none"> Select SETPOINT. Enter 797 MW into the REF DEMAND window. Select ENTER. Enter 0.6 MW/min into the RATE window. Select ENTER. Select EXIT. Notify US and RO of pending ramp. Select GO/HOLD. Verify GO/HOLD button illuminates. Verify HOLD illuminated RED. Select GO. Verify GO illuminates RED. Verify main turbine load begins to rise. 	
	RO/ BOP	<ul style="list-style-type: none"> Monitor reactor power and load increase: <ul style="list-style-type: none"> Monitor NI's, Tave, ΔI, Pzr press/level at 1PM05J. Monitor MWe, Turb loading, EHC at 1PM02J. During dilution: <ul style="list-style-type: none"> Monitor VCT level at 1PM05J. Verify RCS boron concentration lowering. Monitor PW/Total flow predet counter at 1PM05J. Verify dilution auto stops at preset value. At 1PM05J, return Reactor Makeup System to automatic at current boron concentration. 	
EVALUATOR NOTE: After measurable change in power and with lead examiner approval, insert the next event.			

Comments: _____

Scenario No:	NRC 07-2	Event No:	3
Event Description: PZR level channel 1LT-459 fails high.			
Time	Position	Applicant's Actions or Behavior	
	CUE	<ul style="list-style-type: none"> • Annunciator 1-12-A3, PZR LEVEL HIGH RX TRIP STPT ALERT • Annunciator 1-12-C3, PZR LEVEL CONT DEV HIGH HTRS ON • Annunciator 1-9-D3, CHG LINE FLOW HIGH LOW • PZR level and charging flow lowering. 	
	RO	<ul style="list-style-type: none"> • Determine PZR level and/or charging header flow lowering at 1PM05J. • Identify 1LI-459 is failing high. • Report failure to US. • Perform the following at 1PM05J: <ul style="list-style-type: none"> • Place 1LK-459, PZR master level controller, <u>OR</u> 1FK-121, CV pumps flow control valve, in manual. • Raise demand on 1LK-459 <u>OR</u> 1FK-121 sufficiently to raise charging flow and PZR level. • Operate 1LK-459 <u>OR</u> 1FK-121 in manual to restore PZR level to normal operating band and maintain 8-13 gpm RCP seal injection flow. • Reference BwARs 1-12-A3/1-12-C3/1-9-D3. 	
	CREW	<ul style="list-style-type: none"> • Reference BwARs 1-12-A3/1-12-C3/1-9-D3. • Identify entry conditions for 1BWOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL. 	
	US	<ul style="list-style-type: none"> • Notify Shift Manager of plant status and procedure entry. • Request evaluation of Emergency Plan conditions. • Implement 1BWOA INST-2 OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment C, PRESSURIZER LEVEL CHANNEL FAILURE, and direct operator actions of 1BWOA INST-2 to establish the following conditions: <ul style="list-style-type: none"> ○ Direct BOP/RO to stop load ramp/dilution. 	

Comments: _____

Scenario No:	NRC 07-2	Event No:	3
Event Description: PZR level channel 1LT-459 fails high.			
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> • Check PZR level at 1PM05J: <ul style="list-style-type: none"> • PZR level – normal on 1LI-460 & 1LI-461. • Manually restore PZR pressure using 1LK-459 or 1FK-121. • Select operable PZR pressure level control channel: <ul style="list-style-type: none"> • Place PZR level control select C/S to CH 461/460. • Select operable PZR level channel for PZR level recorder at 1PM05J: <ul style="list-style-type: none"> • Verify PZR level channel to recorder select switch in 460. • Check letdown and PZR heaters at 1PM05J: <ul style="list-style-type: none"> • Check PZR level > 17% on 1LI-460 & 1LI0461. • Check letdown flow established: <ul style="list-style-type: none"> ○ Check valve alignment. ○ Letdown flow approximately 120 gpm on 1FI-132. • Check PZR heaters: <ul style="list-style-type: none"> • PZR heaters available in auto. • Check PZR level control in auto at 1PM05J: <ul style="list-style-type: none"> • Verify/place the following components in AUTO: <ul style="list-style-type: none"> • 1LK-459, master PZR level controller. • 1FK-121, CV pumps flow control valve. 	
	BOP	<ul style="list-style-type: none"> • Perform the following: <ul style="list-style-type: none"> • Request operations support for tripping bistables. • Assist US by making notifications. • Refer to BwARs. 	
	US	<ul style="list-style-type: none"> • Perform pre-job brief per HU-AA-1211 for bistable tripping. • Complete 1BwOL 3.3.1, Attachment A, INSTRUMENT CONDITION TRACKING LOG. 	
	Extra NSO/RO	<ul style="list-style-type: none"> • Locally trip bistable for 1LT-459/RO verifies correct bistable operation at 1PM05J: <ul style="list-style-type: none"> • LB459A - C1-751 BS-1 	
	US	<ul style="list-style-type: none"> • Determine TS 3.3.1, conditions A and K are applicable. • Determine TS 3.3.3 and 3.3.4 are NOT applicable – minimum channels operable requirement is met. • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure. 	
		<p>EVALUATOR NOTE: After the actions for the pressurizer level channel failure are complete and with lead examiners concurrence, insert the next event.</p>	

Comments: _____

Scenario No:	NRC 07-2	Event No:	4
Event Description: Turbine impulse pressure channel 1PT-505 fails low.			
Time	Position	Applicant's Actions or Behavior	
	CUE	<ul style="list-style-type: none"> Annunciator 1-14-D1, TAVE CONT DEV HIGH 1PI-505, first stage pressure, indication lowering. Control rod inward motion. 1TR-0412, Auct Tave/Tref recorder, Tref indication lowering. 1SI-412, Rod Speed, indicates 48 - 72 step per minute. 	
	RO/BOP	<ul style="list-style-type: none"> Perform the following at 1PM05J: <ul style="list-style-type: none"> Determine control rods inserting. Identify 1PT-505 is failing low. Report failure to US. Determine turbine power stable at 1PM06J or Operator Work Station drop 210 (DEH computer terminal located behind Unit 1 desk). Place rod bank select switch to manual at 1PM05J to stop uncontrolled rod insertion. 	
	CREW	<ul style="list-style-type: none"> Reference BwARs 1-14-D1. Identify entry conditions for 1BWOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL. 	
	US	<ul style="list-style-type: none"> Notify SM of plant status and procedure entry. Request evaluation of Emergency Plan conditions. Implement 1BWOA INST-2 OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment D, TURBINE IMPULSE PRESSURE CHANNEL FAILURE, and direct operator actions of 1BWOA INST -2 to establish the following conditions: <ul style="list-style-type: none"> Direct BOP/RO to stop load ramp/dilution. 	
	RO/BOP	<ul style="list-style-type: none"> Restore steam dumps: <ul style="list-style-type: none"> Check C-7 bypass permissive NOT LIT at 1PM05J. Perform the following at 1PM02J: <ul style="list-style-type: none"> Place 1PK-507, MS header pressure controller, in manual. Lower 1PK-507 demand to 0%. Place steam dump mode select switch to STM PRESS mode. Place 1PK-507 in auto. Defeat 1PT-505 at 1PM05J: <ul style="list-style-type: none"> Place 1PS505Z, turbine impulse pressure defeat C/S, to DEFEAT 505. 	

