Simulation	r Facility <u>Braidwood</u>		Scenario No.: <b>NRC 11-</b> <b>spare</b> Applicant:	Operating Test No.: 2011 NRC Exam SRO ATC BOP
Initial Con	ditions: IC-18			
Turnover:	Unit 1 is at 75% power, ste 645 ppm. Online risk is gr past 10 hours. 1A CW pur week. 1PR11J filter chang	eady state, e een. 1B HD mp is OOS f e planned ea	equilibrium xenon, pump has been for impeller work. arly in shift.	MOL. RCS boron concentration is OOS for breaker contact work for the Expected back in service in one
Event	Malf. No.	Event		Event
No. Preload	IOR ZDI1CW01PA PTL IOR ZDI1HD01PB PTL IRF ED051C OPEN IRF ED075C OPEN IMF RP14A IMF RP14B IMF TC03 trgset 2 "ZDISIA1 .eq. 1" trgset 3 " ZDISIA2 .eq. 1" trgset 4 " ZDISIA1 .eq. 1" trgset 5 " ZDISIA2 .eq. 1" trg 2 "DMF RP14A" trg 3 "DMF RP14B" trg 4 "DMF RP14B" trg 5 "DMF RP14A"	Type*	1A CW PP OOS 1B HD Pump OG 1CW001A OOS SI auto actuation SI auto actuation Turbine auto trip	Description S DS n failure (Train A) n failure (Train B) o failure
I	None	TS-US		ange
2	IMF RX13A 100 10	I-ATC, US TS-US	PZR level chanr	nel 1LT-459 fails high (Tech Spec)
3	IMF CV23A 80 180	C-ATC (or BOP), US	1A letdown HX t	ube leak
4	IMF EG03 90 96 180	C-BOP, US	Generator voltag	ge regulator failure
5	IMF FW35A	C-BOP, US R-ATC, US	1A Heater Drain	Pump trip requiring turbine runback
6	IMF TH01 0.5 30	M-ALL	PZR vapor spac	e LOCA
7	preload		Turbine auto trip	o failure n failure

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

### SCENARIO OVERVIEW

Unit 1 is at 75% power, steady state, equilibrium xenon, MOL. RCS boron concentration is 645 ppm. Online risk is green. 1B HD pump has been OOS for breaker contact work for the past 10 hours. 1A CW pump is OOS for impeller work. Expected back in service in one week. 1PR11J filter change planned early in shift.

After completing shift turnover and relief, a Radiation Protection Technician will contact the main control room and request the crew shutdown 1PR11J sample pump to support daily filter replacement. The Unit Supervisor will enter Tech Spec 3.4.15, condition B. Approximately two minutes later, the RP Technician will request restart of the 1PR11J skid. 1PR11J will be restarted. LCO 3.4.15 may be exited after filter change completion and monitor is operating normally for 90 minutes.

After changing the 1PR11J filter, PZR level channel 1LT-459 will fail high. 1CV121, charging header flow control valve, will lower charging flow and pressurizer level will lower. The ATC 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 ATC 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, the 1A letdown heat exchanger will develop a tube leak. Letdown flow and VCT level will lower and CC surge tank level and radiation will rise. The crew will implement 1BwOA PRI-6, COMPONENT COOLING SYSTEM MALFUNCTION, and locate and isolate the leakage. The crew will align the 1B letdown heat exchanger in accordance with BwOP CV-22, OPERATION OF LETDOWN AND REGEN HEAT EXCHANGERS.

After the letdown heat exchanger tube is addressed, the generator voltage regulator output will fail high, causing the main generator to be overexcited. The BOP will turn the voltage regulator to off/test and manually lower main generator excitation using the base adjuster.

**After the voltage regulator failure is addressed,** 1A Heater Drain Pump will trip. 1BwOA SEC-1, SECONDARY PUMP TRIP, Attachment C, will be entered. The BOP will initiate a turbine load reduction to 780 MW at 20 MW/minute. The ATC will borate the RCS as necessary to stabilize RCS temperature.

**After the 1A HD pump trip has been addressed,** a weld breaks on the PZR causing a PZR vapor space LOCA. When the reactor trips, the turbine will not automatically trip. The crew will manually trip the turbine. The crew will take actions in accordance with 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION. While performing the actions of 1BwEP-0, the crew should note the failure of SI to automatically actuate. The crew should manually actuate SI. The crew will transition to 1BwEP-1, LOSS OF REACTOR OR SECONDARY COOLANT, after determining that the RCS is not intact.

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 actuate Safety Injection prior to transition to 1BwEP-1.

### 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, MOL, 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 (allow simulator to run during board walk down and turnover).
- Place 1B HD pump C/S in PTL.
- Place 1A CW pump C/S in PTL.
- Wait until 1CW001A valve is fully closed, THEN Run **caep 11-spare SETUP** from disk and verify the following actuate:
  - IOR ZDI1CW01PA PTL
  - IOR ZDI1HD01PB PTL
  - IRF ED051C OPEN
  - IRF ED075C OPEN
  - IMF RP14A
  - IMF RP14B
  - IMF TC03
  - trgset 2 "ZDISIA1 .eq. 1"
  - trgset 3 " ZDISIA2 .eq. 1"
  - trgset 4 " ZDISIA1 .eq. 1"
  - trgset 5 " ZDISIA2 .eq. 1"
  - trg 2 "DMF RP14A"
  - trg 3 "DMF RP14B"
  - trg 4 "DMF RP14B"
  - trg 5 "DMF RP14A"
- Place info tags on 1B HD pump C/S and 1A CW pump C/S
- Provide students with turnover sheets, 1BwOS NR-1, and critical parameter sheet.

### Event 1: 1PR11J filter change

As rad protection, contact the MCR by phone (X-2209) shortly after completion of shift turnover and request shutdown of 1PR11J to obtain sample (change of particulate and iodine filter cartridges. The rad protection procedure governing the filter change is RP-BR-911).

Two minutes after 1PR11J is shutdown, contact the MCR by phone and request startup of 1PR11J. If asked, report the bypass/normal switch on 1PS36J CASP panel is in bypass. Following start of 1PR11J, provide MCR feedback that 1PR11J is operating properly.

Acknowledge as SM LCO 3.4.15, condition B entry for 1PR11J.

### Events 2: PZR level channel 1LT-459 fails high.

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

As SM, if requested support for tripping bistables in AEER, report that AEER bistables are not to be tripped until work analyst and NSO support can be obtained (in approx. 2 hours) and that the abnormal operating procedure should be continued. AEER bistable tripping will be conducted later.

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 3: 1A letdown HX tube leak.

Insert IMF CV23A 80 180 to initiate a 80 gpm tube leak in the 1A letdown HX over a 3 minute period.

Acknowledge as Chemistry request to sample CC system for activity.

If dispatched as Equipment Operator to swap letdown heat exchangers in accordance with BwOP CV-22, report 1B letdown HX was previously filled and vented, then perform and report the following when directed by the crew:

- MRF CC39 100 (open 1CC9452C, 1B letdown HX CC inlet isolation valve).
- Verify RF CC43 50 (throttle 1CC9452D, 1B letdown HX CC outlet isolation valve).
- Verify RF CV64 100 (open 1CV8467B, 1B letdown HX outlet isolation valve).
- MRF CC37 0 (close 1CC9452A, 1A letdown HX CC inlet isolation valve).
- MRF CC40 0 (close 1CC9452B, 1A letdown HX CC outlet isolation valve).
- MRF CV63 0 (close 1CV8467A, 1A letdown HX outlet isolation valve).

If dispatched as Equipment Operator to drain the CC surge tank, run **caep NRC 11-spare EVENT 4 DRAIN CCST** from disk and verify the following actuate:

- IRF CC15 100
- IRF CC16 100
- trgset 29 "CCLSRGTNKP(1) < 56"
- trg 29 "MRF CC15 0"
- trgset 30 "CCLSRGTNKP(1) < 56"
- trg 30 "MRF CC16 0"

Acknowledge as Chemistry request to sample letdown for placing letdown mixed bed demin back on line. Acknowledge as Shift Manager the failures, request for maintenance support, and IR request.

### Event 4: Main generator voltage regulator failure

Insert **IMF EG03 90 96 180** (start malfunction at 90 and ramp to 96 in 180 sec.) for main generator voltage regulator failed.

Acknowledge as SM voltage regulator failure, on line risk assessment, requests for maintenance and OAD support, and IR request.

Acknowledge as Power Team failure of generator voltage regulator.

### Event 5: 1A Heater Drain Pump trip

#### Insert IMF FW35A

As SM, acknowledge the failure, 1BwOA SEC-1 entry, request for E Plan evaluation, and requests for on line risk assessment, maintenance support, and IR initiation.

If dispatched as EO, report 1A Heater Drain pump is seized and report ground overcurrent flag at breaker cubicle.

If dispatched as Equipment Operator, report you will complete pump vent alignment per BwOP HD-2 for tripped pump.

### Events 6: PZR vapor space LOCA/ turbine auto trip failure / SI auto actuation failure

### Insert IMF TH01 0.5 30

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%

Scenario	NRC	11-spare Event 1			
INO. Event		1DD11 L filter obango			
Descripti	ion <sup>.</sup>				
Time	Time Position Applicant's Actions or Behavior				
	CUE	Request from RP to shutdown 1PR11J for filter change			
BOP • Refer to BwOP AR/PR-19, ROUTINE SKID MOUNTED PROCESS RADIATIC MONITOR OPERATIONS					
		Notify 03 of TERT 13 filler change request.     Socure 100111			
		Select Grid 2 on RM-11			
		Select 1PR11.1			
		<ul> <li>Depress flow button to secure 1PR11J.</li> </ul>			
	US	<ul> <li>Recognize entry conditions for TS LCO 3.4.15, condition B.</li> <li>Inform SM of TS 3.4.15 entry</li> </ul>			
	CUE	Request from RP to startup 1PR11J following filter change			
	BOP	Refer to BwOP AR/PR-19			
		Start 1PR11J			
		Select Grid 2 on RM-11			
		Select 1PR11J			
		<ul> <li>Depress flow button to start 1PR11J</li> </ul>			
		<ul> <li>Verify flow indicated on 1PR11J</li> </ul>			
		Notify US of completion of 1PR11J filter change			
	US	<ul> <li>Inform SM of TS 3.4.15 exit 90 minutes after 1PR11J is restarted and no associated alarms have occurred.</li> </ul>			
		NOTE: After the actions for 1PR11J are complete and with lead examiner concurrence, enter next event.			

Scenario NF	C 11-spare Event 2
Event	PZR level channel 11 T-459 fails high
Description:	
Time Positio	n Applicant's Actions or Behavior
CUE	<ul> <li>Annunciator 1-12-A3, PZR LEVEL HIGH RX TRIP STPT ALERT</li> <li>Annunciator 1-12-C3, PZR LEVEL CONT DEV HIGH HTRS ON</li> <li>Annunciator 1-9-D3, CHG LINE FLOW HIGH LOW</li> <li>PZR level and charging flow lowering.</li> </ul>
ATC	<ul> <li>Determine PZR level and/or charging header flow lowering at 1PM05J.</li> <li>Identify 1LI-459 is failing high.         <ul> <li>Report failure to US.</li> </ul> </li> <li>Perform the following at 1PM05J:         <ul> <li>Place 1LK-459, PZR master level controller, <u>OR</u> 1FK-121, CV pumps flow control valve, in manual.</li> <li>Raise demand on 1LK-459 <u>OR</u> 1FK-121 sufficiently to raise charging flow and PZR level.</li> </ul> </li> <li>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.</li> <li>Reference BwARs 1-12-A3/1-12-C3/1-9-D3.</li> </ul>
CREW	<ul> <li>Reference BwARs 1-12-A3/1-12-C3/1-9-D3.</li> <li>Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL.</li> </ul>
US	<ul> <li>Notify Shift Manager of plant status and procedure entry.</li> <li>Request evaluation of Emergency Plan conditions.</li> <li>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:</li> <li>Direct BOP/RO to stop load ramp/dilution.</li> </ul>
ATC	<ul> <li>Check PZR level at 1PM05J:</li> <li>PZR level – normal on 1LI-460 &amp; 1LI-461.</li> <li>Manually restore PZR level using 1LK-459 or 1FK-121.</li> <li>Select operable PZR level control channel:</li> <li>Place PZR level control select C/S to CH 461/460.</li> <li>Select operable PZR level channel for PZR level recorder at 1PM05J:</li> <li>Verify PZR level channel to recorder select switch in 460.</li> <li>Check letdown and PZR heaters at 1PM05J:</li> <li>Check PZR level &gt; 17% on 1LI-460 &amp; 1LI0461.</li> </ul>

Scenario NRC	11-spare Event 2				
No:	No.				
Event	Event PZR level channel 1LT-459 fails high.				
Description:					
Time Position	Applicant's Actions or Behavior				
	<ul> <li>Check letdown flow established:</li> <li>Check valve alignment.</li> <li>Letdown flow approximately 120 gpm on 1FI-132.</li> <li>Check PZR heaters:</li> </ul>				
	<ul> <li>Check PZR level control in auto at 1PM05J:</li> <li>Varifi / lease the following comparents in AUTO:</li> </ul>				
	<ul> <li>Verify/place the following components in AUTO:</li> <li>1LK-459, master PZR level controller.</li> <li>1FK-121, CV pumps flow control valve.</li> </ul>				
BOP	<ul> <li>Perform the following:         <ul> <li>Request operations support for tripping bistables.</li> <li>Assist US by making notifications.</li> <li>Refer to BwARs.</li> </ul> </li> </ul>				
US	<ul> <li>Determine TS 3.3.1, conditions A and K are applicable.</li> <li>Determine TS 3.3.3 and 3.3.4 are NOT applicable – minimum channels operable requirement is met.</li> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.</li> </ul>				
	<b>EVALUATOR NOTE:</b> After the actions for the pressurizer level channel failure are complete and with lead examiners concurrence, insert the next event.				

Scenari	o NRC	11-spare Event 3
Event		1A letdown HX tube leak
Descrip	tion <sup>.</sup>	
Time	Position	Applicant's Actions or Behavior
	CUE	<ul> <li>Annunciator 1-2-A5, CC SURGE TANK LEVEL HIGH/LOW</li> </ul>
		<ul> <li>1PR09J, CC HX OUTLET RAD MONITOR, alarming at the RM-11 console.</li> </ul>
		Letdown flow lowering on 1FI-132 at 1PM05J.
		CC surge tank level rising on 1LI-670 & 1LI-676 at 1PM06J.
		• 1CC017, CC surge tank vent valve, CLOSED at 1PM06J.
	CREW	Reference BwARs.
		Identify entry conditions for 1BwOA PRI-6, COMPONENT COOLING MALFUNCTION.
	US	Notify SM of plant status and procedure entry.
		Request evaluation of Emergency Plan conditions.
		Implement 1BwOA PRI-6, COMPONENT COOLING MALFUNCTION, and direct
		operator actions of 1BWOA PRI-6 to establish the following conditions:
	BOP	Check CC surge tank level at 1PM06J:
		<ul> <li>CC surge tank level &gt; 13% and rising on 1LI-670 &amp; 1LI-676.</li> </ul>
	US	Determine 1BwOA PRI-6, Attachment B, ABNORMAL CC SURGE TANK LEVEL, needs to be implemented
	BOP	Check CC surge tank level at 1PM06J:
		<ul> <li>CC surge tank level &gt; 13% and rising on 1LI-670 &amp; 1LI-676.</li> </ul>
		• Dispatch operators to drain CC surge tank.
	CREW	Check for leakage from RCP thermal barrier at 1PM05J:
		• Annunciator 1-7-E4, RCP THERM BARR CC WTR FLOW HIGH/LOW – NOT LIT.
		Seal injection flows stable on 1FI142A – 1FI-145A.
	CREW	Isolate CC system inleakage:
		<ul> <li>1PR09J, CC HX OUTLET RAD MONITOR, radiation level rising and/or alarming at</li> </ul>
		the RM-11 console.
		Notity chemistry to sample CC system.
		Determine leak exists in letdown heat exchanger.
		Letdown flow lowering on 1FI-132 at 1PM05J.
		VCI level lowering on 1LI-112/1LR-185 at 1PM05J.
		<ul> <li>Place TOV-TTZA, letdown to VOT or HUT divert valve, in the HUT position to divert letdown to the HUT.</li> </ul>
	ATC	Solate normal CV letdown at 1PM05 Lin accordance with BwOP CV-17
		ESTABLISHING AND SECURING NORMAL AND RH LETDOWN FLOW:

Scenario N	C 11-spare Event 3 No.
Event	1A letdown HX tube leak.
Description:	
Time Positi	n Applicant's Actions or Behavior
	<ul> <li>Close 1CV8149A, B, &amp; C, letdown orifice isolation valves.</li> <li>Close 1CV459 &amp; 1CV460, letdown line isolation valves.</li> <li>Close 1CV8152 &amp; 1CV8160, letdown line CNMT isolation valves.</li> <li>Place 1FK-121, CV pumps flow control valve, in manual and lower demand on 1FK-121 while concurrently adjusting 1CV182, charging header backpressure control valve, to control RCP seal injection 8-13 gpm per RCP.</li> <li>Close 1CV8105 &amp; 1CV8106, charging line CNMT isolation valves.</li> <li>Monitor RMCS during automatic VCT makeup:</li> <li>Proper flow indicated on PW/Total Flow (1FT-0111) and Boric Acid Flow (1FT-0110).</li> </ul>
	EVALUATOR NOTE: The crew may elect to leave the 1A letdown heat exchanger isolated place excess letdown on line. The steps for placing excess letdown on line are on page 15.
	<ul> <li>Swap letdown heat exchangers in accordance with BwOP CV-22, OPERATION OF LETDOWN &amp; REGEN HEAT EXCHANGERS:</li> <li>Contact operators to locally align and vent 1B letdown HX.</li> <li>Open 1CV8401B, letdown HX 1B inlet valve, at 1PM05J.</li> <li>Close 1CV8401A, letdown HX 1A inlet valve at 1PM05J.</li> <li>Contact operators to locally close 1CC9452A &amp; B, letdown HX 1A CC inlet and outlet isolation valves.</li> <li>Contact operators to locally close 1CV8467A.</li> </ul>
ATC/ BOP	<ul> <li>Perform the following at 1PM05J to establish normal letdown flow through the 1B letdown heat exchanger in accordance with BwOP CV-17, ESTABLISHING AND SECURING NORMAL AND RH LETDOWN FLOW: (N/A if excess letdown established)</li> <li>Verify/close 1CV8149A, B, &amp; C, letdown orifice isolation valves.</li> <li>Contact operators to locally verity CC locally aligned to 1B letdown HX.</li> <li>Place 1PK-131, letdown line pressure controller, in manual and raise demand to 40%.</li> <li>Place 1CC-130A, letdown HX outlet temperature controller, in manual and raise demand to 60%.</li> <li>Open 1CV459 &amp; 1CV460, letdown line isolation valves.</li> <li>Open 1CV8324A, charging to regen HX 1A isolation valve.</li> <li>Open 1CV8152 &amp; 1CV8160, letdown line CNMT isolation valves.</li> <li>Verify OFF light is lit above BTRS mode selector C/S.</li> <li>Verify/open 1CV8401B, letdown HX 1B inlet valve.</li> </ul>

Scenario NF	C 11-spare Event 3				
No:	No.				
Event	1A letdown HX tube leak.				
Description:					
Time Positic	sition Applicant's Actions or Behavior				
	<ul> <li>Verify/closed 1CV8147, PZR aux spray valve.</li> <li>Verify/open 1CV8145, charging to loop 1A isolation valve.</li> <li>Open 1CV8105 &amp; 1CV8106, charging line CNMT isolation valves.</li> <li>Control 1FK-121, CV pumps flow control valve, in manual to raise letdown flow to 100 gpm while concurrently adjusting 1CV182, charging header backpressure control valve, to control RCP seal injection 8-13 gpm per RCP.</li> <li>Open 1CV8149A/B/C, letdown orifice isolation valves, as necessary to establish desired letdown flow while concurrently and controlling 1PK-131, letdown line pressure controller, in manual to maintain letdown pressure 360-380 psig.</li> <li>Control 1CC130A, letdown HX outlet temperature controller, in manual to maintain letdown temperature 90-115°F.</li> <li>Place 1FK-121, 1PK-131 &amp; 1CC130A in auto.</li> <li>Verify 1PR06J in service at the RM-11 console.</li> </ul>				
BOP	<ul> <li>Perform the following at 1PM05J to establish excess letdown flow in accordance with BwOP CV-15, EXCESS LETDOWN OPERATIONS: (N/A if normal letdown established)</li> <li>Verify/open 1CV8100 &amp; 1CV8112, seal water return CNMT isolation valves, at 1PM05J.</li> <li>Open 1CC9437A &amp; 1CC9437B, CC to excess letdown HX isolation valves, at 1PM06J.</li> <li>Verify/close (at 0% demand) 1HCV-CV123, excess letdown HX flow control valve, at 1PM05J.</li> <li>Verify/place in VCT position 1CV8143, excess letdown to seal filter or RCDT valve, at 1PM05J.</li> <li>Open 1RC8037A, B, C, &amp; D, RCS loop drain valves, at 1PM05J.</li> <li>Open 1CV8153A &amp; 1CV8153B, excess letdown HX 1A &amp; 1B inlet isolation valves, at 1PM05J.</li> <li>Raise demand on 1HCV-CV123, excess letdown HX flow control valve, while maintaining excess letdown outlet temperature &lt; 165°F on 1TI-122A at 1PM05J.</li> </ul>				
US	<ul> <li>Inform SM/Maint of 1A letdown HX leak, IR, EAL evaluation, and contact maintenance to investigate/correct letdown HX leak.</li> <li>Evaluate tech spec 3.4.13 for applicability.</li> </ul>				
	EVALUATOR NOTE: After the actions for letdown heat exchanger leak are complete and with lead examiners concurrence, enter next event.				

Scenario	o NRC	11-spare Event 4				
No:		No.				
Event		Generator voltage regulator failure				
Descript	ION: Desition	Applicant's Actions or Debayier				
Time	Position	Applicant's Actions of Benavior				
	CUES	<ul> <li>Annunciator GENERATOR FIELD FORCING (1-19-B6)</li> </ul>				
		<ul> <li>1IIMP023, Exciter Field Current, rising.</li> </ul>				
		<ul> <li>1VIMP006, Main Generator Output VARS, rising.</li> </ul>				
	CREW	Refer to BwARs				
		Determine generator voltage regulator failing.				
	US	Direct/Ensure BOP takes manual control of generator voltage regulator and lowers				
		generator field current.				
		<ul> <li>Inform SM of voltage regulator failure.</li> </ul>				
		<ul> <li>Direct BOP/RO to stop load ramp/dilution</li> </ul>				
	BOP	Perform the following at 1PM01J:				
		Place voltage regulator to off.				
		Place base adjuster to lower.				
		<ul> <li>Lower exciter field to &lt; 100 amps prior to main generator trip.</li> </ul>				
	CREW	Refer to 1BwGP 100-3A6 and 1BwGP 100-3A7 for generator MW, and generator				
		VARS within limits				
	BOP	Maintain generator field current, generator MW, and generator VARS within limits by				
		operating the base adjuster.				
	US	Contact SM to perform risk assessment, initiate IR, and contact additional personnel				
		to investigate/correct instrument failure.				
		Notify Power Team of voltage regulator failure.				
		EVALUATOR NOTE: After the actions for voltage regulator failure are complete and				
		with lead examiner concurrence, enter next event.				

Scenario	NRC	11-spare Event 5		
Event		1A Heater Drain Pump trip		
Descriptio	on:			
Time I	ne Position Applicant's Actions or Behavior			
	CUE	<ul> <li>Annunciator HD PUMP TRIP (1-17-D2)</li> <li>HD Tank level rising</li> <li>HD Pump discharge valves opening</li> </ul>		
E	BOP	<ul> <li>Recognizes 1A HD pump tripped</li> <li>Refer to BwAR 1-17-D2 as time permits</li> <li>Reports failure to US</li> <li>Recognizes one Heater Drain Pump running</li> </ul>		
(	CREW	<ul> <li>Identify entry conditions for 1BwOA SEC-1, "SECONDARY PUMP TRIP"</li> </ul>		
l	US	<ul> <li>Acknowledge 1A HD pump trip</li> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct failure</li> <li>Implement 1BwOA SEC-1, "SECONDARY PUMP TRIP" Attachment C "HD PUMP TRIP" and direct operator actions of 1BwOA SEC-1 to establish the following conditions.</li> </ul>		
E	BOP	<ul> <li>Recognizes standby HD pump NOT AVAILABLE</li> <li>Check HD pump status</li> <li>ONLY 1C HD pump running</li> <li>Initiate turbine load reduction to 780 MW at 20 MW/min</li> <li>Initiate HD runback on OWS graphic 5512 <ul> <li>Verify turbine load lowering</li> </ul> </li> </ul>		
E	BOP	<ul> <li>Check HD Tank level</li> <li>Level &gt; 72% and rising</li> <li>Maintain HD tank level</li> <li>Verify 1HD046A &amp;B in AUTO</li> <li>Open 1CB113A-D</li> <li>Manually open 1HD117, HD tank overflow valve</li> <li>Lower turbine load as necessary to maintain HD tank level &lt;72%</li> <li>Check 1HD117, HD tank overflow valve in auto and closed</li> <li>Lower turbine load as necessary to close 1HD117</li> <li>Check 1C HD pump parameters</li> <li>1C HD pump flow &lt; 2950 KLB/HR</li> <li>Lower turbine load as necessary to restore 1C HD pump parameters</li> </ul>		

Scenario NRC	<b>11-spare</b> Event 5 No.
Event	1A Heater Drain Pump trip
Description:	
Time Position	Applicant's Actions or Behavior
	Deactivate turbine runback.
US/ ATC	<ul> <li>Check PDMS operable</li> <li>Annunciator PDMS INOPERABLE not lit (1-10-E8)</li> <li>1BwOS PDMS-1A not implemented</li> <li>Annunciator PDMS LIMIT EXCEEDED not lit (1-10-D7)</li> </ul>
ATC	<ul> <li>Control ∆I near target</li> <li>Operate control rods in manual to restore ∆I near target</li> <li>Monitor RCS parameters</li> <li>If RCS pressure lowers &lt; 2209 psig, notify US to enter TS 3.4.1, RCS DNB Limits</li> <li>If control rods &lt; low – 2 rod insertion limit, notify US to enter TS 3.1.6, Control Bank Insertion Limits</li> </ul>
ATC	<ul> <li>Initiate RCS boration         <ul> <li>Determine required boric acid volume (approximate band: 50 gal – 300 gal)</li> <li>Determine from ReMa</li> <li>Determine desired boric acid flow rate</li> <li>Set 1FK-110 BA Flow Control to desired boration rate</li> <li>Set 1FY-0110 BA Blender Predet Counter to desired volume.</li> <li>Place MAKE-UP MODE CONT SWITCH to STOP position</li> <li>Place MAKE-UP MODE CONT SWITCH to START</li> <li>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).</li> <li>Turn on PZR backup heaters in accordance with BwOP RY-14, PRESSURIZER BACKUP HEATER OPERATION.</li> </ul> </li> <li>OR</li> <li>Batch addition of Boric Acid:         <ul> <li>Open 1CV110B</li> <li>Open 1CV110A</li> <li>Start the BA Transfer pump</li> <li>When desired amount of BA has been added, stop the BA Transfer Pump</li> <li>Close 1CV110B</li> <li>Olose 1CV110B</li> <li>May flush boric acid lines per BwOP CV-6 step. F.5.</li> </ul> </li> </ul>
BOP	Verify running CB pump recirc valves in auto

Scenari	o NRC	11-spare	Event	5	
No:			No.		
Event		1A Heater	Drain Pump tr	р	
Descrip	tion:				
Time	Position			ŀ	Applicant's Actions or Behavior
		<ul><li>1CB113</li><li>Dispato</li><li>Shutdo</li></ul>	3A-D on runni h operators to wn CD/CB pu	ng pu perfo np (if	mps orm BwOP HD-2 for 1A HD pump started during procedure performance)
	US	<ul> <li>Notify c</li> <li>Notify S</li> <li>Check c</li> <li>Notify c</li> <li>Notify c</li> <li>Notify r</li> <li>Refer tc</li> <li>Determ insertio</li> </ul>	hemistry to m SM to perform reactor power hemistry to per ad protection D BwOP FW-2 ine TS 3.1.6, n limit	onitor risk a chan erform o per 6 to e condi	r secondary plant chemistry assessment ge > 15% in one hour n TS 3.4.16 sampling form RETS 12.4.1.A sampling evaluate FW venturi fouling tion A entry required if control rods below low – 2 rod
		The next e adequately during latt load that a	vent to be in: / addressed t er part of the illows HD tan	serte he H turb k ove	d when the Lead Examiner is satisfied the crew has D pump trip. Suggest the malfunction be inserted ine runback when crew is attempting to find a turbine erflow valve to be closed.

Scenario	o NRC	11-spare Event 6 & 7		
No:				
Event PZR vapor space LOCA/turbine auto trip failure/ auto SI failure				
Time Desition Applicant's Actions or Rebaylor				
TITLE	Applicant's Actions of Benavior			
	CUE	<ul> <li>Annunciator 1-12-C1, PZR PRESS CONT DEV LOW/ HTRS ON</li> <li>Lowering PZR pressure.</li> </ul>		
	CREW	<ul> <li>Identify entry conditions for 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION.</li> <li>Trip reactor.</li> </ul>		
	US	<ul> <li>Notify SM of plant status and procedure entry.</li> <li>Request evaluation of Emergency Plan conditions.</li> <li>Enter/Implement 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION, and direct operator actions of 1BwEP-0 to establish the following conditions:</li> </ul>		
	ATC	<ul> <li>Perform immediate operator actions of 1BwEP-0 at 1PM05J:</li> <li>Verify reactor trip.</li> <li>Rod bottom lights - ALL LIT.</li> <li>Reactor trip &amp; Bypass breakers – OPEN.</li> <li>Neutron flux – DROPPING.</li> </ul>		
	BOP [CT] E-0Q	<ul> <li>Perform immediate operator actions of 1BwEP-0 at 1PM02J or Operator Work Station drop 210 (DEH computer terminal located behind Unit 1 desk):</li> <li>Verify Turbine Trip.</li> <li>All Turbine throttle valves – OPEN.</li> <li>All Turbine governor valves – OPEN.</li> <li>Manually trip the turbine:</li> <li>Depress turbine trip pushbutton at 1PM02J.</li> <li>Select turbine trip at Operator Work Station drop 211 at 1PM02J.</li> <li>Select turbine trip at Operator Work Station drop 210 (DEH computer terminal located behind Unit 1 desk).</li> </ul>		
	BOP	<ul> <li>Perform immediate operator actions of 1BwEP-0 at 1PM01J:</li> <li>Verify power to 4KV busses.</li> <li>ESF Buses – BOTH ENERGIZED (141 &amp; 142).</li> </ul>		
	CREW	<ul> <li>Perform immediate operator actions of 1BwEP-0 at 1PM04J, 1PM05J, &amp; 1PM06J:</li> <li>Check SI actuated at 1PM05J and 1PM06J:</li> <li>Annunciator 1-11-C1, PZR PRESS LO SI/RX TRIP – LIT.</li> <li>STEAMLINE LOW PRESS SI/RX TRIP – LIT.</li> </ul>		

Scenario	NRC	11-spare Event 6 & 7
Event		PZR vanor space LOCA/turbine auto trin failure/ auto SI failure
Description:		
Time	Position	Applicant's Actions or Behavior
	[CT] E-0D	<ul> <li>SI ACTUATED Bypass Permissive – LIT.</li> <li>SI equipment automatically actuated:</li> <li>1A or 1B SI pump – NOT RUNNING.</li> <li>1SI8801A or B, CV pump cold leg injection valve – OPEN.</li> <li>Check if SI required:</li> <li>PZR pressure cannot be maintained &gt; 1829 psig.</li> <li>Steamline pressure &lt; 640 psig.</li> <li>Containment pressure &gt; 3.4 psig.</li> <li>Manually actuate SI.</li> </ul>
	US	Direct BOP to perform Attachment B of 1BwEP-0
		EVALUATOR NOTE: US and RO will continue in 1BwEP-0 while BOP is performing Attachment B:
		EVALUATOR NOTE: RCPs should be tripped when the crew identifies RCP trip criteria per 1BwEP-0 OAS.
	BOP	<ul> <li>Verify FW isolated at 1PM04J:</li> <li>FW pumps – TRIPPED.</li> <li>Isolation monitor lights – LIT.</li> <li>FW pumps discharge valves - CLOSED (or going closed) 1FW002A-C.</li> <li>Verify DGs running at 1PM01J:</li> <li>DGs – BOTH RUNNING.</li> <li>1SX169A/B OPEN.</li> <li>Dispatch operator locally to check operation</li> <li>Verify Generator Trip at 1PM01J:</li> <li>OCB 1-8 and 7-8 open.</li> <li>PMG output breaker open.</li> <li>Verify Control Room ventilation aligned for emergency operations at 0PM02J:</li> <li>VC Rad Monitors – LESS THAN HIGH ALARM SETPOINT.</li> <li>Operating VC train equipment – RUNNING.</li> <li>0B Supply fan</li> <li>0B Return fan</li> <li>0B M/U fan</li> <li>0B Chilled water pump</li> <li>0B Chiller</li> <li>Operating VC train dampers – ALIGNED.</li> <li>M/U fan outlet damper – 0VC08Y NOT FULLY CLOSED.</li> <li>0B VC train M/U filter light – LIT.</li> </ul>

