Simulation Facility Braidwood

Scenario No.: Operating Test No.: **2006301**
NRC 06-1

Examiners: _____ Applicant: _____ SRO

_____ _____ RO

_____ _____ BOP

Initial Conditions: IC-18

Turnover: Unit 1 is at 76% power, steady state, equilibrium xenon, MOL. Online risk is green. 1B Heater Drain Pump is OOS for motor replacement for the past 3 days. Expected back in service in 7 days. 0BwISR 3.3.7.3-201, Surveillance Calibration of Control Room Outside Air Intake Rad Monitor 0PR31J, is in progress. Awaiting IMD supervisor package review. LCOAR 3.3.7, Condition A has been entered. 0 CC pump is mechanically and electrically aligned to Unit 2 due to OOS on 2B CC pump. 1CV8149C was returned to service last shift following maintenance to replace its fuse block. Following completion of turnover, the shift manager requests the BOP swap 75 gpm letdown orifices from 1B to 1C per BwOP CV-9 for an upcoming clearance order on 1CV8149B to replace its fuse block while the RO monitors reactor power.

Event No.	Malf. No.	Event Type*	Event Description
	IOR ZDI1HD01PB PTL IRF CC42 RO TRGSET 1 ZLO1FW009A(1) = = 1 IMF MS03A (1 0) 100 0 IMF MS03E (1 0) 100 0 IMF MS03I (1 0) 100 0 IMF CV32B TRGSET 2 ZLO1SI01PA(3) = = 1 IMF CV01A (2 0)		1B HD pump OOS 0 CC pump aligned to bus 242 1A SG safety valves stuck open 1B CV pump auto start failure 1A CV pump trip
1	None	N-BOP, US	Swap Letdown orifices
2	IMF PA0253 ON IOR ZDI1MS018A CLS	C-US	SG PORV 1MS018A inoperable (Tech Spec)
3	IMF RX10A 0 15	I-RO, US	Turbine Impulse Pressure channel 1PT-505 failed low (Tech Spec)
4	IMF FW35A	C-BOP, US R-RO, US	1B Heater Drain Pump trip
5	TH03A 450 120	M-ALL	1A SGTR (450 gpm)
6	Preload	C-RO	1A CV pump trips/1B CV pump fails to auto start
7	Preload	M-ALL	Faulted (ruptured) 1A SG

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

SCENARIO OVERVIEW

Unit 1 is at 76% power, steady state, equilibrium xenon, MOL. Online risk is green. 1B Heater Drain Pump is OOS for motor replacement for the past 3 days. Expected back in service in 7 days. 0BwISR 3.3.7.3-201, Surveillance Calibration of Control Room Outside Air Intake Rad Monitor 0PR31J, is in progress. Awaiting IMD supervisor package review. LCOAR 3.3.7, Condition A has been entered. 0 CC pump is mechanically and electrically aligned to Unit 2 due to OOS on 2B CC pump. 1CV8149C was returned to service last shift following maintenance to replace its fuse block. Following completion of turnover, the shift manager requests the BOP swap 75 gpm letdown orifices from 1B to 1C per BwOP CV-9 for an upcoming clearance order on 1CV8149B to replace its fuse block while the RO monitors reactor power.

After completing shift turnover and relief, the crew will swap letdown orifices. The RO will manually lower letdown pressure, remove 1B letdown orifice from operation and place 1C letdown orifice on-line. The RO will then restore letdown line pressure and restore letdown to automatic operation

After completing the letdown orifice swap, Steam Generator 1A atmospheric relief valve 1MS018A, will develop a hydraulic leak. The Unit Supervisor will enter Tech Spec 3.7.4, Condition A and Tech Spec 3.6.3, Condition C. The crew will dispatch an operator to close 1MS019A to comply with TS 3.6.3, condition C. 1MS018A will remain unavailable for the remainder of the scenario.

After the 1MS018A failure has been addressed, First Stage Turbine Impulse Pressure channel 1PT-505 will fail low. The RO 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 RO will return rod control to automatic after verifying Tave and Tref are within 1°F.

After the 1PT-505 failure has been 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 RO will borate the RCS as necessary to stabilize RCS temperature.

After the 1A Heater Drain Pump trip has been addressed, a 450 gpm SGTR will occur on the 1A SG. Pressurizer level will drop and a manual reactor trip will be required. When the reactor is tripped, three safety valves on the 1A SG will stick open, causing a faulted/ruptured SG. The crew will implement 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION. When safety injection is actuated, the 1A CV pump will trip. The 1B CV pump must be manually started to establish high head ECCS flow. After determining 1A SG secondary pressure boundary is not intact the crew will transition to 1BwEP-2, FAULTED STEAM GENERATOR ISOLATION. The crew will complete isolation of 1A SG and transition to 1BwEP-3, STEAM GENERATOR TUBE RUPTURE, based on secondary radiation trends on the 1A SG. After determining ruptured SG pressure is less than 320 psig the crew will transition 1BwCA-3.1, SGTR WITH LOSS OF REACTOR COOLANT – SUBCOOLED RECOVERY DESIRED.

Completion criteria is completion of step 6 of 1BwCA-3.1

Critical Tasks

1. Manually start the 1B CV pump prior to completion step 6 of 1BwEP-0.
   (ERG Critical Task number - E-0--I) (K/A number - 013000A4.01 importance – 4.5/4.8)

2. Isolate 1A Steam Generator prior to completing step 4 of 1BwEP-2.
   (ERG Critical Task number - E-2--A) (K/A number - 000040AA1.10 importance - 4.1/4.1)

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, 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 and 0 CC pumps from 141 and 142 in PTL.

- Run **caep NRC 06-1 SETUP** from disk and verify the following actuate:

  - IOR ZDI1HD01PB PTL
  - IRF CC42 RO
  - TRGSET 1 "ZLO1FW009A(1) = = 1"
  - IMF MS03A (1 0) 100 0
  - IMF MS03E (1 0) 100 0
  - IMF MS03I (1 0) 100 0
  - IMF CV32B
  - TRGSET 2 "ZLO1SI01PA(3) = = 1"
  - IMF CV01A (2 0)

- Adjust control bank D rod height to 140 steps by performing the following:

  - Place rod bank select switch in manual.
  - Insert control bank D to 130 steps.
  - **IRF CV79 684 60**
  - Verify Tave – Tref within 1°F.
  - Place rod bank select switch to auto.

- Place danger tags on 1B HD pump and 1HD075B.

- Update PARAGON to reflect 1B HD pump OOS.

- Set ΔI Target Curve slopes to 0.02 (2.0%).

- Provide examinees with turnover sheets, 1BwOS NR-1, & critical parameter sheet.

Event 1: Swap Letdown orifices

As SM, acknowledge the completion of letdown orifice swap.

Event 2: SG PORV 1MS018A inoperable (Tech Spec)

Run **caep NRC 06-1 EVENT 2** from disk and verify the following actuate:

- IMF PA0252 ON
- IMF PA0253 ON
- IOR ZDI1MS018A CLS

As SM acknowledge the failure, LCO 3.6.3, condition C and LCO 3.7.4, condition A, and requests for on line risk assessment, maintenance support, and IR initiation.