Comments: _____

Scenario No:	NRC 07-2	Event No.	4
Event Description:	Turbine impulse pressure channel 1PT-505 fails low.		
Time	Position	Applicant's Actions or Behavior	
	BOP	<ul style="list-style-type: none"> Perform the following: <ul style="list-style-type: none"> Request operations support for tripping bistables. Assist US by making notifications. Refer to BwARs. 	
	US	<ul style="list-style-type: none"> Perform pre-job brief per HU-AA-1211 for bistable tripping. Complete 1BwOL 3.3.1, Attachment A, INSTRUMENT CONDITION TRACKING LOG. 	
	Extra NSO/BOP	<ul style="list-style-type: none"> Locally trip bistable for PT-505/BOP verifies correct bistable operation at 1PM05J. <ul style="list-style-type: none"> PB505A - C1-742 BS-1 	
	RO	<ul style="list-style-type: none"> Check if rod control can be placed in auto: <ul style="list-style-type: none"> Check C-5 bypass permissive NOT LIT at 1PM05J. Check Tave/Tref stable and within 1°F. <ul style="list-style-type: none"> 1TR-412 at 1PM05J HMI display Adjust Tave – Tref within 1°F by manually withdrawing control rods at 1PM05J Place rod bank select switch in AUTO. 	
	Extra NSO	<ul style="list-style-type: none"> Check status of AMS system: <ul style="list-style-type: none"> Operating Bypass switch in OFF locally. 	
	Extra NSO/BOP	<ul style="list-style-type: none"> Locally trip bistables for AMS/BOP verifies correct bistable operation at 1PM05J: <ul style="list-style-type: none"> Place Operating Bypass switch to TIP-1 locally. Place Operating Bypass Input to TEST-TRIP locally. 	
	RO/BOP	<ul style="list-style-type: none"> Check P13 interlock: <ul style="list-style-type: none"> Turbine power > 10% <ul style="list-style-type: none"> Check P-13 bypass permissive NOT LIT at 1PM05J. 	
	US	<ul style="list-style-type: none"> Determine TS 3.3.1 conditions A and P are applicable. Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure and rod control malfunction. 	
		<p>EVALUATOR NOTE: After the actions for the turbine impulse pressure channel failure are complete and with lead examiners concurrence, insert the next event.</p>	

Comments: _____

Scenario **NRC 07-2** Event **5**
 No: No.

Event Description: Loss of instrument bus 111.

Time	Position	Applicant's Actions or Behavior
		EVALUATOR NOTE: The reactor will trip 3 minutes after Instrument Bus 111 deenergizes. The crew may not complete all of the actions listed for 1BWOA ELEC-2. Actions for the reactor trip begin on page 17.
	CUE	<ul style="list-style-type: none"> • Annunciator 1-4-A5, BUS 111 INVERTER TROUBLE • Annunciator 1-4-A3, PROCESS I & C CAB PWR SUP FAILURE • Annunciator 1-4-B3, SOLID STATE PROT CAB GENERAL WARNING • Numerous block 4,10, & 13 annunciators. • PR N41 deenergized.
	RO/ BOP	<ul style="list-style-type: none"> • Determine instrument inverter 111 deenergized. • Reference BWARs.
	CREW	<ul style="list-style-type: none"> • Identify entry conditions for 1BWOA ELEC-2, LOSS OF INSTRUMENT BUS. • Dispatch operators to investigate status of inverter and instrument bus.
	US	<ul style="list-style-type: none"> • Notify SM of plant status and procedure entry. • Request evaluation of Emergency Plan conditions. • Enter/Implement 1BWOA ELEC-2 LOSS OF INSTRUMENT BUS and direct operator actions of 1BWOA ELEC-2 to establish the following conditions: <ul style="list-style-type: none"> ○ Direct BOP/RO to stop load ramp/dilution.
	RO	<ul style="list-style-type: none"> • Check control channels operable at 1PM05J: <ul style="list-style-type: none"> • PZR pressure • PZR level. (1LI-459 previously failed) • T_{Ave} • Delta T
	BOP	<ul style="list-style-type: none"> • Check control channels operable at 1PM05J/1PM04J: <ul style="list-style-type: none"> • P_{IMP}. (1PT-505 previously failed) • SG level • Steam flow • Feed flow

Comments: _____

Scenario **NRC 07-2** Event **5**
 No. _____

Event Description: **Loss of instrument bus 111.**

Time	Position	Applicant's Actions or Behavior
	BOP	<ul style="list-style-type: none"> • Dispatch operator to check instrument bus 111 and inverter 111: <ul style="list-style-type: none"> • Instrument bus 111 is damaged. • Instrument inverter 111 is NOT damaged.
	CREW	<ul style="list-style-type: none"> • Determine Instrument Bus 111 cannot be energized.
	US	<ul style="list-style-type: none"> • Implement 1BWOA ELEC-2, Attachment A, INSTRUMENT BUS 111 ACTIONS.
	BOP	<ul style="list-style-type: none"> • Check 1A RH train at 1PM06J: <ul style="list-style-type: none"> • 1A RH train NOT in shutdown cooling mode.
	US	<ul style="list-style-type: none"> • Refer to 1BWOA ELEC-2, Table A, LOSS OF INSTRUMENT BUS 111 EFFECTS. • Brief crew on loss of instrument bus 111 effects. • Dispatch operators to fail air to 1AF005A-D.

Comments: _____

Scenario No:	NRC 07-2	Event No:	7&8
Event Description: Spiking PR channel causing reactor trip/turbine auto trip failure			
Time	Position	Applicant's Actions or Behavior	
	CUE	<ul style="list-style-type: none"> Annunciator 1-11-C2, PWR RNG HIGH STPT RX TRIP Reactor trip breakers open. 	
	CREW	<ul style="list-style-type: none"> Identify entry conditions for 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION. 	
	US	<ul style="list-style-type: none"> Notify SM of plant status and procedure entry. Request evaluation of Emergency Plan conditions. Enter/Implement 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION, and direct operator actions of 1BwEP-0 to establish the following conditions: 	
	RO	Perform immediate operator actions of 1BwEP-0 at 1PM05J: <ul style="list-style-type: none"> Verify reactor trip. <ul style="list-style-type: none"> Rod bottom lights - ALL LIT. Reactor trip & Bypass breakers – OPEN. Neutron flux – DROPPING. 	
	BOP	Perform immediate operator actions of 1BwEP-0 at 1PM02J or Operator Work Station drop 210 (DEH computer terminal located behind Unit 1 desk): <ul style="list-style-type: none"> Verify Turbine Trip. <ul style="list-style-type: none"> All Turbine throttle valves – OPEN. All Turbine governor valves – OPEN. Manually trip the turbine: <ul style="list-style-type: none"> Depress turbine trip pushbutton at 1PM02J. Select turbine trip at Operator Work Station drop 211 at 1PM02J. Select turbine trip at Operator Work Station drop 210 (DEH computer terminal located behind Unit 1 desk). 	
	BOP	Perform immediate operator actions of 1BwEP-0 at 1PM01J: <ul style="list-style-type: none"> Verify power to 4KV busses. <ul style="list-style-type: none"> ESF Buses – BOTH ENERGIZED (141 & 142). 	

Comments: _____

Scenario No:	NRC 07-2	Event No:	9
Event Description: Auto SI failure			
Time	Position	Applicant's Actions or Behavior	
		EVALUATOR NOTE: Automatic SI may have actuated by the time the crew reaches step 4 of 1BwEP-0. No SI equipment will automatically actuate. The crew must manually actuate SI in order to satisfy the critical task.	
	CREW	Perform immediate operator actions of 1BwEP-0 at 1PM04J, 1PM05J, & 1PM06J: <ul style="list-style-type: none"> • Check SI actuated at 1PM05J and 1PM06J: <ul style="list-style-type: none"> • Annunciator 1-11-C1, PZR PRESS LO SI/RX TRIP – LIT. • STEAMLINE LOW PRESS SI/RX TRIP – LIT. • SI ACTUATED Bypass Permissive – LIT. • SI equipment automatically actuated: <ul style="list-style-type: none"> • 1A or 1B SI pump – NOT RUNNING. • 1SI8801A or B, CV pump cold leg injection valve – OPEN. • Check if SI required: <ul style="list-style-type: none"> • PZR pressure cannot be maintained > 1829 psig. • Steamline pressure < 640 psig. • Containment pressure > 3.4 psig. • PZR level cannot be maintained > 4%. • Manually actuate SI. 	
	BOP	<ul style="list-style-type: none"> ▪ Verify FW isolated at 1PM04J: <ul style="list-style-type: none"> • FW pumps – TRIPPED. • Isolation monitor lights – LIT. • FW pumps discharge valves - CLOSED (or going closed) 1FW002A-C. 	
		EVALUATOR NOTE: RCPs may be tripped when the crew identifies RCP trip criteria per 1BwEP-0 OAS.	
		EVALUATOR NOTE: The examinees may elect to start train A ESF equipment before directed in 1BwEP-0. OP-AA-101-111, ROLES AND RESPONSIBILITIES OF ON SHIFT PERSONNEL, step 4.6.2.5, directs operators to manually initiate safety systems automatic actions when operating parameters exceed the system's automatic initiation setpoints and the initiation does not occur.	