Scenario	D NRC	11-spare Event 6 & 7
No:		No.
Event		PZR vapor space LOCA/turbine auto trip failure/ auto SI failure
Descript	tion:	
Time	Position	Applicant's Actions or Behavior
		<ul> <li>OVC09Y - OPEN</li> <li>OVC313Y - CLOSED</li> <li>Operating VC train Charcoal Absorber aligned for train B.</li> <li>OVC44Y - CLOSED</li> <li>OVC05Y - OPEN</li> <li>OVC06Y - OPEN</li> <li>Control Room pressure greater than +0.125 inches water on 0PDI-VC038.</li> <li>Verify Auxiliary Building ventilation aligned at 0PM02J:</li> <li>Two inaccessible filter plenums aligned.</li> <li>Plenum A:</li> <li>OVA03CB - RUNNING</li> <li>OVA03CB - RUNNING</li> <li>OVA03CE RUNNING</li> <li>OVA067Y - OPEN</li> <li>OVA052Y - CLOSED</li> <li>Verify FHB ventilation aligned at 0PM02J:</li> <li>OVA055Y - OPEN</li> </ul>
	ATC	<ul> <li>Notify US Attachment B complete</li> <li>Verify ECCS pumps running at 1PM05J/1PM06J:</li> <li>BOTH CV pumps – RUNNING.</li> <li>BOTH RH pumps – RUNNING.</li> </ul>
		BOTH SI pumps – RUNNING.
	ATC	<ul> <li>Verify RCFCs running in Accident Mode:</li> <li>Accident Mode lights – ALL LIT at 1PM06J.</li> </ul>
	ATC / BOP	<ul> <li>Verify Phase A isolation:</li> <li>Group 3 CNMT isolation monitor lights – ALL LIT at 1PM06J.</li> </ul>
	ATC / BOP	<ul> <li>Verify Cnmt Vent isolation:</li> <li>Group 6 Cnmt Vent Isol monitor lights – ALL LIT at 1PM06J.</li> </ul>
	ATC / BOP	<ul> <li>Verify AF system at 1PM06J:</li> <li>AF pumps – BOTH RUNNING.</li> </ul>

Scenario	D NRC	11-spare Event 6 & 7		
No:		No.		
Event PZR vapor space LOCA/turbine auto trip failure/ auto SI failure				
Descript		Anglisse Ve Astisues on Debenier		
Time	Position	Applicant's Actions or Benavior		
		<ul> <li>1B AF pump – RUNNING.</li> <li>AF isolation valves – OPEN.</li> <li>1AF13A-H</li> <li>AF flow control valves – THROTTLED</li> <li>1AF005A-H - throttled</li> </ul>		
	ATC / BOP	<ul> <li>Verify CC pumps at 1PM06J:</li> <li>CC pumps – BOTH RUNNING.</li> </ul>		
	ATC / BOP	<ul> <li>Verify SX pumps at 1PM06J:</li> <li>BOTH SX pump – RUNNING.</li> </ul>		
	ATC / BOP	<ul> <li>Check if Main Steamline Isolation required at 1PM06J:</li> <li>All SG pressure &gt; 640 psig. Containment pressure &lt; 8.2 psig</li> </ul>		
	ATC/ BOP	<ul> <li>Check if CS is required at 1PM06J:</li> <li>CNMT pressure has not risen &gt; 20 psig.</li> </ul>		
	BOP/ ATC	<ul> <li>Verify Total AF flow at 1PM06J:</li> <li>AF flow &gt; 500 gpm.</li> <li>S/G NR levels – NOT rising in an uncontrolled manner.</li> </ul>		
	ATC/ BOP	<ul> <li>Note: the following task may have been performed earlier per note on page 18</li> <li>Verify ECCS valve alignment at 1PM06J: <ul> <li>Group 2 Cold Leg Injection monitor lights required for injection – ALL LIT.</li> </ul> </li> <li>Verify ECCS flow at 1PM05J: <ul> <li>High Head SI flow &gt;100 gpm (1FI-917).</li> <li>RCS pressure &gt; 1700 psig.</li> </ul> </li> </ul>		
	ATC	<ul> <li>Check PZR PORVs and spray valves at 1PM05J:</li> <li>PORV isolation valves: <ul> <li>1RY8000A &amp; B – ENERGIZED</li> </ul> </li> <li>PORV relief paths: <ul> <li>1RY455A &amp; 456– C/S in AUTO</li> <li>1RY8000A &amp; B – OPEN</li> <li>1RY455B &amp; 1RY455C - CLOSED</li> </ul> </li> </ul>		

## Comments:\_\_\_\_\_

Scenari	o NRC	11-spare Event 6 & 7
No:		No.
Event		PZR vapor space LOCA/turbine auto trip failure/ auto SI failure
Descrip	tion:	
lime	Position	Applicant's Actions or Behavior
	ATC	<ul> <li>Maintain RCS temperature control at 1PM05J:</li> <li>RCPs – NONE RUNNING: (If RCPs were tripped per OAS page)</li> <li>Verify RCS average temperature stable at or trending to 557°F.</li> <li>Throttle AF flow.</li> </ul>
	ATC	<ul> <li>NOTE: this step may have been performed earlier per OAS summary page of 1BwEP-0.</li> <li>Check status of RCPs at 1PM05J:</li> <li>RCPs – NONE RUNNING: (If RCPs were tripped per OAS page).</li> <li>Hi Head SI flow &gt; 100 gpm</li> <li>RCS Pressure &lt; 1425 psig</li> <li>STOP ALL RCPs</li> </ul>
	BOP/ ATC	<ul> <li>Check if SG secondary pressure boundaries are intact at 1PM04J:</li> <li>Check pressure in all SGs: <ul> <li>None dropping in an uncontrolled manner.</li> <li>None completely depressurized.</li> </ul> </li> </ul>
	ATC/ BOP	<ul> <li>Check secondary radiation normal</li> <li>Check Secondary trends at RM-11 or PPC:</li> <li>1PR08J SG Blowdown.</li> <li>1PR27J SJAE/GS.</li> <li>1AR 22/23A-D Main steam lines.</li> </ul>
	BOP	Check if RCS is intact     CNMT Area Rad monitors - ABOVE ALERT Setpoint
	CREW	Transition to 1BwEP-1, LOSS OF REACTOR OR SECONDARY COOLANT.

Scenario NRC 11-1 Event 8				
No:		No.		
Event PZR vapor space LOCA				
Descript	tion:	Applicant's Astisps on Datavian		
Time	Position	Applicant's Actions of Benavior		
	US	<ul> <li>Notify SM of plant status and procedure entry.</li> <li>Request evaluation of Emergency Plan conditions.</li> <li>Request STA evaluation of status trees.</li> <li>Enter/Implement 1BwEP-1 and direct operator actions of 1BwEP-1 to establish the following conditions:</li> </ul>		
	ATC	<ul> <li>NOTE: this step may have been performed earlier per OAS summary page of 1BwEP-0.</li> <li>Check status of RCPs at 1PM05J:</li> <li>RCPs – NONE RUNNING: (If RCPs were tripped per OAS page)</li> <li>Hi Head SI flow &gt; 100 gpm</li> <li>RCS Pressure &lt; 1425 psig</li> <li>STOP ALL RCPs</li> </ul>		
	ATC/ BOP	<ul> <li>Check if SG secondary pressure boundaries are intact at 1PM04J:</li> <li>Check pressure in all SGs:</li> <li>None dropping in an uncontrolled manner.</li> <li>None completely depressurized.</li> </ul>		
	ATC/ BOP	<ul> <li>Check intact SG levels at 1PM04J:</li> <li>SG levels maintained between 10% (31%) and 50%.</li> <li>S/G NR levels – NOT rising in an uncontrolled manner.</li> </ul>		
	ATC/ BOP	<ul> <li>Check secondary radiation normal</li> <li>Reset Phase A.</li> <li>OPEN 1SD005A-D at 1PM11J</li> <li>Contact Chemistry for SG sampling.</li> <li>Check Secondary trends at RM-11 or PPC:</li> <li>1PR08J SG Blowdown.</li> <li>1PR27J SJAE/GS.</li> <li>1AR 22/23A-D Main steam lines.</li> </ul>		
	ATC	<ul> <li>Check PZR PORVs and isolation valves at 1PM05J:</li> <li>PORV isolation valves – 1RY8000B Energized but not responding.</li> <li>PORVs – BOTH OPEN</li> <li>PORV isolation valves – 1RY8000A previously CLOSED</li> </ul>		
	ATC/ BOP	<ul> <li>Check if ECCS flow should be reduced at 1PM05J:</li> <li>RCS subcooling – NOT acceptable.</li> </ul>		

Scenario No:	NRC 11-1	Event No.	8
Event Description:	PZR vapo	r space LOCA	
	NOTE: So	enario is termi	inated at this point

(Final)

Simulatior	n Facility Braidwood s:	So No <b>Ni</b> Ap	cenario ).: <b>RC 11-5</b> oplicant:	Operating Test No.: 2011 NRC EXAM SRO ATC BOP
Initial Con	ditions: IC-13			
Turnover:	The unit is at 17% power, xence Turbine is at 1775 rpm ready for of turnover, the Shift Manager F.22.p, turbine trip test. 1BwOS another operator who has also synchronization.	on building in, B or turbine trip te directs the crev S TRM 3.3.g.3 been briefed to	OL, at 1By est. Online v to perform and 3.3.g.4 o take over	wGP 100-3 step 22. The main risk is green. Following completion m 1BwGP 100-3, step F.22.a through will be performed concurrently by at step F.22.q. for the turbine
Event	Malf. No.	Event		Event
Preload	IOR ZDI1WO056A OPEN IRF RP29 OUT IRF RP37 OUT IMF MS01A 100 IMF MS01B 100 IMF MS01C 100 IMF MS01D 100 IMF CC02B 200 IMF CS01B IMF PN0686 OFF		Fail 1WC Slave rela Slave rela MSIVs fa 1B CC pt 1B CS pt Turn off I	Description 0056A open ay for train A Phase A valves ay for train A CS valves il to close ump pressure switch failed high ump trip Drop 2 Sys. Trouble alarm
1	None	N-BOP, US	Turbine (	Overspeed trip test
2	IMF CV05 600 5	I-ATC, US	Letdown output fa	line pressure controller 1PK-CV131 ils high
3	IMF RX06K 0 15	I-BOP, US TS-US	1C SG N	R level transmitter 1LT-539 fails low
4	IMF CC01B	C-BOP, TS-US	1A comp compone switch fa	onent cooling pump trip with 1B ent cooling pump discharge pressure ilure
5	IMF MS07D 4.0 30	M-ALL	Uncontro generato	Iled depressurization of all steam
6	Preload		CS syste	m failure to actuate

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

### SCENARIO OVERVIEW

The unit is at 17% power, xenon building in, BOL, at 1BwGP 100-3 step 22. The main Turbine is at 1775 rpm ready for turbine trip test. Online risk is green. Following completion of turnover, the Shift Manager directs the crew to perform 1BwGP 100-3, step F.22.a through F.22.p, turbine trip test. 1BwOS TRM 3.3.g.3 and 3.3.g.4 will be performed concurrently by another operator who has also been briefed to take over at step F.22 q. for the turbine synchronization.

**After completing shift turnover and relief,** the BOP will perform the turbine trip test per 1BwGP 100-3, step F.22.a thru F.22.p.

**After the turbine trip test is complete,** letdown pressure controller 1PK-131 output will fail high. The letdown PCV will close and letdown pressure will rise lifting the letdown line relief valve. The ATC will take manual control of letdown pressure controller and restore letdown pressure. The crew may isolate letdown due to the lifting letdown relief valve. If letdown is isolated, it will be restored per BwOP CV-17. US may choose to enter tech spec 3.4.13 and then exit when relief resets, or remain in tech spec until a RCS leakrate can verify no leakage.

**After the 1PK-131 failure is addressed,** 1C SG NR level transmitter 1LT-539 will fail low. 1FW530A, Feedwater Regulating Bypass Valve, will open fully and 1C SG level will rise. The BOP will take manual control of 1C SG level and stabilize 1C SG level. 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment E, will be implemented. The BOP will restore 1C SG level control to automatic after 1C SG level is restored to normal and an operable 1C SG NR level controlling channel is selected. Technical specifications 3.3.1, conditions A and E and 3.3.2, conditions A and D are applicable.

**After the 1LT-539 failure is addressed,** the 1A component cooling water pump will trip. When the 1A CC pump trips, the 1B and 0 CC pumps will not automatically start on low system discharge pressure due the 1B CC pump discharge pressure switch being failed high. The crew will manually start a standby CC pump, either the 1B or 0 CC pump, to restore system flow and dispatch operators to investigate the malfunctions. If the 1A CC pump control switch is placed in PTL prior to manually starting a standby pump, the U-0 CC pump will automatically start. Technical specification 3.7.7, condition B applies until the 1A CC pump is placed in PTL (U-0 CC pump then becomes operable).

After the 1A CC pump trip is addressed, the 1D MS line ruptures inside containment. While performing the actions of 1BwEP-0, the crew should note the failure of a Phase A slave relay and manually align valves to close the WO containment penetrations. When containment pressure reaches 20 psig, Phase B actuates but the CS pumps do not start. The crew should manually realign the train A CS valves, which will start the 1A CS pump. Operators should transition to 1BwEP-2 and recognize that the MSIVs have failed to close and that an uncontrolled depressurization of all SGs is in progress. The crew should transition to 1BwCA-2.1 where they will throttle AF flow to the SGs, terminate SI and restore normal charging and letdown. An entry into 1BwFR-P.1 may be required as directed by the status trees.

Completion criteria is checking RCS subcooling per step 21 in 1BwCA-2.1 or completion of 1BwFR-P.1, step 21.

### Critical Tasks

- 1. Manually close Phase A valves before transition out of 1BwEP-0 (UFSAR 15.1) (K/A number 013000A4.01, importance 4.5/4.8)
- Manually actuate one train of containment spray prior to transition out of 1BwEP-0. (ERG Critical Task number - E-0--E) (K/A number - 013000A4.01, importance - 4.5/4.8)
- 3. Manually lower AF flow to 45 gpm for each SG prior to completion of step 2 of 1BwCA-2.1. (ERG Critical Task number ECA-2.1--A) (K/A number 0WE12EA1.3 importance 3.4/3.9)

### SIMULATOR SETUP GUIDE:

- Verify/perform TQ-BR-201-0113, BRAIDWOOD TRAINING DEPARTMENT SIMULATOR EXAMINATION SECURITY ACTIONS CHECKLIST.
- Establish the conditions of IC-13, 17% power, xenon building.
- 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.
- Run caep NRC 11-5 SETUP from disk and verify the following actuate:
  - IOR ZDI1WO056A OPEN
  - IRF RP29 OUT
  - IRF RP37 OUT
  - IMF MS01A 100
  - IMF MS01B 100
  - IMF MS01C 100
  - IMF MS01D 100
  - IMF CC02B 200
  - IMF CS01B
- 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.

### Event 1: Turbine Overspeed trip test.

Acknowledge as Shift Manager commencement and completion of test.

If contacted to coordinate performance of 1BwOS TRM 3.3.g.3 and 1BwOS TRM 3.3.g.4, inform crew that another extra NSO will perform the surveillances.

If contacted about zeroing of governor valve position limits, inform crew that governor valves positions have previously been zeroed and it will **not** be necessary to re-perform.

If contacted about continuing with turbine start up, inform crew that another NSO is being briefed for proceeding at step F.22.q.

### Event 2: Letdown line pressure controller 1PK-CV131 output fails high.

Insert IMF CV05 600 5 for 1PK-131 failure.

If dispatched as EO to investigate 1PT-131, wait three minutes and report no visible damage to 1PT-131.

If dispatched as EO to align excess letdown to the top of the VCT, insert the following:

- MRF CV26 100 to open 1CV8482
- MRF CV27 0 to close 1CV8484

Acknowledge as SM 1PK-131 failure, on line risk assessment, requests for maintenance support, and IR requests.

### Event 3: 1C SG NR level transmitter 1LT-539 fails low.

Insert **IMF RX06K 0 15** to fail 1LT-539 low over a 15 second period.

As SM, if requested support for tripping bistables in AEER, report that AEER bistables are not to be tripped until work analyst and NSO support can be obtained (in approx. 2 hours) and that the abnormal operating procedure should be continued. AEER bistable tripping will be conducted later.

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

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 RX063 TRIP (trip SG 3 P14 bistable LB539A).
- MRF RX064 TRIP (trip SG 3 Lo-2/AF pump start bistable LB539B).
- 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 on line risk assessment, request for IR, evaluation for reactivity screening, QNE and personnel notifications, and evaluation of continuing power operation.

# Event 4: 1A component cooling pump trip with 1B component cooling pump discharge pressure switch failure.

Insert **IMF CC01B** to trip the 1A CC pump.

If dispatched as Equipment Operator to 1A CC pump and/or breaker, report phase A overcurrent present at pump breaker/no visible damage to pump locally.

If dispatched as Equipment Operator to 1B or 0 CC pump, report pump parameters normal.

If dispatched as Equipment Operator to 1PS-CC673B, report no visible damage to pressure switch.

Acknowledge as Equipment Operator/Field Supervisor request to align 0 CC pump to Bus 141.

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

### Events 5 & 6: Uncontrolled depressurization of all SGs

Insert IMF MS07D 4.0 30 to fault the 1D SG inside containment.

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

If dispatched as local operator to investigate the breaker for 1WO056A (valve located inside containment), wait approximately 2 minutes and report that the breaker is closed (MCC 132X2 Cub. 2).

After STA requested, as STA report CSF status: yellow on heat sink until AF flow lowered < 500 gpm, then report red on heat sink. Do not report orange path on containment pressure

Scenario	NRC <sup>·</sup>	11-5 Event 1
No:		No.
Event		Turbine Overspeed Trip Test
Description:	1: 	
Time Po	osition	Applicant's Actions or Behavior
CU	UE	<ul> <li>From turnover, perform Turbine Overspeed Trip Test per 1BwGP 100-3 steps F.22.a thru p.</li> </ul>
US	S	<ul> <li>Directs BOP to perform turbine overspeed trip test.</li> <li>Perform pre-job brief per HU-AA-1211 "PRE-JOB, HEIGHTENED LEVEL OF AWARENESS, INFREQUENT PLANT ACTIVITY, AND POST JOB BRIEFINGS" for load ramp.</li> </ul>
CR	REW	<ul> <li>Review Precautions, and Limitations and Actions, if not already performed during pre- job brief.</li> </ul>
BC	OP	<ul> <li>Test turbine overspeed trip at 1PM02J or OWS drop 210 by performing the following:</li> <li>Select ENABLE ETS 1800 RPM TRIP TEST.</li> <li>Select EXECUTE.</li> <li>Verify TRIP SETPOINT window value changes to 1800.0.</li> <li>Select SETPOINT.</li> <li>Enter 1805 into REF DEMAND window.</li> <li>Verify 1805 appears in REF DEMAND window.</li> <li>Select ENTER.</li> <li>Enter 20 (or less) into the RATE window.</li> <li>Select ENTER.</li> <li>Verify correct value appears in RATE window.</li> <li>Select EXIT.</li> <li>Notify US and RO of pending test.</li> <li>Select GO/HOLD.</li> <li>Verify GO/HOLD button illuminates.</li> <li>Verify GO illuminates RED.</li> <li>Select GO.</li> <li>Verify turbine trips at approx. 1800 RPMs.</li> <li>Verify all turbine control valves have CLOSED.</li> <li>When turbine speed is less than 1700 RPMs perform the following:</li> <li>Select EXIT.</li> <li>Select CVPL up arrow until display indicates 120%.</li> <li>Select EXIT.</li> <li>Select EXIT.</li> <li>Select EXIT.</li> <li>Select EXIT.</li> <li>Select LIMITERS field.</li> <li>Select EXIT.</li> <li>Select EXIT.</li> <li>Select EXIT.</li> <li>Select EXIT.</li> <li>Select EXIT.</li> <li>Select EXIT.</li> <li>Select CVPL up arrow until display indicates 120%.</li> <li>Select EXIT.</li> </ul>

Scenari	o NRC	<b>11-5</b> Event 1
No:		No.
Event		Turbine Overspeed Trip Test
Descrip	tion:	
Time	Position	Applicant's Actions or Behavior
		<ul> <li>Verify TURBINE TRIPPED field turns grey.</li> <li>Verify TURBINE LATCHED and REARM FROM TRIP fields turn green.</li> <li>Verify turbine speed stabilizes.</li> <li>Select SETPOINT.</li> <li>Enter 1700 into REF DEMAND window.</li> <li>Verify 1700 appears in REF DEMAND window.</li> <li>Select ENTER.</li> <li>Enter 50 (or less) into the RATE window.</li> <li>Select ENTER.</li> <li>Verify correct value appears in RATE window.</li> <li>Select EXIT.</li> <li>Select GO/HOLD.</li> <li>Verify GO/HOLD button illuminates.</li> <li>Verify GO/HOLD button illuminates.</li> <li>Verify GO illuminates RED.</li> <li>Select GO.</li> <li>Verify GO indicator red goes off.</li> <li>Notify US of completion of overspeed trip test.</li> </ul>
	AIC	<ul> <li>Peer check actions of BOP operator.</li> <li>Monitor remainder of MCB.</li> </ul>
	US	<ul> <li>Acknowledge report.</li> <li>Notify SM 1BwOP GP 100-3 is complete through step F.22.p.</li> </ul>
		EVALUATOR NOTE: After turbine overspeed trip test is complete and with lead examiners concurrence, enter next event.

Scenari	Scenario NRC 11-5 Event 2				
Event	Event 1PK-CV131 output fails high				
Descrip	tion:				
Time	Position	Applicant's Actions or Behavior			
	CUE	<ul> <li>Annunciator LP LTDWN RLF TEMP HIGH (1-9-B1)</li> <li>Annunciator LTDWN HX OUTLT PRESS HIGH (1-8-B5)</li> <li>1FI-132, letdown line flow, lowering.</li> <li>1PI-131, letdown line pressure, rising.</li> </ul>			
	CREW	<ul><li>Refer to BwARs</li><li>Recognize 1PK-131 failed.</li></ul>			
	US	<ul> <li>Direct/Ensure RO takes manual control of 1PK-131 and returns letdown pressure to normal.</li> <li>Inform SM of 1PK-131 failure.</li> <li>Direct RO to isolate letdown.</li> </ul>			
	ATC	<ul> <li>Perform the following at 1PM05J:</li> <li>Place 1PK-131, letdown line pressure control valve, in manual.</li> <li>Raise demand on 1PK-131.</li> <li>Lower letdown line pressure sufficiently to close letdown line relief valve and restore letdown flow to normal.</li> <li>Maintain letdown flow and pressure by operating 1PK-131 in manual.</li> <li>May take manual control of 1TK-130</li> </ul>			
	US	<ul> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.</li> <li>May choose to enter tech spec 3.4.13 and then exit when relief resets, or remain in tech spec until a RCS leakrate can verify no leakage.</li> </ul>			
		EVALUATORS NOTE: The crew may elect to isolate letdown based on letdown relief valve lifting. The steps for isolating letdown and restoring normal letdown are in italics on the next page.			

Scenario	Scenario NRC 11-5 Event 2				
No:	No: No.				
Event	Event 1PK-CV131 output fails high				
Descripti	on:				
Time	Position	Applicant's Actions or Behavior			
	ATC/	○ Isolate letdown			
	BOP	○ Close 1CV8149A, B, & C			
		<ul> <li>Close 1CV459 &amp; 1CV460</li> </ul>			
		<ul> <li>Place 1CV121 in manual and control RCP seal injection 8-13 gpm per RCP</li> </ul>			
		○ Close 1CV8105/8106			
		<ul> <li>Monitor RMCS during automatic VCT makeup</li> </ul>			
		• Proper flow indicated on PW/Total Flow (1FT-0111) and Boric Acid Flow (1FT-0110).			
	ATC/	<ul> <li>Establish normal letdown per BwOP CV-17</li> </ul>			
	BOP	<ul> <li>Verify/close 1CV8149A/B/C</li> </ul>			
		<ul> <li>Place 1CV131 manual at 30% demand</li> </ul>			
		<ul> <li>Place 1CC130 in manual at 60% demand</li> </ul>			
		<ul> <li>Open 1CV459/460</li> </ul>			
		<ul> <li>Verify open 1CV8324B &amp; 1CV8389B</li> </ul>			
		<ul> <li>Open 1CV8152/8160</li> </ul>			
		<ul> <li>Verify/open 1CV381A/B open</li> </ul>			
		<ul> <li>Open 1CV8105/8106</li> </ul>			
		<ul> <li>Adjust charging flow to approx. 100 gpm w/seal injection 8-10 gpm per RCP</li> </ul>			
		<ul> <li>Open 1CV8149A/B/C, control 1CV131 to maintain letdown press. 360-380 psig</li> </ul>			
		<ul> <li>Control 1CC130 to maintain letdown temperature 90-115°F</li> </ul>			
		<ul> <li>Place controllers in auto</li> </ul>			
		<ul> <li>Verify 1PR06J in service</li> </ul>			
	ATC	<ul> <li>Verify proper operation of RMCS during VCT makeup</li> </ul>			
		<ul> <li>Proper flow indicated on PW/Total Flow (1FT-0111) and Boric Acid Flow (1FT-</li> </ul>			
		0110).			
		<ul> <li>Restore PZR level to program</li> </ul>			
		Initiate the next event when the lead examiner approves.			

Scenari	D NRC	<b>11-5</b> Event 3		
No:		NO.		
Descript	tion.	TC SG NR level transmitter TLT-559 fails low		
Time	ime Position Applicant's Actions or Behavior			
	CUE	Appunciator 1-15-C9_S/G 1C   EVEL DEVIATION HIGH LOW		
	OOL	Annunciator 1-15-C5, S/G 1C LVL LO-2 RX TRIP ALERT		
		<ul> <li>SG 1C feed flow and NR level rising.</li> </ul>		
	BOP	<ul> <li>Determine SG 1C feed flow and/or NR level rising at 1PM04J.</li> </ul>		
		Identify 1LI-539 indicates low SG NR level at 1PM04J.		
		Reference BwARs 1-15-C5 & 1-15-C9.		
	CREW	<ul> <li>Identify entry conditions for 1BwOA INST-2 OPERATION WITH A FAILED</li> </ul>		
	OREW	INSTRUMENT CHANNEL.		
	US	Notify Shift Manager of SG level channel failure.		
		Implement 1BwOA INST-2 OPERATION WITH A FAILED INSTRUMENT CHANNEL,		
		Attachment E, NARROW RANGE SG LEVEL CHANNEL FAILURE, and direct operator		
		actions of TBWOA INST-2 to establish the following conditions:		
	BOP	Stabilize 1C SG level at 1PM04.1:		
		<ul> <li>Place 1FK-530D, FW Reg Bypass Valve 1FW530 controller, in manual.</li> </ul>		
		• Lower demand on 1FK-530 sufficiently to lower feedwater flow to restore 1C SG		
		level.		
		<ul> <li>Operate 1FK-530D in manual to stabilize 1C SG level in the normal operating band</li> </ul>		
		<ul> <li>Select operable 1C SG NR level channel. (per BwAR or 1BwOA INST-2)</li> </ul>		
		<ul> <li>Place 1C SG water level channel select C/S to L-558.</li> </ul>		
		Establish automatic level control by placing 1FK-530D in auto.		
	ATC	Derform the following:		
	AIC	Centrum menorements     Monitor reactor power at 1PM051		
		Assist US by making notifications		
		Refer to BwARs.		
	US	Determine AMS channel NOT affected.		
		Determine TS 3.3.1 conditions A and E are applicable.		
		Determine TS 3.3.2 conditions A and D are applicable.		
		<ul> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to</li> </ul>		

Scenari	D NRC	11-5	Event	3	
No:			No.		
Event		1C SG NR level transmitter 1LT-539 fails low			
Description:					
Time	Position	Applicant's Actions or Behavior			
			investigate/correct i	instrument failure, and make other notifications.	
		EVALI with le	UATOR NOTE: Afte ead examiner's con	er the actions for SG level channel failure are complete and ncurrence, enter next event.	

Scenario NRC 11-5 Event 4					
No:	No.				
Event	1A component cooling pump trip with 1B component cooling pump discharge pressure				
Description: switch failure					
Time Position	ition Applicant's Actions or Behavior				
CUE	<ul> <li>Annunciator 1-2-A4, CC PUMP TRIP</li> <li>Annunciator 1-2-A7, SEAL WTR HX CC FLOW LOW</li> <li>Annunciator 1-2-B5, CC PUMP DSCH PRESS LOW</li> <li>Annunciator 1-2-D7, CNMT PEN CLG FLOW HIGH LOW</li> <li>Annunciators 1-7-A4/B4/C4/D4, RCP 1A/B/C/D THERM BARR CC WTR FLOW LOW</li> <li>Annunciators 1-7-A5/B5/C5/D5, RCP 1A/B/C/D BRNG CC WTR FLOW LOW</li> <li>Annunciator 1-7-E4, RCP THERM BARR CC WTR FLOW HIGH LOW</li> <li>1A CC pump run amber trip light lit at 1PM06J.</li> </ul>				
BOP	<ul> <li>Determine 1A CC pump has tripped.         <ul> <li>Place 1A CC pump in PTL</li> </ul> </li> <li>Report failure to US.</li> <li>Determine 1B or 0 CC pump needs to be started.</li> <li>Dispatch operator to investigate 1A CC pump trip.</li> <li>Refer to BwARs.</li> </ul> EVALUATOR NOTE: The unit supervisor may elect to implement 1BwOA PRI-6, COMPONENT COOLING MALFUNCTION, based on CC system annunciator status. 1BwOA PRI-6 steps are in italics on the next page.				
US	Direct BOP to start 1B or 0 CC pump.				
BOP	<ul> <li>Start 1B or 0 CC pump at 1PM04J.</li> <li>Refer to BwOP CC-1 and BwOP CC-2 for CC pump start/stop follow up actions.</li> </ul>				
ATC	<ul> <li>Perform the following:</li> <li>Monitor RCP operation while CC pump evolutions in progress.</li> <li>Assist US by making notifications.</li> <li>Refer to BwARs.</li> </ul>				
US	<ul> <li>Determines TS 3.7.7 condition B is applicable (entered and exited).</li> <li>Inform SM/Maint of 1B CC pump pressure switch failure, IR, and contact maintenance to investigate/correct instrument failure.</li> </ul>				
	EVALUATOR NOTE: After the actions for CC pump trip and discharge pressure switch failure are complete and with lead examiners concurrence, enter next event.				
Scenari	D NRC	<b>11-5</b> Event 4			
---	--	--	--	--	--
No:		No.			
Event	Event 1A component cooling pump trip with 1B component cooling pump discharge pressure				
Descript	Description: switch failure				
Time	Position	Applicant's Actions or Behavior			
	CREW	○ Identify entry conditions for 1BwOA PRI-6, COMPONENT COOLING MALFUNCTION.			
	US	<ul> <li>Notify SM of plant status and procedure entry.</li> <li>Request evaluation of Emergency Plan conditions.</li> <li>Implement 1BwOA PRI-6, COMPONENT COOLING MALFUNCTION, and direct operator actions of 1BwOA PRI-6 to establish the following conditions:</li> </ul>			
BOP <ul> <li>Check CC surge tank level at 1PM04J:                 <ul></ul></li></ul>		<ul> <li>Check CC surge tank level at 1PM04J:         <ul> <li>1LI-670 and 1LI-676 greater than 13% and stable</li> </ul> </li> <li>Check CC pumps at 1PM04J:             <ul> <li>CC pumps – NONE running</li> <li>Manually start 1B or 0 CC pump</li> <li>Check annunciator 1-2-B5, CC PUMP DSCH PRESS LOW – NOT LIT</li> <li>Check CC system temperature at 1PM04J:</li></ul></li></ul>			
	US	<ul> <li>Determines TS 3.7.7 condition B is applicable.</li> <li>Inform SM/Maint of 1B CC pump pressure switch failure, IR, and contact maintenance to investigate/correct instrument failure.</li> </ul>			

Scenario NRC 11-5 Event 5 & 6					
NO:					
Descript	Event Steam leak inside containment/uncontrolled depressurization of all SGs				
Time	Position Applicant's Actions or Behavior				
	CUE <ul> <li>Annunciator STEAM LINE LOW PRESS SI/RX TRIP (1-11-D1)</li> <li>Annunciator S/G 1D LOW PRESS STEAMLINE ISOL ALERT (1-15-D1)</li> <li>Rx Trip breakers open</li> </ul>				
	<ul> <li>US</li> <li>Notifies SM of plant status and procedure entry         <ul> <li>Requests evaluation of Emergency Plan conditions</li> <li>Enter/Implement 1BwEP-0 and direct operator actions of 1BwEP-0</li> </ul> </li> </ul>				
	<ul> <li>ATC Perform immediate operator actions of 1BwEP-0:</li> <li>Verify reactor trip</li> <li>Rod bottom lights - ALL LIT</li> <li>Reactor trip &amp; Bypass breakers - OPEN</li> <li>Neutron flux - DROPPING</li> </ul>				
	BOP       Perform immediate operator actions of 1BwEP-0:         • Verify Turbine Trip         • All Turbine throttle valves – CLOSED         • All Turbine govenor valves – CLOSED				
	BOP	<ul> <li>Perform immediate operator actions of 1BwEP-0:</li> <li>Verify power to 4KV busses</li> <li>ESF Buses – BOTH ENERGIZED</li> </ul>			
	ATC	<ul> <li>Perform immediate operator actions of 1BwEP-0:</li> <li>Check SI status</li> <li>Annunciator CNMT PRESS HIGH SI/RX TRIP (1-11-E1) – LIT</li> <li>Manually actuate SI</li> </ul>			
	US	Direct BOP to perform Attachment B of 1BwEP-0			
		EVALUATOR NOTE: US and RO will continue in 1BwEP-0 while BOP is performing Attachment B:			