If dispatched as NLO, report 1MS018A has a broken hydraulic line and a small puddle of hydraulic fluid is present beneath the valve.

As WEC supervisor. acknowledge request for EST for 1MS018A C/S, if EST is requested.

If dispatched as NLO to close 1MS019A, perform the following:

- IRF MS51 0

Event 3: 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 (GREEN), maintenance support, and IR initiation.

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
  - MRF RX143 TRIP
  - MRF RP20 CLOSE

If lead examiner desires the AMS bistables tripped, participate in brief and perform the following:
- As assist NSO contact Unit 1 (X-2209)
- Insert the following:
  - IMF PN0470 ON to place operating bypass switch in TIP 1 position (On annunciator tab of Action List)
  - MRF RX149 TRIP to place operating bypass input switch to test-trip

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Event 3: 1B Heater Drain Pump trip

ENSURE ROD CONTROL IS RETURNED TO AUTOMATIC PRIOR TO INSERTING THE NEXT MALFUNCTION.

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 NLO, report 1A Heater Drain pump is seized and report ground overcurrent flag at breaker cubicle.

Event 4: 1A SGTR (450 gpm)

Insert **IMF TH03A 450 10**

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

After STA requested, as STA report CSF status:

Event 5: 1A CV pump trips/1B CV pump fails to auto start (preload)

If dispatched as NLO to investigate 1A CV pump, report ground overcurrent flag at breaker cubicle.

Event 6: Faulted ruptured 1A SG (preload)

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

After STA requested, as STA report CSF status:

Scenario No: **NRC 06-1** Event No. 1		
Event Description: Swap Letdown orifices		
Time	Position	Applicant's Actions or Behavior
	CUE	• Shift manager requests swapping letdown orifices from 1B to 1C (from turnover).
	US	• Directs RO to swap letdown orifices from 1B to 1C per BwOP CV-9

	RO	• Refers to BwOP CV-9
		• Lower letdown pressure
		  • Place 1PK-131, LTDWN Line Press Cont Vlv 1CV131, to MANUAL
		  • Raise demand on 1PK-131, LTDWN Line Press Cont Vlv 1CV131, to lower letdown pressure to ~180 psig (1PI-131)
		• Remove 1B letdown orifice from operation
		  • Close 1CV8149B
		• Align 1C letdown orifice
		  • Open 1CV8149C
		• Restore letdown pressure to 370 psig
		  • Lower demand on 1PK-131, LTDWN Line Press Cont Vlv 1CV131
		  • Restore letdown pressure without causing the following annunciators:
		  • LTDWN HX OUTLT PRESSURE HIGH (1-8-B5)
		  • LP LTDWN RLF TEMP HIGH (1-9-B1)
		• Restore automatic letdown pressure control
		  • Verify letdown pressure stable at ~370 psig (1PI-131)
		  • Place 1PK-131, LTDWN Line Press Cont Vlv 1CV131, to AUTO
		• Verify letdown temperature 90°F - 115°F (1TI-130)
		• Verify PZR level is being maintained at the program value
		• Inform US letdown orifices swapped

	US	• Acknowledge report • Notify SM letdown orifices swapped from 1B to 1C
		NOTE: After the actions for swapping letdown orifices are complete and with lead examiners concurrence, enter next event

Comments: _____

Scenario No: **NRC 06-1** Event No. 2		
Event Description: SG PORV 1MS018A inoperable		
Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator S/G 1A PORV TROUBLE (1-15-A10). • SER 0252, 1A PORV HYDRAULIC FLUID RESERVOIR LOW. • SER 0253, S/G PORV 1A ACCUMULATOR PRESSURE LOW.
	BOP	• Identify/report trouble alarm on 1MS018A • Refer to BwAR 1-15-A10 • Dispatch operator to 1MS018A o Place 1MS018A C/S in close to stop hydraulic pump o Request Equipment Status Tag for 1MS018A
	RO	o Assist US & BOP o Refer to BwARs o Dispatch operators o Refer to Tech Specs o Inform SM of 1MS018A failure
	US	• Identify entry conditions for TS 3.7.4, condition A. • Identify entry conditions for TS 3.6.3, condition C o Direct operator to close 1MS019A.
	US	o Inform SM of 1MS018A status, TS Status, request IR, On Line Risk Assessment, maintenance support, and clearance order/EST for 1MS019A.
		NOTE: After the actions for 1MS018A failure are complete and with lead examiners concurrence, enter next event

Comments: _____

Scenario No: **NRC 06-1** Event No. 3		
Event Description:	Turbine Impulse Pressure Channel 1PT-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
	RO	• Recognizes 1PT-505 has failed low • Report failure to US o Place rod control in manual o Refer to BwAR 1-14-D1
	BOP	o Verifies turbine load not lowering
	CREW	• Identify entry conditions for 1BwOA INST-2, "OPERATION WITH A FAILED 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 D "TURBINE IMPULSE PRESSURE CHANNEL FAILURE" and direct operator actions of 1BwOA INST -2 to establish the following conditions. • Direct RO to place rod control in manual
	BOP	• Restore steam dumps • C-7 NOT lit • Place 1PK-507 in manual • Lower 1PK-507 demand to 0% • Place steam dump mode select switch to STM PRESS mode • Place 1PK-507 in auto
	RO/ BOP	• Defeat 1PT-505 • Place 1PS505Z, Turbine Impulse Pressure Defeat Switch, to DEFEAT 505
	US	• Perform pre-job brief per HU-AA-1211 for bistable tripping • Complete 1BwOL 3.3.1, Attachment A, "INSTRUMENT CONDITION TRACKING LOG"

Comments: _____

Scenario No: **NRC 06-1**		Event No. 3
Event Description:		Turbine Impulse Pressure Channel 1PT-505 failed low
Time	Position	Applicant's Actions or Behavior
	Extra NSO/ BOP	• Locally trip bistable for 1PT-505 P13 input or P7/BOP verifies correct bistable operation • PB505A C1-742 BS-1

	US/RO	• Check if rod control can be placed in auto
		  o C5 NOT lit
		  o Tave/Tref stable and within 1°F.
		o If control rods need to be adjusted to restore Tave – Tref within 1°F, perform the following:
		  o Conduct reactivity brief for restoring control rods per OP-AA-300-1004, Reactivity Change Determination Form
		  o Obtain SM concurrence to reactivity change
		  o Adjust Tave – Tref within 1°F using control rods
		• Place Rod control in auto

	Extra NSO/ BOP	• Check status of AMS system/ BOP verifies correct bistable operation
		  • Operating Bypass switch in OFF
		  • Place Operating Bypass switch to TIP-1
		  • Place Operating Bypass Input to TEST-TRIP

	RO/ BOP	• Check P13 interlock • Turbine power > 10% - P13 NOT lit
	US	• Determine TS 3.3.1 conditions A and P are applicable. • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure and rod control malfunction
		The next event is to be inserted following the above actions by the US and Lead Examiner concurrence.