Comments: _____

Scenario No: NRC 07-2		Event No: 8
Event Description: PZR vapor space LOCA		
Time	Position	Applicant's Actions or Behavior
	RO [CT] E-0--L	<ul style="list-style-type: none"> • Verify ECCS pumps running at 1PM05J/1PM06J: <ul style="list-style-type: none"> • BOTH CV pumps – RUNNING. • NEITHER RH pump – RUNNING. <ul style="list-style-type: none"> • Manually start 1A RH pump. • 1B RH pump – OOS. • NEITHER SI pump – NOT RUNNING. <ul style="list-style-type: none"> • Manually start 1A SI pump. • 1B SI pump will not start.
	BOP	<ul style="list-style-type: none"> • Verify RCFCs running in Accident Mode: <ul style="list-style-type: none"> • 1B & 1D RCFC Accident Mode lights – LIT at 1PM06J. • 1A & 1C RCFC Accident Mode lights - NOT LIT at 1PM06J. <ul style="list-style-type: none"> • Stop 1A & 1C high speed RCFCs at 1PM06J. • Close 1SX112A and 1SX114A, CNMT chiller 1A SX inlet & outlet valves at 0PM02J. • Verify/open 1SX147A, CNMT chiller 1A SX bypass valve at 0PM02J. • Verify/open 1SX016A and 1SX027A,, RCFC 1A & 1C SX inlet & outlet isolation valves at 1PM06J. • Start 1A & 1C low speed RCFCs at 1PM06J.
	RO/ BOP	<ul style="list-style-type: none"> • Verify Phase A isolation: <ul style="list-style-type: none"> • Group 3 CNMT isolation monitor lights – NOT ALL LIT at 1PM06J. • Manually actuate CNMT isolation phase A at 1PM05J and/or 1PM06J. • Manually close CNMT isolation phase A valves. <ul style="list-style-type: none"> • 1CV8100 & 1CV8152 at 1PM05J. • 1WO006A, 1WO020A, & 1WO056B at 1PM06J. • 1PR001A & 1PR066 at 1PM11J. • 1PS228A & 1PS228B at 1PM11J. • 1IA065 at 1PM11J.

Comments: _____

Scenario **NRC 07-2** Event **8 & 10**
 No: _____ No. _____

Event Description: **PZR vapor space LOCA/1B SX pump trip**

Time	Position	Applicant's Actions or Behavior
	RO/ BOP	<ul style="list-style-type: none"> • Verify Cnmt Vent isolation: <ul style="list-style-type: none"> • Group 6 Cnmt Vent Isol monitor lights – ALL LIT at 1PM06J. • Verify CC pumps – BOTH RUNNING.
	RO/ BOP	<ul style="list-style-type: none"> • Verify AF system at 1PM06J: <ul style="list-style-type: none"> • 1A AF pump – NOT RUNNING. <ul style="list-style-type: none"> • Manually start 1A AF pump. • 1B AF pump – RUNNING. • AF isolation valves – OPEN. <ul style="list-style-type: none"> • 1AF13A-H • AF flow control valves – THROTTLED <ul style="list-style-type: none"> • 1AF005A-D failed open due to loss of instrument bus 111. <ul style="list-style-type: none"> • Dispatch operator to locally control 1AF005A-D. • 1AF005E-H - throttled
	RO/ BOP	<ul style="list-style-type: none"> • Verify CC pumps at 1PM06J: <ul style="list-style-type: none"> • CC pumps – BOTH RUNNING.
	RO/ BOP [CT] E-0--L	<ul style="list-style-type: none"> • Verify SX pumps at 1PM06J: <ul style="list-style-type: none"> • NEITHER SX pump – RUNNING. <ul style="list-style-type: none"> • Manually start 1A SX pump. • 1B SX pump – will NOT start.
	RO/ BOP	<ul style="list-style-type: none"> • Check if Main Steamline Isolation required at 1PM06J: <ul style="list-style-type: none"> • If SG pressures < 640 psig due to failure of turbine to trip, perform the following: (otherwise N/A) <ul style="list-style-type: none"> • Verify 1MS001A-D, MSIV 1A-D – CLOSED. • Verify 1MS101A-D, MSIV 1A-D bypass valves – CLOSED.
		<p>EVALUATOR NOTE: Containment pressure recorder is unavailable due to the loss of instrument bus 111.</p>
	RO/ BOP	<ul style="list-style-type: none"> • Check if CS is required at 1PM06J: <ul style="list-style-type: none"> • CNMT pressure remained < 20 psig.
	RO/ BOP	<ul style="list-style-type: none"> • Verify Total AF flow at 1PM04J and 1PM06J: <ul style="list-style-type: none"> • AF flow > 500 gpm • SG levels maintained between 10% (31%) and 50%. • S/G NR levels – NOT rising in an uncontrolled manner.

Comments: _____

Scenario No:	NRC 07-2	Event No:	8
Event Description:	PZR vapor space LOCA		
Time	Position	Applicant's Actions or Behavior	
	RO/ BOP	<ul style="list-style-type: none"> • Verify ECCS valve alignment at 1PM06J: <ul style="list-style-type: none"> • Group 2 Cold Leg Injection monitor lights required for injection – NOT ALL LIT. <ul style="list-style-type: none"> • Perform the following at 1PM05J: <ul style="list-style-type: none"> • Open 1SI8801A • Open 1CV112D • Close 1CV112B • Close 1CV8106 	
	RO/ BOP	<ul style="list-style-type: none"> • Verify ECCS flow at 1PM05J: <ul style="list-style-type: none"> • High Head SI flow >100 gpm (1FI-917). <ul style="list-style-type: none"> ○ RCS pressure < 1700 psig. ○ SI pump discharge flow > 200 gpm. 	
		EVALUATOR NOTE: PZR PORV 1RY455A will not open in automatic due to the loss of instrument bus 111. PZR PORV 1RY455A can be opened in manual.	
	RO/ BOP	<ul style="list-style-type: none"> • Check at least ONE PZR PORV relief path available at 1PM05J: <ul style="list-style-type: none"> • PORV isolation valves – BOTH ENERGIZED. • PORV relief paths: <ul style="list-style-type: none"> • BOTH PZR PORV C/Ss in AUTO. • BOTH PORV block valves – OPEN. 	
	BOP	<ul style="list-style-type: none"> • Verify Generator Trip at 1PM02J: <ul style="list-style-type: none"> • OCB 1-8 and 7-8 open. • PMG output breaker open. 	
	BOP	<ul style="list-style-type: none"> • Verify DGs running at 1PM01J: <ul style="list-style-type: none"> • 1A DG – NOT RUNNING. <ul style="list-style-type: none"> • Manually start 1A DG. • 1B DG – RUNNING. • 1SX169A/B – BOTH OPEN. • Dispatch operator locally to check operation. 	

Comments: _____

Scenario No:	NRC 07-2	Event No.	8
Event Description:	PZR vapor space LOCA		
Time	Position	Applicant's Actions or Behavior	
		EVALUATOR NOTE: The US and RO will likely continue in 1BwEP-0 while BOP is performing the next 3 ventilation steps:	
	BOP	<ul style="list-style-type: none"> • Verify Control Room ventilation aligned for emergency operations at 0PM02J: <ul style="list-style-type: none"> • VC Rad Monitors – LESS THAN HIGH ALARM SETPOINT. • Operating VC train equipment – RUNNING. <ul style="list-style-type: none"> • 0B Supply fan • 0B Return fan • 0B M/U fan • 0B Chilled water pump • 0B Chiller • Operating VC train dampers – ALIGNED: <ul style="list-style-type: none"> • M/U fan outlet damper – 0VC08Y NOT FULLY CLOSED. • 0B VC train M/U filter light – LIT. • 0VC09Y OPEN • 0VC313Y CLOSED • Operating VC train Charcoal Absorber aligned for train B: <ul style="list-style-type: none"> • 0VC44Y CLOSED • 0VC05Y OPEN • 0VC06Y OPEN • Control Room pressure greater than +0.125 inches water on 0PDI-VC038. 	
	BOP	<ul style="list-style-type: none"> • Verify Auxiliary Building ventilation aligned at 0PM02J: <ul style="list-style-type: none"> • Two inaccessible filter plenums aligned. <ul style="list-style-type: none"> • Plenum A: <ul style="list-style-type: none"> • 0VA03CB – RUNNING • 0VA023Y – OPEN • 0VA436Y – CLOSED • Plenum C: <ul style="list-style-type: none"> • 0VA03CE - RUNNING • 0VA067Y – OPEN • Damper 0VA052Y – CLOSED 	
	BOP	<ul style="list-style-type: none"> • Verify FHB ventilation aligned at 0PM02J: <ul style="list-style-type: none"> • 0VA04CB – RUNNING • 0VA055Y – OPEN • 0VA062Y – OPEN • 0VA435Y – CLOSED 	