Scenari	o NRC	11-5 Event 5
Event		Steam leak inside containment/uncontrolled depressurization of all SGs
Descrin	tion <sup>.</sup>	
Time	Position	Applicant's Actions or Behavior
	BOP	<ul> <li>Verify FW isolated at 1PM04J:</li> <li>FW pumps – TRIPPED.</li> <li>Isolation monitor lights – LIT.</li> <li>FW pumps discharge valves - CLOSED (or going closed) 1FW002A-C.</li> <li>Verify DGs running at 1PM01J:</li> <li>DGs – BOTH RUNNING.</li> <li>1SX169A/B OPEN.</li> <li>Dispatch operator locally to check operation</li> <li>Verify Generator Trip at 1PM01J:</li> <li>OCB 1-8 and 7-8 are closed.</li> <li>Open OCB 1-8 and 7-8 are follows.</li> <li>PMG output breaker open.</li> <li>Trip all running HD pumps (none running).</li> <li>Verify Control Room ventilation aligned for emergency operations at 0PM02J:</li> <li>VC Rad Monitors – LESS THAN HIGH ALARM SETPOINT.</li> <li>Operating VC train equipment – RUNNING.</li> <li>0B Return fan</li> <li>0B M/U fan</li> <li>0B Chilled water pump</li> <li>0B Chilled water pump</li> <li>0B Chiller</li> <li>Operating VC train dampers – ALIGNED.</li> <li>M/U fan outlet damper – 0VC08Y NOT FULLY CLOSED.</li> <li>0B COSI - OPEN</li> <li>0VC0313Y - CLOSED</li> <li>0VC044Y - CLOSED</li> <li>0VC05Y - OPEN</li> <li>0VA03C5 - RUNNING</li> <li>0VA03C5 - RUNNING</li> <li>0VA03C5 - RUNNING</li> </ul>

Scenario	D NRC	<b>11-5</b> Event 5
No:		No.
Event Description:		Steam leak inside containment/uncontrolled depressunzation of all SGS
Time	Position	Applicant's Actions or Behavior
		<ul> <li>0VA436Y - CLOSED</li> <li>Plenum C:</li> <li>0VA03CF RUNNING</li> <li>0VA072Y - OPEN</li> <li>0VA438Y - CLOSED</li> <li>Verify FHB ventilation aligned at 0PM02J:</li> <li>0VA04CB - RUNNING</li> <li>0VA055Y - OPEN</li> <li>0VA062Y - OPEN</li> <li>0VA435Y - CLOSED</li> <li>Notify US Attachment B complete</li> </ul>
	ATC/ BOP	<ul> <li>Verify ECCS pumps running</li> <li>Both CV pumps - RUNNING</li> <li>Both RH pumps - RUNNING</li> <li>Both SI pumps - RUNNING</li> </ul>
	ATC/ BOP <b>[CT]</b>	<ul> <li>Verify RCFC's running in Accident Mode - Group 2 RCFC Accident Mode lights - LIT</li> <li>Verify Phase A isolation - Group 3 Cnmt Isol monitor lights - NOT ALL LIT</li> <li>Close 1WO020A</li> <li>Close 1WO056B</li> <li>Close 1WO006A</li> <li>Verify Cnmt Vent isolation - Group 6 Cnmt Vent Isol monitor lights - LIT</li> <li>Verify AF system:</li> <li>AF pumps - BOTH RUNNING</li> <li>AF isolation valves - OPEN</li> <li>1AF13A-H</li> <li>AF flow control valves - THROTTLED</li> <li>1AF005A-H</li> <li>Verify CC pumps - U-0 and 1B RUNNING</li> <li>Verify SX pumps- BOTH RUNNING</li> </ul>
	ATC/ BOP	<ul> <li>Check Main Steamlines Should Be Isolated</li> <li>CNMT pressure &gt; 8.2 psig</li> <li>Verify MS isolation</li> <li>MSIV's open</li> <li>Manually actuate MS isolation</li> <li>MSIV's remain open</li> </ul>

Scenari	D NRC	11-5 Event 5
No:		No.
Event		Steam leak inside containment/uncontrolled depressurization of all SGs
Descript	tion:	
Time	Position	Applicant's Actions or Behavior
	BOP/ ATC	<ul> <li>Check if CS is required</li> <li>CNMT pressure &gt; 20 psig</li> </ul>
		Group 6 CS monitor lights – NOT ALL LIT
		Manually actuate CS and Phase B Isolation
		Group 6 CS monitor lights remain – NOT ALL LIT, Go to attachment C
	US	Implement 1BwEP-0, Attachment C, MANUAL CS ACTUATION

Scenario NRC 11-5 Event 6				
No:	No.	- C II		
Event	Failure of both trains of CS to auton	natically actuate		
Time Pos	Time Desition Applicant's Actions or Bobaviar			
ATC BOI [CT E-0	<ul> <li>Check CS alignment</li> <li>Check 1CS001A - OPEN</li> <li>Check 1CS007A - OPEN</li> <li>Manually open 1CS007A</li> <li>Check 1CS019A - OPEN</li> <li>Place 1A CS pump test switch</li> <li>Manually open 1CS019A</li> <li>Place 1A CS pump test switch</li> <li>Check 1CS010A – OPEN</li> <li>Check 1CS010A – OPEN</li> <li>Check CS pumps – AT LEAST</li> <li>1A CS pump running</li> <li>Place 1B CS pump in PTL</li> </ul>	in test in normal ONE RUNNING		
US	Return to main body, step 14.c			
ATC BOI	<ul> <li>Check if CS is required</li> <li>Group 6 phase B monitor lights</li> <li>Verify/Stop all RCPs (may have</li> <li>Check CS eductor suction flow</li> <li>Check CS eductor additive flow</li> </ul>	– ALL LIT e been done previously) – 1FI-CS013 > 15 gpm v – 1FI-CS015 > 5 gpm		
ATC BOI	<ul> <li>Verify Total AF flow:</li> <li>AF flow &gt; 500 gpm</li> <li>Control feed flow to maintain</li> <li>Check status of S/G NR level</li> </ul>	NR level 31% - 50% Is – not rising in an uncontrolled manner		
ATC BOI	<ul> <li>Verify ECCS valve alignment</li> <li>Group 2 Cold Leg Injection</li> </ul>	monitor lights required for injection - LIT		
RO/ BOI	<ul> <li>Verify ECCS flow</li> <li>High Head SI flow &gt;100 gpm</li> <li>RCS pressure &lt; 1700 psig</li> <li>SI pump flow &gt; 200 gpm</li> <li>RCS pressure &gt; 325 psig</li> </ul>	ı (1FI-917)		

Scenario     NRC 11-5     Event     6					
No:		No.			
Event	Event Failure of both trains of CS to automatically actuate				
Description	n:				
Time Po	Position	Applicant's Actions or Behavior			
A	TC	<ul> <li>Check PZR PORVs and SPRAYs:</li> <li>PORVs CLOSED.</li> <li>PORV isolation valves – 1RY8000A and 1RY8000B ENERGIZED</li> <li>PORV relief paths – PORVs in AUTO, PORV isolation valves OPEN</li> <li>Normal Spray valves CLOSED</li> </ul>			
A	TC	<ul> <li>Maintain RCS temperature control</li> <li>Check RCP's – NONE RUNNING</li> <li>RCS Tcold temperature is NOT stable at or trending to 557°</li> <li>Stop dumping steam</li> <li>Throttle AF flow while maintaining &gt; 500 gpm</li> <li>MSIV's open – verify closed (will not close)</li> </ul>			
		Note: RCPs may have been previously stopped by crew after recognizing a Phase B isolation has occurred per the OAS page of 1BwEP-0.			
A BC	TC/ OP	<ul> <li>Check status of RCP's</li> <li>RCP's – NONE RUNNING</li> </ul>			
CI	REW	<ul> <li>Determine status of SG secondary pressure boundary:</li> <li>Check if SG secondary pressure boundaries are intact:</li> <li>All SG pressures dropping in an uncontrolled manner</li> </ul>			
CI	REW	Transitions to 1BwEP-2, 'FAULTED STEAM GENERATOR ISOLATION'			

Scenari	o NRC	<b>11-5</b> Event 5	
No:		No.	
Event		Uncontrolled depressurization of all steam generators	
Descrip	tion:		
Time	Position	Applicant's Actions or Behavior	
	US	<ul> <li>Notify SM of plant status and procedure entry.</li> <li>Request evaluation of Emergency Plan conditions.</li> <li>Request STA evaluation of status trees.</li> <li>Enter/Implement 1BwEP-2, FAULTED STEAM GENERATOR ISOLATION, and direct operator actions of 1BwEP-2 to establish the following conditions:</li> </ul>	
<ul> <li>BOP</li> <li>Check Main Steamline Isolation at 1PM06J:</li> <li>1MS001A-D, MSIV 1A-D – OPEN.</li> <li>Manually actuate MS isolation at 1PM05J and/or 1PM06J.</li> <li>1MS001A-D, MSIV 1A-D – will not close.</li> <li>Verify 1MS101A-D, MSIV 1A-D bypass valves – CLOSED.</li> </ul>			
	CREW	<ul> <li>Determine NO SG pressure boundaries are intact.</li> <li>Check if any SG secondary pressure boundary is intact at 1PM04J:</li> <li>ALL SG pressures dropping in an uncontrolled manner.</li> </ul>	
	CREW	<ul> <li>Identify entry conditions for 1BwCA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS.</li> </ul>	

Scenario	D NRC	<b>11-5</b> Event 5		
No:		No.		
Event Uncontrolled depressurization of all steam generators				
Time	Position	Applicant's Actions or Behavior		
	US	<ul> <li>Notify SM of plant status and procedure entry.</li> <li>Request evaluation of Emergency Plan conditions.</li> <li>Request STA evaluation of status trees.</li> <li>Enter/Implement 1BwCA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, and direct operator actions of 1BwCA-2.1 to establish the following conditions:</li> </ul>		
	BOP	<ul> <li>Check Main Steamline Isolation at 1PM06J:</li> <li>1MS001A-D, MSIV 1A-D – OPEN.</li> <li>Manually actuate MS isolation at 1PM05J and/or 1PM06J.</li> <li>1MS001A-D, MSIV 1A-D – will not close.</li> <li>Place 1MS001A-D C/Ss to CLOSE at 1PM06J.</li> <li>Verify 1MS101A-D, MSIV 1A-D bypass valves – CLOSED.</li> <li>Verify 1MS018A-D, SG 1A-D PORVs – CLOSED.</li> <li>All rows of FW isolation monitor lights – lit at 1PM04J.</li> <li>Verify 1SD002A-H, SG blowdown isolation valves - closed at 1PM06J or 1PM11J.</li> <li>Verify 1SD005A-D, SG blowdown sample isolation valves – closed at 1PM06J or 1PM11J.</li> </ul>		
	BOP [CT] ECA- 2.1A	<ul> <li>Control feed flow to minimize RCS cooldown:</li> <li>RCS cooldown rate at 1PM05J - greater than100°F in one hour.</li> <li>Throttle 1AF005A-H as necessary to lower feed flow to 45 gpm per SG.</li> <li>SG NR levels at 1PM04J - less than 50%.</li> <li>RCS hot leg temperatures at 1PM05J – dropping.</li> </ul>		
		EVALUATOR NOTE: The crew will transition to 1BwFR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, when the STA reports a RED path exists on the heat sink status tree. 1BwFR-H.1 will not be implemented due to total feed flow being less than 500 gpm due to operator action. Actions for addressing 1BwFR-H.1 are listed below.		
	CREW	<ul> <li>Identify entry conditions for 1BwFR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK.</li> </ul>		
	US	<ul> <li>Notify SM of plant status and procedure entry.</li> <li>Request evaluation of Emergency Plan conditions.</li> <li>Determine 1BwFR-H.1 does not need to be implemented due to total feed flow being</li> </ul>		

Scenari	0 <b>NRC</b>	11-5 Event	5		
No:		No.			
Event		Uncontrolled depressuri	zation of all steam generators		
Descrip	tion:				
Time	Position	Applicant's Actions or Behavior			
		less than 500 gpm d	lue to operator action.		
		Transition back to 1BwCA-2.1.			
		EVALUATOR NOTE: A	At this point the scenario is terminated		

Simulation	n Facility Braidwood	Sc No <b>Ni</b> Ac	cenario 5.: <b>RC 11-4</b> policant:	Operating Test No.: 2011 NRC EXAM SRO
		· •		ATC
				BOP
Initial Con	ditions: IC-21			
Turnover:	Unit 1 is operating at 99.5% green. 1C CD/CB pump is OC back in service in four days. Fo MS-Q1, UNIT 1 MAIN STEAM	power, steady OS for bearing o ollowing compl DUMP VALVE	y state, eq replacemen etion of tur STROKE \$	uilibrium xenon. Online risk is nt. The 1C CD/CB pump is expected nover, the crew is to perform 1BwOS SURVEILLANCE.
Event No	Malf. No.	Event		Event Description
Preload	IOR ZDI1CD05PC PTL IOR ZDI1CD05PCB PTL IOR ZDI1CB113C CLS		1C CD/C	B Pump OOS
1	None	N-BOP, US	Steam Du	ump Valve Stroke Surv.
2	IMF RX29D 100 30	I-BOP, US	1FW540	controller fails high in auto
3	IMF RX17 -4.25	C-ATC, US	Rod cont	rol failure
4	IMF SW01A	C-BOP, US TS-US	1A SX Pu	ımp Trip
5	IMF RX21A 2500 30	I-ATC, US TS-US	1PT-455	fails high
6	IMF TC14D 0	R-ATC, US	#4 Gover	nor valve servo failure closed
7	In caep file below	M-ALL	1D Stean	n Generator Tube Rupture
8	IMF TH11A 0 IMF TH03D 450 60 TRGSET 1 "ZLO1IA066(2)==0" IOR ZDI1IA066 (1 0) CLS IOR ZAO1PIRY018 (1 60) 0 30 IMF PN1555 (1 70) ON IMF TH11B 0		Loss of R	CS pressure control

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

# **SCENARIO OVERVIEW**

Unit 1 is operating at 100% power, steady state, equilibrium xenon. 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 MS-Q1, UNIT 1 MAIN STEAM DUMP VALVE STROKE SURVEILLANCE.

After completing shift turnover and relief, the BOP will perform 1BwOS MS-Q1, UNIT 1 MAIN STEAM DUMP VALVE STROKE SURVEILLANCE.

**After completing 1BwOS MS-Q1,** 1FW540 Feed Reg Valve Controller 1FK-540 will fail to 100% demand. The 1FW540 valve will fail open and 1D SG level will rise. The crew will take actions to stabilize the plant by taking manual control of the 1FK-540.

**After the 1FK-540 failure is addressed**, the rod control summing amplifier will malfunction, resulting in uncontrolled inward rod motion. After checking turbine power stable, the RO will place rod control in Manual to stop the inward rod motion. 1BwOA ROD-1, UNCONTROLLED ROD MOTION, will be implemented. Rods will remain in Manual control for the remainder of the scenario.

**After the rod control failure has been addressed**, the 1A Essential Service Water pump will trip due to overcurrent. The crew will implement 1BwOA PRI-8, ESSENTIAL SERVICE WATER MALFUNCTION, and start the 1B Essential Service Water pump. Technical Specifications 3.7.8, condition A applies. On-line risk remains yellow. The 1A SX pump will remain unavailable for the rest of the scenario.

**After the Essential Service Water malfunction has been addressed,** the controlling pressurizer pressure channel will fail high. The ATC will identify the failure and take manual control to restore pressurizer pressure. The US will enter 1BwOA INST 2, OPERATION WITH A FAILED INSTRUMENT CHANNEL-Attachment B. Tech Specs 3.3.1 conditions A, E, and K, 3.3.2 conditions A and D, and 3.3.4 condition A will be entered.

After the pressurizer pressure channel failure has been addressed, the #4 turbine governor valve servo will fail, causing the #4 governor valve to close. Turbine load will lower approximately 70 Mw. The ATC will borate the RCS as necessary and/or move rods in to stabilize RCS temperature. On-line risk remains yellow.

**After the governor valve malfunction has been addressed,** a 450 gpm Steam Generator Tube Rupture will occur on the 1D SG. The crew will implement 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION. When SI actuates, a solenoid failure will cause 1IA066 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 1D SG. After determining RCS pressure control is unavailable, the crew will transition to 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-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.
- 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 info tags on 1C CD/CB pump, 1C CD/CB Lube Oil pump, and 1CB113C C/Ss.
- Lower reactor power to 99.5% by reducing turbine load approx. 5 MW.
- Run caep NRC 11-4 SETUP from disk and verify the following actuate:
  - IOR ZDI1CD05PC PTL
  - IOR ZDI1CD05PCB PTL
  - IOR ZDI1CB113C CLS
- 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 MS-Q1.

When requested, as Equipment Operator report you are standing by at the steam dump isolation valves ready to isolate the steam dumps and condenser spray valves.

Note: valve positions can be monitored from SIM Graphic Display FW1 and MS6

Acknowledge as EO request to locally close 1MS003A-M and 1CB038A-M / 1CB006, then run **NRC 11-4 to CLOSE valves EVENT 1** from disk and verify the following:

- MRF MS09 0
- MRF MS10 0
- MRF MS11 0
- MRF MS12 0
- MRF MS13 0
- MRF MS14 0
- MRF MS15 0
- MRF MS16 0
- MRF MS17 0
- MRF MS18 0
- MRF MS19 0
- MRF MS20 0
- MRF FW001 0
- MRF FW002 0
- MRF FW003 0
- MRF FW004 0
- MRF FW005 0
- MRF FW006 0
- MRF FW007 0
- MRF FW008 0
- MRF FW009 0
- MRF FW010 0
- MRF FW011 0
- MRF FW012 0

Report as EO that 1MS003A-M and 1CB038A-M / 1CB006 are locally closed.

Acknowledge as EO request to locally open 1MS003A-M and 1CB038A-M / 1CB006, then run **CAEP NRC 09-4 to OPEN valves EVENT 1** from disk and verify the following:

- MRF MS09 100
- MRF MS10 100
- MRF MS11 100
- MRF MS12 100
- MRF MS13 100
- MRF MS14 100
- MRF MS15 100
- MRF MS16 100
- MRF MS17 100
- MRF MS18 100

- MRF MS19 100
- MRF MS20 100
- MRF FW001 100
- MRF FW002 100
- MRF FW003 100
- MRF FW004 100
- MRF FW005 100
- MRF FW006 100
- MRF FW007 100
- MRF FW008 100
- MRF FW009 100
- MRF FW010 100
- MRF FW011 100
- MRF FW012 100

Report as EO that 1MS003A-M and 1CB038A-M / 1CB006 are locally open.

Acknowledge as Shift Manager commencement and completion of procedure.

### Event 2: 1FW540 controller fails high in auto

Insert **IMF RX29D 100 30** to fail 1FK-540 high over a 30 second period.

If dispatched as EO to investigate, wait one minute and report no visible damage to 1FW540 Valve. Valve appears to be failing open in auto and responding correctly in manual (if asked for feedback to manual ops).

Acknowledge as Shift Manager the failure, request for maintenance support, and IR request.

## Ensure control rods are in automatic prior to inserting the next event.

#### Event 3: Uncontrolled inward control rod motion.

If control rods are in manual, as SM direct crew to restore automatic rod control.

Insert IMF RX17 -4.25 to cause uncontrolled inward rod motion.

If dispatched as Equipment Operator to rod control cabinets, report no abnormal indications present.

As SM acknowledge the failure, on line risk assessment, request for maintenance support, and IR requests.

If consulted as SM for status of manual or auto rod control, direct crew to perform actions in accordance with 1BwOA ROD-1.

### Event 4: 1A SX pump trip

Insert IMF SW01A for 1A SX pump trip.

If dispatched as EO to investigate 1A SX pump breaker, wait 2 minutes and report phase A overcurrent flag on 1A SX pump breaker cubicle (Bus 141, cubicle 2).

If dispatched as EO to investigate 1A SX pump, wait 3 minutes and report no damage visible at pump and pump is NOT rotating backwards. Report 1B SX pump is running with normal parameters if dispatched to check 1B SX pump.

If contacted as Unit 2 to swap Unit 2 SX pumps for chem. Feed alignment, acknowledge request.

If contacted as Rad Waste operator, report no abnormal aux building sump indications.

As SM, acknowledge the trip of 1A SX pump, LCO 3.7.8 condition A entry, and requests for on line risk assessment, maintenance support, and IR initiation.

### Event 5: Pressurizer pressure channel 1PT-455 fails high

#### Insert IMF RX21A 2500 30

As SM, acknowledge the failure, LCO 3.3.1 conditions A, E, & K entry, LCO 3.3.2, condition A & D entry, and LCO 3.3.4 condition A entry, requests for on line risk assessment, maintenance support, and IR initiation.

As SM, if requested support for tripping bistables in AEER, report that AEER bistables are not to be tripped until work analyst and NSO support can be obtained (in approx. 2 hours) and that the abnormal operating procedure should be continued. AEER bistable tripping will be conducted later.

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

- As assist NSO contact Unit 1 (X-2209)
- Insert the following:
- MRF RP20 OPEN (open protection cabinet #1 door)
- MRF RX032 TRIP (trip PRZ HI PRESS RX TRIP bistable PB455A)
- **MRF RX034 TRIP** (trip PRZ LO PRESS RX TRIP bistable PB455C)
- **MRF RX035 TRIP** (trip PRZ LO PRESS SI bistable PB455D)
- **MRF RX033 TRIP** (trip PRZ ENABLE BLOCK P-11 bistable PB455B)
- **MRF RX013 TRIP** (trip OTDT RX TRIP bistable TB411C)
- **MRF RX135 TRIP** (trip OTDT RUNBACK bistable TB411D)
- MRF RP20 CLOSE (close protection cabinet #1 door)

### Event 6: #4 governor valve servo failure.

### Insert IMF TC14D 0

If dispatched as EO to investigate #4 GV failure, wait 2 minutes and report #4 GV is closed and no visible damage present.

Acknowledge as Power Team loss of load due to Governor Valve failure.

Acknowledge as chemistry/rad protection requests for RCS samples.

Acknowledge as SM the GV failure and requests for on line risk assessment, maintenance support, and IR initiation.

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

### Events 7& 8: 1D Steam Generator Tube Rupture, loss of RCS pressure control

Run caep NRC 11-4 EVENTS 7 & 8 from disk and verify the following actuate:

- IMF TH11A 0
- IMF TH03D 450 60
- TRGSET 1 "ZLO1IA066(2) == 0"
- IOR ZDI1IA066 (1 0) CLS
- IOR ZAO1PIRY018 (1 60) 0 30
- IMF PN1555 (1 70) ON
- IMF TH11B 0

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 1IA066, 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 1D SG PORV open.

Scenario NRC 11-4 Event 1				
No: No.				
Event Perform 1BwOS MS-Q1				
Description:				
Time Position				
CUE	<ul> <li>From turnover, perform 1BwOS MS-Q1, UNIT 1 MAIN STEAM DUMP VALVE STROKE SURVEILLANCE.</li> </ul>			
US	Direct BOP to perform 1BwOS MS-Q1.			
BOP	US       • Direct BOP to perform 1BwOS MS-Q1.         BOP       • Refer to 1BwOS MS-Q1.         • Record initial data on step F.1.2.       • Notify Equipment Operator to locally close 1MS003A thru M and 1CB038A thru M 1CB006.         • Acknowledge report from EO that requested valves are closed.       • Perform the following at 1PM02J:         • Place 1PK-507 controller in MANUAL.       • Verify the controller demand is 0%.         • Place steam dump MODE SELECT switch in STM PRESS position.       • Verify 1MS004A-M CLOSED lamps are illuminated.         • Verify 1MS004A-M CLOSED lamps are NOT illuminated.       • Verify 1MS004A-M OPEN lamps are NOT illuminated.         • Verify 1MS004A-M OPEN lamps are NOT illuminated.       • Verify 1MS004A-M CLOSED lamps are illuminated.         • Verify 1MS004A-M OPEN lamps are NOT illuminated.       • Verify 1MS004A-M CLOSED lamps are illuminated.         • Verify 1MS004A-M OPEN lamps are NOT illuminated.       • Verify 1MS004A-M CLOSED lamps are illuminated.         • Verify 1MS004A-M OPEN lamps are NOT illuminated.       • Verify 1MS004A-M CLOSED lamps are illuminated.         • Verify 1MS004A-M CLOSED lamps are illuminated.       • Verify 1MS004A-M CLOSED lamps are illuminated.         • Verify 1MS004A-M CLOSED lamps are illuminated.       • Verify 1MS004A-M CLOSED lamps are illuminated.         • Verify 1MS004A-M CLOSED lamps are illuminated.       • Verify 1MS004A-M CLOSED lamps are illuminated.         • Verify 1MS004A-M CLOSED lamps are illuminated.			
ATC	<ul> <li>Peer check actions of BOP operator.</li> <li>Monitor remainder of MCB.</li> </ul>			
US	<ul> <li>Acknowledge report.</li> <li>Notify SM 1BwOS MS-Q1 is complete.</li> </ul>			
	EVALUATOR NOTE: After 1BwOS MS-Q1 is complete and with lead examiner concurrence, enter next event.			

Scenario	NRC	<b>11-4</b> Event 2
No:		No.
Event		1FW540 controller fails high in auto
Descripti	ON: Desition	Applicant's Actions or Robaviar
Time	POSILION	
	CUE	<ul> <li>Annunciator 1-15-D3, S/G 1D FLOW MISMATCH STM FLOW LOW</li> </ul>
		<ul> <li>Annunciator 1-15-D9, S/G 1D LEVEL DEVIATION HIGH LOW</li> </ul>
		<ul> <li>1FK-540 controller output failed high.</li> </ul>
		<ul> <li>1FI-540A/541A FW Flow Indication rising.</li> </ul>
		<ul> <li>1D SG level indicators 1LI547/548/549/559 indicate rising level.</li> </ul>
	BOP	<ul> <li>Perform the following at 1PM04J:</li> </ul>
		Determine 1D SG level rising.
		<ul> <li>Identify 1FK-540 is failing high.</li> </ul>
		Report failure to US.
		<ul> <li>○ Initiate 5MW power reduction.</li> </ul>
	CREW	Reference BwARs
		Recognize 1FK-540 output failed high
	US	<ul> <li>Direct/Ensure BOP takes manual control of 1FK-540 and returns 1D S/G level to</li> </ul>
		normal.
		Inform SM of 1FK-540 failure.
		<ul> <li>Direct BOP/RO to stop load ramp/dilution.</li> </ul>
	BUD	- Derform the following at 1DM04 I:
	DOF	<ul> <li>Periori die following al TEM043.</li> <li>Place 1EK 540, 1EW540 1D EBV Controller, in manual</li> </ul>
		• Lower demand on 1EK 540
		<ul> <li>Lower definition of TER-540.</li> <li>Monitor 1D S/C lovel and return lovel to normal</li> </ul>
		<ul> <li>Mointoir 1D S/G level and return level to normal.</li> <li>Mointoir 1D S/G flow by exercting 1EK 540 in manual.</li> </ul>
	US	Contact SM to perform risk assessment, initiate IR, and contact maintenance to
		investigate/correct instrument failure.
		Initiate the next event when the lead examiner approves.

Scenario	NRC	11-4 Event 3
Event		Uncontrolled inward control rod motion
Descripti	on:	Applicant's Actions on Datavian
Time	Position	Applicant's Actions or Benavior
	CUE	Control rod inward motion.
		<ul> <li>RODS IN light lit at 1PM05J.</li> <li>101 442 red enced indicates indicates encreation to the second reduction.</li> </ul>
		• 1SI-412, rod speed indicator, indicates approximately 48 steps per minute.
	ATC	Identify control rods incorrectly inserting.
		Report failure to US.
		Determine turbine power stable at 1PM06J or OWS drop 210.
		<ul> <li>Place rod bank select switch to manual at 1PM05J to attempt to stop uncontrolled rod insortion</li> </ul>
	CREW	Identify entry conditions for 1BwOA ROD-1, "UNCONTROLLED ROD MOTION".
	US	Notify SM of plant status and procedure entry.
		<ul> <li>Enter/implement 1BwOA ROD-1, "UNCONTROLLED ROD MOTION " and direct</li> </ul>
		operator actions of 1BwOA ROD-1 to establish the following conditions:
	CREW	Check turbine power stable at 1PM06J or OWS drop 210.
		Check rod control status at 1PM05J:
		<ul> <li>Verify/place rod bank select switch in manual.</li> </ul>
		Verify rods stopped moving.
	US	Determine applicable Tech Spec entries.
		<ul> <li>If pressurizer pressure drops below 2209 psig, then LCO 3.4.1 Cond. A applies.</li> </ul>
		<ul> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to</li> </ul>
		investigate/correct rod control malfunction.
		EVALUATOR NOTE: After the actions for the rod control malfunction are complete
		and with lead examiner's concurrence, insert the next event.

Scenari	Scenario     NRC 11-4     Event     4				
NO:	No: No.				
Event 1A essential service water pump trip					
Description:					
Time	1 0311011				
		EVALUATOR NOTE: The crew may start the stand-by SX pump per the annunciator response OR elect to enter 1BwOA PRI-8, ESSENTIAL SERVICE WATER MALFUNCTION, to address the 1A essential service water pump trip. Actions for 1BwOA PRI-8 are in italics below and on the next page.			
	CUE	Annunciator SX PUMP TRIP (1-2-A1)			
		Annunciator SX PUMP DSCH HDR PRESS LOW (1-2-A2)			
		1A SX pump trip light – LIT.			
	BOP	Determine 1A SX pump tripped.			
		○ Reference BwARs.			
		<ul> <li>Place 1A SX pump C/S in PTL</li> </ul>			
	BOP	Start 1B SX pump at 1PM06J per 1BwAR 1-2-A1, SX PUMP TRIP.			
		Verify 1SX001B OPEN			
		Verify 1SX016B OPEN			
		Verify 1SX027B OPEN			
		Place 1B SX pump control switch to start and hold until the lube oil pressure interlock			
		is met and 1B SX pump starts.			
		<ul> <li>Verify annunciator SX PUMP DSCH HDR PRESS LOW (1-2-A2) is NOT LIT.</li> </ul>			
	US	Determines TS 3.7.8 condition A is applicable.			
		Contact SM to perform risk assessment, initiate IR, and contact maintenance to			
		investigate/correct instrument failure.			
		<ul> <li>Inform Unit 2 to swap SX pumps for proper Chem Feed alignment.</li> </ul>			
	CREW	<ul> <li>Identify entry conditions for 1BwOA PRI-8, "ESSENTIAL SERVICE WATER MALFUNCTION".</li> </ul>			
		<ul> <li>Dispatch operators to investigate status of 1A SX pump and breaker.</li> </ul>			
	US	<ul> <li>Notify SM of plant status and procedure entry.</li> </ul>			
		<ul> <li>Request evaluation of Emergency Plan conditions.</li> </ul>			
		• Enter/Implement 1BwOA PRI-8, "ESSENTIAL SERVICE WATER MALFUNCTION"			
		and direct operator actions of 1BwOA PRI-8 to establish the following conditions:			
		<ul> <li>Direct BOP to start 1B SX pump per BwAR 1-2-A1.</li> </ul>			
	CREW	<ul> <li>Check for excessive leakage in aux building:</li> </ul>			
		<ul> <li>Contact RWCR to monitor aux building sumps.</li> </ul>			
		<ul> <li>Annunciator SX PUMP SUCT VLV PIT LEVEL HIGH (1-2-D2) – NOT LIT.</li> </ul>			
	BOP	<ul> <li>Check status of SX pumps at 1PM06J:</li> </ul>			
		<ul> <li>Start 1B SX pump if not already started using BwAR.</li> </ul>			
		• Check status of SX system at 1PM06J:			
		• Annunciator SX PUMP SUCT PRESS LOW (1-2-C1) – NOT LIT.			
		• Annunciator SX STRN DP HIGH (1-2-C2) – NOT LIT.			
		• Annunciator SX PUMP DSCH HDR PRESS LOW (1-2-A2) – NOT LIT.			
		<ul> <li>Annunciator SX PUMP DSCH HDR TEMP HIGH LOW (1-2-B2) – NOT LIT.</li> <li>AA OX memory NOT metaling leads</li> </ul>			
		$\circ$ 1A SX pump NOT rotating backwards.			

Scenari	o NRC	<b>11-4</b> Event 4
No:		No.
Event		1A essential service water pump trip
Descript	tion:	
Time	Position	Applicant's Actions or Behavior
		<ul> <li>Check for SX leakage into containment at 1PM06J:</li> </ul>
		<ul> <li>Annunciator CNMT DRAIN LEAK DETECT FLOW HIGH (1-1-A2) – NOT</li> </ul>
		LIT.
		$\circ$ Check CC outlet temperatures < 105 °F at 1PM06J.
		<ul> <li>Check RCP cooling at 1PM05J:</li> </ul>
		○ Annunciator RCP THERM BARR CC WTR TEMP HIGH (1-7-E3) – NOT LIT.
		○ Annunciator RCP BRNG CC WTR TEMP HIGH (1-7-E5) – NOT LIT.
	US	<ul> <li>Determines TS 3.7.8 condition A is applicable.</li> </ul>
		<ul> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to</li> </ul>
		investigate/correct instrument failure.
		EVALUATOR NOTE: After the actions for the 1A SX pump trip are complete and
		with lead examiner's concurrence, insert the next event.