Comments: _____

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Scenario No: **NRC 06-1** Event No. 4		
Event Description: 1B Heater Drain Pump trip		
Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator HD PUMP TRIP (1-17-D2) • HD Tank level rising • HD Pump discharge valves opening
	BOP	• Recognizes 1B HD pump tripped o Refer to BwAR 1-17-D2 • Reports failure to US • Recognizes one Heater Drain Pump running
	CREW	• Identify entry conditions for 1BwOA SEC-1, "SECONDARY PUMP TRIP"
	US	• Acknowledge 1B HD pump trip • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct failure • 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.

	BOP	• Recognizes standby HD pump NOT AVAILABLE
		• Check HD pump status
		  • ONLY 1C HD pump running
		  • Initiate turbine load reduction to 780MW at 20 MW/min
		  • Depress LOAD RATE MW/MIN
		  • Enter desired load rate (20 MW/min)
		  • Depress REF
		  • Enter desired MW on REFERENCE DEMAND Window (780 MW)
		  • Depress GO pushbutton
		  • Verify turbine load lowering

Comments: _____

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Scenario No: **NRC 06-1** Event No. 4		
Event Description: 1B Heater Drain Pump trip		
Time	Position	Applicant's Actions or Behavior

	BOP	• Check HD Tank level
		  • Level > 72% and rising
		  • Maintain HD tank level
		  o Verify 1HD046A &B in AUTO
		  o Open 1CB113A-D
		  o Manually open 1HD117, HD tank overflow valve
		  o Lower turbine load as necessary to maintain HD tank level <72%
		• Check 1HD117, HD tank overflow valve in auto and closed
		  o Lower turbine load as necessary to close 1HD117
		• Check 1C HD pump parameters
		• 1C HD pump amps < 168 amps
		• 1C HD pump flow < 2950 KLB/HR
		  o Lower turbine load as necessary to restore 1C HD pump parameters

	US/RO	• Check PDMS operable
		  • Annunciator PDMS INOPERABLE not lit (1-10-E8)
		  • 1BwOS PDMS-1A not implemented
		  • Annunciator PDMS LIMIT EXCEEDED not lit (1-10-D7)

	RO	• Control ΔI near target
		  • Operate control rods in manual to restore ΔI near target
		• Monitor RCS parameters
		  o If RCS pressure lowers < 2209 psig, notify US to enter TS 3.4.1, RCS DNB Limits
		  o If control rods < low – 2 rod insertion limit, notify US to enter TS 3.1.6, Control Bank Insertion Limits

Comments: _____

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Scenario No: **NRC 06-1**		Event No. 4
Event Description:		1B Heater Drain Pump trip
Time	Position	Applicant's Actions or Behavior
	RO	• Initiate RCS boration • Determine required boric acid volume (approximate band: 50 gal – 300 gal) o Perform boration boundary calculation per 1BwGP 100-4T2 o Determine from ReMa • Determine desired boric acid flow rate • Set 1FK-110 BA Flow Control to desired boration rate • Set 1FY-0110 BA Blender Predet Counter to desired volume. • Place MAKE-UP MODE CONT SWITCH to STOP position • Place MODE SELECT SWITCH to BORATE position • Place MAKE-UP MODE CONT SWITCH to START • Verify proper operation of valves and BA transfer pump (1CV110B open, Boric Acid Transfer Pump running, 1CV110A throttles open, proper BA flow indicated on recorder). o Turn on PZR backup heaters 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	• Verify running CB pump recirc valves in auto • 1CB113A-D on running pumps • Dispatch operators to perform BwOP HD-2 for 1B HD pump • Shutdown CD/CB pump (if started during procedure performance)

Comments: _____

Scenario No: **NRC 06-1**		Event No. 4
Event Description:		1B Heater Drain Pump trip
Time	Position	Applicant's Actions or Behavior
	US	• Notify chemistry to monitor secondary plant chemistry • Notify SM to perform risk assessment • Check reactor power change > 15% in one hour o Notify chemistry to perform TS 3.4.16 sampling o Notify rad protection to perform RETS 12.4.1.A sampling o Refer to BwOP FW-26 to evaluate FW venturi fouling o Determine TS 3.1.6, condition A entry required if control rods below low – 2 rod insertion limit
		The next event (SGTR) is to be inserted following the above actions by the US and Lead Examiner concurrence.

Comments: _____

Scenario No: **NRC 06-1**		Event No. 5, 6, & 7
Event Description:		1A SGTR (450 gpm), 1A CV pump trips/1B CV pump fails to auto start, Faulted ruptured 1A SG
Time	Position	Applicant's Actions or Behavior
	CUE	o Annunciator CHARGING LINE FLOW HIGH LOW (1-9-D3) • RM-11 Rad Monitor ALERT/HI RAD Alarms o 1PR08J SG Blowdown o 1PR27J SJAE/GS o 1AR 22/23B & 1AR22/23C, 1B & 1C Main steam line • PZR pressure lowering in an uncontrolled manner • Inability to maintain > 17% PZR level o Level rise/FW flow drop noted on 1A S/G
		Examiners Note: Crew may elect to initially go to 1BwOA SEC-8, 'STEAM GENERATOR TUBE LEAK'. Either flowpath should result in the crew manually tripping the reactor. ***Actions for 1BwOA SEC-8 are in italics below:***
	CREW	• *Transitions to 1BwOA SEC-8 based on entry symptoms*
	US	• *Notify SM of plant status and procedure entry* • *Request evaluation of Emergency Plan conditions* • *Enter/Implement 1BwOA SEC-1 and direct operator actions to establish the following conditions:*
	RO	• *Throttle 1CV121 and 1CV182 to attempt to maintain PZR level* • *Check PZR level NOT stable or rising* • *Establish 75 gpm letdown* • *Recognize PZR level CANNOT be maintained > 17%* • *Notify US for concurrence and initiate a manual reactor trip*
	CREW	• Initiate a manual reactor trip and transition to 1BwEP-0 • Initiate a manual SI
	US	• Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions • Enter/Implement 1BwEP-0 and direct operator actions of 1BwEP-0

Comments: _____

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Scenario No: **NRC 06-1**		Event No. 5 & 7
Event Description:		1A SGTR (450 gpm), Faulted ruptured 1A SG
Time	Position	Applicant's Actions or Behavior

	RO	Perform immediate operator actions of 1BwEP-0:
		• Verify reactor trip
		  • Rod bottom lights - ALL LIT
		  • Reactor trip & Bypass breakers - OPEN
		  • Neutron flux - DROPPING

	BOP	Perform immediate operator actions of 1BwEP-0:
		• Verify Turbine Trip
		  • All Turbine throttle valves - CLOSED
		  • All Turbine governor valves - CLOSED

	BOP	Perform immediate operator actions of 1BwEP-0: • Verify power to 4KV busses • ESF Buses – BOTH ENERGIZED (141 & 142)