Comments: _____

Scenario No:	NRC 07-2	Event No:	8
Event Description: PZR vapor space LOCA			
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> • Check PZR sprays & PORVs at 1PM05J: <ul style="list-style-type: none"> • BOTH PZR spray valves – CLOSED. • BOTH PZR PORVs – CLOSED. 	
		EVALUATOR NOTE: RCPs may have been previously tripped when the crew identified RCP trip criteria per 1BwEP-0 OAS.	
	RO/ BOP	<ul style="list-style-type: none"> • Maintain RCS temperature control at 1PM05J: <ul style="list-style-type: none"> ○ RCPs – ALL RUNNING: <ul style="list-style-type: none"> • Verify RCS average temperature stable at or trending to 557°F. ○ Throttle AF flow. ○ RCPs – NONE RUNNING: <ul style="list-style-type: none"> • Verify RCS cold leg temperatures stable at or trending to 557°F. ○ Throttle AF flow. 	
	RO	<ul style="list-style-type: none"> • Check status of RCPs at 1PM05J <ul style="list-style-type: none"> • All RCPs – RUNNING. • Check high head SI flow (1FI-917). • Check RCS pressure: <ul style="list-style-type: none"> • RCS pressure < 1425 psig, trip ALL RCPs. 	
	RO/ BOP	<ul style="list-style-type: none"> • Check if SG secondary pressure boundaries are intact at 1PM04J: <ul style="list-style-type: none"> • Check pressure in all SGs: <ul style="list-style-type: none"> • None dropping in an uncontrolled manner. • None completely depressurized. 	
	RO/ BOP	<ul style="list-style-type: none"> • Check if SG tubes are intact: <ul style="list-style-type: none"> • Check the following not in ALERT or HI alarms at the RM-11 console: <ul style="list-style-type: none"> • 1PR08J SG Blowdown. • 1PR27J SJAE/GS. • 1AR 22/23A-D, 1A-D Main Steam Line. 	
	RO/ BOP	<ul style="list-style-type: none"> • Determine RCS in NOT intact <ul style="list-style-type: none"> • CNMT area rad monitors > alert alarm setpoint. • CNMT pressure > 3.4 psig (1PI-CS934-937). ○ CNMT floor water level > 5 inches (1LI-PC006/007). 	

Comments: _____

Scenario No:	NRC 07-2	Event No:	8
Event Description: PZR vapor space LOCA			
	CREW	Transition to 1BwEP-1, LOSS OF REACTOR OR SECONDARY COOLANT.	
	US	<ul style="list-style-type: none"> • Notify SM of plant status and procedure entry. • Request evaluation of Emergency Plan conditions. • Request STA evaluation of status trees. • Enter/Implement 1BwEP-1 and direct operator actions of 1BwEP-1 to establish the following conditions: 	
	RO	<ul style="list-style-type: none"> • Check status of RCPs at 1PM05J: <ul style="list-style-type: none"> • All RCPs – NONE RUNNING. 	
	RO/BOP	<ul style="list-style-type: none"> • Check if SG secondary pressure boundaries are intact at 1PM04J: <ul style="list-style-type: none"> • Check pressure in all SGs: <ul style="list-style-type: none"> • None dropping in an uncontrolled manner. • None completely depressurized. 	
	RO/BOP	<ul style="list-style-type: none"> • Check intact SG levels at 1PM04J: <ul style="list-style-type: none"> • SG levels maintained between 10% (31%) and 50%. • S/G NR levels – NOT rising in an uncontrolled manner. 	
	BOP	<ul style="list-style-type: none"> • Check secondary radiation trends: <ul style="list-style-type: none"> • Check the following rad monitor trends normal at the HMI terminal or at the RM-11 console: <ul style="list-style-type: none"> • 1PR27J SJAE/GS • 1PR08J SG Blowdown • 1AR 22/23A-D, 1A-D Main Steam Line 	
	RO	<ul style="list-style-type: none"> • Check PZR PORVs and isolation valves at 1PM05J: <ul style="list-style-type: none"> • PORV isolation valves – BOTH ENERGIZED • PORVs – BOTH CLOSED • PORV isolation valves – BOTH OPEN 	

Comments: _____

Scenario No: NRC 07-2		Event No: 8
Event Description: PZR vapor space LOCA		
Time	Position	Applicant's Actions or Behavior
	RO/ BOP	<ul style="list-style-type: none"> • Check if ECCS flow should be reduced at 1PM05J: <ul style="list-style-type: none"> • RCS subcooling – NOT acceptable.
		EVALUATOR NOTE: At this point the scenario is terminated
	US	<ul style="list-style-type: none"> • US to determine EAL at conclusion of scenario: <ul style="list-style-type: none"> • Alert FA1 <ul style="list-style-type: none"> • Potential loss of RCS. <ul style="list-style-type: none"> • Unisolable leak exceeding the capacity of one charging pump in the normal charging mode.

Comments: _____

Simulation Facility Braidwood

Scenario No.:

Operating Test No.:20070301

NRC 07-3

Examiners: _____

_____Applicant: _____ SRO

_____ RO
_____ BOP

Initial Conditions: IC-21

Turnover:

Unit 1 is operating at 100% power, steady state, equilibrium xenon, Boron concentration is 820 ppm. Online risk is green. Following completion of turnover, the shift manager requests the BOP to start the 0B WS pump in accordance with BwOP WS-1, STARTUP AND OPERATION OF THE NON-ESSENTIAL SERVICE WATER SYSTEM, and secure the 0C WS pump in accordance with BwOP WS-3, SHUTDOWN OF A NON-ESSENTIAL SERVICE WATER PUMP, for an upcoming clearance order on the 0C WS pump. Align the 0C WS for standby after it is secured. Operators have been briefed and are standing by at the Lake Screen House to support WS pump swap. Power Team has requested Unit 1 prepare to lower power 200 MW at 3.0 MW/min due to grid demand.

Event No.	Malf. No.	Event Type*	Event Description
Preload	IMF FW44 IMF FW48A IMF RP02A IMF RP02B		1B AF Pump fails to start 1A AF Pump auto start failure Reactor trip breaker A fails to open Reactor trip breaker B fails to open
1	None	N-BOP, US	Swap WS pumps
2	None	R-RO, US	Lower power 200 MW at 3 MW/min
3	IMF RX21A 1700 30	I-RO, US	PZR pressure channel 1PT-455A fails low (Tech Spec)
4	IMF CV01A	C-RO, US	1A CV pump trip (Tech Spec)
5	IMF TH16C	M-ALL	1C RCP Trip/ATWS
6	IOR ZDIRMIO NEUTRAL IOR ZDIBKSEL MAN	C-RO, US	Control rods will not insert
7	Preload	C-BOP, US	1A AF pump auto start failure/1B AF fail to start

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

SCENARIO OVERVIEW

Unit 1 is operating at 100% power, steady state, equilibrium xenon, Boron concentration is 820 ppm. Online risk is green. Following completion of turnover, the shift manager requests the BOP to start the 0B WS pump in accordance with BwOP WS-1, STARTUP AND OPERATION OF THE NON-ESSENTIAL SERVICE WATER SYSTEM, and secure the 0C WS pump in accordance with BwOP WS-3, SHUTDOWN OF A NON-ESSENTIAL SERVICE WATER PUMP, for an upcoming clearance order on the 0C WS pump. Align the 0C WS for standby after it is secured. Operators have been briefed and are standing by at the Lake Screen House to support WS pump swap. Power Team has requested Unit 1 prepare to lower power 200 MW at 3.0 MW/min due to grid demand.