Scenario NRC 11-4 Event 5						
No:	No: No.					
Event Pressurizer pressure channel 1PT-455 fails high						
Descrip	tion:					
Ime	Position	Applicant's Actions or Benavior				
	CUE	Annunciator PZR PRESS HIGH RX TRIP STPT ALERT (1-12-A2)				
		Annunciator PZR PORV OR SAFETY VALVE OPEN (1-12-B2)				
		Annunciator PZR PRESS CONT DEV HIGH (1-12-D2)				
		Annunciator PZR PORV DSCH TEMP HIGH (1-9-C6)				
		PZR pressure indicators 1PI-456, 457, and 458 lowering				
		PZR PORV 1RY-455A open light lit at 1PM05J.				
	ATC	Identify 1PT-455 is failing high.				
		Identify 1RY455A is open.				
		Report failure to US.				
		Perform the following at 1PM05J:				
		• Select an Operable controlling channel per the BWAR OR				
		• Perform the following actions per TBWUA INST-2				
		Place TR1455A, PZR PORV, C/S in close phor to reactor trip or 51 occurring.				
		<ul> <li>Place IPK-455A, master PZK pressure controller, in manual.</li> <li>Lower demand on 1DK 455A sufficiently to close DZP spray valves and</li> </ul>				
		LOwer demand on TEX-400A sufficiently to close FZR spray valves and energize PZR besters prior to reactor trip or SL occurring				
		<ul> <li>Operate 1PK-455 in manual to restore PZR pressure to normal operating</li> </ul>				
		band				
		<ul> <li>Monitor reactor response to RCS pressure transient.</li> </ul>				
	CREW	• Refer to BwARs				
		Identify entry conditions for 1BwOA INST-2, "OPERATION WITH A FAILED				
	05	Notify SM of plant status and procedure entry				
		Request evaluation of Emergency Plan conditions				
		Enter/Implement 1BWUA INST-2, "UPERATION WITH A FAILED INSTRUMENT     OUTANNEL". Attachment D "DDESSUDZED DDESSUDE CHANNEL FAILUDE" and				
		direct operator actions of 18WOA INST. 2 to establish the following conditions				
		Direct ROP/RO to ston load ramn/dilution				
	ATC	Check PZR pressure at 1PM05J:				
		• PZR pressure – low on 1PI-456, 457, & 458.				
		<ul> <li>Manually restore PZR pressure using 1PK-455A.</li> </ul>				
		<ul> <li>Select operable PZR pressure control channel</li> </ul>				
		Place PZR pressure control select C/S to CH-457/CH-458.				
		Check PZR PORVs - CLOSED				
		Check PZR spray valves – NORMAL				
		Check PZR heaters – NORMAL				

Scenario NRC 11-4 Event 5					
No:		No.			
Event	Event Pressurizer pressure channel 1PT-455 fails high				
Descrip	tion:				
Time	Position	Applicant's Actions or Behavior			
	ATC	<ul> <li>Check PZR pressure control in auto</li> <li>PZR PORVs in auto</li> <li>PZR spray valves in auto</li> <li>Place Master PZR pressure controller in auto</li> <li>Select operable channels to recorders</li> <li>PZR pressure recorder selected to CH456, CH457, or CH458</li> <li>Loop ∆T recorder selected to 1B, 1C, or 1D</li> <li>Check P11 interlock</li> <li>RCS pressure &gt; 1930 psig – P11 NOT lit</li> </ul>			
	US	<ul> <li>Perform pre-job brief per HU-AA-1211 for bistable tripping</li> <li>Complete 1BwOL 3.3.1, Attachment A, "INSTRUMENT CONDITION TRACKING LOG"</li> </ul>			
	US	<ul> <li>Determine TS 3.3.1 conditions A, E, &amp; K are applicable.</li> <li>Determine TS 3.3.2 conditions A &amp; D are applicable</li> <li>Determine TS 3.3.4 condition A is applicable</li> <li>If PZR pressure drops below 2109 psig. determine TS 3.4.1 condition A is applicable</li> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.</li> <li>Dequip entry for P-11</li> </ul>			
		The next event is to be inserted following the above actions by the US and Lead			
		Examiner concurrence.			

Scenario NRC 11-4 Event 6				
No: No.				
Event		#4 governor valve servo failure		
Descript	lion:	Applicant's Actions or Debayier		
Time	Position	Applicant's Actions of Benavior		
	CUE	Annunciator TAVE CONT DEV HIGH (1-14-D1)		
		<ul> <li>#4 governor valve closed indication at 1PM02J or OWS drop 210.</li> </ul>		
		<ul> <li>Generator MW lowering at 1PM02J or OWS drop 210.</li> </ul>		
		RCS Tave rising at 1PM05J.		
	CREW	Refer to BwARs		
	ATC/	<ul> <li>Determine turbine load rejection in progress from 1PM02J or OWS drop210.</li> </ul>		
	BOP	Reference BwARs.		
		Dispatch operators to investigate #4 GV.		
	US	Notify SM of #4 GV malfunction.		
		<ul> <li>Direct operators to restore RCS Tave / Delta I.</li> </ul>		
		NOTE: The crew may decide to borate the rods back out based upon Delta I		
	470			
	AIC	<ul> <li>Initiate RCS boration per BwOP CV-6 at 1PM05J.</li> </ul>		
		<ul> <li>Determine required bonc acid volume.</li> <li>Determine desired bonc acid flow rate.</li> </ul>		
		<ul> <li>Determine desired bond actuality rate.</li> <li>Set 1EK-110 BA Flow Control to desired horation rate</li> </ul>		
		<ul> <li>Set 1FY-0110 BA Blender Predet Counter to desired volume</li> </ul>		
		<ul> <li>Place MAKE-UP MODE CONT SWITCH to STOP position</li> </ul>		
		<ul> <li>Place MODE SELECT SWITCH to BORATE position.</li> </ul>		
		<ul> <li>Place MAKE-UP MODE CONT SWITCH to START.</li> </ul>		
		• 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).		
		OR		
		<ul> <li>Batch addition of Boric Acid:</li> </ul>		
		• Open 1CV110B.		
		• Open 1CV110A.		
		<ul> <li>Start the BA Transfer pump.</li> <li>When desired amount of BA has been added, step the BA Transfer Dump.</li> </ul>		
		$\circ$ Close 1CV110B		
		• Turn on PZR backup heaters in accordance with BwOP RY-14, PRESSURIZER		
		BACKUP HEATER OPERATION.		
	US	• Contact SM to perform risk assessment, initiate IR, and contact maintenance, OAD,		
		SED to investigate/correct component.		
		Check reactor power change < 15% in one hour.		
		<ul> <li>Refer to BwOP FW-26 to evaluate FW venturi fouling.</li> </ul>		

Scenario	NRC	11-4	Event	6
No:			No.	
Event		#4 governor val	ve servo fa	ailure
Descript	ion:			
Time	Position			Applicant's Actions or Behavior
		<ul> <li>Contact Pov duration of p</li> <li>Review Tec</li> <li>Review RIL</li> </ul>	ver Team a bower dera h Spec 3.4 per COLR	and inform Power Team of load reduction and estimated ate. 4.1 for applicability R
		EVALUATOR N and with lead of	IOTE: Aft examiners	ter the actions for the governor valve failure are complete s concurrence, insert the next event.

Scenario	NRC	<b>11-4</b> Event 7 & 8
Event		1D Steam Generator Tube Rupture/loss of RCS pressure control
Descripti	on:	
Time	Position	Applicant's Actions or Behavior
	CUE	<ul> <li>Annunciator CHARGING LINE FLOW HIGH LOW (1-9-D3).</li> </ul>
		RM-11 Rad Monitor ALERT/HI RAD Alarms.
		<ul> <li>1PR08J SG Blowdown.</li> </ul>
		• 1PR27J SJAE/GS.
		<ul> <li>TAR 22/23A &amp; TAR22/23D, TA &amp; TD main steam line.</li> <li>DZD pressure lowering in an upsentrelled menner.</li> </ul>
		<ul> <li>PZR pressure lowering in an uncontrolled manner.</li> <li>Level rise/EW flow drop poted on 1B S/G</li> </ul>
		C Level lise/I w now drop hoted on TB S/G.
	CREW	Identify entry conditions for 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION.
	ATC	a Initiate e menuel regeter trip
	AIC	<ul> <li>Initiate a manual feactor trip.</li> <li>Initiate a manual SI</li> </ul>
	US	Notify SM of plant status and procedure entry.
		<ul> <li>Request evaluation of Emergency Plan conditions.</li> </ul>
		<ul> <li>Enter/Implement 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION, and direct</li> </ul>
		operator actions of 1BwEP-0 to establish the following conditions:
	ATC	Perform immediate operator actions of 1BwEP-0 at 1PM05.
	/110	<ul> <li>Verify reactor trip.</li> </ul>
		<ul> <li>Rod bottom lights - ALL LIT.</li> </ul>
		<ul> <li>Reactor trip &amp; Bypass breakers – OPEN.</li> </ul>
		Neutron flux – DROPPING.
	BOD	Perform immediate operator actions of 18wEP. 0 at 1PM02 Lor Operator Work Station
	DOI	drop 210 (DEH computer terminal located behind Unit 1 desk).
		<ul> <li>Verify Turbine Trip.</li> </ul>
		<ul> <li>All Turbine throttle valves – CLOSED.</li> </ul>
		All Turbine governor valves – CLOSED.
	BOD	Perform immediate operator actions of 18wEP.0 at 10M01 I:
	DOF	<ul> <li>Verify nower to 4KV busses</li> </ul>
		<ul> <li>ESE Buses – BOTH ENERGIZED (141 &amp; 142)</li> </ul>
	CREW	Perform immediate operator actions of 1BwEP-0 at 1PM04J, 1PM05J, & 1PM06J:
		Check SI actuated at 1PM05J and 1PM06J:
		<ul> <li>Annunciator 1-11-C1, PZR PRESS LO SI/RX TRIP – LIT.</li> </ul>
		<ul> <li>SI ACTUATED Bypass Permissive – LIT.</li> </ul>
		SI equipment automatically actuated:
		<ul> <li>1A and 1B SI pump –RUNNING.</li> </ul>

Scenario	NRC	<b>11-4</b> Event 7 & 8
Event		1D Steam Generator Tube Rupture/loss of RCS pressure control
Descripti Time	on: Position	Applicant's Actions or Behavior
	1 0310011	Applicant's Actions of Benavior
		<ul> <li>ISI880 IA and B, CV pump cold leg injection valves – OPEN.</li> <li>Manually actuate SI</li> </ul>
	US	Direct BOP to perform Attachment B of 1BwEP-0
		EVALUATOR NOTE: US and ATC will continue in 1BwEP-0 while BOP is performing
		Attachment B:
	BOD	<ul> <li>Verify FVV isolated at 1PM04J:</li> <li>FW number TDIDDED</li> </ul>
		• FW pumps – IRIPPED.
		<ul> <li>Isolation monitor lights – LLL.</li> <li>EW summer discharge velves. CLOSED (or geing closed) 4EW0004. C</li> </ul>
		<ul> <li>Fw pumps discharge valves - CLOSED (or going closed) TFW002A-C.</li> <li>Verify DCe rupping et 1DM01 I:</li> </ul>
		• DGS - DOTH RUNNING. • 19Y1604/R ODEN
		<ul> <li>Dispatch operator locally to check operation</li> </ul>
		<ul> <li>Dispatch operator Trip at 1PM01 I:</li> </ul>
		• OCB 1.8 and 7.8 open
		<ul> <li>DCB 1-8 and 7-8 open.</li> <li>PMC output breaker open.</li> </ul>
		<ul> <li>Find output breaker open.</li> <li>Secure all HD running numps</li> </ul>
		<ul> <li>Verify Control Room ventilation aligned for emergency operations at 0PM02 I:</li> </ul>
		<ul> <li>VC Rad Monitors – LESS THAN HIGH ALARM SETPOINT</li> </ul>
		<ul> <li>Operating VC train equipment – RUNNING</li> </ul>
		OB Supply fan
		OB Return fan
		• 0B M/U fan
		OB Chilled water pump
		• 0B Chiller
		<ul> <li>Operating VC train dampers – ALIGNED.</li> </ul>
		<ul> <li>M/U fan outlet damper – 0VC08Y NOT FULLY CLOSED.</li> </ul>
		• 0B VC train M/U filter light – LIT.
		OVC09Y - OPEN
		OVC313Y - CLOSED
		<ul> <li>Operating VC train Charcoal Absorber aligned for train B.</li> </ul>
		OVC44Y - CLOSED
		• 0VC05Y - OPEN
		• 0VC06Y - OPEN
		<ul> <li>Control Room pressure greater than +0.125 inches water on 0PDI-VC038.</li> </ul>
		<ul> <li>Verify Auxiliary Building ventilation aligned at 0PM02J:</li> </ul>
		Two inaccessible filter plenums aligned.
		Plenum A:
		OVA03CB - RUNNING

Scenario No:	NRC	<b>11-4</b> Event 7 & 8 No.
Event		1D Steam Generator Tube Rupture/loss of RCS pressure control
Descriptio	on: Position	Applicant's Actions or Behavior
Time	POSILION	
		<ul> <li>0VA023Y - OPEN</li> <li>0VA436Y - CLOSED</li> <li>Plenum C:</li> <li>0VA03CF RUNNING</li> <li>0VA072Y - OPEN</li> <li>0VA438Y - CLOSED</li> <li>Verify FHB ventilation aligned at 0PM02J:</li> <li>0VA04CB - RUNNING</li> <li>0VA055Y - OPEN</li> <li>0VA062Y - OPEN</li> <li>0VA435Y - CLOSED</li> </ul>
		Notify US Attachment B complete
	ATC/ BOP	<ul> <li>Verify ECCS pumps running at 1PM05J/1PM06J:</li> <li>Both CV pumps - RUNNING.</li> <li>Both RH pumps - RUNNING.</li> <li>Both SI pumps - RUNNING.</li> </ul>
	ATC/ BOP	<ul> <li>Verify RCFCs running in Accident Mode at 1PM06J:</li> <li>Group 2 RCFC Accident Mode lights – ALL LIT.</li> </ul>
	ATC/ BOP	<ul> <li>Verify Phase A isolation at 1PM06J:</li> <li>Group 3 Cnmt Isol monitor lights – ALL LIT.</li> </ul>
	ATC/ BOP	<ul> <li>Verify Cnmt Vent isolation at 1PM06J:</li> <li>Group 6 Cnmt Vent Isol monitor lights – ALL LIT.</li> </ul>
	BOP	<ul> <li>Verify AF system at 1PM06J:</li> <li>AF pumps – BOTH RUNNING.</li> <li>AF isolation valves – OPEN: <ul> <li>1AF13A-H</li> </ul> </li> <li>AF flow control valves – THROTTLED: <ul> <li>1AF005A-H</li> </ul> </li> </ul>
	ATC/ BOP	<ul> <li>Verify CC pumps at 1PM06J:</li> <li>CC pumps – BOTH RUNNING.</li> </ul>
	ATC/ BOP	<ul> <li>Verify SX pumps at 1PM06J:</li> <li>SX pumps – 1B RUNNING.</li> </ul>

Scenario	NRC	11-4 Event 7 & 8
Event		1D Steam Generator Tube Rupture/loss of RCS pressure control
Descripti	on: Position	Applicant's Actions or Rehavior
Time		Obsiste Main Otsensling Instation required at 4DM04 Long 44DM00 L
	BOP	<ul> <li>Check if Main Steamline Isolation required at 1PM04J and 1PM06J:</li> <li>SG pressures – ALL &gt; 640 psig</li> </ul>
	201	<ul> <li>CNTM pressure - &lt; 8.2 psig.</li> </ul>
-	ATC/	Check if CS is required at 1PM06J:
	BOP	<ul> <li>CNMT pressure remained &lt; 20 psig.</li> </ul>
	BOP/	Verify Total AF flow at 1PM04J and 1PM06J:
	AIC	<ul> <li>AF flow &gt; 500 gpm.</li> <li>SC lovels maintained between 10% and 50%</li> </ul>
		<ul> <li>Check status of S/G NR levels.</li> </ul>
		<ul> <li>1D S/G level rising in an uncontrolled manner.</li> </ul>
		Close 1AF013D & H.
	ATC/	Verify ECCS valve alignment at 1PM06J:
	BOP	<ul> <li>Group 2 Cold Leg Injection monitor lights required for injection – LIT.</li> </ul>
		Verify ECCS flow at 1PM05J:
		• High Head St flow > 100 gpm (1FI-917). $\circ$ RCS pressure > 1700 psig
		<ul> <li>SI pump discharge flow &lt; 200 gpm.</li> </ul>
	ATC	Check PZR PORVs and spray valves at 1PM05J:
		PORV isolation valves:
		<ul> <li>IRY8000A &amp; B - ENERGIZED</li> <li>PORV relief naths:</li> </ul>
		<ul> <li>1RY455A &amp; 456– C/S in AUTO</li> </ul>
		<ul> <li>1RY8000A &amp; B – OPEN</li> </ul>
		<ul> <li>1RY455B &amp; 1RY455C - CLOSED</li> </ul>
	ATC	Maintain RCS temperature control at 1PM05J:
		<ul> <li>RCPs – ALL RUNNING:</li> <li>Vorify BCS average temperature stable at or trending to 557°E</li> </ul>
		<ul> <li>Throttle AF flow.</li> </ul>
	ATC	Check status of RCPs at 1PM05J
		All RCPs – RUNNING.
		Check RCP trip criteria:     Phase B isolation NOT actuated
		<ul> <li>RCS pressure &gt; 1425 psig – continue on in 1BwFP-0</li> </ul>

Scenario No:	NRC	11-4 Event 7 & 8 No.
Event Descripti	on:	1D Steam Generator Tube Rupture/loss of RCS pressure control
Time	Position	Applicant's Actions or Behavior
	BOP/ ATC	<ul> <li>Check if SG secondary pressure boundaries are intact at 1PM04J:</li> <li>Check pressure in all SGs: <ul> <li>None dropping in an uncontrolled manner.</li> <li>None completely depressurized.</li> </ul> </li> </ul>
	CREW	<ul> <li>Determine 1B S/G tubes are NOT intact:</li> <li>RM-11 ALERT/HI RAD Alarms:         <ul> <li>1PR08J SG Blowdown</li> <li>1PR27J SJAE/GS</li> <li>1AR 22/23D 1D Main Steam Line</li> </ul> </li> </ul>
	CREW	Transition to 1BwEP-3, STEAM GENERATOR TUBE RUPTURE.

Scenario No:	NRC	11-4 Event 7 & 8 No.
Event Descripti	on:	1D Steam Generator Tube Rupture/loss of RCS pressure control
Time	Position	Applicant's Actions or Behavior
	US	<ul> <li>Notify SM of plant status and procedure entry.</li> <li>Request evaluation of Emergency Plan conditions.</li> <li>Request STA evaluation of status trees.</li> <li>Enter/Implement 1BwEP-3, STEAM GENERATOR TUBE RUPTURE, and direct operator actions of 1BwEP-3 to establish the following conditions:</li> </ul>
	BOP/ ATC	<ul> <li>Check status of RCPs at 1PM05J:</li> <li>All RCPs – RUNNING.</li> <li>Check RCP trip criteria at 1PM05J:</li> <li>High head ECCS flow &gt; 100 gpm</li> <li>RCS pressure &gt; 1425 psig – continue on in 1BwEP-3.</li> </ul>
	BOP/ ATC [CT] E-3A	<ul> <li>Identify ruptured SG 1D: <ul> <li>1D Main steam line rad monitor ABNORMAL for plant conditions.</li> </ul> </li> <li>Isolate ruptured SG at 1PM04J &amp; 1PM06J: <ul> <li>Verify 1MS018D in AUTO</li> <li>Check 1MS018D CLOSED</li> <li>Verify closed when SG pressure &lt; 1115 psig.</li> <li>Notify SM to dispatch Environmental Monitoring Teams.</li> <li>Announce condition on plant page.</li> </ul> </li> <li>Verify 1SD002C &amp; D CLOSED.</li> <li>Place 1MS001D, Loop 1B MSIV, C/S to CLOSE.</li> <li>Verify 1MS101D, 1D MSIV Bypass Valves - CLOSED.</li> <li>Check PORVs on 1A, 1B, &amp; 1C SGs available for RCS cool down.</li> </ul>
	BOP/ ATC	<ul> <li>Perform the following at 1PM04J:</li> <li>Check 1D SG level - Narrow Range &gt; 10%.</li> <li>Check 1D SG pressure &gt; 320 psig.</li> </ul>
	CREW [CT] E-3B	<ul> <li>Initiate RCS cooldown:</li> <li>Determine required core exit temperature: <ul> <li>Lowest 1D SG pressure at 1PM04J.</li> <li>Average of 10 highest CETC's at 1PM05J.</li> </ul> </li> <li>Check P-11 status at 1PM05J: <ul> <li>RCS pressure &lt; 1930 psig: <ul> <li>Verify P-11 Bypass Permissive light – LIT.</li> <li>Place BOTH Steam Line SI Reset/Block C/S to BLOCK.</li> <li>RCS pressure &gt; 1930 psig:</li> </ul> </li> </ul></li></ul>

Scenario No <sup>:</sup>	NRC	11-4 Event 7 & 8
Event		1D Steam Generator Tube Rupture/loss of RCS pressure control
Descripti	on: Position	Applicant's Actions or Behavior
Time	FUSILION	
		<ul> <li>Continue RCS cooldown and block steamline SI in accordance with above steps when RCS pressure &lt; 1930 psig.</li> <li>Dump steam to condenser at maximum rate: <ul> <li>Check C-9 Bypass Permissive – NOT LIT at 1PM05J.</li> <li>Check 1A, 1B, &amp; 1C MSIVs – OPEN at 1PM06J.</li> </ul> </li> <li>Perform the following at 1PM04J: <ul> <li>Place 1PK-507, MS Header Pressure Controller, in MANUAL.</li> <li>Lower 1PK-507, MS Header Pressure Controller, demand to 0%.</li> <li>Place Steam Dump Mode Selector C/S to STM PRESS.</li> <li>Raise demand on 1PK-507, MS Header Pressure Controller, to initiate RCS cooldown.</li> <li>When P-12 permissive is LIT, bypass P-12 interlock to continue cool down by placing steam dump switches to BYP-INTLK.</li> </ul> </li> <li>Check average of 10 highest CETC's: <ul> <li>CETC &lt; required temperature determined in step 6a - stop RCS cooldown</li> </ul> </li> </ul>
		<ul> <li>by lowering demand on MS Header Pressure Controller and throttling AF flow.</li> <li>CETC &gt; required temperature determined in step 6a – continue with 1BwEP-3 steps 7-13 and stop RCS cooldown when CETC &lt; required temperature.</li> <li>Check 1A, 1B, &amp; 1C SG levels at 1PM04J:</li> <li>Control SG levels between 30% - 50%.</li> <li>Check narrow range levels not increasing in an uncontrolled manner.</li> </ul>
	ATC	Note: RO may note depressurized PORV accumulator and report that PORV unavailable. • Check PZR PORVs and isolation valves at 1PM05J: • PORV isolation valves: • 1RY8000A/B - ENERGIZED • PORVs: • 1RY455A/456 – CLOSED • PORV isolation valves: • 1RY8000A/B – OPEN
	BOP/ ATC	<ul> <li>Reset SI at 1PM06J:</li> <li>Depress both SI reset pushbuttons.</li> <li>Verify SI actuated permissive light – NOT LIT.</li> <li>Verify auto SI blocked permissive light – LIT.</li> <li>Reset CNMT isolations at 1PM06J:</li> <li>Reset phase A isolation.</li> </ul>

Scenario No <sup>.</sup>	NRC	11-4 Event 7 & 8
Event		1D Steam Generator Tube Rupture/loss of RCS pressure control
Descripti Time	on: Position	Applicant's Actions or Behavior
	1 0010011	Check Station Air Compressors and running
		<ul> <li>Open 1IA065, Instrument Air Outside Isolation Valve.</li> <li>1IA066, Instrument Air Jacida Isolation Valve.</li> </ul>
		<ul> <li>1IA066, Instrument Air Inside Isolation Valve, will NOT open.</li> <li>Vorify all AC buses operaized at 1PM01 I:</li> </ul>
		All 4 KV ESE buses energized
		<ul> <li>All 4KV non-ESF buses energized.</li> </ul>
		All 6.9 KV buses energized.
		Check if RH pumps should be stopped at 1PM06J:
		<ul> <li>1SI8812A &amp; B open.</li> </ul>
		<ul> <li>RCS pressure &gt; 325 psig.</li> </ul>
		• Stop both RH pumps and place in standby.
		<ul> <li>Check average of 10 highest CETC's:</li> <li>CETC &lt; required temporature determined in step 6a, step BCS cooldown by</li> </ul>
		lowering demand on MS Header Pressure Controller and throttling AF flow
		<ul> <li>CETC &gt; required temperature determined in step 6a – continue cooldown and DO</li> </ul>
		NOT proceed further in with 1BwEP-3 until CETC < required temperature.
		<ul> <li>Maintain CETC &lt; required temperature.</li> </ul>
		<ul> <li>Check 1D SG pressure at 1PM04J – stable or rising.</li> </ul>
		<ul> <li>Check RCS subcooling acceptable per Figure 1BwEP 3-2.</li> </ul>
	ATC	Attempt to depressurize RCS:
		<ul> <li>Determine normal PZR spray at 1PM05J – NOT available (1IA066 will not open)</li> </ul>
		Check PZR PORVs at 1PM05J:
		1RY455A is unavailable (air accumulator de-pressurized).
		Attempt to open 1RY456.
	ATC/	Determine 1RY456 will not open. Trute actablish any aprove
	ROP	<ul> <li>Try to establish aux spray.</li> <li>Verify at least one SL and one CV nump running.</li> </ul>
	DOI	<ul> <li>Terminate Hi Head ECCS:</li> </ul>
		<ul> <li>Reset SI recirc sump isol valves/CV pump miniflow valves.</li> </ul>
		<ul> <li>Verify CV pump miniflow valves OPEN - 1CV8110, 1CV8111, 1CV8114, &amp;</li> </ul>
		1CV8116.
		<ul> <li>Close CV pump cold leg injection valves - 1SI8801A &amp; B. (critical tasks may be performed later in 1PwCA 2.2)</li> </ul>
	υα-3.3 Δ	$\sim$ Place 1CV182 at 0%
		<ul> <li>Open 1CV8105 &amp; 1CV8106.</li> </ul>
		<ul> <li>Determine aux spray unavailable without IA to CNMT.</li> </ul>
		NOTE: IF the above critical task was performed, the scenario can be terminated here
		at the discretion of the lead evaluator.

Scenario	NRC	<b>11-4</b> Event 7 & 8
NO: Event		No. 1P. Steam Consister Tube Bupture/loss of BCS pressure central
Descript	ion:	The Steam Generator Tube Rupture/loss of RCS pressure control
Time	Position	Applicant's Actions or Behavior
	US	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 1D 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 below.
	BOP	Check 1D SG NR level:
		<ul> <li>Greater than 88%, GO TO Step 7 (CHECK IF ECCS FLOW CAN BE</li> </ul>
		TERMINATED).
		<ul> <li>Less than 88% NR, continue with next step.</li> </ul>
	CREW	Determine normal PZR spray unavailable until IA can be restored to CNMT.
	CREW	• Attempt to restore PZR PORV:
	BOP	<ul> <li>Check intact SG levels - Narrow range levels &gt; 10%:</li> </ul>
		<ul> <li>Maintain narrow range levels between 30% and 50%.</li> </ul>
		<ul> <li>Check narrow range levels not increasing in an uncontrolled manner.</li> </ul>
	RU	Check PZR level:
		$\circ$ Greater than 14%, return to step 1 of 15wCA-5.5.
		EVALUATOR NOTE: 1BwCA-3.3, step 7 actions are contained in the row below.
	CREW	<ul> <li>Check if ECCS flow can be terminated: (Step 7)</li> </ul>
		<ul> <li>Subcooling - acceptable per Iconics or Attachment A and Fig 1BwCA-3.3-1.</li> </ul>
		<ul> <li>Secondary heat sink established.</li> </ul>
		<ul> <li>RVLIS Plenum 15% or greater.</li> </ul>
		Ruptured SG 1D rising in an uncontrolled manner or off scale high.
	BOP	Stop BOTH SI pumps.
		Stop 1 CV pump.
	CREW	Terminate high head ECCS:
	[CT]	<ul> <li>CV pump suction aligned to RWST - 1CV112D &amp; E open.</li> </ul>
	CA-3.3	<ul> <li>Reset SI recirc sump isol valves/CV pump miniflow valves.</li> </ul>
	A	• Verify CV pump miniflow valves OPEN-1CV8110, 1CV8111, 1CV8114, & 1CV8116.

Scenario	NRC	11-4 Event 7 & 8			
No:		No.			
Event		1B Steam Generator Tube Rupture/loss of RCS pressure control			
Descripti	on:	·			
Time	Position	Applicant's Actions or Behavior			
		<ul> <li>Close CV pump cold leg injection valves - 1SI8801A &amp; B. (critical tasks may have been performed earlier in 1BwEP-3)</li> </ul>			
		EVALUATOR NOTE: At this point the scenario is terminated.			
Simulation Facility       Braidwood       Scenario       Operating Test No.: 2011 NRC         No.:       Exam       NRC 11-3       Exam         Examiners:       Applicant:       SRO					
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				<u>BOP</u>	
Initial Con	ditions: IC-21				
Turnover:	Unit 1 is operating at 100% pow Control rods are in manual for tr not available.	er, steady oubleshoc	state, equilibr ting by Instrur	ium xenon. Online risk is yellow. ment Maintenance. Auto rod control is	
Event	Malf. No.	Event		Event	
No.		Туре		Description	
Preload	IMF FW44		1B AF pump	fails to start	
	MRF RP84 OPEN			Tails to automatically start	
	trgset 1 "ZLO52BRKA(2) == 1"				
	IMF CV01B (1 0)		1B CV pump	trips when Rx trips	
	trg 1 "IMF FW19C 3.5 0 10"		Feed line bre	eak inside containment when Rx trips	
				anure requiring roos in manual.	
1	None	N-BOP, US	Lower reactiv	ve load 1 KV.	
2	IMF ED15A IMF ED015I	R-ATC, US	Grid disturba	ance requiring turbine load reduction	
3	IOR ZDI1CV110B CLS IOR ZDO1CV110B(1) OFF IOR ZDO1CV110B(2) OFF	C-ATC, US	1CV110B va rods only	Ive fails closed requiring ramp with	
4	IMF FW17 100	I-BOP, US	HDT Level C	Controller Failure in Auto	
5	IRF ED025 OPEN	TS-US	Loss of DC t	o inverter 113	
6	IMF ED07A	C-ATC, BOP TS-US	Loss of bus	141	
7	IMF RP09A	M	Inadvertent F	-WI	
0	Preload	(ALL)	Feed line bre	eak inside containment	
<u>ŏ</u>				trip when KX trips	
9	Preload		Loss of heat	sink (1B AF pp)	

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

## **SCENARIO OVERVIEW**

Unit 1 is operating at 100% power, steady state, equilibrium xenon. Online risk is yellow. Control rods are in manual for troubleshooting by Instrument Maintenance. Auto rod control is not available.

After completing shift turnover and relief, the BOP will lower Unit 1 reactive load 1 KV in accordance with BwOP MP-23.

**After lowering reactive load,** a grid disturbance will cause 345 KV lines 0103 and 0104 to be lost. One minute later, the Transmission System Operations Reliability Coordinator will contact the main control room and direct Unit 1 to initiate an emergency load reduction of 100 MW within 20 minutes to alleviate an overload condition on grid transmission lines. The state estimator alarm is not present.

**During the initial boric acid addition,** 1CV110B valve will fail closed (blown fuse), forcing the crew to complete the load ramp with control rods only.

**After the load ramp is complete,** HDT Level Controller, 1LK-HD009A, will fail to 100% demand. The 1HD046A/B valves will full open and HDT level will drop. The BOP will take actions to stabilize the plant by taking manual control of the 1LK-HD009A.

**After the HDT Level Controller failure is addressed,** a loss of DC to instrument inverter 113 will occur. The crew will follow the annunciator response BwAR 1-4-C5. The crew will determine from field report that the instrument inverter DC input has failed. Technical Specification 3.8.7, condition A applies.

**Following completion of inverter 113 actions,**, a ground fault will occur on bus 141. 1BwOA ELEC-3 will be entered and the operators will start redundant equipment on bus 142 and investigate the status of bus 141. Tech Spec 3.8.9 applies.

**Following completion of 1BwOA ELEC-3 actions,** an inadvertent FWI occurs. When the crew manually trips the reactor, a feed line break on the 1C SG inside containment will occur. SI will actuate. The crew will enter 1BwEP-0 to stabilize the plant. The 1B SI pump fails to auto start and must be manually started due to a failure of its actuation relay. The 1B AF pump will not start (engine will seize) resulting in a transition to 1BwFR-H.1 at step 15 of 1BwEP-0. The 1B CV pump trips when the reactor trips. Bleed and feed will be required due to the status of the CV pumps.

Completion criteria is establishing startup feedwater pump flow to the non-faulted SGs.

# **Critical Tasks**

- 1. Manually start the 1B SI pump before transition out of 1BwEP-0 (ERG Critical Task number E-0—J) (K/A number 006000A4.01 4.1/3.9)
- 2. Initiate RCS bleed and feed before attempting to establish main feedwater flow or condensate flow to any SG (ERG Critical Task number FR-H.1--F) (K/A number 000E05EA1.1 importance 4.1/4.0)

# 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 (allow simulator to run during board walk down and turnover).
- Place Control Rods in MANUAL
- Run caep NRC 11-3 SETUP from disk and verify the following actuate:
  - IMF FW44
  - IMF RP15D
  - MRF RP84 OPEN
  - trgset 1 "ZLO52BRKA(2) == 1"
  - IMF CV01B (1 0)
  - trg 1 "IMF FW19C 3.5 0 10"
  - IMF RX17 0
- Secure 1A VP chiller and 1A VP WO pump.
- Start 1B VP chiller and 1B VP WO pump.
- Raise MVARS to 250 MW out.
- Provide students with turnover sheets, 1BwOS NR-1, and critical parameter sheet.

## Event 1: Lower reactive load 1KV.

As TSO (Kerry Koch), call TSO tie line (white phone) and request Braidwood Station to lower switchyard voltage 2KV.

Acknowledge as Shift Manager commencement and completion of procedure.

If contacted as Unit 2 to coordinate lowering reactive load, report Unit 2 main generator reactive load is 250 MVARS. Following adjustment of reactive load, report Unit 2 main generator reactive load is 200 MVARS. Report that Unit 2 will log the reactive load change.

If contacted, acknowledge as Transmission System Operation (TSO) (Kerry Koch) completion of reactive load adjustment.

## Event 2: Grid disturbance requiring load reduction.

#### NOTE: Insert Event 3 when first boration is initiated.

Run caep NRC 11-3 EVENT 2 from disk and verify the following actuate:

- IMF ED15A
- IMF ED15I

One minute after inserting the above malfunctions, contact Unit 1 on the TSO phone as Reliability Coordinator Bruce Larsen and direct Unit 1 to initiate an emergency load reduction of 100 MW within 20 minutes due to an overload condition on grid transmission lines. Inform Unit 1 that Unit 2 has been contacted and Unit 2 is also initiating a 100 MW load drop in response to the grid emergency.

As Nuclear Engineer, inform examinees Beacon Prediction is available for Emergency Offsite Line Drop Ramp in Operator Aid Book. Examinees are to use Beacon Prediction for load drop.