	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:
		  • PZR pressure cannot be maintained > 1829 psig
		  • PZR level cannot be maintained > 4%
		• Manually actuate SI

	CREW	• Check SI Status
		  o SI First OUT annunciator - LIT
		  o SI ACTUATED Permissive Light - LIT
		  o SI Equipment – AUTOMATICALLY ACTUATED
		  o Either SI pumps - RUNNING
		  o Either CV pump to cold leg isolation valve OPEN – 1SI8801A/B

	BOP	• Verify FW isolated
		  • FW pumps - TRIPPED
		  • Isolation monitor lights - LIT
		  • FW pumps discharge valves - CLOSED (or going closed) 1FW002A-C

Comments: _____

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Scenario No: **NRC 06-1**		Event No. 5 & 7
Event Description:		1A SGTR (450 gpm), Faulted ruptured 1A SG
Time	Position	Applicant's Actions or Behavior

	RO/ BOP **[CT] E-0--I**	• Verify ECCS pumps running
		  • CV pumps - NONE RUNNING
		  • Manually start the 1B CV pump prior to completion step 6 of 1BwEP-0.
		  • Both RH pumps - RUNNING
		  • Both SI pumps - RUNNING

	BOP	• Verify RCFCs running in Accident Mode
		  • Group 2 RCFC Accident Mode lights - LIT
		• Verify Phase A isolation
		  • Group 3 Cnmt Isol monitor lights - LIT
		• Verify Cnmt Vent isolation
		  • Group 6 Cnmt Vent Isol monitor lights - LIT
		• Verify AF system:
		  • AF pumps – BOTH RUNNING
		  • AF isolation valves – OPEN
		  • 1AF13A-H
		  • AF flow control valves - THROTTLED
		  • 1AF005A-H
		• Verify CC pumps – BOTH RUNNING
		• Verify SX pumps- -1A SX pump RUNNING

	RO/ BOP	• Check Main Steamline Isolation not required
		  • Check pressures
		  o SG pressures > 640 psig – continue on in 1BwEP-0
		  o SG pressures < 640 psig - verify MSIVs and MSIV bypass valves closed
		  • CNMT pressure < 8.2 psig

	BOP	• Check CS not required • CNMT pressure remained < 20 psig

Comments: _____

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Scenario No: **NRC 06-1**		Event No. 5 & 7
Event Description:		1A SGTR (450 gpm), Faulted ruptured 1A SG
Time	Position	Applicant's Actions or Behavior
	BOP/ RO	• Verify Total AF flow: • AF flow > 500 gpm • SG levels maintained between 10% and 50% • Check status of S/G NR levels o 1A S/G level rising in an uncontrolled manner • Close 1AF013A & E
	RO/ BOP	• Verify ECCS valve alignment • Group 2 Cold Leg Injection monitor lights required for injection – LIT • Verify ECCS flow • High Head SI flow >100 gpm (1FI-917) o RCS pressure < 1700 psig o SI pump discharge flow > 200 gpm
	RO	• Check at least ONE PZR PORV relief path available: • PORV isolation valves – ENERGIZED • PORV relief paths – PORVs in AUTO, PORV isolation valves OPEN
	BOP	• Verify Generator Trip • OCB 1-8 and 7-8 open • PMG output breaker open
	BOP	• Verify DGs running • Both DGs RUNNING • 1SX169A/B OPEN • Dispatch operator locally to check operation

Comments: _____

Scenario No: **NRC 06-1**		Event No. 5 & 7
Event Description:		1A SGTR (450 gpm), Faulted ruptured 1A SG
Time	Position	Applicant's Actions or Behavior
		Examiners note: US and RO will likely continue in 1BwEP-0 while BOP is performing the next 3 ventilation steps:

	BOP	• Verify Control Room ventilation aligned for emergency operations:
		  • VC Rad Monitors – LESS THAN HIGH ALARM SETPOINT
		  • Operating VC train equipment - RUNNING
		  • 0B Supply fan
		  • 0B Return fan
		  • 0B M/U fan
		  • 0B Chilled water pump
		  • 0B Chiller
		  • Operating VC train dampers - ALIGNED
		  • M/U fan outlet damper – 0VC08Y NOT FULLY CLOSED
		  • 0B VC train M/U filter light - LIT
		  • 0VC09Y OPEN
		  • 0VC313Y CLOSED
		  • Operating VC train Charcoal Absorber aligned for train B
		  • 0VC44Y CLOSED
		  • 0VC05Y OPEN
		  • 0VC06Y OPEN
		  • Control Room pressure greater than +0.125 inches water on 0PDI-VC038

	BOP	• Verify Auxiliary Building ventilation aligned
		  • Two inaccessible filter plenums aligned
		  • Plenum A
		  • 0VA03CB - RUNNING
		  • 0VA023Y - OPEN
		  • 0VA436Y - CLOSED
		  • Plenum C
		  • 0VA03CF RUNNING
		  • 0VA072Y - OPEN
		  • Damper 0VA438Y - CLOSED

Comments: _____

Scenario No: **NRC 06-1**		Event No. 5 & 7
Event Description:		1A SGTR (450 gpm), Faulted ruptured 1A SG.
Time	Position	Applicant's Actions or Behavior
	BOP	• Verify FHB ventilation aligned • 0VA04CB - RUNNING • 0VA055Y - OPEN • 0VA062Y - OPEN • 0VA435Y - CLOSED
	RO	• Check PZR sprays & PORVs • Normal spray valves - CLOSED • PORVs - CLOSED
	RO	• Maintain RCS temperature control • Check RCPs - RUNNING • Verify RCS average temperature stable at or trending to 557°F o Throttle AF flow
	RO	• Check status of RCPs • All RCPs - RUNNING • Check RCP trip criteria o RCS pressure > 1425 psig – continue on in 1BwEP-0 o RCS pressure < 1425 psig • Verify high head injection flow (1FI-917) > 100 gpm • Trip all RCPs
	BOP/ RO	• Check if SG secondary pressure boundaries are intact: • Check pressure in all SGs: • 1A SG pressure decreasing in an uncontrolled manner
	CREW	• Transition to 1BwEP-2, 'FAULTED STEAM GENERATOR ISOLATION'

Comments: _____

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Scenario No: **NRC 06-1**		Event No. 5 & 7
Event Description:		1A SGTR (450 gpm), Faulted ruptured 1A SG
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 • Enter/Implement 1BwEP-2 and direct operator actions of 1BwEP–2 to establish the following conditions
	BOP	• Check MS isolation • All MSIVs and bypass valves - CLOSED
	BOP	• Check if any SG secondary pressure boundary is intact • 1B, 1C, & 1D SG pressures stable

	CREW	• Identify faulted SG
		  • 1A SG pressure decreasing in an uncontrolled manner
		  • 1A SG indicates steam flow with MSIVs and MSIV bypass valve closed