After completing shift turnover and relief, the BOP will swap WS pumps in accordance with BwOP WS-1 and BwOP WS-2.

After swapping WS pumps, Power Team will request Unit 1 lower power to 200 MW @ 3 MW/min due to grid demand.

After a measurable change in power, PZR pressure channel 1PT-455A will fail low. PZR variable and backup heaters will energize and PZR spray valves will close. RCS pressure will rise. The RO will take manual control of PZR pressure and stabilize PZR pressure. 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment B, will be implemented. The RO will restore PZR pressure control to automatic after PZR pressure is restored to normal and an operable PZR pressure control channel is selected. Technical specifications 3.3.1, conditions A, E, and K and 3.3.2, conditions A and D apply.

After the 1PT-455A failure is addressed, 1A CV pump will trip. The crew will implement 1BwOA PRI-15, LOSS OF NORMAL CHARGING. The crew will start the 1B CV pump to restore normal charging. Technical specifications 3.5.2 condition A and TRM 3.1.d, condition A apply.

After the 1A CV pump is addressed, 1C RCP will trip. The reactor will not automatically trip and when a manual reactor trip is attempted, the reactor will not trip, resulting in an ATWS. The crew will implement 1BwFR-S.1, RESPONSE TO NUCLEAR GENERATION/ATWS. The control rods will not insert in either automatic or manual. The RO will initiate emergency boration to add negative reactivity to the core. The 1B AF pump will not start and the 1A AF pump will have to be manually started. After completing actions of 1BwFR-S.1, the crew will transition to 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION.

The scenario is complete when the crew completes step 4 of 1BwEP-0.

Critical Tasks

1. Start 1A AF pump prior to completion of step 3 of 1BwFR-S.1
(ERG Critical Task number – FR-S.1—B) (K/A number –061000A2.04 importance – 3.4/3.8)
2. Insert negative reactivity into the core by establishing emergency boration flow to the RCS prior to completion of step 4 of 1BwFR-S.1.
(ERG Critical Task number – FR-S.1--C) (K/A number – 000029EA1.15 importance – 4.1/3.9)

SIMULATOR SETUP GUIDE:

- Verify/perform TQ-BR-201-0113, BRAIDWOOD TRAINING DEPARTMENT SIMULATOR EXAMINATION SECURITY ACTIONS CHECKLIST.
- Establish the conditions of IC 21, 100% power, steady state, equilibrium xenon.
- Complete items on Simulator Ready for Training Checklist.
- Verify/remove any Equipment Status Tags and Danger Tags not applicable to the scenario.
- Place simulator in RUN and allow simulator to run during board walk down and turnover.
- Place 1A FW pump in PTL, 1A FW pump AOP in PTL, and 1FW02A C/S in NAC.
- Run **caep DEMO NRC 07-3 SETUP** from disk and verify the following actuate:
 - IMF FW44
 - IMF FW48A
 - IMF RP02A
 - IMF RP02B
- Set ΔI Target Curve slopes to -0.02 (-2.0%)
- Verify SER and printer are clear of data.
- Verify 10 MW load drop at 5 MW/minute is programmed into DEH.
- Provide students with turnover sheets, 1BwOS NR-1, critical parameter sheet, Op Aids, Load Swing Instruction Sheet, Pre-Job Brief Forms, and copies of BwOP WS-1 and BwOP WS-3.

Event 1: Swap WS pumps.

If contacted as Equipment Operator for WS pump swap, report 0B WS pump is aligned for start and you are ready for the control room to start 0B WS pump in accordance with BwOP WS-1, step F.3.c.

If contacted as Equipment Operator for WS pump swap, report 0B WS pump has stable operating parameters once running, and no signs of reverse rotation from the 0C WS pump when the 0C WS pump is stopped.

Acknowledge as Shift Manager commencement and completion of procedure.

Event 2: Lower power 200 MW at 3 MW/min.

As Power Team, contact the MCR by phone and request Unit 1 lower power 200MW at 3 MW/min due to grid demand.

Acknowledge as chemistry/rad protection requests for RCS samples (if required).

Acknowledge as Power Team initiation of ramp.

Events 3: PZR pressure channel 1PT-455A fails low.

Insert **IMF RX21A 1700 30** to fail 1PT-455 low over a 30 second period.

To trip the required bistables, participate in brief and perform the following:

- As extra NSO contact Unit 1 (X-2209)
- Insert the following:
 - **MRF RP20 OPEN** (open protection cabinet #1 door)
 - **MRF RX032 TRIP** (trip PZR hi press Rx trip bistable PB455A)
 - **MRF RX034 TRIP** (trip PZR low press Rx trip bistable PB455C)
 - **MRF RX035 TRIP** (trip PZR low press SI bistable PB455D)
 - **MRF RX033 TRIP** (trip P11 bistable PB455B)
 - **MRF RX013 TRIP** (trip OTΔT Rx trip bistable TB411C)
 - **MRF RX135 TRIP** (trip OTΔT Runback bistable TB411D)
 - **MRF RP20 CLOSE** (close protection cabinet #1 door)

Acknowledge as Shift Manager the failure, LCOAR entry, on line risk assessment, EAL evaluation, request for maintenance support, and IR request.

Event 4: 1A CV pump trip

Insert IMF CV01A for 1A CV pump.

If dispatched as Equipment Operator to 1A CV pump and/or pump breaker, wait three minutes and report 1A CV pump appears normal and/or report phase A overcurrent flag at breaker cubicle.

Acknowledge as Shift Manager the failure, LCOAR entry, on line risk assessment, EAL evaluation, request for maintenance support, and IR request.

Events 5 & 6: 1C RCP Trip/ATWS/ Control rods will not insert

Run caep DEMO NRC 07-3 EVENT 5& 6 from disk and verify the following actuate:

- IMF TH16C
- IOR ZDIRMIO NEUTRAL
- IOR ZDIBKSEL MAN

If dispatched as Equipment Operator to locally trip Unit 1 reactor, **wait until 1BwFR-S.1 step 6 (VERIFY REACTOR SUBCRITICAL) is complete**, then delete the following malfunctions to locally open Unit 1 reactor trip breakers:

- DMF RP02A
- DMF RP02B

If reactor trip breakers do not open when above malfunctions deleted, insert the following remote functions to open the reactor trip breakers:

- IRF RP01 TRIP
- IRF RP02 TRIP

If dispatched as Equipment Operator /Field Supervisor to verify dilution paths isolated, wait 15 minutes and report the following: 1CV8441, 1CV8435, & 1CV8453 are locked closed. 1AB8629A is closed.

Acknowledge as Shift Manager procedure changes, Emergency Plan evaluations, STA request, and requests for support personnel.

After STA requested, as STA report CSF status: red on subcriticality until PR channels < 5%. Red on heat sink if 1A AF pump is not manually started and SG NR level <10%.

Event 7: 1A AF Pump auto start failure/1B AF Pump fails to start

If dispatched as Equipment Operator to 1B AF pump, report low oil pressure annunciator is lit on 1AF01J and there is a puddle of oil beneath the 1B AF pump engine.

Acknowledge as Shift Manager the failures and request for maintenance support.

Scenario No:	NRC 07-3	Event No.	1
Event Description:	Swap WS Pumps		
Time	Position	Applicant's Actions or Behavior	
	CUE	<ul style="list-style-type: none"> ○ From turnover, start the 0B WS pump in accordance with BwOP WS-1, STARTUP AND OPERATION OF THE NON-ESSENTIAL SERVICE WATER SYSTEM, and secure the 0C WS pump in accordance with BwOP WS-3, SHUTDOWN OF A NON-ESSENTIAL SERVICE WATER PUMP. 	
	US	<ul style="list-style-type: none"> ● Direct BOP to perform BwOP WS-1 and BwOP WS-3. 	
	BOP	<ul style="list-style-type: none"> ● Refer to BwOP WS-1. ● Contact Equipment Operator at 0B WS pump to verify 0B WS pump is ready for start. ● Start 0B WS pump at 0PM01J. ● Check 0B WS pump amps and WS system pressure normal. ○ Contact Equipment Operator at 0B WS pump to verify normal pump parameters. ● Contact Equipment Operator at 0B WS pump to align chemical feed to 0B WS pump. 	
		<ul style="list-style-type: none"> ● Refer to BwOP WS-3. ● Contact Equipment Operator at 0C WS pump to isolate chemical feed to 0C WS pump. ● Place 0C WS pump C/S to PULL OUT. ● Contact Equipment Operator at 0C WS pump to determine if 0C WS pump shaft is not rotating backwards. ● Verify WS header pressure is stable. ● Place 0C WS pump C/S in AFTER TRIP. ● Contact Equipment Operator at 0C WS pump to complete 0C WS pump shutdown. ● Inform US WS pumps have been swapped. 	
	US	<ul style="list-style-type: none"> ● Acknowledge report. ○ Notify SM WS pump swap is complete. 	
		NOTE: After WS pump swap is complete and with lead examiners concurrence, enter next event.	