If dispatched as Equipment Operator to the relay house to investigate the breaker trips and/or transmission system status, acknowledge request.

If contacted as TSO for cause of grid conditions, report LaSalle Station had fault in switchyard with local breaker backup failures which resulted in a loss of 345 KV lines 0103 and 0104. The state estimator alarm is not present.

If requested as extra NSO to perform Offsite Power Availability Surveillance, report Unit 2 will perform the surveillance. Wait 15 minutes and report surveillance acceptance criteria are met.

Acknowledge as Shift Manager initiation of load reduction, failures, request for maintenance support, and IR request.

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

Acknowledge as Power Team initiation of ramp.

# Event 3: 1CV110B valve fails closed.

When the ATC begins the first boration for the unit load reduction, run caep **NRC 11-3 EVENT 3** from disk and verify the following actuate:

- IOR ZLI1CV110B CLS
- IOR ZLO1CV110B(1) OFF
- IOR ZLO1CV110B(2) OFF

If asked as SM about ramping the unit without boration capability, insist that the unit continue to ramp on rods only, until the valve failure can be fixed. TSO reports no other stations are available to perform the load drop.

As SM, acknowledge the failure and requests for on line risk assessment, maintenance support, and IR initiation.

If dispatched as EO to 1DC12J to investigate, wait 10 minutes and report the fuses for 1CV110B are blown.

As SM report that system engineering is present to replace the fuses, **wait until ramp is complete**, replace the fuses by deleting the following:

- DOR ZLO1CV110B(1) OFF
- DOR ZLO1CV110B(2) OFF
- DOR ZLI1CV110B CLS

## Event 4: HDT Level Controller Failure.

#### Insert IMF FW17 100

If dispatched as EO to investigate, wait one minute and report no visible damage to 1HD046A or B Valves. Report local operation of valves same as MCR indication. (if asked for feedback to manual ops). Report local tank level same as MCR indication.

## Event 5: Loss of DC to inverter 113

Insert **IRF ED025 OPEN** for loss of DC to inverter 113.

When dispatched as Equipment Operator to instrument inverter 113, wait two minutes and report DC input breaker to Inverter 113, B1 is tripped open and Low DC Voltage light P16 is lit.

If requested to close the DC input breaker locally, report breaker will not close.

If dispatched as Equipment Operator /NSO to instrument bus 113, wait one minute and report instrument bus 113 appears normal.

Acknowledge as SM entry into TS 3.8.7 and on line risk status. Acknowledge requests for an IR and System Engineering/Maintenance support.

## Event 6: Loss of bus 141

## • Insert IMF ED07A

If dispatched as EO to bus 141 report acrid smell in Div. 11 ESF switchgear room but no fire.

Acknowledge as SM request for E-plan evaluation, Tech Spec 3.8.9 entry for unit 1, and 3.8.1 for both units request for on line risk assessment. (on line risk will be red) Acknowledge Tech Spec 3.8.4 entry and exit.

Acknowledge request for U-2 admin NSO to perform 1/2BwOSR 3.8.1.1 If requested as ES/EQ to cross-tie 125 VDC bus 111 to 125 VDC bus 211 wait five min

If requested as FS/EO to cross-tie 125 VDC bus 111 to 125 VDC bus 211 wait five minutes and insert the following:

## • MRF ED111 CLOSE

If dispatched as EO to depress 1A DG emergency stop push button insert the following:

## • MRF EG19 TRIP

## Event 7: Inadvertent Feed Water Isolation

Insert IMF RP09A

# Event 8: Feed line break in containment / Loss of Heat Sink/CV pump trip

Acknowledge as SM procedure changes, E Plan evaluations, and STA request. After STA requested, as STA report CSF status – Red path on heat sink (until feed flow established). Yellow on heat sink once feed flow established, Yellow on inventory when head voids due to bleed and feed.

If dispatched as EO, report 1B CV pump has phase C overcurrent flag. If dispatched as EO, report 1B AF pump has large lube oil leak and engine damage. Acknowledge as U2 NSO request to remove FW isolation fuses insert the following:

- MRF FW150 REMOVED
- MRF FW151 REMOVED
- MRF RP78 REMOVED
- MRF RP79 REMOVED

Acknowledge as EO start startup FW pump aux oil pump and insert the following:

## • MRF FW149 START

Acknowledge request as EO to close containment isolation valves.

- MRF CH11 0 to close 1WO006A
- MRF CH13 0 to close 1WO020A
- MRF CV17 0 to close 1CV8100

Scenario NRC 11-3 Event 1						
No:	No: No.					
Event	Event Lower reactive load 1KV					
Descrip	tion:					
Time	Position	Applicant's Actions or Behavior				
	CUE	<ul> <li>From turnover, lower Switchyard voltage 2KV (1KV from each unit) in accordance with BwOP MP-23, ADJUSTING REACTIVE LOAD.</li> </ul>				
	US	Directs BOP to perform BwOP MP-23.				
	BOP	<ul> <li>Refer to BwOP MP-23.</li> <li>Verify MVAR change will not exceed Generator Capability Curve in 1BwGP 100-3A6.</li> <li>Contact Unit 2 to coordinate MVAR adjustment.</li> <li>Perform the following at 1PM01J:</li> <li>Place voltage adjust C/S to lower. (may be done intermittently)</li> <li>Monitor 1VI-MP006, main generator output VARS.</li> <li>Release voltage adjust C/S when 1VI-MP006 has dropped 50 MVARS.</li> <li>Inform US BwOP MP-23 is complete.</li> </ul>				
	US	<ul> <li>Acknowledge report.</li> <li>Notify SM BwOP MP-23 is complete.</li> <li>Notify TSO BwOP MP-23 is complete.</li> </ul>				
	ATC	<ul> <li>Peer check actions of BOP operator.</li> <li>Monitor remainder of MCB.</li> </ul>				
		EVALUATOR NOTE: After BwOP MP-23 is complete and with lead examiners concurrence, enter next event.				

Scenari	D NRC	<b>11-3</b> Event 2			
No:		No.			
Event Grid disturbance requiring turbine load reduction.					
Descrip	lion:	Applicant's Astigns on Debovier			
Time	Position	Applicant's Actions of Benavior			
	CUE	<ul> <li>Call from TSO Reliability Coordinator directing Unit 1 to initiate an emergency load reduction of 100 MW within 20 minutes due to an overload condition on grid transmission lines.</li> <li>Numerous annunciators on 0PM03J.</li> <li>345 KV bus tie breakers 1-3, 1-8, 9-10, and 9-15 open at 0PM03J.</li> <li>345 KV lines 0103 and 0104 deenergized at 0PM03J.</li> </ul>			
	US	<ul> <li>Acknowledge request to lower power 100 MW at 5 Mw/min.</li> <li>Implement actions of 1BwGP 100-4, POWER DESCENSION.</li> <li>Perform pre-job brief per HU-AA-1211 PRE-JOB, HEIGHTENED LEVEL OF AWARENESS, INFREQUENT PLANT ACTIVITY, AND POST JOB BRIEFINGS for load ramp.</li> <li>Initiate 1BwGP 100-4T2, LOAD SWING INSTRUCTION SHEET.</li> </ul>			
	CREW	<ul> <li>Review applicable Precautions, and Limitations and Actions.</li> <li>Review Tech Spec 3.8.1</li> </ul>			
		EVALUATOR NOTE: Immediately after initial boration is started, insert the next event.			
	ATC	<ul> <li>Verify rod position and boron concentration.</li> <li>Initiate boration, if required. (BwOP CV-6)</li> <li>Determine required boric acid volume.</li> <li>Perform boration boundary calculation per 1BwGP 100-4T2.</li> <li>Refer to operator aid for ramp.</li> <li>Determine desired boric acid flow rate.</li> <li>Perform the following at 1PM05J:</li> <li>Set 1FK-110 BA Flow Control to desired boration rate.</li> <li>Set 1FY-0110 BA Blender Predet Counter to desired volume.</li> <li>Place MAKE-UP MODE CONT SWITCH to STOP position.</li> <li>Place MAKE-UP MODE CONT SWITCH to START.</li> <li>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).</li> </ul>			

Scenario No:	ScenarioNRC 11-3Event2No:No.				
Event Grid disturbance requiring turbine load reduction.					
Time	Position	Applicant's Actions or Behavior			
		OR • Batch addition of Boric Acid: • 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 ATC/ BOP	<ul> <li>Turn on PZR backup heaters (BwOP RY-13).</li> <li>Lower turbine load at 1PM02J or Operator Work Station drop 210 (DEH computer terminal located behind Unit 1 desk).by performing the following:</li> <li>Select SETPOINT.</li> <li>Enter MW value that is 100 MW below current value in REF window into REF DEMAND window.</li> <li>Select ENTER.</li> <li>Enter 3.0 MW/min into the RATE window.</li> <li>Select ENTER.</li> <li>Select ENTER.</li> <li>Select EXIT.</li> <li>Notify US and RO of pending ramp.</li> <li>Select GO/HOLD.</li> <li>Verify GO/HOLD button illuminates.</li> <li>Verify HOLD illuminated RED.</li> <li>Select GO.</li> <li>Verify GO illuminates RED.</li> <li>Verify main turbine load begins to lower.</li> <li>Monitor reactor power and turbine load lowering:</li> <li>Monitor NI's, Tave, ΔI, Pzr press/level at 1PM05J.</li> <li>Monitor MWe and DEHC system response at 1PM02J or Operator Work Station drop</li> </ul>			
		<ul> <li>210 (DEH computer terminal located behind Unit 1 desk).</li> <li>Return Reactor Makeup System to automatic at current boron concentration.</li> </ul>			

Scenari	Scenario NRC 11-3 Event 3				
NU. Evont		ICV/110P valve fails closed requiring rame with rode only			
Description:					
Time	Position	Applicant's Actions or Behavior			
	CUE	<ul> <li>Boric acid flow stops</li> <li>Annunciator BA FLOW DEVIATION (1-9-A6)</li> </ul>			
	ATC	<ul> <li>Identify/report loss of boric acid flow</li> <li>Refer to BwAR 1-9-A6</li> <li>Identify/report 1CV110B valve failure</li> <li>Dispatch operator to 1DC12J to inspect fuses</li> </ul>			
	US	<ul> <li>Notify SM of 1CV110B valve failure</li> <li>Direct BOP to stop load ramp</li> </ul>			
	BOP	<ul> <li>Stop turbine load ramp</li> <li>Select GO/HOLD.</li> <li>Assist US &amp; RO</li> <li>Refer to BwARs</li> </ul>			
	ATC	<ul> <li>MAKE-UP MODE CONT SWITCH to STOP</li> <li>Close 1CV110A</li> </ul>			
	US	<ul> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct component.</li> <li>Recommence ramp using rods only.</li> <li>If PZR pressure drops below 2109 psig. LCO 3.4.1 applies.</li> </ul>			
	BOP	<ul> <li>Initiate turbine load reduction:</li> <li>When ready to begin load reduction, depress GO</li> <li>Verify load reduction occurring</li> </ul>			
	ATC/ BOP	<ul> <li>Monitor reactor power and load reduction</li> <li>Monitor NI's, Tave, △I, Pzr press/level</li> <li>Monitor MWe, Turb loading, EHC</li> </ul>			
	ATC	<ul> <li>Maintain Tave/Tref within desired band:</li> <li>At 1PM05J – insert rods manually at desired intervals.</li> </ul>			
		NOTE: After the unit load ramp is complete and with lead examiners concurrence, enter next event			

Scenari	Scenario NRC 11-3 Event 4					
No:	No: No.					
Event	Event HDT Level Controller Failure					
Descrip	tion:					
Time	Position	Applicant's Actions or Behavior				
	CUE	1LK-HD009A output failed high				
		Rising Flow on 1LI-HD004/5/6				
		<ul> <li>Lowering level on 1LI-HD009</li> </ul>				
		Annunciator HDT LEVEL HIGH LOW (1-17-E4)				
	CREW	Refer to BwARs				
		<ul> <li>Recognize 1LK-HD009A output failed high</li> </ul>				
	US	<ul> <li>Direct/Ensure BOP takes manual control of 1LK-HD009A and returns HDT level to</li> </ul>				
		normal.				
		<ul> <li>Inform SM of 1LK-HD009A failure.</li> </ul>				
	BOP	<ul> <li>Perform the following at 1PM03J:</li> </ul>				
		<ul> <li>Place 1LK-HD009A, HDT Level Controller, in manual.</li> </ul>				
		<ul> <li>Lower demand on 1LK-HD009A.</li> </ul>				
		<ul> <li>Monitor HDT level and 1HD046A/B positions to return HDT level to normal.</li> </ul>				
		<ul> <li>Maintain HDT flow by operating 1LK-HD009A in manual.</li> </ul>				
		<ul> <li>Dispatch EO to 1HD046A/B valves.</li> </ul>				
	US	• Contact SM to perform risk assessment, initiate IR, and contact maintenance to				
		investigate/correct instrument tailure.				
<b> </b>		Initiate the next event when the lead examiner approves.				
J		••				

Scenario	D NRC	<b>11-3</b> Event 5
Event Descript	tion:	Loss of DC to instrument inverter 113
Time	Positio n	Applicant's Actions or Behavior
	CUE	Annunciator BUS 113 INVERTER TROUBLE (1-4-C5)
	ATC/ BOP	<ul><li>Determine instrument inverter 113 trouble.</li><li>Reference BwAR.</li></ul>
	CREW	Dispatch operators to investigate status of inverter and instrument bus.
	US	<ul> <li>Notify SM of plant status.</li> </ul>
	US	<ul> <li>Determines TS 3.8.7 condition A is applicable.</li> <li>Contact SM to perform risk assessment, initiate IR, and contact additional personnel to investigate/correct instrument failure.</li> <li>Perform "what if" brief for loss of inverter</li> </ul>
		EVALUATOR NOTE: After the tech spec entry is complete and with lead examiner concurrence, insert the next event.

Scenario	D NRC	<b>11-3</b> Event 6				
INU. Event		NU.				
Descript	Description:					
Time	Position	Applicant's Actions or Behavior				
	CUE	Annunciator (1-21-A7) "BUS 141 FD BRKR 1412 TRIP"				
		Annunciator (1-21-C7) "BUS 141 OVERLOAD OR VOLT LOW"				
		Annunciator (1-21-C8) "DG 1A TROUBLE/FAIL TO START"				
		Bus 141 bus alive light not lit				
	CREW	Determine Bus 141 De-energized.				
		Reference BwARs				
		<ul> <li>Identify entry conditions for 1BwOA ELEC-3 "LOSS OF 4KV ESF BUS"</li> </ul>				
	US	Notify SM of plant status and procedure entry				
		Request evaluation of Emergency Plan conditions				
		<ul> <li>Implement 1BwOA ELEC-3 "LOSS OF 4KV ESF BUS" to establish the following</li> </ul>				
		conditions:				
		Determines TS 3.8.9 condition A & B are applicable.				
		Contact SM to perform risk assessment, initiate IR, and contact maintenance to				
		investigate/correct instrument failure.				
	ATC/	Ensure the following B train equipment started/running				
	BOP	1B CV pump				
		<ul> <li>1B CC pump</li> </ul>				
		1B SX pump				
		○ 1B/D RCFCs				
		<ul> <li>OB VC train</li> </ul>				
		<ul> <li>Isolate bus 141 by placing the following breakers in PTL:</li> </ul>				
		• ACB 1413 FIRST, then:				
		• ACB 1411, 1412, 1414				
		Bus 141 lockout alarm (1-21-A7) LIT				
		111 Batt Chrg trouble alarm (1-21-E8) LIT				
		<ul> <li>Dispatch operator to crossile ESF DC Bus 111 with ESF DC Bus 211</li> </ul>				
		Refer to Lech Specs				
		Perform 1BWOSR 3.8.1.1 Within 1 hour				
		Unit 2 contacted to perform 2BWOSR 3.8.1.1 w/i 1 hr				
		• Keview 3.8.1, 3.8.9				
		• Keview 3.8.4				
		Operator dispatched to emergency trip TA D/G				

Scenario	o NRC	11-3	Event	6
No:			No.	
Event		Loss of bus 141		
Descript	tion:			
Time	Position			Applicant's Actions or Behavior
		Dispatch op	erators to I	ocally investigate bus 141
		EVALUATOR N	OTE: Afte	er the actions for the bus 141 failure are complete and with
		lead examiners	concurre	ence, insert the next event.

Scenario NRC 11-3 Event 7					
NO:	No: No.				
Event	Event Inadvertent FWI & Feed line break inside containment				
Time	UON. Desition	Applicant's Actions or Pobaviar			
Time	Position	Applicant's Actions of Benavior			
	CUE	Annunciator (1-15-E7) "FWIV NOT FULL OPEN"			
		FWI monitor lights - ALL lit			
	CREW	Recognize FWI and conditions require a manual reactor trip.			
	US	Direct a manual Rx trip			
		<ul> <li>Implement 1BwEP-0 "REACTOR TRIP OR SI"</li> </ul>			
		<ul> <li>Direct operator actions of 1BwEP-0 to establish the following conditions:</li> </ul>			
	ATC	Perform immediate operator actions of 1BwEP-0 at 1PM05J:			
		Verify reactor trip.			
		<ul> <li>Rod bottom lights - ALL LIT.</li> </ul>			
		<ul> <li>Reactor trip &amp; Bypass breakers – OPEN.</li> </ul>			
		Neutron flux – DROPPING.			
	BOP	Perform immediate operator actions of 1BwEP-0 at 1PM02J or OWS drop 210:			
		Verify Turbine Trip.			
		<ul> <li>All Turbine throttle valves – CLOSED.</li> </ul>			
		All Turbine governor valves – CLOSED.			
	BOP	Perform immediate operator actions of 1BwEP-0 at 1PM01J:			
		Verify power to 4KV busses.			
		Bus 141 deenergized			
		Bus 142 energized			
	CREW	(If manual SI not previously performed) Recognize and respond to conditions requiring a			
		Safety Injection in accordance with 1BwEP-0 "REACTOR TRIP OR SAFETY			
		INJECTION", Step 4:			
		<ul> <li>1C SG pressure cannot be maintained &gt; 640 psig.</li> </ul>			
		Manually actuate SI from 1PM05J and 1PM06J.			
		I ne crew may transition to 18wEP ES-0.1 "REACTOR TRIP RESPONSE" if SI			
		conditions are not met in accordance with 18wEP-0 "REACIOR IRIP or SI."			
		Recognition of SI requirements during performance of 15WEP ES-0.1 Will require re-ontering 18WEP 0 at stop 1 (Page 17 continues the estions of 48WEP 0)			
		re-enterning IDWEP-0 at step 1 (Page 17 continues the actions of IDWEP-0). Decognition of 1BWED H 1 ontry requirements during performance of 1BWED ES			
		Accognition of IBWER-A. I entry requirements during performance of IBWEP ES-			
		U. I WIII IEYUIIE EIIIEIIIIY IDWFR-П. I. 18wED-H 1 actions start on page 20			
		ισωγκ-π.ι αυιισιό stati στι μάγε 20.			

Scenari	o NRC	<b>11-3</b> Event 7
No:		No.
Event		Feed line break inside containment & Loss of heat sink
Descrip	tion:	
Time	Position	Applicant's Actions or Behavior
	US	<ul> <li>Transition to 1BwEP ES-0.1 "REACTOR TRIP RESPONSE" from 1BwEP-0</li> </ul>
		<ul> <li>Notify SM of plant status and procedure entry.</li> </ul>
		<ul> <li>Request evaluation of Emergency Plan conditions.</li> </ul>
		<ul> <li>Request STA evaluation of status trees.</li> </ul>
		<ul> <li>Enter/Implement 1BwES-0.1 and direct operator actions of 1BwEP–1 to establish</li> </ul>
		the following conditions:
	ATC	<ul> <li>RCS temperature stable at/trending to 557°F</li> </ul>
		<ul> <li>All rod bottom lights are lit</li> </ul>
		$\circ$ PZR level > 17%
		<ul> <li>Charging and Letdown in Service</li> </ul>
		<ul> <li>PZR Level Trending to Program</li> </ul>
		<ul> <li>PZR pressure &gt; 1829 psig</li> </ul>
		<ul> <li>PZR pressure stable or trending to 2235 psig.</li> </ul>
		<ul> <li>Check FW status</li> </ul>
		○ RCS temp <564 °F
		<ul> <li>FWI monitor lights lit</li> </ul>
		<ul> <li>Trip Running FW Pumps</li> </ul>
		<ul> <li>Check FW flow to SGs &gt;500 gpm</li> </ul>
		<ul> <li>Check SG levels</li> </ul>

Scenari	o NRC	11-3 Event 8 & 9			
No:		No.			
Event		Feed line break inside containment & Loss of heat sink/1B CV pump trip			
Descrip	Description:				
Time	Position	Applicant's Actions or Behavior			
		Note: If the crew had previously transitioned to 1BwEP ES- 0.1, "Reactor Trip Response", then immediate actions of 1BwEP-0 should be re-performed when SI is actuated or recognized.			
		EVALUATOR NOTE: US and RO will continue in 1BwEP-0 while BOP is performing Attachment B:			
	BOP	<ul> <li>Attachment B:</li> <li>Verify FW isolated at 1PM04J: <ul> <li>FW pumps – TRIPPED.</li> <li>Isolation monitor lights – LIT.</li> <li>FW pumps discharge valves - CLOSED (or going closed) 1FW002A-C.</li> </ul> </li> <li>Verify DGs running at 1PM01J: <ul> <li>DGs – BOTH RUNNING.</li> <li>1SX169A/B OPEN.</li> <li>Dispatch operator locally to check operation</li> </ul> </li> <li>Verify Generator Trip at 1PM01J: <ul> <li>OCB 1-8 and 7-8 open.</li> <li>PMG output breaker open.</li> </ul> </li> <li>Verify Control Room ventilation aligned for emergency operations at 0PM02J: <ul> <li>VC Rad Monitors – LESS THAN HIGH ALARM SETPOINT. (train A rad monitors de-energized)</li> <li>Dispatch EO to secure VL, VW and VV supply fans.</li> </ul> </li> <li>Operating VC train equipment – RUNNING. <ul> <li>0B Supply fan</li> <li>0B Return fan</li> <li>0B Chilled water pump</li> <li>0B Chiller</li> </ul> </li> <li>Operating VC train dampers – ALIGNED.</li> <li>M/U fan outlet damper – 0VC08Y NOT FULLY CLOSED.</li> <li>0VC09Y - OPEN</li> <li>0VC313Y - CLOSED</li> </ul>			

Scenario	D NRC	<b>11-3</b> Event 8 & 9
No:		NO.
Event		Feed line break inside containment & Loss of heat sink/1B CV pump trip
Descript	ION:	Annligentie Actions on Debovier
Time	Position	Applicant's Actions of Benavior
		<ul> <li>Operating VC train Charcoal Absorber aligned for train B.</li> <li>0VC44Y - CLOSED</li> <li>0VC05Y - OPEN</li> <li>0VC06Y - OPEN</li> <li>Control Room pressure greater than +0.125 inches water on 0PDI-VC038.</li> <li>Verify Auxiliary Building ventilation aligned at 0PM02J:</li> <li>Two inaccessible filter plenums aligned.</li> <li>Plenum A:</li> <li>0VA03CB - RUNNING</li> <li>0VA023Y - OPEN</li> <li>0VA03CF RUNNING</li> <li>0VA03CF RUNNING</li> <li>0VA03CF RUNNING</li> <li>0VA436Y - CLOSED</li> <li>Verify FHB ventilation aligned at 0PM02J:</li> <li>0VA04CB - RUNNING</li> <li>0VA05Y - OPEN</li> <li>0VA05Y - OPEN</li> <li>0VA05Y - CLOSED</li> <li>Verify FHB ventilation aligned at 0PM02J:</li> <li>0VA04CB - RUNNING</li> <li>0VA05Y - OPEN</li> <li>0VA05Y - OPEN</li> <li>0VA035Y - CLOSED</li> </ul>
	ATC [CT] E-0J	<ul> <li>Verify ECCS pumps running at 1PM05J/1PM06J:</li> <li>CV pumps – NONE RUNNING (1B tripped):</li> <li>1B RH pump – RUNNING.</li> <li>SI pump – NONE RUNNING</li> <li>START 1B SI PP</li> <li>RCFCs running in accident mode (0B train ONLY running)</li> <li>RCFC accident mode status light lit</li> <li>CNMT Phase A valves closed (train A valves not all closed)</li> <li>Manually actuate Phase A</li> <li>Dispatch EO to close de-energized valves outside containment</li> <li>Verify Cnmt Vent isolation:</li> <li>Group 6 Cnmt Vent Isol monitor lights – ALL LIT.</li> </ul>

Scenari	o NRC	11-3 Event 8 & 9			
No:	No: No.				
Event	Event Feed line break inside containment & Loss of heat sink/1B CV pump trip				
Descrip	tion:	r			
Time	Position	Applicant's Actions or Behavior			
	ATC/	<ul> <li>Verify AF system:         <ul> <li>AF pumps – Neither RUNNING.</li> <li>Attempt manual start of 1B AF pump</li> <li>Dispatch EO to check 1B AF pump</li> <li>AF isolation valves – 1AF13A-H OPEN.</li> <li>AF flow control valves – 1AF005A-H THROTTLED.</li> </ul> </li> <li>Verify CC pumps – 1B RUNNING.</li> <li>Verify SX pumps – 1B RUNNING</li> <li>Check if Main Steamline Isolation required</li> </ul>			
	BOP	<ul> <li>Check if Main Steamline Isolation required</li> <li>1C S/G pressures &lt; 640 psig</li> <li>CNMT pressure &gt; 8.2 psig</li> <li>MSIV &amp; MSIV bypass valves - CLOSED</li> </ul>			
	CREW	<ul> <li>Determine and Announce containment is adverse when pressure rises above 5 psig.</li> </ul>			
	BOP/ ATC	<ul> <li>Check CS not required</li> <li>CNMT pressure remained &lt; 20 psig</li> </ul>			
	BOP/ ATC	<ul> <li>Verify Total AF flow:</li> <li>AF flow &lt; 500 gpm</li> <li>SG levels &lt; 31%</li> <li>May CLOSE 1AF005C &amp; 1AF013G to isolate CST gravity flow to 1C SG FW line break.</li> </ul>			
	CREW	Identify entry conditions for 1BwFR-H.1, "RESPONSE TO LOSS OF SECONDARY HEAT SINK"			

Scenario NRC 11-3 Event 9					
No:		No.			
Event	Event Feed line break inside containment/loss of heat sink				
Descrip	tion:				
Time	Position	Applicant's Actions or Behavior			
	US	Notify SM of plant status and procedure entry			
		Request evaluation of Emergency Plan conditions			
		Request STA evaluation of status trees			
		<ul> <li>Enter/Implement 1BwFR-H.1 and direct operator actions of 1BwFR-H.1 to establish</li> </ul>			
		the following conditions			
	ATC	Check if secondary heat sink is required			
		RCS pressure > faulted SG pressure			
		<ul> <li>RCS temperature &gt; 350°F</li> </ul>			
	ATC	- Charle CV nump status			
	AIC	Check CV pump status     CV pumpa NONE PUNNING			
		CV pumps – NONE RUNNING     CO TO step 15 (blood and food)			
		• GO TO step 15 (bleed and leed)			
	ATC	Establish RCS feed path			
		Actuate SI			
	BOP	Verify RCS feed path			
		1B SI pump - RUNNING			
		<ul> <li>Group 2 cold leg injection monitor lights required for operating ECCS pumps – LIT</li> </ul>			
	ATC	Establish RCS bleed path			
	[CT]	<ul> <li>PORV isolation valves – 1RY8000A deenergized &amp; open, 1RY8000B energized &amp;</li> </ul>			
	FR-H.1-	open			
	-F	<ul> <li>Open BOTH PZR PORVs (1RY455A &amp; 1RY456)</li> </ul>			
	1				
	ATC	Verify adequate RCS bleed path			
		PZR PORVs – BOTH OPEN			
		<ul> <li>PORV isolation valves – BOTH OPEN</li> </ul>			
	ATC /	Verify ESF equipment actuations			
	BOP				

Scenario NRC 11-3 Event 9					
No:		No.			
Event	Event Feed line break inside containment/loss of heat sink				
Descript	ion:				
Time	Position	Applicant's Actions or Behavior			
	CREW	Maintain RCS heat removal			
		Maintain ECCS flow			
		Maintain PZR PORVs – BOTH OPEN			
	BOP	Reset SI			
		Reset Cnmt isolations			
		Reset Phase A			
		Restore I/A to Cnmt			
	ROD	Check if CS should be stopped			
		CS pumps – NONE RUNNING			
	ATC	Verify cold leg recirc capability			
		1B RH pump - RUNNING			
		1SI8811B – ENERGIZED			
	BOP/	Try to establish AF to at least one SG			
	AIC	Check blowdown isolation and sample valves closed			
		• 1SD005 A-D & 1SD002A-H			
		Review attachment B     Observe attachment B     Observe attachment B			
		Check annunciator AF PUMPS SUCT VLVS ARMED (1-3-E7) – NUT LIT     Check 14 50044 & D     ODEN			
		Check 1AF004A & B – OPEN     Check AF number NONE DUNING			
		Check AF pullips – NONE RONNING     Dispatch operator to 1P AF nump			
		• AF isolation valves – OPEN			
		• $1\Delta F13\Delta_{-H}$			
		AF flow control valves - THROTTLED			
		• 1AF005A-H			
		Check AF flow – NOT ESTABLISHED			
	ATC /	Prepare FW system for restoration			
	BOP	<ul> <li>CD/CB pumps – at least ONE RUNNING</li> </ul>			
		Place FW valves in manual at 0% demand			
		• 1FW510 – 540			
		<ul> <li>1FW510A – 540A</li> </ul>			

Scenario NRC 11-3 Event 9					
No: No.					
Event	Event Feed line break inside containment/loss of heat sink				
Descript					
Time	Position	Applicant's Actions or Benavior			
		• 1FW034A – D			
	ATC / BOP	<ul> <li>Defeat FW isolation</li> <li>Dispatch operators to remove FW isolation fuses</li> <li>FW isolation fuses removed <ul> <li>1PA27J</li> <li>1PA28J</li> </ul> </li> </ul>			
	ATC / BOP	<ul> <li>Establish main FW flow to at least one SG</li> <li>Open 1FW035A/B/D</li> <li>Check FW pumps available</li> <li>CD/CB pumps – at least TWO RUNNING</li> <li>Check startup FW pump prepared for operation <ul> <li>Dispatch operator to startup FW pump</li> <li>Bus 159 – ENERGIZED</li> <li>Locally start aux oil pump</li> <li>Open startup FW pump disch valve - 1FW059</li> <li>Open startup FW pump recirc valve - 1FW076 (place C/S in modulate)</li> <li>Verify close main FW pump recirc valves – 1FW012A, B, &amp; C</li> </ul> </li> </ul>			
	US	Review Attachment B prior to initiating FW flow			
	ATC / BOP	<ul> <li>Establish main FW flow to at least one SG</li> <li>Throttle 1FW034A/B to desired flow rate</li> <li>Maintain hotwell level &gt; 7 inches</li> <li>Check SG WR levels rising</li> </ul>			
		Note: The scenario may be terminated at this point			

(final)

Simulation	n Facility <u>Braidwood</u> s:	So No <b>NF</b> Ap	enario o.: <b>RC 11-2</b> oplicant:	Operating Test No.:2011 NRC Exam SRO ATC BOP
Initial Con	ditions: IC-21			
Turnover:	Unit 1 is operating at 100% pow SX pump is OOS for change ou 1BwOL 3.7.8 has been initiated. turnover, the crew is to perform FEEDWATER PUMP STOP VA lower power to 1125 MW at 3 M FW-W1. Heavy rains have been and are forecasted to continue.	er, steady stat t of the aux lul Expected ba 1BwOS FW-V LVE SURVEIL W/min due to n experienced	te, equilibri be oil pump ck in servio V1, UNIT 1 LLANCE. I grid dema at the Bra	ium xenon. Online risk is yellow. 1B o for the past 24 hours. LCOAR ce next shift. Following completion of TURBINE DRIVEN MAIN Power Team has requested Unit 1 nd following completion of 1BwOS idwood site over the past few days
Event	Malf. No.	Event		Event
Preload	IOR ZDI1SX01PB PTL IOR ZLO1SX01PBC OFF IMF MS01C 100 trgset 1 "ZDI1MS001C(1) == 1" trg 1 "DMF MS01C"		1В SX рц 1В SX ац 1MS0010	imp OOS ix lube oil pump OOS C fails to close from MSI switches
1	None	N-BOP, US	1BwOS F	FW-W1
2	None	R-ATC, US	Lower po	wer at 3 Mw/Min
3	IMF CV01B	C-ATC, US TS, US	1В CV рι	ımp trip (Tech Spec)
4	IMF RX10A 0 15	I-ATC, US TS-US	Turbine in fails Low	mpulse pressure channel 1PT-505 (Tech Spec)
5	IMF FW35C	C-BOP, US	1C HD P	ump Trip (standby pump available)
6	IMF RX05 0 30	I-BOP, US	Steam lin	e pressure detector 1PT-507 fails
7	MRF ED042D OPEN MRF ED042E OPEN MRF ED042H OPEN IOR ZLO1HSDG0201 OFF IMF ED15C IMF ED15G IMF ED15J IMF EG08A	M-ALL	Dual unit (unit 1 los	loss of Offsite AC power ss of all AC power)
8	Preload		1C MSIV	Fails to Close From MSI Switches

# SCENARIO OVERVIEW

Unit 1 is operating at 100% power, steady state, equilibrium xenon. 1B SX pump is OOS for change out of the aux lube oil pump for the past 24 hours. LCOAR 1BwOL 3.7.8 has been initiated. Expected back in service next shift. Following completion of turnover, the crew is to perform 1BwOS FW-W1, UNIT 1 TURBINE DRIVEN MAIN FEEDWATER PUMP STOP VALVE SURVEILLANCE. Power Team has requested Unit 1 lower power to 1125 MW at 3 MW/min due to grid demand following completion of 1BwOS FW-W1. Heavy rains have been experienced at the Braidwood site over the past few days and are forecasted to continue.