	RO/ BOP **[CT] E-2--A**	• Isolate 1A Steam Generator prior to completing step 4 of 1BwEP-2.
		  o Close 1AF013A & D – may have already be closed at step 15 of 1BwEP-0
		  • Top row of FW isolation monitor lights – lit
		  • 1MS018A closed
		  • 1SD002A & B closed
		  • 1SD005A closed

	BOP	• Monitor AF pump suction pressure • Annunciator AF PUMP SX SUCTION VLVS ARMED (1-3-E7) – NOT LIT

	CREW	• Determine 1A S/G tubes are NOT intact:
		  • RM-11 or HMI Rad Monitor ALERT/HI RAD Alarms
		  o 1PR08J SG Blowdown
		  o 1PR27J SJAE/GS
		  o 1AR 22/23A 1A Main steam Line

	CREW	Transition to 1BwEP-3, 'STEAM GENERATOR TUBE RUPTURE'

Comments: _____

Scenario No: **NRC 06-1**		Event No. 5 & 7
Event Description:		1A SGTR (450 gpm), Faulted ruptured 1A SG
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 • Enter/Implement 1BwEP-3 and direct operator actions of 1BwEP–3 to establish the following conditions
	RO	• Check Status of RCPs: • RCPs – NONE running – should have been tripped earlier when RCP trip criteria met

	BOP	• Identify ruptured SG 1A
		  o 1A Main steam line rad monitor ABNORMAL for plant conditions
		• Isolate ruptured SG
		  • 1MS018A inoperable due to hydraulic leak
		  • Verify 1SD002A & B CLOSED
		  • Verify MSIVs and MSIV bypass valves for 1A SG
		• Check PORVs on intact (1B, 1C, & 1D) SGs available for RCS cool down
		• Check ruptured SG level - Narrow Range < 10%
		  • Do not feed 1A SG per caution prior to step
		  o Verify/close 1AF013A & E - should have already be closed in 1BwEP-0 OR 1BwEP-2

	CREW	• Determine ruptured SG pressure < 320 psig
		Transition to 1BwCA-3.1, 'SGTR WITH LOSS OF REACTOR COOLANT, - SUBCOOLED RECOVERY DESIRED'
	US	• Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions • Request STA evaluation of status trees • Enter/Implement 1BwCA-3.1 and direct operator actions of 1BwCA-3.1EP–3 to establish the following conditions

Comments: _____

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Scenario No: **NRC 06-1**		Event No. 5 & 7
Event Description:		1A SGTR (450 gpm), Faulted ruptured 1A SG
Time	Position	Applicant's Actions or Behavior

	RO/BOP	• Reset SI
		  • Depress both SI reset pushbuttons
		  • Verify SI actuated permissive light – NOT LIT
		  • Verify auto SI blocked permissive light – LIT
		• Reset CNMT isolations
		  • Reset phase A isolation
		  • Check SAC – one running
		  • Open 1IA065 and 1IA066
		• Verify all AC buses energized
		  • All 4 KV ESF buses energized
		  • All 4KV non-ESF buses energized
		  • All 6.9 KV buses energized
		• Check is CS should be stopped
		• CS pumps – NONE running
		• Check ruptured SG level
		  • 1A SG NR level < 10% - do not feed 1A SG per caution prior to step
		• Check if RH pumps should be stopped
		  • 1SI8812A & B open
		  • RCS pressure > 325 psig and stable
		  • Stop both RH pumps and place in standby

		Note: At this point the scenario may be terminated

	US	• US to determine EAL at conclusion of scenario:
		  • Site Area Emergency FS1 – Loss of 2 Fission Product Barriers
		  • Loss of Containment (1.g).
		  • Primary to secondary leakage > 10 gpm AND unisolable release of secondary coolant form affected SG to environment
		  • Loss of RCS (3.e).
		  • Entry into 1BwEP-3 AND unisolable secondary line break resulting in radioactive release to environment from affected SG

Comments: _____

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Simulation Facility Braidwood

Scenario No.: Operating Test No. **2006301**
NRC 06-2

Examiners: _____ Applicant: _____ SRO

_____ _____ RO

_____ _____ BOP

Initial Conditions: IC-21

Turnover: Unit 1 is at 100% power, steady state, equilibrium xenon, MOL. Online risk is green. 1C CD/CB pump is OOS for an alignment and vibration problem. Expected back in service in one week. The CV Cation demin is scheduled to be placed on line for 30 minutes later in the shift.

Event No.	Malf. No.	Event Type*	Event Description
Preload	IMF RH01B IOR ZDI1CD05PC PTL IOR ZDI1CD05PCB PTL IOR ZDI1CB113C CLS		RHR pump 1B trip 1C CD/CB pump OOS 1C CD/CB AOP OOS 1CB113C OOS
1	None	N-BOP, US	1PR11J filter change (Tech Spec)
2	None	R-RO, US N-BOP	Power descension
3	IMF CV03	C-RO, US	Boric acid transfer pump trip
4	IMF ED11A	C-BOP, US	Loss of instrument bus 111 (Tech Spec)
5	IMF TH17B	C-RO, US	1B RCP degraded performance/locked rotor
6	IMF TH06B 540000	M-ALL	Large break RCS LOCA (1B RCS cold leg)
7	Preload	C-BOP	1B RH pump trip
8	Preload	C-BOP	1SI8811A fail to auto open

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

SCENARIO OVERVIEW

Unit 1 is at 100% power, steady state, equilibrium xenon, MOL. Online risk is green. 1C CD/CB pump is OOS for an alignment and vibration problem. Expected back in service in one week. The CV Cation demin is scheduled to be placed on line for 30 minutes later in the 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 five minutes later, the RP Technician will request restart of the 1PR11J skid. 1PR11J will be restarted. Per operations department standing order 05-006, LCO 3.4.15 will not be exited until 1.5 hours after filter change completion and monitor is operating normally for plant conditions.

After changing the 1PR11J filter, Transmission Systems Operations will request Unit 1 lower power to 850 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, the Unit 1 Boric Acid pump motor bearing will seize while the pump is running. MCC 133X3, cubicle A4 will open, causing a trip of the Unit 1 Boric Acid Transfer Pump. The crew will stop the load reduction and align the Unit 0 Boric Acid Transfer Pump to Unit 1 per BwOP AB-23, ALIGNMENT OF UNIT 0 BORIC ACID TRANSFER PUMP FOR UNIT ONE OR UNIT TWO DEMANDS.

After the Boric Acid Transfer Pump trip is addressed, Instrument Bus 111 will be damaged. The crew will implement 1BwOA ELEC-2, LOSS OF INSTRUMENT BUS, and determine Instrument Bus 111 cannot be reenergized and enter TS 3.8.9, condition A. The crew will perform 1BwOA INST-1, NUCLEAR INSTRUMENTATION MALFUNCTION, due to the loss of nuclear instrumentation.