Comments: _____

Scenario		NRC 07-3	Event	2
to:			No.	
Event Description:		Lower power 200 MW at 3 MW/min		
Time	Position	Applicant's Actions or Behavior		
	CUE	<ul style="list-style-type: none"> • Call from Power Team to lower power 200 MW at 3 Mw/min. 		
	US	<ul style="list-style-type: none"> • Acknowledge request to lower power 200 MW at 3 Mw/min. • Implement actions of 1BwGP 100-4, POWER DESCENSION. <ul style="list-style-type: none"> ○ Perform pre-job brief per HU-AA-1211 "PRE-JOB, HEIGHTENED LEVEL OF AWARENESS, INFREQUENT PLANT ACTIVITY, AND POST JOB BRIEFINGS" for load ramp. 		
	CREW	<ul style="list-style-type: none"> • Review applicable Precautions, and Limitations and Actions of 1BwGP 100-4. 		
		EVALUATOR NOTE: The following step may be repeated as necessary to borate the RCS during the power descension.		
	RO	<ul style="list-style-type: none"> • Verify rod position and boron concentration. • Initiate boration, if required. (BwOP CV-6) (approximate band: 100 gal – 400 gal). • Determine required boric acid volume. <ul style="list-style-type: none"> ○ Perform boration boundary calculation per 1BwGP 100-4T2. ○ Refer to operator aid for ramp. • Determine desired boric acid flow rate. • Perform the following at 1PM05J: <ul style="list-style-type: none"> • Set 1FK-110 BA Flow Control to desired boration rate. • Set 1FY-0110 BA Blender Predet Counter to desired volume. • Place MAKE-UP MODE CONT SWITCH to STOP position. • Place MODE SELECT SWITCH to BORATE position. • Place MAKE-UP MODE CONT SWITCH to START. • Verify proper operation of valves and BA transfer pump (1CV110B open, Boric Acid Transfer Pump running, 1CV110A throttles open, proper BA flow indicated on recorder). ○ Turn on PZR backup heaters. <p>OR</p>		

Comments: _____

Scenario No:	NRC 07-3	Event No:	2
Event Description: Lower power 200 MW at 3 MW/min			
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> • Batch addition of Boric Acid: <ul style="list-style-type: none"> • Open 1CV110B. • Open 1CV110A. • Start the BA Transfer pump. • When desired amount of BA has been added, stop the BA Transfer Pump. • Close 1CV110A. • Close 1CV110B. 	
	BOP	<ul style="list-style-type: none"> • Lower turbine load at 1PM02J or OWS drop 210 by performing the following: <ul style="list-style-type: none"> • Select SETPOINT. • Enter 1060 MW into REF DEMAND window. • Select ENTER. • Enter 3.0 MW/min into the RATE window. • Select ENTER. • Select EXIT. ○ Notify US and RO of pending ramp. • Select GO/HOLD. • Verify GO/HOLD button illuminates. • Verify HOLD illuminated RED. • Select GO. • Verify GO illuminates RED. • Verify main turbine load begins to lower. 	
	RO/ BOP	<ul style="list-style-type: none"> • Monitor reactor power and turbine load lowering: • Monitor NI's, Tave, ΔI, Pzr press/level at 1PM05J. • Monitor MWe and DEHC system response at 1PM02J or OWS drop 210. • During boration, monitor the following at 1PM05J and HMI: <ul style="list-style-type: none"> ○ Monitor VCT level. ○ Verify RCS boron concentration rising. ○ Monitor BA predet counter. ○ Verify boration auto stops at preset value. ○ Return Reactor Makeup System to automatic at current boron concentration. 	
EVALUATOR NOTE: After measurable change in power and with lead examiner approval, insert the next event.			

Comments: _____

Scenario No:	NRC 07-3	Event No:	3
Event Description: PZR pressure channel 1PT-455A fails low			
Time	Position	Applicant's Actions or Behavior	
	CUE	<ul style="list-style-type: none"> Annunciator 1-12-A1, PZR PRESS LOW RX TRIP STPT ALERT Annunciator 1-12-B1, PZR PRESS LOW Annunciator 1-12-C1, PZR PRESS CONT DEV LOW HTRS ON Annunciator 1-14-B1, OTDT HIGH RX TRIP ALERT PZR pressure indicators 1PI-456, 457, and 458 rising. PZR heaters energized. 	
	RO	<ul style="list-style-type: none"> Identify 1PT-455 is failing low. Identify PZR heaters are energized. Report failure to US. Perform the following at 1PM05J: <ul style="list-style-type: none"> Place 1PK-455A, master PZR pressure controller, in manual. Raise demand on 1PK-455A sufficiently to deenergized PZR backup heaters and open normal PZR spray valves prior to PZR PORV opening. Operate 1PK-455 in manual to restore PZR pressure to normal operating band. Monitor reactor response to RCS pressure transient. 	
	CREW	<ul style="list-style-type: none"> Identify entry conditions for 1BWOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL. 	
	US	<ul style="list-style-type: none"> Notify SM of plant status and procedure entry. Request evaluation of Emergency Plan conditions. Enter/Implement 1BWOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment B, PRESSURIZER PRESSURE CHANNEL FAILURE and direct operator actions of 1BWOA INST-2 to establish the following conditions: <ul style="list-style-type: none"> Direct BOP/RO to stop load ramp/boration. 	
	RO	<ul style="list-style-type: none"> Check PZR pressure at 1PM05J: <ul style="list-style-type: none"> PZR pressure – normal on 1PI-456, 457, & 458. <ul style="list-style-type: none"> Manually restore PZR pressure using 1PK-455A. Select operable PZR pressure control channel: <ul style="list-style-type: none"> Place 1PK-455A in manual and restore PZR pressure to normal. Place PZR pressure control select C/S to CH-457/CH-458. 	
	BOP	<ul style="list-style-type: none"> Perform the following: <ul style="list-style-type: none"> Request operations support for tripping bistables. Assist US by making notifications. Refer to BwARs. 	

Comments: _____

Scenario No:	NRC 07-3	Event No.	3
Event Description:	PZR pressure channel 1PT-455A fails low.		
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> • Check PZR PORVS, spray valves, and heaters at 1PM05J: <ul style="list-style-type: none"> • PZR PORVs closed. • PZR spray valves normal for plant conditions. • PZR heaters normal for plant conditions. • Check PZR pressure control in auto at 1PM05J: <ul style="list-style-type: none"> • Check the following components in AUTO: <ul style="list-style-type: none"> • PZR PORVs. • PZR spray valve 1RY455B. • PZR spray valve 1RY455C. • Master PZR pressure controller 1PK-455A. <ul style="list-style-type: none"> • If 1PK-455A is in manual from initial response, place in AUTO. • Select operable recorders at 1PM05J: <ul style="list-style-type: none"> • Place PZR pressure select switch to CH-456, CH-457, or CH-458. • Place loop ΔT recorder select switch to 1B, 1C, or 1D. 	
	US	<ul style="list-style-type: none"> ○ Perform pre-job brief per HU-AA-1211 for bistable tripping. ○ Complete 1BwOL 3.3.1, Attachment A, INSTRUMENT CONDITION TRACKING LOG. 	
	Extra NSO/ RO	<ul style="list-style-type: none"> • Locally trip bistables for 1PT-455/RO verifies correct bistables operation at 1PM05J. <ul style="list-style-type: none"> ○ PB455A - C1-153 BS-1. ○ PB455C - C1-153 BS-4. ○ PB455D - C1-153 BS-3. ○ PB455B - C1-153 BS-2. ○ PB411C - C1-124 BS-3. ○ PB411D - C1-124 BS-4. 	
	RO	<ul style="list-style-type: none"> • Check P11 bypass permissive NOT LIT at 1PM05J. 	
	US	<ul style="list-style-type: none"> • Determine TS 3.3.1, conditions A, E, and K, 3.3.2, conditions A and D, and 3.3.4, condition A are applicable. • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure. 	
		<p>NOTE: After the actions for the pressurizer pressure channel failure are complete and with lead examiners concurrence, insert the next event.</p>	