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

**After completing 1BwOS FW-W1**, the crew will lower power to 1125 MW at 3 MW/min due to grid demand. The crew will commence a power reduction at 3 MW/min.

**After a measurable change in power,** 1B CV pump will trip. The crew will implement 1BwOA PRI-15, LOSS OF NORMAL CHARGING. The crew will start the 1A CV pump to restore normal charging. Technical Specifications 3.5.2 condition A and TRM 3.1.d, condition A apply.

**After the 1B CV pump trip is addressed,** First Stage Turbine Impulse Pressure channel 1PT-505 will fail low. The ATC will diagnose the failure of 1PT-505 and take manual control of rods after verifying turbine load stable. 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment D, will be entered. TS 3.3.1 conditions A and P will be entered. The ATC will return rod control to automatic after verifying Tave and Tref are within 1°F.

After the 1PT-505 failure is addressed, the 1C Heater Drain pump will trip due to overcurrent. The crew will implement 1BwOA SEC-1, SECONDARY PUMP TRIP, and start the 1B Heater Drain pump. Technical Specifications do not apply. On-line risk remains yellow. The 1C Heater Drain pump will remain unavailable for the rest of the scenario.

After the 1C Heater Drain pump has been addressed, steam line pressure detector 1PT-507 will fail low over a 30 second period. Both main feedwater pumps speed will lower, reducing feedwater flow and causing all steam generator levels to begin lowering. The crew will take actions to stabilize the plant by taking manual control of the main feedwater pumps. 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment J, will be implemented. 1PT-507 will remain unavailable for the remainder of the scenario. On-line risk remains yellow.

After the 1PT-507 failure is addressed, a loss of all offsite power will occur for both Units. When the 1A DG engine attempts to start, the engine will seize. A loss of DC control power to the 1B DG will prevent it from starting, resulting in a loss of all AC power to Unit 1. Transition will be made to 1BwCA-0.0, LOSS OF ALL AC POWER. The 1C MSIV will fail to close from either MSI switch and will have to be closed from the C/S. A limited crosstie to Unit 2 will be required due to the failure of 2B DG to energize bus 142. The crew must restore power to Unit 1 within 10 minutes. After power is restored to Bus 141, SX will be cross-tied between units per 1BwCA-0.0, Attachment C.

The scenario is complete when the crew has restored CV pump flow in 1BwCA-0.0, step 23e.

# Critical Tasks

- 1. Restore power to Bus 141 within 10 minutes of loss of all AC power. (UFSAR 15.0.8/Table 15.0-7) (K/A number – 000055EA2.03 importance 3.9/4.7)
- Isolate RCP seal injection before a CV pump is started in 1BwCA-0.0. (ERG Critical Task number - ECA-0.0--H) (K/A number - 003000A4.01 importance - 3.3/3.2)

# 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 1B SX pump in PTL.
- Run caep DEMO NRC 11-2 SETUP from disk and verify the following actuate:
- IOR ZDI1SX01PB PTL
- IOR ZLO1SX01PBC OFF
- IMF MS01C 100
- trgset 1 "ZDI1MS001C(1) == 1"
- trg 1 "DMF MS01C"
- Place info tags on 1B SX pump and 1SX001B.
- Update PARAGON to reflect 1B SX pump OOS.
- Post Yellow safety status sign.
- VERIFY/START 1B CV Pump, SECURE and place in standby 1A CV Pump.
- VERIFY 1C HD Pump is RUNNING.
- **Provide** students with turnover sheets, 1BwOS NR-1, 1BwOS FW-W1 and critical parameters sheet.

# 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: Lower power at 3 MW/min

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

Acknowledge as Power Team initiation of ramp.

## Event 3: 1B CV pump trip

Insert **IMF CV01B** for 1B CV pump.

If dispatched as Equipment Operator to 1B CV pump and/or pump breaker, wait three minutes and report 1B 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.

## Event 4: Turbine Impulse Pressure channel 1PT-505 failed low.

#### Insert IMF RX10A 0 15

As SM, acknowledge the failure, 1BwOA INST-2 entry, request for E Plan evaluation, LCO 3.3.1 conditions A & P entry, and requests for on line risk assessment, maintenance support, and IR initiation.

As SM, if requested support for tripping bistables in AEER, report that AEER bistables are not to be tripped until work analyst and NSO support can be obtained (in approx. 2 hours) and that the abnormal operating procedure should be continued. AEER bistable tripping will be conducted later.

# Event 5: 1C Heater Drain Pump Trip.

Insert IMF FW35C to trip 1C HD Pump.

As SM acknowledge the failure, on line risk assessment, 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 1C HD pump is seized and report ground overcurrent flag at breaker cubicle.

If dispatched as Equipment Operator, report you will complete pump vent alignment per BwOP HD-2 for tripped pump.

If dispatched as Equipment Operator, report standby pump start was successful and you will complete BwOP HD-1 for started pump.

Event 6: Steam line pressure detector 1PT-507 fails low.

Insert IMF RX05 0 30 for 1PT-507 failed low.

If dispatched as EO to investigate 1PT-507, wait two minutes report no visible damage to 1PT-507.

Acknowledge as SM 1PT-507 failure, on line risk assessment, request for maintenance support, and IR requests.

Event 7: Dual unit loss of offsite power.

Run caep NRC 11-2 EVENT 7 from disk and verify the following actuate:

- MRF ED042H OPEN
- MRF ED042E OPEN
- MRF ED042D OPEN
- IOR ZLO1HSDG0201 OFF
- IMF ED15C
- IMF ED15G
- IMF ED15J
- IMF EG08A

Record time loss of all AC power occurred: \_\_\_\_\_:\_\_\_:\_\_\_\_.

Record time AC power restored to Bus 141: \_\_\_\_\_:\_\_\_\_.

Calculate time to restore AC power: \_\_\_\_\_:\_\_\_\_.

After STA requested, as STA report CSF status – Yellow on inventory if pressurizer level < 17%.

## Event 7: Dual unit loss of offsite power (continued)

When requested as EO to start the U1 D/Gs, report that 1A D/G is seized, 1B DG does not have control power, and 1BwOA ELEC-3 was ineffective.

Acknowledge as EO request to depress U1 DG emergency stop push buttons and insert the following:

- MRF EG19 TRIP
- MRF EG20 TRIP

As Unit 2 operator, report **ONLY** Bus 241 is energized from 2A DG, acknowledge request to perform 2BwCA-0.3, and acknowledge request to monitor crosstie current as loads are started.

4 min. 19 sec. after request 2BwCA-0.3, insert the following to align Unit 2 4KV ESF buses to Unit 1:

• MRF ED006 CLOSE to close ACB 2414.

Acknowledge as EO request to monitor 1B AF pump and request to maintain 1B AF pump day tank level.

Acknowledge as EO request to isolate RCP seals, wait three minutes and insert the following to isolate the RCS seal injection filters. Report RCP seal isolation to MCR.

- MRF CV41 0 to close 1CV8384A
- MRF CV42 0 to close 1CV8384B (should already be closed)

If asked as Unit 2 for 2SX016A and 2SX027A status, report 2SX016A and 2SX027A are open/energized.

Acknowledge request as EO to close 1SX016B and 2SX016B. Perform the following to close 1SX016B.

## • Open Monitor window and Input: SWV1SX016B=0

Wait three minutes and report 1SX016B and 2SX016B are closed.

If dispatched as EO to check 1SX005 position locally, wait two minutes and report 1SX005 is open.

If asked as Unit 2 for 2SX005 status, report 2SX005 is closed.

Acknowledge request as EO to throttle SX to the CC HXs. Insert the following to close 0SX007 and 1SX007.

- MRF SW01 0
- MRF SW02 0

Wait two minutes and report 0SX007 is closed, 1SX007 is closed and 2SX007 is 20% open.

# INSTRUCTOR/SIMULATOR RUN AID GUIDE

## Event 7: Dual unit loss of offsite power (continued)

If requested as Unit 2 to open 2SX005, Insert the following to open 2SX005.

## • MRF SW07 100

Wait one minute and report 2SX005 is open.

If asked as Unit 2 for 2SX033 and 2SX034 status, report 2SX033 and 2SX034 are open.

If dispatched as EO to throttle 0SX007 to 10% open, Insert the following to throttle 0SX007.

## • MRF SW01 10

Wait 30 sec and report 0SX007 is 10% open.

Acknowledge request as Unit 2 to monitor 2A SX pump amps and discharge pressure.

If asked as Unit 2 for crosstie loading capability, report adequate capacity exists prior to starting Unit 1 loads.

Acknowledge as EO request to isolate CC surge tank auto makeup and insert the following to isolate CC surge tank makeup:

- MRF CC51 0 to close 1CC185
- MRF CC52 0 to close 1CC184

Acknowledge as EO request to drain CC surge tank to normal level and insert the following as needed to initiate CC surge tank drain:

- MRF CC15 100 to open 1CC2020B
- MRF CC16 100 to open 1CC2020A

Scenario	D NRC	<b>11-2</b> Event 1		
No:		No.		
Event 1BwOS FW-W1				
Time	Position	Applicant's Actions of Benavior		
	CUE	<ul> <li>From turnover perform 1BwOS FW-W1, UNIT 1 TURBINE DRIVEN MAIN FEEDWATER PUMP STOP VALVE SURVEILLANCE.</li> </ul>		
	US	Direct BOP to perform 1BwOS FW-W1.		
	BOP	<ul> <li>Refer to 1BwOS FW-W1.</li> <li>Update data sheet D-2 as each test is performed.</li> <li>Test 1B main FW pump at 1PM04J:</li> <li>Depress left LP stop valve TEST pushbutton.</li> <li>Observe left LP stop valve OPEN lamp goes out.</li> <li>Observe left LP stop valve TEST button illuminates.</li> <li>Observe left LP stop valve OPEN lamp goes out.</li> <li>Observe high pressure stop valve OPEN lamp goes out.</li> <li>Observe high pressure stop valve OPEN lamp goes out.</li> <li>Observe high pressure stop valve OPEN lamp goes out.</li> <li>Observe high pressure stop valve CLOSED and TEST buttons illuminate.</li> <li>Observe high pressure stop valve CLOSED button goes out.</li> <li>Observe high pressure stop valve CLOSED button goes out.</li> <li>Test 1C main FW pump at 1PM04J:</li> <li>Depress left LP stop valve OPEN lamp goes out.</li> <li>Observe left LP stop valve OPEN lamp goes out.</li> <li>Observe left LP stop valve TEST pushbutton.</li> <li>Observe left LP stop valve OPEN lamp goes out.</li> <li>Observe left LP stop valve OPEN lamp goes out.</li> <li>Observe left LP stop valve OPEN lamp goes out.</li> <li>Observe left LP stop valve OPEN lamp goes out.</li> <li>Observe left LP stop valve OPEN lamp goes out.</li> <li>Observe left LP stop valve OPEN lamp goes out.</li> <li>Observe left LP stop valve OPEN lamp goes out.</li> <li>Observe left LP stop valve OPEN lamp goes out.</li> <li>Observe high pressure stop valve OPEN lamp goes out.</li> <li>Observe high pressure stop valve OPEN lamp goes out.</li> <li>Observe high pressure stop valve OPEN lamp goes out.</li> <li>Observe high pressure stop valve CLOSED and TEST buttons illuminate.</li> <li>Observe high pressure stop valve CLOSED and TEST buttons illuminate.</li> <li>Observe high pressure stop valve CLOSED and TEST buttons illuminate.</li> <li>Observe high pressure stop valve CLOSED button goes out.</li> <li>Inform US 1BwOS EW-W1 complete</li> </ul>		
	US	<ul> <li>Acknowledge report.</li> <li>Notify SM 1BwOS FW-W1 complete.</li> </ul>		
		EVALUATOR NOTE: After 1BwOS FW-W1 is complete and with lead examiner's concurrence, insert the next event.		

Scenario NRC 11-2 Event 2				
No: No.				
Event Lower power to 1125 MW at 3 MW/min				
Description:				
Time	Time   Position     Applicant's Actions or Behavior			
	US	<ul> <li>Implement actions of 1BwGP 100-4, POWER DESCENSION or BwOP EH-15 DEHC OPERATIONS.</li> </ul>		
		<ul> <li>Perform pre-job brief per HU-AA-1211 "PRE-JOB, HEIGHTENED LEVEL OF AWARENESS, INFREQUENT PLANT ACTIVITY, AND POST JOB BRIEFINGS" for load ramp.</li> </ul>		
	CREW	<ul> <li>Review Precautions, and Limitations and Actions, if not already performed during pre- job brief.</li> </ul>		
	ATC	<ul> <li>Verify rod position and boron concentration.</li> <li>Initiate boration, if required. (BwOP CV-6)</li> <li>Determine required boric acid volume.</li> <li>Refer to operator aid REMA for reactivity guidlines.</li> </ul>		
		<ul> <li>Auto addition of Boric Acid:</li> <li>Determine desired boric acid flow rate.</li> <li>Perform the following at 1PM05J:</li> <li>Set 1FK-110 BA Flow Control to desired boration rate.</li> <li>Set 1FY-0110 BA Blender Predet Counter to desired volume.</li> <li>Place MAKE-UP MODE CONT SWITCH to STOP position.</li> <li>Place MODE SELECT SWITCH to BORATE position.</li> <li>Place MAKE-UP MODE CONT SWITCH to START.</li> <li>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).</li> <li>Turn on PZR backup heaters in accordance with BwOP RY-13, PRESSURIZER BACKUP HEATER OPERATION.</li> </ul>		
		<ul> <li>Batch addition of Boric Acid:</li> <li>Open 1CV110B.</li> <li>Open 1CV110A.</li> <li>Start the BA Transfer pump.</li> <li>When desired amount of BA has been added, stop the BA Transfer Pump.</li> <li>Close 1CV110A.</li> <li>Close 1CV110B.</li> <li>Turn on PZR backup heaters (BwOP RY-13).</li> </ul>		

Scenario NRC	<b>Event</b> 2			
No:	No.			
Event Lower power to 1125 MW at 3 MW/min				
Description:				
Time Position	Applicant's Actions or Behavior			
BOP	<ul> <li>Lower turbine load at 1PM02J or OWS drop 210 by performing the following::</li> <li>Select SETPOINT.</li> <li>Enter desired MW into REF DEMAND window</li> <li>Select ENTER.</li> <li>Enter 3 MW/min into the RATE window.</li> <li>Select ENTER.</li> <li>Select EXIT.</li> <li>Notify US and RO of pending ramp.</li> <li>Select GO/HOLD.</li> <li>Verify GO/HOLD button illuminates.</li> <li>Verify HOLD illuminated RED.</li> <li>Select GO.</li> <li>Verify GO illuminates RED.</li> <li>Verify main turbine load begins to lower.</li> </ul>			
ATC/ BOP	<ul> <li>Monitor reactor power and turbine load lowering:</li> <li>Monitor NI's, Tave, △I, Pzr press/level at 1PM05J.</li> <li>Monitor MWe and DEHC system response at 1PM02J or OWS drop 210.</li> <li>During boration, monitor the following at 1PM05J and HMI:         <ul> <li>Monitor VCT level.</li> <li>Verify RCS boron concentration rising.</li> <li>Monitor BA predet counter.</li> <li>Verify boration auto stops at preset value.</li> <li>Return Reactor Makeup System to automatic at current boron concentration.</li> </ul> </li> </ul>			
	After measurable change in power and lead examiner concurrence, insert the next			
	event.			

Scenario	D NRC	11-2 Event 3		
NO: NO. Event 1B CV nump trip				
Description:				
Time	Position Applicant's Actions or Behavior			
	CUE	Annunciator 1-9-A3 CHG PUMP TRIP		
		<ul> <li>Annunciator 1-9-D3 CHG LINE FLOW HIGH/LOW</li> </ul>		
		<ul> <li>Annunciator 1-7-B2 RCP SEAL WATER INJ FLOW LOW</li> </ul>		
		Annunciator 1-9-A1 REGEN HX LTDWN TEMP HIGH		
		PZR level lowering.     Trin/vallow disagreement light on 1D CV nump C/C		
		• Thp/yellow disagreement light on TB CV pump C/S.		
	ATC	Identify 1B CV pump has tripped at 1PM05J.		
		Report failure to US.		
		<ul> <li>May isolate letdown per BwAR by closing 1CV8149A/B/C</li> </ul>		
	CREW	Reference BwARs as time permits.		
		<ul> <li>Identify entry conditions for 1BwOA PRI-15, LOSS OF NORMAL CHARGING.</li> </ul>		
		<ul> <li>Dispatch operator to investigate cause of 1B CV pump trip.</li> <li>Place unit ramp on hold.</li> </ul>		
		NOTE: The crew may elect to start the stand-by CV pump using Immediate Actions		
		of BwAR 1-9-A3 OR by entering 1BwOA PRI-15. The required actions for each method are described below		
	ATC	IF crew chooses to use BwAR 1-9-A3 to start 1A CV pump, required actions begin		
		here.		
		<ul> <li>Determine NO indications of gas binding of tripped pump.</li> </ul>		
		<ul> <li>NO fluctuation of pump amps prior to trip.</li> </ul>		
		<ul> <li>NO fluctuation of pump discharge flow prior to trip.</li> <li>NO fluctuation of observing flow prior to trip.</li> </ul>		
		<ul> <li>NO incluation of charging now prior to trip.</li> <li>Verify suction source 1CV/112B and 1CV/112C OPEN</li> </ul>		
		Verify recirc path 1CV8111 and 1CV8114 OPEN		
		• Place 1A CV pump C/S to start.		
	US	IF crew chooses to enter 1BwOA PRI-15 to start 1A CV pump, required actions		
		begin here.		
		Notify Shift Manager of plant status and procedure entry.		
		Request evaluation of Emergency Plan conditions.		
		<ul> <li>Implement TBWOA PRI-15, LUSS OF NORMAL CHARGING, and direct operator actions of 1BWOA PRI 15 to establish the following conditions:</li> </ul>		
		$\circ$ Direct BOP/ATC to stop load ramp/dilution		
1				

Scenario NRC	11-2 Event 3		
Event	1B CV nump trip		
Description:			
Time Position	Fime         Position         Applicant's Actions or Behavior		
	<ul> <li>Enter Tech Spec 3.4.1 if PZR pressure &lt; 2209 psig.</li> </ul>		
ATC	<ul> <li>Perform the following at 1PM05J:</li> <li>Check CV pump status:</li> <li>Identify NEITHER CV pump is running</li> <li>Place 1B CV pump C/S in PULL OUT.</li> <li>Isolate normal letdown:</li> <li>Place 1CV8149A, B, &amp; C, letdown orifice isolation valves, C/S's to CLOSE.</li> <li>Place 1CV459 &amp; 1CV460, letdown isolation valves, C/S's to CLOSE.</li> <li>Check VCT status:</li> <li>Check 1CV112B &amp; 1CV112C, VCT suction valves, OPEN.</li> <li>Maintain VCT level greater than 20%.</li> <li>Check VCT level &gt; 20% on 1LI-112 or 1LR-185.</li> <li>Operate RMCS in automatic or manual to maintain VCT level &gt; 20%.</li> <li>Check annunciator 1-9-C2, VCT TEMP HIGH - NOT lit.</li> </ul>		
ATC/ BOP	<ul> <li>Perform the following at 1PM05J: <ul> <li>Acknowledge RM-11 alarm caused by isolating flow to 1PR06J, Gross Failed Fuel Monitor.</li> <li>Check for gas binding of previously running CV pump by verifying the following trends NOT fluctuating prior to pump trip (may use PPC trends):</li> <li>RCP #1 seal leak off flows.</li> <li>CV pump flow.</li> <li>CV pump discharge pressure.</li> <li>CV pump amps.</li> <li>Restore normal charging flow:</li> <li>Check 1CV8111 &amp; 1CV8114, 1B CV pump miniflow isolation valves – OPEN.</li> <li>Check RCS pressure approximately 2235 psig.</li> <li>Place 1A CV pump C/S to start.</li> <li>Check CV System Alignment:</li> <li>Verify 1CV8146, charging to RC 1B loop isolation valve – OPEN.</li> <li>Verify 1CV8105 AND 1CV8106, charging line CNMT isolation valves – OPEN.</li> <li>Check charging flow established (Charging flow may be at minimum for RCP seal injection due to letdown isolation).</li> <li>Determine normal letdown is isolated.</li> <li>Monitor RMCS during automatic VCT makeup:</li> </ul> </li> </ul>		

Scenario NRC 11-2 Event 3				
NO: NO.				
Description:				
Time         Position         Applicant's Actions or Behavior				
	<ul> <li>Proper flow indicated on PW/Total Flow (1FT-0111) and Boric Acid Flow (1FT-0110).</li> </ul>			
CREW	<ul> <li>Identify entry conditions for 1BwOA ESP-2, REESTABLISHING CV LETDOWN DURING ABNORMAL CONDITIONS.</li> </ul>			
US	<ul> <li>Notify Shift Manager of plant status and procedure entry.</li> <li>Implement 1BwOA ESP-2, REESTABLISHING CV LETDOWN DURING ABNORMAL CONDITIONS, and direct operator actions of 1BwOA ESP-2 to establish the following conditions:</li> </ul>			
BOP	<ul> <li>Perform the following at 1PM05J:</li> <li>Check letdown Isolated:</li> <li>Verify 1CV8149A, B, &amp; C, letdown orifice isolation valves - CLOSED.</li> <li>Verify 1CV459 &amp; 1CV460, letdown isolation valves - CLOSED.</li> </ul>			
BOP	<ul> <li>Perform the following at 1PM05J:</li> <li>Check letdown flow path:</li> <li>Verify 1CV8401A, letdown to letdown HX 1A isolation valve, - OPEN.</li> <li>Verify 1CV8324A, charging to regen HX 1A isolation valve – OPEN.</li> <li>Verify 1CV8152 &amp; 1CV8160, letdown line CNMT isolation valves – OPEN.</li> <li>Verify BTRS mode select switch OFF.</li> <li>Align letdown controllers:</li> <li>Place 1PK-131, letdown HX outlet temperature controller, in MANUAL and raise demand to 40%.</li> <li>Place 1CC130A, letdown HX outlet temperature controller, in MANUAL and raise demand to 60%.</li> <li>Verify 1CV8105 AND 1CV8106, charging line CNMT isolation valves - OPEN</li> <li>Adjust 1CV182, charging header backpressure control valve, to establish 8-13 gpm RCP seal injection flow.</li> <li>Place 1FK-121, in manual and operate 1FK-121 in manual to establish 100 gpm charging flow on 1FI-121A.</li> <li>Establish letdown flow:</li> <li>Place 1CV8149A, B, &amp; C, letdown orifice isolation valves, C/S's to OPEN as necessary to establish 120 gpm letdown flow.</li> </ul>			

Scenario NRC	<b>11-2</b> Event 3				
No:	No.				
Event	1B CV pump trip.				
Description:					
Time Position	Applicant's Actions or Behavior				
	<ul> <li>Lower demand on 1PK-131, letdown line pressure controller, to raise letdown pressure to approximately 360 psig on 1PI-131.</li> <li>Operate 1FK-121 in manual to restore PZR level to normal operating band and maintain 8-13 gpm RCP seal injection flow.</li> <li>Lower demand on 1CC130A, to control letdown temperature between 90° to 115°F on 1TI-130.</li> <li>Place 1PK-131, letdown line pressure controller, in AUTO.</li> <li>Place 1CC130A, letdown HX outlet temperature controller, in AUTO.</li> <li>At the RM-11, verify 1PR06 Lourson is GREEN.</li> </ul>				
US	<ul> <li>Note: these actions are applicable for both methods of starting 1A CV pump.</li> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.</li> <li>Determine TS 3.5.2, condition A is applicable.</li> <li>Determine TRM 3.1.d, condition A is applicable.</li> <li>EVALUATOR NOTE: After the actions for charging pump trip are complete and with lead examiner concurrence, enter next event.</li> </ul>				
Scenar	io NRC	11-2 Event 4			
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NO:		NO. Turbing Impulse Dressure Channel 1DT 505 failed law			
Descrir	otion.	Turbine impulse Pressure Channel TPT-505 failed low			
Time         Position         Applicant's Actions or Behavior					
	CUE	Annunciator TAVE CONT DEV HIGH (1-14-D1)			
		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 72 step per minute			
	ATC/	Recognizes 1PT-505 has failed low			
	BOP	Report failure to US			
		• Place rod control in manual			
		○ Refer to BwAR 1-14-D1 as time permits			
	BOP	<ul> <li>Verifies turbine load not lowering</li> </ul>			
	CREW	<ul> <li>Identify entry conditions for 1BwOA INST-2, "OPERATION WITH A FAILED INSTRUMENT CHANNEL"</li> </ul>			
	US	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"			
		<ul> <li>Direct PO to place rod control in manual</li> </ul>			
		$\circ$ If Pzr Pressure drops below 2209 psig_enter LCO 3.4.1 until pressure is > 2209 psig			
	ATC/	Restore steam dumps			
	BOD	C-7 NOT lit			
		Place 1PK-507 in manual     Lower 1PK 507 demond to 0%			
		Lower TPK-507 demand to 0%     Diago stoom dump mode select switch to STM DRESS mode			
		<ul> <li>Place 1PK-507 in auto</li> </ul>			
		<ul> <li>Check Reactor Power &lt;100%</li> </ul>			
	ATC/	Defeat 1PT-505			
	BOP	Place 1PS505Z, Turbine Impulse Pressure Defeat Switch, to DEFEAT P-505			
	US/ATC	Check if rod control can be placed in auto     C5 NOT lit			
		$\circ$ Tave/Tref stable and within 1°F (check T0494 < 1°F)			
1	1				

Scenar	io NRC	<b>11-2</b> Event 4					
No:		No.					
Event	Event Turbine Impulse Pressure Channel 1PT-505 failed low						
Descrip	otion:						
Time	Position	Applicant's Actions or Behavior					
		<ul> <li>If control rods need to be adjusted to restore Tave – Tref within 1°F, perform the following:</li> <li>Conduct reactivity brief for restoring control rods per OP-AP-300-1004, Reactivity Change Determination Form</li> <li>Obtain SM concurrence for reactivity change</li> <li>Adjust Tave – Tref within 1°F using control rods</li> <li>Place Rod control in auto</li> </ul>					
	ATC/ BOP	<ul> <li>Check P13 interlock</li> <li>Turbine power &gt; 10% - P13 NOT lit</li> </ul>					
	US	<ul> <li>Determine TS 3.3.1 conditions A and P are applicable.</li> <li>Contact SM to perform risk assessment, initiate IR, perform reactivity screening and contact personnel to investigate/correct instrument failure.</li> </ul>					
		The next event is to be inserted following the above actions by the US and Lead Examiner concurrence.					

Scenari	o NRC	11-2 Event 5					
Event		1C Heater Drain Pump Trip					
Description:							
Time	Fime         Position         Applicant's Actions or Behavior						
	CUE	<ul> <li>Annunciator HD PUMP TRIP (1-17-D2)</li> <li>Annunciator HD TANK LEVEL HIGH LOW (1-17-E4)</li> <li>HDT level indicator 1LI-HD009 rising at 1PM03J.</li> <li>1C HD Pump flow indication 1FI-HD006 drops at 1PM03J.</li> <li>1A HD Pump flow indication 1FI-HD004 rises at 1PM03J.</li> </ul>					
	ATC/ BOP	<ul> <li>Recognize 1C HD pump has tripped.</li> <li>Report pump trip to US.</li> <li>Reference BwARs.</li> <li>Dispatch operators to investigate.</li> </ul>					
	CREW	Identify entry conditions for 1BwOA SEC-1, SECONDARY PUMP TRIP.					
	US	<ul> <li>Acknowledge 1C HD pump trip.</li> <li>Contact Shift Manager to perform risk assessment, initiate IR, and contact maintenance to investigate/correct failure.</li> <li>Implement 1BwOA SEC-1, SECONDARY PUMP TRIP Attachment C, HD PUMP TRIP, and direct operator actions of 1BwOA SEC-1 to establish the following conditions:</li> </ul>					
	BOP	<ul> <li>Start the 1B HD Pump (may have been done per BwAR actions).</li> <li>Recognize two pumps running again.</li> <li>Monitor HD tank level at 1PM03J.</li> <li>Restore Plant Conditions <ul> <li>1HD117 in auto and closed.</li> <li>Running HD pumps parameters acceptable</li> <li>HD Flow</li> </ul> </li> </ul>					
	ATC	<ul> <li>Check PDMS operable</li> <li>1-10-E8 NOT lit.</li> <li>1-10-D7 NOT lit.</li> </ul>					
	ATC/ BOP	<ul> <li>Dispatch EO to perform BwOP HD-1 on standby pump that was started and BwOP HD-2 on tripped pump.</li> </ul>					
		EVALUATOR NOTE: After the actions for the HD Pump trip are complete and with					
		lead examiners concurrence, insert the next event.					

Scenario	Scenario NRC 11-2 Event 6					
NO: Event	NO: NO.					
Description:						
Time	Time Position Applicant's Actions or Behavior					
	CUE	<ul> <li>Annunciators S/G 1A/B/C/D FLOW MISMATCH FW FLOW LOW (1-15-A4/B4/C4/D4)</li> <li>Annunciators S/G 1A/B/C/D LEVEL DEVIATION HIGH/LOW (1-15-A9/B9/C9/D9)</li> <li>BOTH main feedwater pump speed/flow – LOWERING.</li> <li>1PI-507, S/G HDR PRESS, - LOWERING</li> </ul>				
	CREW	<ul> <li>Refer to BwARs</li> <li>Determine 1PT-507 failing low at 1PM04J.</li> <li>Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL.</li> <li>Dispatch operators to investigate 1PT-507 failure.</li> </ul>				
	US	<ul> <li>Notify SM of plant status and procedure entry</li> <li>Request evaluation of Emergency Plan conditions</li> <li>Implement 1BwOA INST-2 "OPERATION WITH A FAILED INSTRUMENT CHANNEL", Attachment J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.</li> <li>Direct BOP/RO to stop load ramp/dilution</li> </ul>				
	BOP	<ul> <li>Perform the following at 1PM04J:</li> <li>Place 1SK-509A, Master FW pump speed controller in manual.</li> <li>Raise demand on 1SK-509A.</li> <li>Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.</li> <li>Maintain SG levels by operating 1SK-509A in manual.</li> <li>Aligns steam dumps back to Tave mode.</li> </ul>				
		Note to evaluator: The crew may ask for Shift Manager direction regarding Steam Dump mode of operation. The procedures for 1PT-505 failure and 1PT-507 failure conflict for which mode steam dumps are left in. Since the steam dumps will not work in Tave on the load reject controller nor will they work in Stm Press mode, they should be returned to Tave mode since they will still work on the plant trip controller.				
	ATC	<ul> <li>Perform the following at 1PM05J:</li> <li>Monitor reactor power response to SG under and overfeeding transient.</li> </ul>				

Scenari	0 <b>NRC</b>	11-2 Event	6
No:		No.	
Event		Steam line pressure de	tector 1PT-507 fails low.
Descrip	tion:		
Time	Position		Applicant's Actions or Behavior
	US	<ul> <li>Contact SM to perform investigate/correct i</li> <li>If PZR pressure drop</li> </ul>	orm risk assessment, initiate IR, and contact maintenance to instrument failure. opped below 2109 psig during transient, LCO 3.4.1 applies.