After the instrument bus failure has been addressed, the 1B RCP rotor will degrade. LPMS alarms come in. Rotor degradation will cause RCS flow in the 1B loop to slowly lower until a reactor trip is required due to low RCS loop flow. RCP degradation will continue and the 1B RCP will dislodge components into the RCS, followed shortly by a large break LOCA in RCS loop 1B due to the dislodged RCP components. The crew will take actions per 1BwEP-0, RECTOR TRIP OR SAFETY INJECTION. Train A ESF equipment must be manually aligned due to the failure of Instrument Bus 111. 1B RH pump will trip when starting. The crew must manually start 1A RH pump to establish low head ECCS flow. The crew will transition to 1BwEP-1 after determining that the RCS is not intact. SR NI N32 will fail low due to the HELB inside containment. PANMs will be utilized to monitor SR level.

When the RWST level reaches the low-2 setpoint the crew will transition to 1BwEP ES-1.3, TRANSFER TO COLD LEG RECIRCULATION. Upon transition to 1BwEP ES-1.3, 1SI8811A will not automatically open due to the loss of Instrument Bus 111. The crew will align the 1A RH pump for cold leg recirculation per attachment A of 1BwEP ES-1.3 to ensure long term core cooling.

Completion criteria is performance of 1BwEP ES-1.3, step 8.

Critical Tasks

1. Manually start 1A RH pump prior to completion of step 6 of 1BwEP-0.
   (ERG Critical Task number - E-0--H) (K/A number – 000011EA1.13 importance - 4.1/4.2)

2. Align 1A RH Pump suction to the containment sump prior to completion of step 3 of 1BwEP ES-1.3.
   (ERG Critical Task number – ES-1.3--A) (K/A 011000EA1.11 Importance 4.2/4.2)

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, BOL, 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 1C CD/CB pump and 1C CD/CB pump aux oil pump C/S's in PTL.
- Place 1CB113C C/S in closed.
- Place CD/CB Pump Standby Selector C/S to OFF.
- Run **caep NRC 06-2 SETUP** from disk and verify the following actuate:
    - IMF RH01B
    - IOR ZDI1CD05PC PTL
    - IOR ZDI1CD05PCB PTL
    - IOR ZDI1CB113C CLS
- Place danger tags on 1C CD/CB pump, 1C CD/CD pump aux oil pump, and 1CB113C C/S's.
- Update PARAGON to reflect 1C CD/CB pump OOS.
- Set ΔI Target Curve slopes to –0.015 (-1.5%)
- 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.

Three 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.

Event 2: Power descension

As Transmission Systems Operations, contact the MCR by phone (TSO phone) and request Unit 1 lower power 200 MW at 3 MW/min due to grid demand.

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

Acknowledge as Transmission Systems Operations initiation of ramp.

Event 3: Boric acid transfer pump trip

Note: Ensure a boration is in progress prior to inserting the next malfunction.

Insert **IMF CV03**

If dispatched as NLO, report Unit 1 AB pump breaker 133X3 is tripped and does not appear to be damaged. If breaker re-closure is requested, report breaker is closed. DO NOT DELETE MALFUNCTION. If pump restart is attempted, report the breaker is open.

If dispatched as NLO, report the Unit 1 AB pump bearing is hot and appears to be damaged.

If contacted as Unit 2, report Unit 0 AB pump is NOT supplying Unit 2 demands and is NOT electrically aligned to Unit 2.

If dispatched as NLO, align the Unit 0 AB pump to Unit 1 demands per BwOP AB-23 as follows:

- Verify w/MCR U-1 makeup c/s is in STOP (BwOP AB-23, step F.1.b)
- Verify w/MCR AB pump 1 + 0 c/s is in PTL (BwOP AB-23, step F.1.c)
- Insert **IOR ZLO0AB03P ON**
- Wait approximately two minutes then perform the following:
  - Delete malfunction **DMF CV03**
- Report Unit 0 AB pump aligned for Unit 1 demands (BwOP AB-23 is complete up to step F.1.k)

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

Event 4: Loss of instrument bus 111

Insert **IMF ED11A** for loss of instrument bus 111.

When dispatched as NLO to instrument inverter 111, wait two minutes and report inverter appears normal, inverter output volts are 121 and amps at 0, and inverter output breaker open.

When dispatched as NSO to instrument bus 111, wait one minute and report instrument bus 111 has signs of arcing on cabinet. (X-2209)

When dispatched as NLO to fail air 1AF005A-D, wait approximately 5 minutes and perform the following:

- Perform first check at 1AF005A-D (364' P-10 Aux Bdg)
- IMF FW45A 100
- IMF FW45B 100
- IMF FW45C 100
- IMF FW45D 100

If lead examiner desires the N41 bistables tripped, participate in brief and perform the following:

- As assist NSO contact Unit 1 (X-2209)
- Insert the following:
  - MRF RP20 OPEN
  - MRF RX013 TRIP
  - MRF RX135 TRIP
  - MRF RP20 CLOSE

As SM, acknowledge the failure, LCO 3.3.1 condition A, D, & E entry and LCO 3.8.9 condition B entry, and requests for on line risk assessment **(COLOR)**, maintenance support, and IR initiation.

AT THE CONCLUSION OF THE SCENARIO, ENSURE THE FOLLOWING COMPUTER POINTS ARE TAKEN OUT OF TEST AND RETURNED TO SCAN: N0041, N0042, U1144, N0049A

Events 5: 1B RCP degraded performance/locked rotor

Run **caep NRC 06-2 EVENTS 5_6** from disk and verify the following actuate:

- IMF TH17B
- IMF PN1760 ON
- TRGSET 1 "ZLO52BRKA(2) = = 1"
- IMF TH16B (1 0)
- IMF TH06B (1 10) 540000 10

If dispatched as NSO to LPMS panel 1PA44J, report LPMS high alarms on 1VE-LM008, cold side SG B channel head (first out) and 1VE-LM003, reactor bottom H-13. Report metallic impact noises heard on both channels. Report tapes will be allowed to run per BwOP LM-6.

Event 6: Large break LOCA (1A RCS cold leg)

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

After STA requested, as STA report CSF status:

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

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

Event 7: 1B RH pump trip

If dispatched as NLO to investigate 1B RH pump, report ground overcurrent flag at breaker cubicle.

Event 8: 1SI8811A fail to auto open

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

After STA requested, as STA report CSF status:

AT THE CONCLUSION OF THE SCENARIO, ENSURE THE FOLLOWING COMPUTER POINTS ARE TAKEN OUT OF TEST AND RETURNED TO SCAN: N0041, N0042, U1144, N0049A

Scenario No: **NRC 06-2** Event No. 1		
Event Description: 1PR11J filter change		
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 RADIATION MONITOR OPERATIONS
		• Notify US of 1PR11J filter change request
		• Secure 1PR11J
		  • Select Grid 2 on RM-11
		  • Select 1PR11J
		  • Depress flow button to secure 1PR11J.

	US	• Recognize entry conditions for TS LCO 3.4.15, condition B. o Inform SM of TS 3.4.15 entry
	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
		  • Depress flow button to start 1PR11J
		  • Verify flow indicated on 1PR11J
		• Notify US of completion of 1PR11J filter change

		NOTE: LCO 3.4.15 should NOT be exited following completion of 1PR11J filter change. Per operations department standing order 05-006, LCO 3.4.15 will not be exited until 1.5 hours after filter change completion and monitor is operating normally for plant conditions.