Comments: _____

Scenario **NRC 07-3** Event **4**
 No.:

Event Description: **1A CV pump trip.**

Time	Position	Applicant's Actions or Behavior
	CUE	<ul style="list-style-type: none"> ● Annunciator 1-9-A3 CHG PUMP TRIP ● Annunciator 1-9-D3 CHG LINE FLOW HIGH/LOW ● Annunciator 1-7-B2 RCP SEAL WATER INJ FLOW LOW ● Annunciator 1-9-A1 REGEN HX LTDN TEMP HIGH ● PZR level lowering. ● Trip/yellow disagreement light on 1A CV pump C/S.
	RO	<ul style="list-style-type: none"> ● Identify 1A CV pump has tripped at 1PM05J. ● Report failure to US.
	CREW	<ul style="list-style-type: none"> ● Reference BwARs 1-9-A3/1-9-D3/1-7-B2/1-9-A1. ● Identify entry conditions for 1BwOA PRI-15, LOSS OF NORMAL CHARGING. ● Dispatch operator to investigate cause of 1A CV pump trip.
	US	<ul style="list-style-type: none"> ● Notify Shift Manager of plant status and procedure entry. ● Request evaluation of Emergency Plan conditions. ● Implement 1BwOA PRI-15, LOSS OF NORMAL CHARGING, and direct operator actions of 1BwOA PRI-15 to establish the following conditions: <ul style="list-style-type: none"> ○ Direct BOP/RO to stop load ramp/dilution. ○ Enter Tech Spec 3.4.1 if PZR pressure < 2210 psig.
	RO	<ul style="list-style-type: none"> ● Perform the following at 1PM05J: <ul style="list-style-type: none"> ● Check CV pump status: <ul style="list-style-type: none"> ● Identify NEITHER CV pump is running ● Place 1A CV pump C/S in PULL OUT. ● Isolate normal letdown: <ul style="list-style-type: none"> ● Place 1CV8149A, B, & C, letdown orifice isolation valves, C/S's to CLOSE. ● Place 1CV459 & 1CV460, letdown isolation valves, C/S's to CLOSE. ○ Acknowledge RM-11 alarm caused by isolating flow to 1PR06J, Gross Failed Fuel Monitor. ● Check VCT status: <ul style="list-style-type: none"> ● Check 1CV112B & 1CV112C, VCT suction valves, OPEN. ● Maintain VCT level greater than 20%. <ul style="list-style-type: none"> ● Check VCT level > 20% on 1LI-112 or 1LR-185. ● Operate RMCS in automatic or manual to maintain VCT level > 20%. ● Check annunciator 1-9-C2, VCT TEMP HIGH - NOT lit.

Comments: _____

Event Description: 1A CV pump trip.

Time	Position	Applicant's Actions or Behavior
	RO/ BOP	<ul style="list-style-type: none"> • Perform the following at 1PM05J: <ul style="list-style-type: none"> • Check for gas binding of previously running CV pump by verifying the following trends NOT fluctuating prior to pump trip. (may use HMI trends): <ul style="list-style-type: none"> • RCP #1 seal leak off flow. • CV pump flow. • CV pump discharge pressure. • CV pump amps. • Restore normal charging flow: <ul style="list-style-type: none"> • Check 1CV8110 & 1CV8116, 1B CV pump miniflow isolation valves – OPEN. • Check RCS pressure approximately 2235 psig. • Place 1B CV pump C/S to start. • Check CV System Alignment: <ul style="list-style-type: none"> • Verify 1CV8147, charging to RC 1A loop isolation valve – OPEN. • Verify 1CV8324A, charging to regen HX 1A isolation valve – OPEN. • Verify 1CV8105 AND 1CV8106, charging line CNMT isolation valves – OPEN. • Check charging flow established (Charging flow may be at minimum for RCP seal injection due to letdown isolation). • Determine normal letdown is isolated. ○ Monitor RMCS during automatic VCT makeup: <ul style="list-style-type: none"> • Proper flow indicated on PW/Total Flow (1FT-0111) and Boric Acid Flow (1FT-0110).
	CREW	<ul style="list-style-type: none"> • Identify entry conditions for 1BwOA ESP-2, REESTABLISHING CV LETDOWN DURING ABNORMAL CONDITIONS.
	US	<ul style="list-style-type: none"> • Notify Shift Manager of plant status and procedure entry. • Implement 1BwOA ESP-2, REESTABLISHING CV LETDOWN DURING ABNORMAL CONDITIONS, and direct operator actions of 1BwOA ESP-2 to establish the following conditions:
	BOP	<ul style="list-style-type: none"> • Perform the following at 1PM05J: <ul style="list-style-type: none"> • Check letdown Isolated: <ul style="list-style-type: none"> • Verify 1CV8149A, B, & C, letdown orifice isolation valves - CLOSED. • Verify 1CV459 & 1CV460, letdown isolation valves - CLOSED.

Comments: _____

Scenario **NRC 07-3** Event **4**
 No.:

Event Description: **1A CV pump trip.**

Time	Position	Applicant's Actions or Behavior
	BOP	<ul style="list-style-type: none"> • Perform the following at 1PM05J: <ul style="list-style-type: none"> • Check letdown flow path: <ul style="list-style-type: none"> • Verify 1CV8401A, letdown to letdown HX 1A isolation valve, - OPEN. • Verify 1CV8324A, charging to regen HX 1A isolation valve – OPEN. • Verify 1CV8389A, letdown to regen HX 1A isolation valve – OPEN. • Verify 1CV8152 & 1CV8160, letdown line CNMT isolation valves – OPEN. • Verify BTRS mode select switch OFF. • Align letdown controllers: <ul style="list-style-type: none"> • Place 1PK-131, letdown line pressure controller, in MANUAL and raise demand to 40%. • Place 1CC130A, letdown HX outlet temperature controller, in MANUAL and lower demand to 60%. • Verify charging flow established: <ul style="list-style-type: none"> • Verify 1CV8105 AND 1CV8106, charging line CNMT isolation valves - OPEN • Adjust 1CV182, charging header backpressure control valve, to establish 8-13 gpm RCP seal injection flow. • Place 1FK-121, in manual and operate 1FK-121 in manual to establish 100 gpm charging flow on 1FI-121A. • Establish letdown flow: <ul style="list-style-type: none"> • Place 1CV459 & 1CV460, letdown isolation valves, C/S'S to OPEN. • Place 1CV8149A, B, & C, letdown orifice isolation valves, C/S's to OPEN as necessary to establish 120 gpm letdown flow. • Lower demand on 1PK-131, letdown line pressure controller, to raise letdown pressure to approximately 360 psig on 1PI-131. • Operate 1FK-121 in manual to restore PZR level to normal operating band and maintain 8-13 gpm RCP seal injection flow. • Lower demand on 1CC130A, to control letdown temperature between 90° to 115°F on 1TI-130. • Place 1PK-131, letdown line pressure controller, in AUTO. • Place 1CC130A, letdown HX outlet temperature controller, in AUTO. • At the RM-11, verify 1PR06J cursor is GREEN.
	US	<ul style="list-style-type: none"> • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure. • Determine TS 3.5.2, condition A is applicable. • Determine TRM 3.1.d, condition A is applicable.
<p>EVALUATOR NOTE: After the actions for charging pump trip are complete and with lead examiners concurrence, enter next event.</p>		