Scenario	o NRC	11-2 Event 7		
Event		Dual unit loss of offsite power. (U-1 loss of all AC power)		
Descript				
Time Position Applicant's Actions or Behavior				
	CUE	<ul> <li>Annunciator LOSS OF OFFSITE POWER (1-20-A1)</li> <li>Annunciator DG1A TROUBLE/FAIL TO START (1-21-C8)</li> <li>BOTH 4KV ESF bus alive lights NOT LIT.</li> <li>Annunciator SAT 141-1/142-2 BUS 4 TRIP (0-35-E1)</li> <li>Annunciator SAT 241-1/242-2 BUS 14 TRIP (0-36-E1)</li> </ul>		
	CREW	Determine Loss of All AC Power has occurred.		
	US	<ul> <li>Enter/Implement 1BwCA-0.0, "LOSS OF ALL AC POWER", and direct operator actions of 1BwCA-0.0 to establish the following conditions:</li> <li>Direct operator actions of 1BwCA-0.0.</li> <li>Notifies SM of plant status and procedure entry.</li> <li>Requests evaluation of Emergency Plan conditions.</li> <li>Record time loss of all AC power occurred::</li></ul>		
	ATC	<ul> <li>Perform immediate operator actions of 1BwCA-0.0:</li> <li>Manually trip reactor at 1PM05J or 1PM06J.</li> <li>Verify reactor trip at 1PM05J:</li> <li>Reactor trip &amp; Bypass breakers - OPEN</li> <li>Neutron flux – DROPPING</li> </ul>		
	BOP	<ul> <li>Perform immediate operator actions of 1BwCA-0.0:</li> <li>Manually Isolate Steamlines at 1PM05J or 1PM06J:</li> <li>Actuate main steamline isolation.</li> <li>Verify all MSIVs and MSIV Bypass valves – CLOSED. (1MS001C will NOT be Closed) <ul> <li>Actuate main steamline isolation from alternate MSI Switch.</li> <li>Close 1MS001C with C/S at 1PM06J</li> </ul> </li> </ul>		
	BOP	<ul> <li>Verify AF flow at 1PM06J:</li> <li>AF flow &gt;500 gpm (1B AF train only)</li> </ul>		
	RO	<ul> <li>Verify RCS isolated at 1PM05J:</li> <li>BOTH PZR PORVs closed.</li> <li>1CV8149A, B &amp; C closed.</li> <li>1CV459 and 1CV460 closed.</li> </ul>		

Scenario NRC		11-2 Event 7
Event		Dual unit loss of offsite power. (U-1 loss of all AC power)
Description:		Applicant's Actions or Debayier
Time	Position	
		• 1CV8153A & B closed.
	BOP	<ul> <li>Try to restore power to any/both Unit 1 4KV ESF buses at 1PM01J:</li> <li>DGs – NONE RUNNING.</li> <li>Attempt Manual Start of 1A/B DG</li> <li>Manually Actuate SI from 1PM05J and 1PM06J.</li> </ul>
	BOP/ US	<ul> <li>Prepare for Unit 2 crosstie:</li> <li>Dispatch operator to depress emergency stop push buttons on both U1 DGs.</li> <li>Reset SI at 1PM06J.</li> </ul>
	US	<ul> <li>Check status of Unit 2 ESF buses at 1PM01J:</li> <li>Bus 241 – ENERGIZED from 2A DG.</li> <li>Notify Unit 2 to implement 2BwCA-0.3, RESPONSE TO OPPOSITE UNIT LOSS OF ALL AC POWER.</li> <li>Bus 242 – DEENERGIZED</li> <li>GO TO 1BwCA-0.0, Step 14 (limited crosstie).</li> </ul>
	BOP/ US	<ul> <li>Energize bus 141 using limited Unit 2 crosstie (DG 2A) at 1PM01J:</li> <li>Bus 241 energized from 2A DG.</li> <li>Check Bus 141 – NOT FAULTED: <ul> <li>ACB 1413 (DG feed) in PULL OUT.</li> <li>ACB 1411 (Non-ESF bus tie) in PULL OUT.</li> <li>ACB 1412 (SAT feed) in PULL OUT.</li> <li>ACB 1412 (SAT feed) in PULL OUT.</li> <li>ACB 1414 (Reserve feed) in PULL OUT.</li> <li>Verify Bus 141 alarms NOT LIT:</li> <li>Annunciator BUS 141 FD BRKR ACB 1412 TRIP (1-21-A7).</li> <li>Annunciator DG 1A OVERLOAD (1-21-B9).</li> </ul> </li> </ul>
	ATC/ BOP	<ul> <li>Energize bus 141 using limited Unit 2 crosstie (DG 2A) at 1PM01J: (Cont'd)</li> <li>Place ESF loads in PULL OUT: (may have been performed per BwAP 340-1 prudent operator actions)</li> <li>BOTH CENT CHG pumps</li> <li>BOTH RH pumps</li> <li>BOTH SI pumps</li> <li>1A AF pump</li> </ul>

Scenari	o NRC	<b>11-2</b> Event 7			
No:		No.			
Event	· · · · ·	Dual unit loss of offsite power. (U-1 loss of all AC power)			
Descrip	lion:	Applicant's Actions or Pobaviar			
Applicant's Actions or Behavior					
	[CT] UFSAR 15.0.8/ Table 15.0-7	<ul> <li>ALL RCFCs (HI and LO)</li> <li>BOTH CS pumps</li> <li>ALL CC pumps (1A, 1B, and 0)</li> <li>BOTH SX pumps</li> <li>BOTH MCR chillers</li> <li>Check ACB 2414 closed (reserve feed light lit.).</li> <li>Synch and Close Bus 141/241 reserve feeder breaker: <ul> <li>Close ACB 1414</li> <li>Check Bus 141 energized.</li> <li>Check Bus 131X energized.</li> </ul> </li> <li>Record time AC power restored:: (&lt;10 minutes)</li> <li>Check VC Train 0A fans – RUNNING: <ul> <li>Start 0A supply fan, 0A return fan, &amp; 0A makeup fan.</li> <li>Notify TSO to implement an emergency AC restoration program.</li> <li>GO TO step 16.</li> </ul> </li> </ul>			
	ATC/ BOP	<ul> <li>Check AF pump status at 1PM06J:</li> <li>1B AF pump – RUNNING.</li> <li>Check SG levels at 1PM05J:</li> <li>Maintain NR levels between 10% (31%) and 50%.</li> <li>Throttle 1AF005E/F/G/H</li> <li>Dispatch operator to monitor 1B AF pump.</li> <li>Place 1A &amp; 1D SG PORVs in AUTO.</li> </ul>			
	ATC/ BOP [CT] ECA- 0.0H	<ul> <li>Isolate RCP seals:</li> <li>Dispatch operator to locally close 1CV8384A &amp; B.</li> <li>Close 1CC9438 at 1PM06J.</li> <li>Close 1CV8100 at 1PM05J.</li> </ul>			
	ATC/ BOP	<ul> <li>Verify Equipment loaded on bus 141 at 1PM06J:</li> <li>Annunciator 125V DC BATT CHGR 111 TROUBLE - NOT LIT (1-21-E8)</li> <li>Annunciator Bus 111 INVERTER TROUBLE NOT LIT (1-4-A5)</li> <li>Annunciator Bus 113 INVERTER TROUBLE NOT LIT (1-4-C5)</li> </ul>			

Scenari	o NRC	<b>11-2</b> Event 7					
NO:							
Event		Dual unit loss of offsite power. (U-1 loss of all AC power)					
Descrip	UON: Desition	Applicant's Actions or Debayier					
Time	Applicant's Actions or Benavior						
		NOTE: All critical tasks are complete at this point. The scenario may be					
		terminated here at the lead evaluators discretion.					
	US	Restore Unit 1 SX cooling:					
		<ul> <li>Enter/Implement 1BwCA-0.0, "LOSS OF ALL AC POWER", "ATTACHMENT C,</li> </ul>					
		STATION BLACKOUT – ALTERNATE SX COOLING", and direct operator actions of					
		1BWCA-0.0 ATTACHMENT C to establish the following conditions:					
		Prepare RCFC train for SX crosstie:					
	BOP	Contact Unit 2 to verify 2SX016A & 2SX027A - OPEN					
		Dispatch operators to locally close 15X016B AND 25X016B.					
		Prepare CC HX for SX crosstle:					
		Unit 0 CC HX – In service to Unit 1					
		1SX005 previously open at 1PM06J or open locally.					
		Contact Unit 2 to Verity 25X005 closed.					
		Close 15X004 at 1PM06J.     Dispersion to the other OC LIX OX floorer					
		Dispatch operators to throttle CC HX SX flow:					
		• 2SX007 – 20% open.					
		Crosstie unit SX systems:					
		Close 15X016A & 15X027A at 1PM06J.     Verify 10X005 mentionals at 4DM00 has seen baseling					
		Verity 15X005 previously open at 1PM06J or open locally.					
		Contact Unit 2 to open 25X005.					
		• Verify open 15X033 & 15X034 at 1PM06J.					
		Contact Unit 2 to verify open 25X033 & 25X034.  Establish minimum OX as align for Unit 4 OO systems					
		Establish minimum SX cooling for Unit 1 CC system:					
		<ul> <li>Dispatch operator to throttle USX007 – 10% open.</li> </ul>					
		Local operator to adjust USXUU7 & 2SXUU7 to maintain the following:					
		<ul> <li>2A SX pump amps &lt; 191 AMPS</li> <li>2A SX pump discharge processes &gt; 00 DOLO</li> </ul>					
		A SX pump discharge pressure > 90 PSIG					
		<ul> <li>Unit 1 &amp; Unit 2 CC HX outlet temperatures &lt; 105°F.</li> <li>CO TO main hady, stan 20h</li> </ul>					
		GO TO Hidill bouy, step 200.					
		<ul> <li>Start 0A VC chilled water pump at 0P1002J.</li> <li>Start 0A VC obiller at 0PM02 I</li> </ul>					
	DOF	<ul> <li>Start UA VO UTITIET at UPTVIUZJ.</li> <li>Dispetab operators to start 14.8 1P DC per 1DwOA ELEC 2</li> </ul>					
		<ul> <li>Dispatch operators to start TA &amp; TD DG per TBWOA ELEC-3.</li> <li>Bostoro CC evidem et 1PM06 l:</li> </ul>					
		<ul> <li>Start TA CC pump.</li> <li>Dranara to reactors CV nump at 1DM05 I:</li> </ul>					
		• Frepare to restore CV pump at TPN0001.					

Scenari	o NRC	11-2	Event	7	
No:			No.		
Event		Dual	unit loss of offsite po	ower.	(U-1 loss of all AC power)
Descript	tion:				
Time	Position			A	Applicant's Actions or Behavior
		• • • • • •	Open 1CV112D Close 1CV112B Close 1CV8106 Reset SI recirc su Verify/open 1CV8 1SI8801A & B – C Check seal injecti 1CV8384A & B Cl Start 1A CV pump Open 1SI8801A at	mp a 111 & LOS on filt OSE at 11 1PM	nd CV pump miniflow isolation valves. & 1CV8114 ED er isolated: D PM05J. 05J as needed to maintain PZR level > 25% (41%).
		NOT	E: Scenario is term	inate	d at this point

(Final)

Simulation Examiners	n Facility <u>Braidwood</u> s:		Scenario No.: <b>NRC 11-1</b> Applicant:	Operating Test No.:         NRC 2011           Exam
				BOP
Initial Con	ditions: IC-18			
Turnover:	Unit 1 is at 75% power, s PP is OOS for intake bay requests the BOP to swa 1GC01PA next shift. TS0 0.4 MW/min due to grid o	steady state, e y inspection. F ap GC pumps O has request demand.	quilibrium xenon, Following complet per BwOP GC-5, ed Unit 1 prepare	MOL. Online risk is green. 1B CW ion of turnover, the shift manager in preparation for an OOS on to raise turbine load to full power at
Event No	Malf. No.	Event Type*		Event Description
Preload	IOR ZDI1CW01PB	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1B CW PP OOS	
	MRF ED093B OPEN IMF RP02A IMF RP02B IMF RD09 IRF RP49 OUT TRGSET 1 "THPPRZP_GT_2315"		1CW001B OOS Reactor trip brea Reactor trip brea Auto Rod Speec prevents 1A CV SI signal PZR PORV 1RY	aker A fails to open aker B fails to open I Failure (8 steps/min) train valves from auto positioning on 7456 fails open
	IMF TH11B (1 0) 100 IOR ZDI1RY8000B AUTO		1RY8000B fails	open
1	None	N-BOP, US	Swap stator coo	ling pumps.
2	None	R-ATC, US	Raise power at (	0.4 Mw/Min
3	IMF FW16 1500 30	I-BOP, US	1PT-508 FW Htt	Dsch Press fails high
4	IMF TH11A 5 TRGSET 2 "ZLO 1RY8000A(2)==0" MRF ED058C (2 5) OPEN	C-ATC, TS-US	1RY455A partial 1RY8000A block	ly opens valve breaker trips
5	IMF CV16 100 10	I-RO, US	VCT level chann	el 1LT-112 failure.
6	IMF ED11D DMF TH11A 5 IRF ED019 OPEN	TS-US	Loss of instrume	ent bus 114 (Tech Spec)
7	IMF ED07C		Bus 143 Deener	gized
8	Preload	M-All	ATWS	
9	Preload		PZR PORV 1RY	456 fails open

# **SCENARIO OVERVIEW**

Unit 1 is at 75% power, steady state, equilibrium xenon, MOL. Online risk is green. 1B CW PP is OOS for intake bay inspection. Following completion of turnover, the shift manager requests the BOP to swap GC pumps per BwOP GC-5, in preparation for an OOS on 1GC01PA next shift. TSO has requested Unit 1 prepare to raise turbine load to full power at 0.4 MW/min due to grid demand.

After completing shift turnover and relief, the BOP will swap stator cooling pumps per BwOP GC-5.

**After swapping stator cooling pumps,** Power Team will request Unit raise turbine load to full power at 0.4 MW/min due to grid demand. The crew will commence a power ascension at 0.4 mw/min.

**After a measurable change in power,** feedwater line pressure detector 1PT-508 will fail high over a 30 second period. Both main feedwater pumps speed will lower, reducing feedwater flow and causing all steam generator levels to begin lowering. The crew will take actions to stabilize the plant by taking manual control of the main feedwater pumps. 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment J, will be implemented. 1PT-508 will remain unavailable for the remainder of the scenario.

**After the 1PT-508 failure is addressed,** PZR PORV 1RY455A will open to the intermediate position, resulting in a slow RCS pressure drop. The ATC will isolate the PZR PORV by closing 1RY8000A, PORV block valve. Once 1RY8000A is closed, its breaker will trip open, removing power from 1RY8000A. 1RY455A will remain unavailable for the remainder of the scenario. Tech spec 3.4.11, conditions B and C apply. If pressure drops below 2209 psig, Tech Spec 3.4.1 will apply.

**After the PZR PORV failure is addressed,** VCT level transmitter 1LT-112 will fail high, causing letdown to divert to the HUT. The RO will take manual control and close the letdown divert valve. Tech Spec 3.3.9 does not apply in Mode 1. The instrument failure will prevent RMCS for operating in automatic mode. 1LT-112 will remain unavailable for the remainder of the scenario.

After the VCT level channel has been addressed, a loss of instrument bus 114 will occur. The crew will enter 1BwOA ELEC-2, LOSS OF INSTRUMENT BUS, and determine that instrument bus 114 is damaged and cannot be energized from the CVT. Tech Spec 3.8.9 will apply.

After the instrument bus 114 failure is addressed, bus 143 is lost causing the loss of 1A and 1C CW pumps. Condenser vacuum is lost and a manual reactor trip or an automatic turbine trip - reactor trip signal is generated. The turbine trips but the reactor does not trip, placing the plant in an ATWS condition. 1BwEP-0 is entered with a transition to 1BwFR S-1. A failure of rod control to automatically insert rods at  $\geq$  48 steps/minute forces the Unit NSO to manually insert control rods. The RWST will be used as the borated water source since the BA transfer pump has lost power. RCS pressure rises and PZR PORV 1RY456 opens to reduce pressure.

Although RCS pressure starts dropping, PZR PORV 1RY456 remains open creating a loss of reactor coolant. 1BwFR-S.1 is completed and 1BwEP-0 is reentered with a failure of high head injection valves (1SI8801A/B) and charging line Cnmt isolation valves (1CV8105/6) to automatically reposition. The crew will take action to manually open 1SI8801A/B and close 1CV8105/6.

**Completion criteria** is transition to 1BwEP ES-1.2.

## Critical Tasks

1. Insert negative reactivity into the core by initiating RCCA insertion at greater than or equal to 48 steps per minute prior to completion of step 1 of 1BwFR-S.1.

(ERG Critical Task number - FR-S.1--C) (K/A number – 000029EA1.09 importance – 4.0/3.6) 2. Establish high head injection flow before transition out of 1BwEP-0.

(ERG Critical Task number - E-0--I) (K/A number - APE008AA2.10, importance - 3.6/3.6)

# 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 (allow simulator to run during board walk down and turnover).
- Turn ON two sets of pressurizer back-up heaters and stabilize RCS pressure.
- Shut down the 1B CW pump and allow enough time for 1CW001B to fully close.
- Run caep NRC 11-1 SETUP from disk and verify the following actuate:
  - IOR ZDI1CW01PB PTL
  - MRF ED093B OPEN
  - IMF RP02A
  - IMF RP02B
  - IMF RD09 8
  - IRF RP49 OUT
  - TRGSET 1
  - "THPPRZR .GT. 2315"
  - IMF TH11B (1 0) 100
  - IOR ZDI1RY8000B AUTO
- Place 1B CW pump C/S in PTL.
- Place info tags on 1B CW pump C/S.
- Provide students with turnover sheets, 1BwOS NR-1, critical parameter sheet, and beacon load follow sheets.
- Replace procedures requiring new drafts for PPC mod in simulator procedure books.

#### Event 1: Swap stator cooling pumps.

If dispatched as EO to observe stator cooling pump swap, report 1B stator cooling pump is ready for start, the pump has stable operating parameters once running, and no signs of leakage at the stator water skid.

If dispatched as EO to acknowledge stator panel alarm, insert the following:

• **MRF TP15 ACK** to acknowledge 1PL01J.

Acknowledge as SM commencement and completion of procedure.

#### Event 2: Raise power at 0.4 MW/min

As Power Team, contact the MCR by phone and request Unit 1 raise power to 100% at 0.4 MW/min due to grid demand.

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

Acknowledge as Power Team initiation of ramp.

#### Event 3: Feed line pressure detector 1PT-508 fails high.

Insert IMF FW16 1500 30 for 1PT-508 failed low.

If dispatched as EO to investigate 1PT-508, wait two minutes report no visible damage to 1PT-508.

Acknowledge as SM 1PT-508 failure, on line risk assessment, request for maintenance support, and IR requests.

## Event 4: 1RY455A partially opens/1RY8000A block valve breaker trips.

Run caep NRC 11-1 EVENT 4 from disk and verify the following actuate:

- IMF TH11A 5
- TRGSET 2 "ZLO1RY8000A(2) = = 0"
- MRF ED058C (2 5) OPEN

If dispatched as Equipment Operator, report 1RY8000A breaker (131X2B A5 front and rear) 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 5: VCT level channel 1LT-112 failure.

Insert IMF CV16 100 10 to fail VCT level transmitter 1LT-112 high over a 10 second period.

If dispatched as EO to investigate 1LT-112, wait 2 minutes and report no visible damage to 1LT-112.

As SM, acknowledge failure of 1LT-112, dequip entry, and requests for on line risk assessment, maintenance support, and IR initiation.

# Event 6: Loss of instrument bus 114

Run caep NRC 11-1 EVENT 6 from disk and verify the following actuate:

- IMF ED11D
- IRF ED019 OPEN

When dispatched as EO/NSO to instrument bus 114, wait one minute and report instrument bus 114 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 114, wait two minutes and report inverter 114 output breaker is tripped open. Inverter 114 otherwise appears normal.

If dispatched as Equipment Operator to fail open 1AF005E-H, perform the following:

IMF FW45E 100 IMF FW45F 100 IMF FW45G 100 IMF FW45H 100

Report to NSO that 1AF005E-H are failed open.

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

#### Event 7: Bus 143 Deenergized

Insert IMF ED07C

If dispatched as EO to bus 143 report acrid smell in Div. 11 ESF switchgear room but no fire.

#### Event 8: ATWS

If dispatched as EO to locally trip Unit 1 reactor, wait until 1BwFR-S.1 step 7 (CHECK IF 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 EO/FS to verify dilution paths isolated, wait 15 minutes and report the following: 1CV8441, 1CV8435, & 1CV8453 are locked closed. 1AB8629A is closed.

#### Event 9: PZR PORV 1RY456 fails open (preload)

If dispatched as EO to locally close 1RY8000B at the breaker, wait 5 minutes and report 1RY8000B is not responding to local control.

Acknowledge as SM procedure changes, E Plan evaluations, and STA request.

Scenario No:	NRC	<b>11-1</b> Event 1 No.						
Event	Event Swap stator cooling pumps							
Descripti	on:	-						
Time	Position	Applicant's Actions or Behavior						
	CUE	<ul> <li>From turnover, swap stator cooling pumps per BwOP GC-5, SWITCHING STANDBY AND OPERATING GC PUMPS.</li> </ul>						
	US	Directs BOP to perform BwOP GC-5.						
		<ul> <li>Peer check actions of BOP operator.</li> </ul>						
	BOP	Refer to BwOP GC-5.						
		<ul> <li>Start 1B stator water pump at 1PM02J.</li> </ul>						
		<ul> <li>Allow both pumps to run in parallel for ≥ 5 minutes (per step D.1).</li> </ul>						
		Note: When examinee indicates that a 5 minute parallel run is required, evaluator may						
		time compress parallel run and give cue that "5 minutes has elapsed"						
		$\circ$ Notify EO to perform leak check at skid and acknowledge local alarm.						
		Stop 1A stator water pump at 1PM02J.						
		Inform US BwOP GC-5 complete.						
	US	Acknowledge report.						
		<ul> <li>Notify SM BwOP GC-5 is complete.</li> </ul>						
	ATC	<ul> <li>Peer check actions of BOP operator.</li> </ul>						
		<ul> <li>Monitor remainder of MCB.</li> </ul>						
		NOTE: After BwOP GC-5 is complete and with lead examiners concurrence, enter						

Scenario NRC	<b>11-1</b> Event 2
No:	No.
Event	Raise power at 0.4 MW/min
Description:	
Time Position	Applicant's Actions or Behavior
CUE	<ul> <li>Call from Power Team to raise power 100 MW at 0.4 Mw/min.</li> </ul>
US	<ul> <li>Acknowledge request to raise power 100 MW at 0.4 Mw/min.</li> <li>Implement actions of 1BwGP 100-3.</li> <li>Perform pre-job brief per HU-AA-1211 "PRE-JOB, HEIGHTENED LEVEL OF AWARENESS, INFREQUENT PLANT ACTIVITY, AND POST JOB BRIEFINGS" for load ramp.</li> </ul>
US	<ul> <li>Direct raising load 100% at 0.4 MW/min.</li> <li>Initiate load swing instruction sheet, 1BwGP 100-4T2.</li> </ul>
CREW	<ul> <li>Review applicable Precautions, and Limitations and Actions. (may have been done in PJB prior to starting demo)</li> </ul>
ATC	<ul> <li>Verify rod position and boron concentration.</li> <li>Perform dilution boundary calculation per 1BwGP 100-4T2 (may have been previously completed).</li> <li>Initiate dilution, if required (BwOP CV-5).</li> <li>Determine required PW volume:</li> <li>Effects of previously performed dilutions.</li> <li>Braidwood Boration Dilution Tables.</li> <li>REMA form.</li> <li>Determine required PW flow rate.</li> <li>Perform the following at 1PM05J:</li> <li>Add PW in auto dilute mode</li> <li>Set 1FK-111 PW/Total Flow Cont POT to the desired PW flow rate.</li> <li>Set 1FY-0111 PW Control Predet Counter to desired PW volume.</li> <li>Place MAKE-UP CONT SWITCH to STOP position.</li> <li>Set MODE SELECT to DIL/ALT DIL position.</li> <li>Place MAKE-UP CONT Switch to START.</li> <li>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).</li> </ul>

Scenario NRC	<b>11-1</b> Event 2
No:	No.
Event	Raise power at 0.4 MW/min
Description:	
Time Position	Applicant's Actions or Behavior
RO	<ul> <li>Batch addition of PW:</li> <li>Open 1CV111B.</li> <li>Open 1CV110B.</li> <li>Open 1CV111A.</li> <li>When desired amount of primary water added:</li> <li>Close 1CV111A.</li> <li>Verify/Close 1CV111B.</li> <li>Verify/Close 1CV110B.</li> </ul>
BOP	<ul> <li>Raise turbine load at 1PM02J or OWS drop 210 by performing the following:</li> <li>Select SETPOINT.</li> <li>Enter desired MW into REF DEMAND window.</li> <li>Select ENTER.</li> <li>Enter 0.4 MW/min into the RATE window.</li> <li>Select ENTER.</li> <li>Select EXIT.</li> <li>Notify US and RO of pending ramp.</li> <li>Select GO/HOLD.</li> <li>Verify GO/HOLD button illuminates.</li> <li>Verify HOLD illuminated RED.</li> <li>Select GO.</li> <li>Verify GO illuminates RED.</li> <li>Verify main turbine load begins to rise.</li> </ul>
ATC/ BOP	<ul> <li>Monitor reactor power and load ascension:</li> <li>Monitor NI's, Tave, ΔI, Pzr press/level at 1PM05J or HMI.</li> <li>Monitor MW and DEHC system response at 1PM02J or OWS drop 210.</li> <li>During dilution, monitor the following at 1PM05J and HMI:</li> <li>VCT level.</li> <li>RCS Tave rising/RCS boron concentration lowering.</li> <li>PW/Total flow predet counter responding correctly.</li> <li>Verify dilution auto stops at preset value.</li> <li>Return Reactor Makeup System to automatic.</li> </ul>
	event.

No:         No.           Event Description:         FW Htr Dsch Press 1PT-508 fails high.           Time         Position         Applicant's Actions or Behavior           CUE         • Control rods inward motion • Annunciators (1-15-A9 thru D9) "S/G 1_ LEVEL DEVIATION HIGH LOW" • Steam flow / FW flow mismatch on all SGs • 1B MFP speed lowering • 1C MFP speed lowering • Master, 1B and 1C MFP speed controllers demand lowering • 1PI-508 meter indication rising. • 1PI-509 meter indication rising. • 1PI-509 meter indication rising. • 1PI-509 meter indication rising. • 1PI-509 meter indication rising.           CREW         Refer to BwARs • Determine 1PT-508 failing high at 1PM04J. • Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL. • Dispatch operators to investigate 1PT-508 failure.           US         • 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 J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions. • Direct BOP/RO to stop load ramp/dilution           BOP         • Perform the following at 1PM04J: • Place 1SK-509A, Master FW pump speed controller in manual. • Raise demand on 1SK-509A. • Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal. • Maintain SG levels by operating 1SK-509A in manual.           ATC         • Perform the following: • Monitor reactor power response to SG under and overfeeding transient.           US         • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct inst	Scenario	o NRC	<b>11-1</b> Event 3
Event       FW Hit Dsch Press TP1-Su8 fails figh.         Description:       Time       Position       Applicant's Actions or Behavior         CUE       • Control rods inward motion • Annunciators (1-15-A9 thru D9) "S/G 1_ LEVEL DEVIATION HIGH LOW" • Steam flow / FW flow mismatch on all SGs • 1B MFP speed lowering • 1C MFP speed lowering • 1C MFP speed lowering • 1P1-508 meter indication rising. • 1P1-509 meter indication rising. • 1P1-508 failing high at 1PM04J. • Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL. • Dispatch operators to investigate 1PT-508 failure.         US       • 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 J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions. • Direct BOP/RO to stop load ramp/dilution         BOP       • Perform the following at 1PM04J: • Place 1SK-509A, Master FW pump speed controller in manual. • Raise demand on 1SK-509A. • Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal. • Maintain SG levels by operating 1SK-509A in manual.         ATC       • Perform the following: • Monitor reactor power response to SG under and overfeeding transient.         US       • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.	No:		NO.
Description.         Applicant's Actions or Behavior           Time         Position         Annunciators (1-15-A9 thru D9) "S/G 1_ LEVEL DEVIATION HIGH LOW"           Steam flow / FW flow mismatch on all SGs         1B MFP speed lowering         Steam flow / FW flow mismatch on all SGs           0         1B MFP speed lowering         1C MFP speed lowering         Master, 1B and 1C MFP speed controllers demand lowering           0         1PI-508 meter indication rising.         1PI-509 meter indication rising.           0         1PI-509 meter indication rising.           0         1PI-508 failing high at 1PM04J.           Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL.           0         Dispatch operators to investigate 1PT-508 failure.           US         • 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 J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.           • Direct BOP/RO to stop load ramp/dilution           BOP         • Perform the following at 1PM04J:           • Place 1SK-509A, Master FW pump speed controller in manual.           • Raise demand on 1SK-509A.           • Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.	Descript	tion.	FW Hu DSch Press TPT-508 fails high.
CUE         Control rods inward motion           Annunciators (1-15-A9 thru D9) "S/G 1_ LEVEL DEVIATION HIGH LOW"         Steam flow / FW flow mismatch on all SGs           B MFP speed lowering         1C MFP speed lowering           1C MFP speed lowering         Master, 1B and 1C MFP speed controllers demand lowering           1PI-508 meter indication rising.         1PI-508 meter indication rising.           2 TPI-508 meter indication rising.         1PI-508 meter indication rising.           CREW         Refer to BwARs           Determine 1PT-508 failing high at 1PM04J.         Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL.           Dispatch operators to investigate 1PT-508 failure.         Dispatch operators to investigate 1PT-508 failure.           US         • 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 J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.           Direct BOP/RO to stop load ramp/dilution         Place 15K-509A, Master FW pump speed controller in manual.           Raise demand on 15K-509A.         Raise demand on 15K-509A in manual.           Raise demand on 15K-509A.         Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.           Maintain SG levels by operating 15K-509A in manual.         <	Time	Position	Applicant's Actions or Behavior
OBJ       Operation of the second secon			Control rods inward motion
o       Steam flow / FW flow mismatch on all SGs         1B MFP speed lowering       1C MFP speed lowering         1C MFP speed lowering       Master, 1B and 1C MFP speed controllers demand lowering         1PI-508 meter indication rising.       1PI-509 meter indication rising.         Very Pierson       1PI-509 meter indication rising.         CREW       Refer to BwARs         Determine 1PT-508 failing high at 1PM04J.         Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL.         Dispatch operators to investigate 1PT-508 failure.         US       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 J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.         Direct BOP/RO to stop load ramp/dilution         BOP       Perform the following at 1PM04J:         Place 1SK-509A, Master FW pump speed controller in manual.         Raise demand on 1SK-509A.         Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.         Maintain SG levels by operating 1SK-509A in manual.         ATC       Perform the following:         Monitor reactor power response to SG under and overfeeding transient.         US       Contact SM		COL	<ul> <li>Annunciators (1-15-A9 thru D9) "S/G 1 LEVEL DEVIATION HIGH LOW"</li> </ul>
o       1B MFP speed lowering         o       1C MFP speed lowering         o       Master, 1B and 1C MFP speed controllers demand lowering         o       1PI-508 meter indication rising.         o       1PI-509 meter indication rising.         c       Refer to BwARs         Determine 1PT-508 failing high at 1PM04J.         Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL.         o       Dispatch operators to investigate 1PT-508 failure.         US       • 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 J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.         • Direct BOP/RO to stop load ramp/dilution         BOP       • Perform the following at 1PM04J:         • Place 1SK-509A, Master FW pump speed controller in manual.         • Raise EW pump speed sufficiently to restore SG levels and FW header DP to normal.         • Maintain SG levels by operating 1SK-509A in manual.         ATC       • Perform the following:         • Monitor reactor power response to SG under and overfeeding transient.         US       • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.			<ul> <li>Steam flow / FW flow mismatch on all SGs</li> </ul>
o       1C MFP speed lowering         Master, 1B and 1C MFP speed controllers demand lowering       1PI-509 meter indication rising.         1PI-509 meter indication rising.       1PI-509 meter indication rising.         CREW       Refer to BwARs         Determine 1PT-508 failing high at 1PM04J.         Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL.         Dispatch operators to investigate 1PT-508 failure.         US       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 J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.         Direct BOP/RO to stop load ramp/dilution         BOP       Perform the following at 1PM04J:         Place 1SK-509A, Master FW pump speed controller in manual.         Raise demand on 1SK-509A.         Raise HW pump speed sufficiently to restore SG levels and FW header DP to normal.         Maintain SG levels by operating 1SK-509A in manual.         ATC       Perform the following:         Monitor reactor power response to SG under and overfeeding transient.         US       Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.			<ul> <li>1B MFP speed lowering</li> </ul>
• Master, 1B and 1C MFP speed controllers demand lowering         • 1PI-508 meter indication rising.         • 1PI-509 meter indication rising.         • 1PI-509 meter indication rising.         • Refer to BwARs         • Determine 1PT-508 failing high at 1PM04J.         • Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL.         • Dispatch operators to investigate 1PT-508 failure.         US       • 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 J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.         • Direct BOP/RO to stop load ramp/dilution         BOP       • Perform the following at 1PM04J:         • Place 1SK-509A, Master FW pump speed controller in manual.         • Raise demand on 1SK-509A.         • Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.         • Maintain SG levels by operating 1SK-509A in manual.         • Monitor reactor power response to SG under and overfeeding transient.         US       • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.			<ul> <li>1C MFP speed lowering</li> </ul>
Image: Section of the section of th			<ul> <li>Master, 1B and 1C MFP speed controllers demand lowering</li> </ul>
CREW       • Refer to BwARs         • Determine 1PT-508 failing high at 1PM04J.         • Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL.         • Dispatch operators to investigate 1PT-508 failure.         US       • 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 J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.         • Direct BOP/RO to stop load ramp/dilution         BOP       • Perform the following at 1PM04J:         • Place 1SK-509A, Master FW pump speed controller in manual.         • Raise demand on 1SK-509A.         • Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.         • Maintain SG levels by operating 1SK-509A in manual.         • Monitor reactor power response to SG under and overfeeding transient.         US       • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.			<ul> <li>1PI-508 meter indication rising.</li> <li>1PI 500 meter indication rising.</li> </ul>
CREW       • Refer to BwARs         • Determine 1PT-508 failing high at 1PM04J.         • Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL.         • Dispatch operators to investigate 1PT-508 failure.         US       • 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 J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.         • Direct BOP/RO to stop load ramp/dilution         BOP       • Perform the following at 1PM04J:         • Place 1SK-509A, Master FW pump speed controller in manual.         • Raise demand on 1SK-509A.         • Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.         • Maintain SG levels by operating 1SK-509A in manual.         ATC       • Perform the following:         • Monitor reactor power response to SG under and overfeeding transient.         US       • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.			
• Determine 1PT-508 failing high at 1PM04J.         • Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL.         • Dispatch operators to investigate 1PT-508 failure.         US       • 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 J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.         • Direct BOP/RO to stop load ramp/dilution         BOP       • Perform the following at 1PM04J:         • Place 1SK-509A, Master FW pump speed controller in manual.         • Raise demand on 1SK-509A.         • Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.         • Maintain SG levels by operating 1SK-509A in manual.         • Monitor reactor power response to SG under and overfeeding transient.         US       • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.		CREW	Refer to BwARs
Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL.         Dispatch operators to investigate 1PT-508 failure.         US       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 J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.         Direct BOP/RO to stop load ramp/dilution         BOP       Perform the following at 1PM04J:         Place 1SK-509A, Master FW pump speed controller in manual.         Raise demand on 1SK-509A.         Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.         Maintain SG levels by operating 1SK-509A in manual.         ATC       Perform the following:         Monitor reactor power response to SG under and overfeeding transient.         US       Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.			Determine 1PT-508 failing high at 1PM04J.
INSTRUMENT CHANNEL.       Dispatch operators to investigate 1PT-508 failure.         US       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 J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.         Direct BOP/RO to stop load ramp/dilution       Direct BOP/RO to stop load ramp/dilution         BOP       Perform the following at 1PM04J: Place 1SK-509A, Master FW pump speed controller in manual. Raise demand on 1SK-509A.         Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal. Maintain SG levels by operating 1SK-509A in manual.         ATC       Perform the following: Monitor reactor power response to SG under and overfeeding transient.         US       Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.			<ul> <li>Identify entry conditions for 1BwOA INST-2, OPERATION WITH A FAILED</li> </ul>
<ul> <li>Dispatch operators to investigate 1PT-508 failure.</li> <li>US</li> <li>Notify SM of plant status and procedure entry</li> <li>Request evaluation of Emergency Plan conditions</li> <li>Implement 1BwOA INST-2 "OPERATION WITH A FAILED INSTRUMENT CHANNEL", Attachment J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.</li> <li>Direct BOP/RO to stop load ramp/dilution</li> <li>BOP</li> <li>Perform the following at 1PM04J:</li> <li>Place 1SK-509A, Master FW pump speed controller in manual.</li> <li>Raise demand on 1SK-509A.</li> <li>Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.</li> <li>Maintain SG levels by operating 1SK-509A in manual.</li> <li>ATC</li> <li>Perform the following:</li> <li>Monitor reactor power response to SG under and overfeeding transient.</li> <li>US</li> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.</li> </ul>			INSTRUMENT CHANNEL.
US       • 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 J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.         • Direct BOP/RO to stop load ramp/dilution         BOP       • Perform the following at 1PM04J:         • Place 1SK-509A, Master FW pump speed controller in manual.         • Raise demand on 1SK-509A.         • Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.         • Maintain SG levels by operating 1SK-509A in manual.         • ATC       • Perform the following:         • Monitor reactor power response to SG under and overfeeding transient.         US       • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.			<ul> <li>Dispatch operators to investigate 1P1-508 failure.</li> </ul>
<ul> <li>Request evaluation of Emergency Plan conditions</li> <li>Implement 1BwOA INST-2 "OPERATION WITH A FAILED INSTRUMENT CHANNEL", Attachment J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.</li> <li>Direct BOP/RO to stop load ramp/dilution</li> <li>BOP</li> <li>Perform the following at 1PM04J:</li> <li>Place 1SK-509A, Master FW pump speed controller in manual.</li> <li>Raise demand on 1SK-509A.</li> <li>Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.</li> <li>Maintain SG levels by operating 1SK-509A in manual.</li> <li>ATC</li> <li>Perform the following:</li> <li>Monitor reactor power response to SG under and overfeeding transient.</li> <li>US</li> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.</li> </ul>		US	Notify SM of plant status and procedure entry
<ul> <li>Implement 1BwOA INST-2 "OPERATION WITH A FAILED INSTRUMENT CHANNEL", Attachment J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1BwOA INST -2 to establish the following conditions.</li> <li>Direct BOP/RO to stop load ramp/dilution</li> <li>BOP</li> <li>Perform the following at 1PM04J:</li> <li>Place 1SK-509A, Master FW pump speed controller in manual.</li> <li>Raise demand on 1SK-509A.</li> <li>Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.</li> <li>Maintain SG levels by operating 1SK-509A in manual.</li> <li>ATC</li> <li>Perform the following:</li> <li>Monitor reactor power response to SG under and overfeeding transient.</li> <li>US</li> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.</li> </ul>			<ul> <li>Request evaluation of Emergency Plan conditions</li> </ul>
BOP       • Perform the following at 1PM04J:         • Place 1SK-509A, Master FW pump speed controller in manual.         • Raise demand on 1SK-509A.         • Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.         • Maintain SG levels by operating 1SK-509A in manual.         • ATC       • Perform the following:         • Monitor reactor power response to SG under and overfeeding transient.         US       • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.			Implement 1BwOA INST-2 "OPERATION WITH A FAILED INSTRUMENT
BOP       Perform the following at 1PM04J:         Place 1SK-509A, Master FW pump speed controller in manual.         Raise demand on 1SK-509A.         Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.         Maintain SG levels by operating 1SK-509A in manual.         ATC         Perform the following:         Monitor reactor power response to SG under and overfeeding transient.         US       Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.			CHANNEL", Attachment J "FW PUMP SPEED CONTROL MALFUNCTION" and direct operator actions of 1PwOA INST. 2 to actablish the following conditions
BOP       • Perform the following at 1PM04J:         • Place 1SK-509A, Master FW pump speed controller in manual.         • Raise demand on 1SK-509A.         • Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.         • Maintain SG levels by operating 1SK-509A in manual.         ATC       • Perform the following:         • Monitor reactor power response to SG under and overfeeding transient.         US       • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.			$\sim$ Direct BOP/RO to stop load ramp/dilution
BOP       • Perform the following at 1PM04J:         • Place 1SK-509A, Master FW pump speed controller in manual.         • Raise demand on 1SK-509A.         • Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.         • Maintain SG levels by operating 1SK-509A in manual.         • ATC       • Perform the following:         • Monitor reactor power response to SG under and overfeeding transient.         US       • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.			
<ul> <li>Place 1SK-509A, Master FW pump speed controller in manual.</li> <li>Raise demand on 1SK-509A.</li> <li>Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.</li> <li>Maintain SG levels by operating 1SK-509A in manual.</li> <li>ATC</li> <li>Perform the following:         <ul> <li>Monitor reactor power response to SG under and overfeeding transient.</li> </ul> </li> <li>US</li> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.</li> </ul>		BOP	Perform the following at 1PM04J:
<ul> <li>Raise demand on 1SK-509A.</li> <li>Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.</li> <li>Maintain SG levels by operating 1SK-509A in manual.</li> <li>ATC</li> <li>Perform the following:         <ul> <li>Monitor reactor power response to SG under and overfeeding transient.</li> </ul> </li> <li>US</li> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.</li> </ul>			<ul> <li>Place 1SK-509A, Master FW pump speed controller in manual.</li> </ul>
<ul> <li>Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.</li> <li>Maintain SG levels by operating 1SK-509A in manual.</li> <li>ATC</li> <li>Perform the following:         <ul> <li>Monitor reactor power response to SG under and overfeeding transient.</li> </ul> </li> <li>US</li> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.</li> </ul>			Raise demand on 1SK-509A.
<ul> <li>Maintain SG levels by operating 1SK-509A in manual.</li> <li>ATC</li> <li>Perform the following:         <ul> <li>Monitor reactor power response to SG under and overfeeding transient.</li> </ul> </li> <li>US</li> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.</li> </ul>			Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal.
ATC       • Perform the following:         • Monitor reactor power response to SG under and overfeeding transient.         US       • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.			Maintain SG levels by operating 1SK-509A in manual.
<ul> <li>Monitor reactor power response to SG under and overfeeding transient.</li> <li>US</li> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.</li> </ul>		ATC	Perform the following:
US • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.			<ul> <li>Monitor reactor power response to SG under and overfeeding transient.</li> </ul>
Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.			
		05	<ul> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.</li> </ul>