Comments: _____

Scenario No: **NRC 06-2**		Event No. 2
Event Description:		200 MW power reduction at 3 Mw/min
Time	Position	Applicant's Actions or Behavior
	CUE	o Call from Transmission System Operations to lower power 200 MW at 3 Mw/min.
	US	• Acknowledge request to lower power 200 MW at 3 Mw/min. • Implement actions of 1BwGP 100-4
	US	• Direct load reduction of 200 MW at 3 Mw/min. • Initiate load swing instruction sheet, 1BwGP 100-4T2 o Perform pre-job brief per HU-AA-1211 "PRE-JOB, HEIGHTENED LEVEL OF AWARENESS, INFREQUENT PLANT ACTIVITY, AND POST JOB BRIEFINGS" for load ramp.
	CREW	Review applicable Precautions, Limitations and Actions of 1BwGP 100-4

	RO	• Verify rod position and boron concentration
		• Initiate boration, if required. (BwOP CV-6) (approximate band: 500 gal – 750 gal)
		• Determine required boric acid volume.
		  o Perform boration boundary calculation per 1BwGP 100-4T2
		  o Refer to operator aid for ramp
		• Determine desired boric acid flow rate
		• Set 1FK-110 BA Flow Control to desired boration rate
		• Set 1FY-0110 BA Blender Predet Counter to desired volume.
		• Place MAKE-UP MODE CONT SWITCH to STOP position
		• Place MODE SELECT SWITCH to BORATE position
		• Place MAKE-UP MODE CONT SWITCH to START
		• Verify proper operation of valves and BA transfer pump (1CV110B open, Boric Acid Transfer Pump running, 1CV110A throttles open, proper BA flow indicated on recorder).
		o Turn on PZR backup heaters
		
		OR

Comments: _____

Scenario No: **NRC 06-2** Event No. 2		
Event Description:	200 MW power reduction at 3 Mw/min	
Time	Position	Applicant's Actions or Behavior
	RO	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	• Initiate turbine load reduction:
		  • Depress LOAD RATE MW/MIN
		  • Enter desired load rate (3 MW/min)
		  • Depress REF
		  • Enter desired MW on REFERENCE DEMAND Window (850 MW)
		  • When ready to begin load reduction, depress GO
		  • Verify load reduction occurring

	RO/ BOP	• Monitor reactor power and load reduction
		  • Monitor NI's, Tave, ΔI, Pzr press/level
		  • Monitor MWe, Turb loading, EHC

	RO	• Perform Boration:
		  • Monitor VCT Level and pressure
		  • Verify RCS boron concentration increasing
		  • Monitor BA blender counter
		  • Verify boration stops at preset value
		  • Verify boration auto stops at preset value.
		  • Return Reactor Makeup System to automatic at current boron concentration.

		After a measurable response and with lead examiners concurrence initiate the next event:

Comments: _____

Scenario No: **NRC 06-2** Event No. 3		
Event Description: Boric acid transfer pump trip		
Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator BA XFER PUMP TRIP (1-9-A4) • Trip/yellow disagreement light on Boric Acid Transfer pump 1 + 0 C/S
	RO	• Identify/report trip of Unit 1 Boric Acid Transfer pump • Refer to BwAR 1-9-A4 • Dispatch operator to Unit 1 Boric Acid Transfer pump and breaker
	US	• Notify SM of Unit 1 Boric Acid Transfer pump trip. • Direct operators to align the Unit 0 Boric Acid Transfer pump for Unit 1 demand o Direct BOP to stop load ramp
	BOP	o Stop turbine load ramp o Depress DEHC HOLD pushbutton o Assist US & RO o Refer to BwARs o Dispatch operators o Refer to BwOP AB-23
	RO	• Determine Unit 1 Boric Acid Transfer pump bearing is damaged • Report from NLO • Align 0AB03P, Boric Acid Transfer pump 0 for Unit 1 demands per BwOP AB-23 • Verify 0AB03P NOT supplying Unit 2 boric acid demands • Verify 0AB03P NOT connected to Unit 2 power supply • MAKE-UP MODE CONT SWITCH to STOP • Place Boric Acid Transfer pump 1 + 0 C/S in PULL OUT • Dispatch operator to align 0AB03P to Unit 1 per BwOP AB-23 • Verify 1CV110A in AUTO • Place Boric Acid Transfer pump 1 + 0 C/S in AFTER TRIP • Return Unit 1 RMCS to AUTO
	US	• Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct component.
		NOTE: After the actions for boric acid pump trip are complete and with lead examiners concurrence, enter next event

Comments: _____

Scenario No: **NRC 06-2** Event No. 4		
Event Description: Loss of instrument bus 111		
Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator BUS 111 INVERTER TROUBLE (1-4-A5) • Annunciator PROCESS I & C CAB PWR SUP FAILURE (1-4-A3) • Annunciator SOLID STATE PROT CAB GENERAL WARNING (1-4-B3) • Annunciator SEQUENCING CAB PWR FAILURE (1-4-C2) • Annunciator RCP BUS UNDERVOLTAGE (1-13-A2) • Loss of control and instrument power to: • N31 Source Range Instrument • N35 Intermediate Range Instrument • N41 Power Range Instrument
	RO/ BOP	• Determine instrument bus 111 deenergized • Reference BwARs
	CREW	• Identify entry conditions for 1BwOA ELEC-2, "LOSS OF INSTRUMENT BUS" • Dispatch operators to investigate status of inverter and instrument bus
		Examiners note: Loss of instrument bus 111 will require the crew to implement 1BwOA INST-1, NUCLEAR INSTRUMENTATION MALFUNCTION. See page 12 for 1BwOA INST-1 actions.
	US	• Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions • Enter/Implement 1BwOA ELEC-2 "LOSS OF INSTRUMENT BUS" and direct operator actions of 1BwOA ELEC-2 to establish the following conditions. o Direct BOP/RO to stop load ramp/boration
	RO/ BOP	o Stop turbine load ramp o Depress DEHC HOLD pushbutton • Check control channels • PZR pressure/level • T_{AVE}/Delta T • P_{IMP} • SG level, steam flow & feed flow

Comments: _____

Scenario No: **NRC 06-2** Event No. 4		
Event Description: Loss of instrument bus 111		
Time	Position	Applicant's Actions or Behavior

	BOP	• Dispatch operator to locally energize affected instrument bus
		  • Determine Instrument Bus 111 DAMAGED
		  • Determine Instrument Bus 111 DEAD
		• Do NOT attempt to energize Instrument Bus 111 from the CVT