Comments: _____

Scenario **NRC 07-3** Event **5 & 6**
 No. _____ No. _____

Event Description: **1C RCP trip/ATWS/ control rods will not insert**

Time	Position	Applicant's Actions or Behavior
	CUE	<ul style="list-style-type: none"> • Annunciator 1-11-C5, RCP LOW FLOW ABOVE P8 RX TRIP • Annunciator 1-13-C3, RCP 1C BRKR OPEN OR FLOW LOW ALERT • Annunciator 1-13-E3, RCP TRIP • Trip/yellow disagreement light on 1A CV pump C/S.
	CREW	<ul style="list-style-type: none"> • Identify 1C RCP tripped. • Identify reactor did NOT automatically trip.
	US	<ul style="list-style-type: none"> • Notify SM of plant status. • Direct operator to manually trip reactor.
	RO	<ul style="list-style-type: none"> • Manually trip the reactor: <ul style="list-style-type: none"> • Place RX trip switch to trip at 1PM05J. • Place RX trip switch to trip at 1PM06J. • Determine reactor will NOT manually trip.
	CREW	<ul style="list-style-type: none"> • Identify entry conditions for 1BwFR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS. • Dispatch operator to locally trip reactor.
	RO	<p>Perform immediate operator actions of 1BwFR-S.1:</p> <ul style="list-style-type: none"> • Verify reactor trip: <ul style="list-style-type: none"> • Rod bottom lights - NONE LIT. • Reactor trip breakers – CLOSED. • Neutron flux – NOT DROPPING. • Manually trip the reactor (N/A if previously attempted): <ul style="list-style-type: none"> • Place RX trip switch to trip at 1PM05J. • Place RX trip switch to trip at 1PM06J. • Determine control rods NOT inserting automatically: • Attempt to manually insert control rods: <ul style="list-style-type: none"> • Place rod bank select switch to MANUAL. • Place rod control in-hold-out switch to IN. • Determine rods NOT inserting manually.

Comments: _____

Time	Position	Applicant's Actions or Behavior
Scenario NRC 07-3 Event 5, 6, & 7 No: No.		
Event Description: ATWS/control rods will not insert/1A AF pump auto start failure/1B AF fail to start		
	BOP	Perform immediate operator actions of 1BwFR-S.1 at 1PM02J or OWS drop 210: <ul style="list-style-type: none"> Verify Turbine Trip: <ul style="list-style-type: none"> All Turbine throttle valves – CLOSED. All Turbine governor valves – CLOSED.
	BOP [CT] FR-S.1- -B	Perform immediate operator actions of 1BwFR-S.1 at 1PM06J: <ul style="list-style-type: none"> Check AF pumps running: <ul style="list-style-type: none"> AF pump run lights – NONE LIT. Manually start the 1A AF pump prior to completion of step 3 of 1BwFR-S.1. Attempt to manually start 1B AF pump. <ul style="list-style-type: none"> Determine 1B AF pump will not start.
	US	<ul style="list-style-type: none"> Notify SM of plant status and procedure entry. Request evaluation of Emergency Plan conditions. Enter/Implement 1BwFR-S.1 and direct operator actions of 1BwFR-S.1.
	RO/ BOP [CT] FR-S.1- -C	<ul style="list-style-type: none"> Initiate emergency boration of the RCS at 1PM05J: <ul style="list-style-type: none"> 1B CV pump – RUNNING. Place 1CV8104, emergency boration valve, C/S to OPEN. Start boric acid transfer pump. Verify emergency boration flow > 30 gpm on 1FI-183A. Verify charging flow > 30 gpm on 1FI-121A. Verify PZR pressure < 2335 psig on 1PI-455A/456/457/458. If PZR pressure rises > 2335 psig, verify PZR PORVs cycle as necessary to maintain PZR pressure 2135-2335 psig.
	BOP	<ul style="list-style-type: none"> Verify CNMT vent isolation: <ul style="list-style-type: none"> Group 6 CNMT vent isolation monitor lights – ALL LIT at 1PM06J.
	RO	<ul style="list-style-type: none"> Verify reactor subcritical: <ul style="list-style-type: none"> PR channels > 5%. IR channels startup rate – NOT NEGATIVE.
	BOP	<ul style="list-style-type: none"> Isolate steam dumps: <ul style="list-style-type: none"> Place BOTH steam dump bypass interlock switches in OFF RESET at 1PM02J.

Comments: _____

Scenario No: **NRC 07-3** Event No: **5, 6, & 7**

Event Description: **ATWS/control rods will not insert/1A AF pump auto start failure/1B AF fail to start**

Time	Position	Applicant's Actions or Behavior
	RO/ BOP	<ul style="list-style-type: none"> • Check if the following trips have occurred: <ul style="list-style-type: none"> • Reactor trip at 1PM05J: <ul style="list-style-type: none"> • Rod bottom lights - ALL LIT. • Reactor trip & bypass breakers – OPEN. • Neutron flux – DROPPING. • Turbine trip at 1PM02J or OWS drop 210: <ul style="list-style-type: none"> • All Turbine throttle valves – CLOSED. • All Turbine governor valves – CLOSED. • Check SG levels at 1PM04J: <ul style="list-style-type: none"> • At least one SG level > 10% (31%). • SG levels maintained between 10% (31%) and 50%. • 1SD002A-H, SG blowdown isolation valves – CLOSED at 1PM06J or 1PM11J. • Verify dilution paths isolated at 1PM05J: <ul style="list-style-type: none"> • 1CV111A & B – CLOSED. • BTRS mode selector switch – OFF. • Dispatch operator to locally verify dilution paths isolated. • Stop reactivity insertion from RCS cooldown: <ul style="list-style-type: none"> • RCS temperature not decreasing in an uncontrolled manner. • All SG pressures not decreasing in an uncontrolled manner. • Check CETCs < 1200°F at 1PM05J. • Verify reactor subcritical at 1PM05J: <ul style="list-style-type: none"> • All PR channels < 5%. • All IR channels – NEGATIVE SUR.
	CREW	<ul style="list-style-type: none"> • Identify entry conditions for 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION.
	US	<ul style="list-style-type: none"> • Notify SM of plant status and procedure entry. • Request evaluation of Emergency Plan conditions. • Enter/Implement 1BwEP-0 and direct operator actions of 1BwEP-0.
	RO	<ul style="list-style-type: none"> • Perform immediate operator actions of 1BwEP-0 at 1PM05J: <ul style="list-style-type: none"> • Verify reactor trip. <ul style="list-style-type: none"> • Rod bottom lights - ALL LIT. • Reactor trip & Bypass breakers – OPEN. • Neutron flux – DROPPING.

Comments: _____

Scenario No:	NRC 07-3	Event No.	5, 6, & 7
Event Description: ATWS/control rods will not insert/1A AF pump auto start failure/1B AF fail to start			
Time	Position	Applicant's Actions or Behavior	
	BOP	<ul style="list-style-type: none"> Perform immediate operator actions of 1BwEP-0 at 1PM02J or OWS drop 210: <ul style="list-style-type: none"> Verify Turbine Trip: <ul style="list-style-type: none"> All Turbine throttle valves – OPEN. All Turbine governor valves – OPEN. 	
	BOP	<ul style="list-style-type: none"> Perform immediate operator actions of 1BwEP-0 at 1PM01J: <ul style="list-style-type: none"> Verify power to 4KV busses: <ul style="list-style-type: none"> ESF Buses – BOTH ENERGIZED (141 & 142). 	
	CREW	<ul style="list-style-type: none"> Perform immediate operator actions of 1BwEP-0 at 1PM04J, 1PM05J, & 1PM06J: <ul style="list-style-type: none"> Check SI actuated at 1PM05J and 1PM06J: <ul style="list-style-type: none"> SI ACTUATED Bypass Permissive – NOT LIT. SI equipment automatically actuated: <ul style="list-style-type: none"> 1A or 1B SI pump – NOT RUNNING. 1SI8801A or B, CV pump cold leg injection valve – CLOSED. Check if SI required: <ul style="list-style-type: none"> PZR pressure can be maintained > 1829 psig. Steamline pressure > 640 psig. Containment pressure < 3.4 psig. PZR level can be maintained > 4%. Determine SI is NOT required. 	
EVALUATOR NOTE: At this point the scenario is terminated			
	US	<ul style="list-style-type: none"> US to determine EAL at conclusion of scenario: <ul style="list-style-type: none"> Site Area Emergency MS3 – Failure of the Reactor Protection System to complete or initiate an automatic reactor trip once a Reactor Protection System setpoint has been exceeded and manual trip was NOT successful. 	

Comments: _____