NRC	11-1 Event 4
	1RY455A partially opens/1RY8000A block valve breaker trips
n:	
Position	Applicant's Actions or Behavior
CUE	Annunciator 1-12-B2, PZR PORV OR SAF VLV OPEN
	<ul> <li>Annunciator 1-12-C1 PZR PRESS CONT DEV LOW HTRS ON</li> </ul>
	<ul> <li>Annunciator 1-12-C6 PZR PORV DSCH TEMP HIGH</li> </ul>
	<ul> <li>1RY455A open and closed lights lit.</li> </ul>
	<ul> <li>PZR pressure dropping on 1PI-455 – 458.</li> </ul>
ATC	<ul> <li>Perform the following at 1PM05J:</li> </ul>
	<ul> <li>Recognize 1RY455A PORV has opened prior to reaching lift setpoint.</li> </ul>
	<ul> <li>Place 1RY455A, PZR PORV, C/S to CLOSE.</li> </ul>
	• Determine 1RY455A will not close.
	<ul> <li>Place 1RY8000A, PZR PORV block valve, C/S to close.</li> </ul>
	<ul> <li>Report failure to US.</li> <li>Report failure to US.</li> <li>Report failure to US.</li> </ul>
	<ul> <li>Recognize loss of indication of 1PX2000A breaker following valve closure</li> </ul>
	<ul> <li>Report when DNBR I CO can be exited, if applicable</li> </ul>
	$\circ$ Dispatch operator to investigate 1RY8000A breaker
BOP	<ul> <li>Perform the following:</li> </ul>
	<ul> <li>Dispatch operators to 1RY8000A breaker.</li> </ul>
	<ul> <li>Assist US by making notifications.</li> </ul>
	<ul> <li>○ Refer to BwARs.</li> </ul>
US	Acknowledge PORV failure and concur with actions to close PORV and/or PORV block
	valve.
	<ul> <li>Determine LCO 3.4.11 Condition B and C are applicable.</li> </ul>
	<ul> <li>TRM 3.4.d does not apply.</li> </ul>
	<ul> <li>Acknowledge DNB LCO status (if applicable).</li> </ul>
	<ul> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to</li> </ul>
	investigate/correct instrument failure.
	EVALUATOR NOTE: After the actions for PZR PORV failure are complete and with
	lead examiner's concurrence, enter next event.
	n: Position CUE ATC BOP

Scenaric No:	NRC	11-1 Event 5 No.		
Event	Event VCT level channel 1LT-112 failure			
Descripti	ion:			
Time	Position	Applicant's Actions or Behavior		
	CUE	<ul> <li>Annunciator VCT LEVEL HIGH-HIGH LOW (1-9-A2)</li> <li>VCT level indicator 1LI-112 rising at 1PM05J.</li> <li>1CV112A, Letdown to VCT or HUT Divert Valve - HUT light lit at 1PM05J.</li> <li>VCT level recorder 1LT-0185 indication lowering at 1PM05J.</li> </ul>		
	ATC/ BOP	<ul> <li>Determine 1LT-112 has failed high.</li> <li>Reference BwAR.</li> <li>Dispatch operators to investigate 1LT-112.</li> </ul>		
	US	Notify SM of plant status.		
	ATC	<ul> <li>Take manual control of VCT level at 1PM05J:</li> <li>Place 1CV112A in manual and lower demand to close 1CV112.</li> <li>Place 1CV112A control switch in VCT.</li> <li>Determine RMCS auto makeup – NOT AVAILABLE.</li> <li>Place RMCS in manual at 1PM05J:</li> <li>Place RMCS mode C/S to MAN.</li> <li>Place RMCS makeup C/S to START.</li> <li>Place RMCS to OFF to enable 37% low level alarm.</li> </ul>		
	US	<ul> <li>Determines TS 3.3.9 is NOT applicable.</li> <li>Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.</li> </ul>		
		EVALUATOR NOTE: After the actions for the VCT level channel malfunction are complete and with lead examiners concurrence, insert the next event.		

Scenario No:	NRC <sup>2</sup>	I1-1 Event 6 No.
Event De	escription:	Loss of instrument bus 114
Time	Position	Applicant's Actions or Behavior
	CUE	<ul> <li>Annunciator 1-4-D5, BUS 114 INVERTER TROUBLE</li> <li>Annunciator 1-4-A3, PROCESS I &amp; C CAB PWR SUP FAILURE</li> <li>Annunciator 1-4-B3, SOLID STATE PROT CAB GENERAL WARNING</li> <li>Numerous block 4,10, &amp; 13 annunciators.</li> <li>PR N44 deenergized.</li> </ul>
	ATC/ BOP	<ul><li>Determine instrument inverter 114 deenergized.</li><li>Reference BwARs.</li></ul>
	CREW	<ul> <li>Identify entry conditions for 1BwOA ELEC-2, LOSS OF INSTRUMENT BUS.</li> <li>Dispatch operators to investigate status of inverter and instrument bus.</li> </ul>
	US	<ul> <li>Notify SM of plant status and procedure entry.</li> <li>Request evaluation of Emergency Plan conditions.</li> <li>Enter/Implement 1BwOA ELEC-2 LOSS OF INSTRUMENT BUS and direct operator actions of 1BwOA ELEC-2 to establish the following conditions:</li> <li>Direct BOP/ATC to stop load ramp/dilution.</li> </ul>
	RO	<ul> <li>Check control channels operable at 1PM05J:</li> <li>PZR pressure</li> <li>PZR level</li> <li>T<sub>AVE</sub></li> <li>Delta T</li> </ul>
	BOP	<ul> <li>Check control channels operable at 1PM05J/1PM04J:</li> <li>P<sub>IMP</sub></li> <li>SG level</li> <li>Steam flow</li> <li>Feed flow</li> </ul>
	BOP	<ul> <li>Dispatch operator to check instrument bus 114 and inverter 114:</li> <li>Instrument bus 114 is damaged.</li> <li>Instrument inverter 114 is NOT damaged.</li> </ul>
	CREW	Determine Instrument Bus 114 cannot be energized.
	US	Implement 1BwOA ELEC-2, Attachment D, INSTRUMENT BUS 114 ACTIONS.

Scenario No:	NRC <sup>/</sup>	11-1 Event 6 No.
Event Des	scription:	Loss of instrument bus 114
Time	Position	Applicant's Actions or Behavior
	US	<ul> <li>Refer to 1BwOA ELEC-2, Table D, LOSS OF INSTRUMENT BUS 114 EFFECTS.</li> <li>Brief crew on loss of instrument bus 114 effects.</li> <li>Direct actions of 1BwOA INST-1 NUCLEAR INSTRUMENTATION MALFUNCTION, Attachment A.</li> <li>Dispatch operators to fail air to 1AF005E-H.</li> <li>Determine TS 3.8.9, condition B is applicable</li> </ul>
		EVALUATOR NOTE: After the crew recognizes instrument bus 114 cannot be reenergized and the tech spec call has been made, the scenario can continue by inserting the next event. If desired by evaluator the crew can perform steps below of 1BwOA INST-1. When crew requests assistance for tripping bistables, cue will be that no extra NSOs are currently available.
	RO/ BOP	<ul> <li>Place Rod Bank Select in MANUAL</li> <li>Check annunciator 1-10-B5 – LIT</li> <li>Place N44 Rod Stop Bypass switch in BYPASS at 1PM07J</li> <li>Check Tave – Tref deviation within 1 deg. F.</li> <li>Check SG levels normal and stable.</li> <li>Defeat N44 Functions at 1PM07J <ul> <li>Place upper section current comparator defeat switch in PR N44 position.</li> <li>Place lower section current comparator defeat switch in PR N44 position.</li> <li>Place power mismatch bypass switch in PR N44 position.</li> <li>Place rod stop bypass switch in PR N44 position.</li> <li>Place rod stop bypass switch in PR N44 position.</li> </ul> </li> <li>Check annunciator 1-10-C3 – LIT <ul> <li>Reset PR N44 rate trip at 1PM07J</li> </ul> </li> <li>Place computer points in TEST, N0047, N0048, U1143</li> <li>Remove computer point from scan N0052A</li> <li>Place N44 input to DEH in test</li> <li>Remove N44 control power fuses at 1PM07J</li> <li>Select LOOP delta T recorder to operable channel</li> <li>Check Tave – Tref within 1 deg. F</li> </ul>

Scenario NRC 11-1 Event 7			
No:	No: No.		
Event	Event Bus 143 De-energized		
Timo	Docition	Applicant's Actions or Bobavior	
Time	FUSILION		
	CUE	<ul> <li>All CW pumps tripped</li> <li>BP Annunciator C-9 (5.6) "CNDSR NOT AVAILABLE"</li> </ul>	
		Annunciator 1-11-A9, "TURB TRIP ABOVE P-8 RX TRIP"	
		Condenser pressure rising.	
	ATC/	Identify/report loss of bus 143	
	BOP	<ul> <li>Identify report loss of all CW pumps</li> </ul>	
		Identify report condenser pressure rising	
	US	Notify SM of plant status	
		Direct operator to trip reactor	
	ATC	<ul> <li>Initiate a manual reactor trip</li> </ul>	
	US	Notify SM of plant status and procedure entry	
		<ul> <li>Request evaluation of Emergency Plan conditions</li> </ul>	
		<ul> <li>Enter/Implement 1BwEP-0 and direct operator actions of 1BwEP-0</li> </ul>	
	ATC	Perform immediate operator actions of 1BwEP-0:	
		Verify reactor trip	
		Rod bottom lights - NONE LIT	
		Reactor trip & Bypass breakers - GLOSED	
		Manually trip the reactor	
		• 1PM05.1	
		• 1PM06J	
		• PR channels > 5%	
	US	Notify SM of plant status and procedure entry	
		Request evaluation of Emergency Plan conditions	
		<ul> <li>Enter/Implement 1BwFR-S.1 and direct operator actions of 1BwFR-S.1</li> </ul>	

Scenario N	RC 11-5 Event 8
No:	No.
Event	ATWS
Description:	Applicant's Actions or Debauier
Time Positi	Applicant's Actions of Benavior
ATC [CT] FR-S.	<ul> <li>Perform immediate operator actions of 1BwFR-S.1:</li> <li>Verify reactor trip <ul> <li>Rod bottom lights - NONE LIT</li> <li>Reactor trip &amp; Bypass breakers - CLOSED</li> <li>Neutron flux – NOT DECREASING</li> <li>Manually trip the reactor <ul> <li>1PM05J</li> <li>1PM06J</li> </ul> </li> <li>Determine control rods NOT inserting automatically</li> <li>Manually insert control rods at greater than or equal to 48 steps per minute prior to completion of step 1 of 1BwFR-S.1.</li> </ul> </li> </ul>
BOP	<ul> <li>Perform immediate operator actions of 1BwFR-S.1:</li> <li>Verify Turbine Trip</li> <li>All Turbine throttle valves – CLOSED</li> <li>All Turbine governor valves – CLOSED</li> </ul>
BOP	<ul> <li>Check AF pumps running         <ul> <li>AF pump run lights status (May be LIT or NOT LIT)</li> <li>Manually start the 1A AF pump if it did not yet have an auto start signal.</li> <li>Manually start the 1B AF pump (loss of bus 114 prevents auto start)</li> </ul> </li> </ul>
RO/ BOP	<ul> <li>Initiate emergency boration of the RCS</li> <li>CV pumps – ONE RUNNING</li> <li>Open 1CV8104</li> <li>Attempt start boric acid transfer pump (no power to pump)</li> <li>Open 1CV112D or 1CV112E</li> <li>Close 1CV112B or 1CV112C</li> <li>Check PZR pressure &lt; 2335 psig</li> </ul>
BOP	<ul> <li>Verify CNMT vent isolation</li> <li>Group 6 CNMT vent isolation monitor lights – LIT</li> </ul>

Scenari	o NRC	<b>11-5</b> Event 8
No:		No.
Event		ATWS
Descrip	tion:	Applicant's Astisns or Debouier
Time	Position	Applicant's Actions or Benavior
	ATC	Check If The Following Trips Have Occurred
		Reactor Trip has NOT occurred.
		Dispatch operator to locally trip reactor
		All Turbine throttle valves - CLOSED
	ATC	All Turbine governor valves – CLOSED
	AIC	• Check II reactor is subcritical $\sim$ PR channels > 5% (continue in 1BwER S-1)
		$\sim$ PR channels < 5% (transition to 1BwEP-0)
		IR channels startup rate – NEGATIVE
		NOTE: The reactor will be locally tripped sometime after the previous step (step 7
		of 1BwFR-S.1).
		NOTE: If Reactor power is >5% at this point the remaining steps below will be
		completed in 1BwFR S-1.
	ATC/	Check SG levels
	BOP	<ul> <li>At least one SG level &gt; 10% (31%)</li> </ul>
		SG levels maintained between 10% (31%) and 50%
		• 1SD002A-H – CLOSED
		Verify dilution paths isolated
		1CV111A & B – CLUSED     DTDS made selector switch _ OFF
		<ul> <li>BTRS mode selector switch – OFF</li> <li>Dispatch operator to locally verify dilution paths isolated</li> </ul>
		<ul> <li>Dispatch operator to locally verify dilution paths isolated</li> <li>Stop reactivity insertion from RCS cooldown</li> </ul>
		Check RCS temperature _NOT DROPPING IN AN UNCONTROLLED MANNER
		Check SG pressures – NOT DROPPING IN AN UNCONTROLLED MANNER OR
		COMPLETELY DEPRESSURIZED.
	ATC/	Check CETCs < 1200°F
	BOP	Verify reactor subcritical
		<ul> <li>PR channels &lt; 5%</li> </ul>
		<ul> <li>IR channels – NEGATIVE SUR</li> </ul>
		Return to 1BwEP-0

Scenario	<b>NRC 11-1</b>	Event 9 No
Event D	escription:	PZR PORV 1RY456 fails open
Time	Position	Applicant's Actions or Behavior
	BOP	<ul> <li>Perform immediate operator actions of 1BwEP-0 at 1PM02J or OWS drop 210:</li> <li>Verify Turbine Trip.</li> <li>All Turbine throttle valves – CLOSED.</li> <li>All Turbine governor valves – CLOSED.</li> </ul>
	BOP	<ul> <li>Perform immediate operator actions of 1BwEP-0 at 1PM01J:</li> <li>Verify power to 4KV busses.</li> <li>ESF Buses – BOTH ENERGIZED (141 &amp; 142).</li> </ul>
	CREW	<ul> <li>(If manual SI not previously performed) Recognize and respond to conditions requiring a Safety Injection in accordance with 1BwEP-0 "REACTOR TRIP OR SAFETY INJECTION", Step 4:</li> <li>PZR pressure cannot be maintained &gt; 1829 psig.</li> <li>Manually actuate SI from 1PM05J and 1PM06J.</li> </ul>
	CREW	<ul> <li>Check SI Status at 1PM05J:         <ul> <li>SI First OUT annunciator – LIT.</li> <li>SI ACTUATED Permissive Light – LIT.</li> <li>SI Equipment – AUTOMATICALLY ACTUATED.</li> <li>BOTH SI pumps – RUNNING.</li> <li>CV pump to cold leg isolation valves 1SI8801A/B – CLOSED.</li> </ul> </li> </ul>
	US	Direct BOP to perform Attachment B of 1BwEP-0
		EVALUATOR NOTE: US and RO will continue in 1BwEP-0 while BOP is performing Attachment B:
		EVALUATOR NOTE: The examinees may elect to re-align train A high head injection valves 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.
	BOP	<ul> <li>Verify FW isolated at 1PM04J:</li> <li>FW pumps – TRIPPED.</li> <li>Isolation monitor lights – LIT.</li> <li>FW pumps discharge valves - CLOSED (or going closed) 1FW002A-C.</li> <li>Verify DGs running at 1PM01J:</li> <li>DGs – BOTH RUNNING.</li> </ul>

Scenario	NRC 11-1	Event 9
NO:		NO.
Event De	escription:	PZR PORV 1R1456 fails open
Time	Position	Applicant's Actions or Behavior
lime	Position	<ul> <li>Applicant's Actions or Benavior</li> <li>1SX169A/B OPEN.</li> <li>Dispatch operator locally to check operation</li> <li>Verify Generator Trip at 1PM01J:</li> <li>OCB 1-8 and 7-8 open.</li> <li>PMG output breaker open.</li> <li>Verify Control Room ventilation aligned for emergency operations at 0PM02J:</li> <li>VC Rad Monitors - LESS THAN HIGH ALARM SETPOINT.</li> <li>Operating VC train equipment – RUNNING.</li> <li>0B Return fan</li> <li>0B Roturn fan</li> <li>0B Chilled water pump</li> <li>0B Chilled water pump</li> <li>0B Chiller</li> <li>Operating VC train dampers – ALIGNED.</li> <li>M/U fan outlet damper – 0VC08Y NOT FULLY CLOSED.</li> <li>0B VC train M/U filter light – LIT.</li> <li>0VC09Y - OPEN</li> <li>0VC03Y - CLOSED</li> <li>Operating VC train charcoal Absorber aligned for train B.</li> <li>0VC44Y - CLOSED</li> <li>0VC05Y - OPEN</li> <li>0VC06Y - OPEN</li> <li>0VA03CB - RUNNING</li> <li>0VA03CB - RUNNING</li> <li>0VA03CB - RUNNING</li> <li>0VA03CE RUNNING</li> <li>0VA03CE RUNNING</li> <li>0VA03CE RUNNING</li> <li>0VA03CE RUNNING</li> <li>0VA05Y - CLOSED</li> <li>Plenum C:</li> <li>0VA03CE RUNNING</li> <li>0VA05Y - CLOSED</li> <li>Verify HB ventilation aligned at 0PM02J:</li> <li>Verify HB ventilation aligned at 0PM02J:</li> <li>0VA05CE RUNNING</li> <li>0VA05CE RUN</li></ul>
		OVA435Y – CLOSED

Scenario No	• NRC 11-1	Event 9 No		
Event D	escription:	PZR PORV 1RY456 fails open		
Time	Position	Applicant's Actions or Behavior		
		Notify US Attachment B complete		
	ATC	<ul> <li>Verify ECCS pumps running at 1PM05J/1PM06J:</li> <li>BOTH CV pumps – RUNNING.</li> <li>Manually start 1B CV pump.</li> <li>1A CV pump – RUNNING.</li> <li>Check RH pumps – RUNNING.</li> <li>Manually start 1B RH pump.</li> <li>1A RH pump – RUNNING.</li> <li>Check SI pumps – RUNNING.</li> <li>Manually start 1B SI pump.</li> <li>1A SI pump – RUNNING.</li> </ul>		
	ATC/ BOP	<ul> <li>Verify RCFCs running in Accident Mode:</li> <li>1A &amp; 1C RCFC Accident Mode lights – LIT at 1PM06J.</li> <li>1B &amp; 1D RCFC Accident Mode lights - NOT LIT at 1PM06J.</li> <li>Stop 1B &amp; 1D high speed RCFCs at 1PM06J.</li> <li>Close 1SX112B and 1SX114B, CNMT chiller 1B SX inlet &amp; outlet valves at 0PM02J.</li> <li>Verify/open 1SX147B, CNMT chiller 1B SX bypass valve at 0PM02J.</li> <li>Verify/open 1SX016B and 1SX027B, RCFC 1B &amp; 1D SX inlet &amp; outlet isolation valves at 1PM06J.</li> <li>Start 1D &amp; 1D low speed RCFCs at 1PM06J.</li> </ul>		
	ATC/ BOP	<ul> <li>Verify Phase A isolation:</li> <li>Group 3 CNMT isolation monitor lights – NOT ALL LIT at 1PM06J.</li> <li>Manually actuate CNMT isolation phase A at 1PM05J and/or 1PM06J.</li> <li>Manually close CNMT isolation phase A valves. <ul> <li>1CV8112, 1CV8160, 1RY8028 &amp; 1RY8033 at 1PM05J.</li> <li>1WO006B, 1WO020B, &amp; 1WO056A at 1PM06J.</li> <li>1PR001B, 1FP010, 1PS229A &amp; 1PS229B at 1PM11J.</li> <li>1RE9160B, 1RE9170 &amp; 1RF027 at 1PM11J.</li> </ul> </li> </ul>		
	ATC/ BOP	<ul> <li>Verify Cnmt Vent isolation at 1PM06J:</li> <li>Group 6 Cnmt Vent Isol monitor lights – ALL LIT.</li> </ul>		
	ATC/ BOP	<ul> <li>Verify AF system at 1PM06J:</li> <li>1B AF pump – NOT RUNNING.</li> <li>Manually start 1B AF pump.</li> <li>1A AF pump – RUNNING.</li> </ul>		

Scenari	o NRC 11-1	Event 9		
No:	A a a rintian	NO.		
		PZR PORV TR 1456 fails open		
Time	Position Applicant's Actions or Behavior			
		AF isolation valves – OPEN.		
		<ul> <li>AF ISA-Π</li> <li>AF flow control valves – THROTTLED</li> </ul>		
		<ul> <li>1AF005E-H failed open due to loss of instrument bus 114</li> </ul>		
		<ul> <li>Dispatch operator to locally control 1AF005E-H.</li> </ul>		
		<ul> <li>Throttle 1AF013E-H from 1PM06J</li> </ul>		
	ATC/	Verify CC pumps at 1PM06J:		
	BOP	BOTH CC pump – RUNNING.		
		Manually start 1B CC pump.		
	ATC/	Verify SX pumps at 1PM06J:		
	BOP	<ul> <li>BOTH SX pumps – RUNNING.</li> </ul>		
		Manually start 1B SX pump.		
	ATC/	Check if Main Steamline Isolation required at 1PM06J:		
	BOP	<ul> <li>All SG pressure &gt; 640 psig.</li> </ul>		
		Containment pressure < 8.2 psig		
	ATC/	Check if CS is required at 1PM06J:		
	BOP	<ul> <li>CNMT pressure has not risen &gt; 20 psig.</li> </ul>		
	BOP/ ATC	Verify Total AF flow at 1PM06J:		
		• AF flow > 500 gpm.		
		<ul> <li>S/G NR levels – NOT rising in an uncontrolled manner.</li> </ul>		
	ATC/ BOP	Note: the following task may have been performed earlier per note on page 18		
		Verify ECCS valve alignment at 1PM06.1		
	[СТ]	<ul> <li>Group 2 Cold Lea Injection monitor lights required for injection – NOT ALL LIT.</li> </ul>		
	E-0I	Manually OPEN 1SI8801A/B		
		Manually CLOSE 1CV8105/06		
		Verify ECCS flow at 1PM05J:		
		<ul> <li>High Head SI flow &gt;100 gpm (1FI-917).</li> </ul>		
		<ul> <li>RCS pressure &gt; 1700 psig.</li> </ul>		

Scenari No:	o NRC 11-1	Event 9 No.			
Event Description:		PZR PORV 1RY456 fails open			
Time	me Position Applicant's Actions or Behavior				
	ATC	<ul> <li>Check PZR PORVs and SPRAY VALVES at 1PM05J:</li> <li>1RY456 PORV OPEN</li> <li>1RY8000B can NOT be CLOSED</li> </ul>			
	CREW	Transition to 1BwEP-1, LOSS OF REACTOR OR SECONDARY COOLANT.			

Scenario	NRC	11-1 Event 9
Event		PZR PORV 1RY456 fails open
Time P	Position	Applicant's Actions or Behavior
U	S	<ul> <li>Notify SM of plant status and procedure entry.</li> <li>Request evaluation of Emergency Plan conditions.</li> <li>Request STA evaluation of status trees.</li> <li>Enter/Implement 1BwEP-1 and direct operator actions of 1BwEP-1 to establish the following conditions:</li> </ul>
A	ATC	<ul> <li>NOTE: this step may have been performed earlier per OAS summary page of 1BwEP-0.</li> <li>Check status of RCPs at 1PM05J: <ul> <li>All RCPs – ALL RUNNING.</li> <li>Hi Head SI flow &gt; 100 gpm</li> <li>RCS Pressure &lt; 1425 psig</li> <li>STOP ALL RCPs</li> </ul> </li> </ul>
AB	ATC/ BOP	<ul> <li>Check if SG secondary pressure boundaries are intact at 1PM04J:</li> <li>Check pressure in all SGs:</li> <li>None dropping in an uncontrolled manner.</li> <li>None completely depressurized.</li> </ul>
AB	ATC/ BOP	<ul> <li>Check intact SG levels at 1PM04J:</li> <li>SG levels maintained between 10% (31%) and 50%.</li> <li>S/G NR levels – NOT rising in an uncontrolled manner.</li> </ul>
AB	ATC/ 30P	<ul> <li>Check secondary radiation normal</li> <li>Reset Phase A.</li> <li>OPEN 1SD005A-D at 1PM11J</li> <li>Contact Chemistry for SG sampling.</li> <li>Check Secondary trends at RM-11 or PPC: <ul> <li>1PR08J SG Blowdown.</li> <li>1PR27J SJAE/GS.</li> <li>1AR 22/23A-D Main steam lines.</li> </ul> </li> </ul>
A	ATC	<ul> <li>Check PZR PORVs and isolation valves at 1PM05J:</li> <li>PORV isolation valves – 1RY8000B Energized but not responding.</li> <li>PORVs – BOTH OPEN</li> <li>PORV isolation valves – 1RY8000A previously CLOSED</li> </ul>

Scenario	NRC	<b>11-1</b> Event 9
NO:		NO.
	ı.	PZR PORV TR 1456 fails open
Description	1.	NOTE: If subcooling is ACCEPTABLE in the following step, the crew will transition to 1BwEP ES-1.1. When Charging pump is stopped in 1BwEP ES-1.1 RCS pressure will drop and transition will be made to 1BwEP ES-1.2, then the scenario may be terminated.
Ē	ATC/ BOP	<ul> <li>Check if ECCS flow should be reduced at 1PM05J:</li> <li>RCS subcooling – NOT acceptable.</li> </ul>
A E	ATC/ BOP	<ul> <li>Check if CS should be stopped</li> <li>CS pumps – NONE RUNNING</li> </ul>
E	ATC/ 3OP	<ul> <li>Check if RH pumps should be stopped at 1PM06J:</li> <li>Reset SI</li> <li>RCS pressure &gt; 325 psig</li> <li>If RCS pressure is STABLE, perform the following</li> <li>Check RH pumps suction aligned to RWST</li> <li>STOP BOTH RH pumps</li> </ul>
E E	ATC/ BOP	<ul> <li>Check for Faulted SG Indications</li> <li>SG Pressures – ALL STABLE</li> <li>RCS Pressure - STABLE</li> </ul>
E	ЗОР	<ul> <li>Check if DGs should be stopped</li> <li>4KV busses – Energized from offsite power (EXCEPT BUS 143 which is FAULTED)</li> <li>Stop DG 1A &amp; 1B at 1PM01J</li> </ul>
E	ATC/ BOP	<ul> <li>Evaluate Plant Status</li> <li>RH Trains – BOTH AVAILABLE</li> <li>Aux Bldg Rads – ALL NORMAL</li> <li>Check trends at RM-11 or PPC:</li> </ul>
l	JS	<ul> <li>Place H2 Monitors in service</li> <li>Contact U-2 for assist NSO to place U-1 H2 monitors in service.</li> <li>Contact SM for consulting with TSC</li> </ul>
E	BOP	Shutdown 0A VC chiller at 0PM02J
E	ATC/ BOP	<ul> <li>Energize Source Range Detectors</li> <li>Place Boron Dilution Alert Switches in NRMAL at 1PM05J</li> <li>Place Scaler Timer Power Switch to ON at 1PM07J</li> </ul>
E F	ATC/ BOP	<ul> <li>Check if RCS cooldown and depressuization is required</li> <li>RCS pressure &gt; 325 psig</li> </ul>

Scenario No:	NRC	11-1 Event No.	9	
Event		PZR PORV 1RY456 fail	s open	
Description	on:			
	CREW	Transition to 1BwEP ES	-1.2 PO	ST LOCA COOLDOWN AND DEPRESSURIZATION.
		NOTE: Scenario is termin	nated at tl	nis point

(Final)