	BOP	• Verify RH train 1A NOT operating in shutdown cooling mode
	CREW	• Dispatch operator to locally fail open 1AF005A – D
	US	• Refer to Table A for expected equipment failures • Identify entry conditions for 1BwOA INST-1, "NUCLEAR INSTRUMENTATION MALFUNCTION" • Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions • Enter/Implement 1BwOA ELEC-2 "LOSS OF INSTRUMENT BUS" and direct operator actions of 1BwOA ELEC-2 to establish the following conditions.
	RO	• Place rod control in manual • Check for PR flux high rod stop
	BOP	• Place rod stop bypass switch for N41 in bypass
	RO	• Check Tave – Tref stable and within 1°F o Restore Tave – Tref within 1°F using control rods, turbine load, or RCS boron adjustment
	RO/ BOP	• Check SG levels normal and stable

	BOP	• Bypass associated functions for PR N41
		  • Upper current comparator
		  • Lower current comparator
		  • Power mismatch
		  o Rod stop
		  • Channel current comparator

Comments: _____

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Scenario No: **NRC 06-2** Event No. 5		
Event Description: 1B RCP degraded performance/locked rotor		
Time	Position	Applicant's Actions or Behavior

	RO/ BOP	• Place computer points in test
		  • N0041
		  • N0042
		  • U1144
		• Place computer point N0049A in removed from scan

	RO/ BOP	• Trip bistables for N41 by removing PR N41 control power fuses.
		  • NC41P
		  • NC41R
		  • NC41U

	US	• Perform pre-job brief per HU-AA-1211 for bistable tripping • Complete 1BwOL 3.3.1, Attachment A, "INSTRUMENT CONDITION TRACKING LOG"

	Extra NSO/ RO	• Locally trip bistables for 1D Loop by placing in TEST/ RO verifies correct bistable operation
		  • TB441C C4-124 BS-3
		  • TB441D C4-124 BS-4

	RO	• Select channel 1B, 1C or 1D to ΔT recorder • Check if rod control can be placed in automatic • C5 NOT lit • Tave – Tref stable within 1°F • Place rod bank select switch in auto
	US	o Determine TS 3.3.1 conditions A, D, and E are applicable • Determine Tech Spec 3.8.9, condition B applies • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct component failure
		The next event is to be inserted following the above actions by the US and Lead Examiner concurrence

Comments: _____

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Scenario No: **NRC 06-2** Event No. 5		
Event Description: 1B RCP degraded performance/locked rotor		
Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator LOOSE PARTS MONITORING SYSTEM TROUBLE (1-13-E9) • RCP 1B amps rising • RCS loop 1B flow lowering
	RO	• Refer to BwAR 1-9-A4 • Dispatch operator to 1PA44J • Identify/report degraded performance of 1B RCP
	US	• Notify SM of plant status • Direct operator to monitor 1B RCP performance • Determine 1B RCP degraded flow requires reactor trip
	CREW	• Initiate a manual reactor trip and transition to 1BwEP-0
	US	• Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions • Enter/Implement 1BwEP-0 and direct operator actions of 1BwEP-0

	RO	Perform immediate operator actions of 1BwEP-0:
		• Verify reactor trip
		  • Rod bottom lights - ALL LIT
		  • Reactor trip & Bypass breakers - OPEN
		  • Neutron flux - DROPPING

	BOP	Perform immediate operator actions of 1BwEP-0:
		• Verify Turbine Trip
		  • All Turbine throttle valves - CLOSED
		  • All Turbine governor valves - CLOSED

	BOP	Perform immediate operator actions of 1BwEP-0: • Verify power to 4KV busses • ESF Buses – BOTH ENERGIZED (141 & 142)

Comments: _____

Scenario No: **NRC 06-2**		Event No. 6 & 7
Event Description:		Large break RCS LOCA/1B RH pump trip
Time	Position	Applicant's Actions or Behavior
	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: • PZR pressure cannot be maintained > 1829 psig • PZR level cannot be maintained > 4% • Manually actuate SI
	CREW	• Check SI Status o SI First OUT annunciator - LIT o SI ACTUATED Permissive Light - LIT o SI Equipment – AUTOMATICALLY ACTUATED o Either SI pumps - RUNNING o Either CV pump to cold leg isolation valve OPEN – 1SI8801A/B
	RO	• Determine RCP trip required • CNMT phase B actuated • RCS pressure < 1425 psig • High head SI flow (1FI-917) > 100 gpm • Trip ALL RCPs
	BOP	• Verify FW isolated • FW pumps - TRIPPED • Isolation monitor lights - LIT • FW pumps discharge valves - CLOSED (or going closed) 1FW002A-C
	RO/ BOP **[CT] E-0--H**	• Verify ECCS pumps running • Both CV pumps – RUNNING • NEITHER RH pump – RUNNING • Manually start 1A RH pump prior to completion of step 6 of 1BwEP-0. o Place 1B RH pump in pull out • 1B SI pump – RUNNING • Manually start 1A SI pump

Comments: _____

Scenario No: **NRC 06-2**		Event No. 6 & 7
Event Description:		Large break RCS LOCA/1B RH pump trip
Time	Position	Applicant's Actions or Behavior

	BOP	• Verify RCFCs running in Accident Mode
		  • 1B & 1D RCFC Accident Mode lights - LIT
		  • 1A & 1C RCFC Accident Mode lights - NOT LIT
		  • Stop 1A & 1C high speed RCFCs
		  • Close 1SX112A and 1SX114A
		  • Verify/open 1SX147A
		  • Verify/open 1SX016A and 1SX027A
		  • Start 1A & 1C low speed RCFCs

	RO/ BOP	• Verify Phase A isolation
		  • Group 3 Cnmt Isol monitor lights – NOT ALL LIT
		  • Manually actuate Cnmt isol phase A
		  • Manually close Cnmt isol phase A valves
		  • 1CV8100 & 1CV8152
		  • 1WO006A, 1WO020A, & 1WO056B
		  • 1PR001A & 1PR066
		  • 1PS228A & 1PS228B
		  • 1IA065
		• Verify Cnmt Vent isolation
		  • Group 6 Cnmt Vent Isol monitor lights – ALL LIT
		• Verify AF system:
		  • AF pumps – 1B AF pump RUNNING
		  • Manually start 1A AF pump
		  • AF isolation valves – OPEN
		  • 1AF13A-H
		  • AF flow control valves – THROTTLED
		  • 1AF005A-D failed open – dispatch operator to locally control 1AF005A-D
		  • 1AF005E-H throttled
		• Verify CC pumps – BOTH RUNNING
		• Verify SX pumps - BOTH RUNNING
		• Main Steamline Isolation - required
		  • All S/G pressures > 640 psig
		  • CNMT pressure > 8.2 psig
		Verify MSIVs & MSIV bypass valves – CLOSED

Comments: _____

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Scenario No: **NRC 06-2**		Event No. 6 & 7
Event Description:		Large break RCS LOCA/1B RH pump trip
Time	Position	Applicant's Actions or Behavior
	BOP	• Check if CS is required • CNMT pressure has risen > 20 psig (CNMT pressure recorder in not available) • Stop ALL RCPs • Group 6 CS monitor lights – NOT ALL LIT • Manually actuate CS and phase B • Group 6 CS monitor lights – NOT ALL LIT • Go to 1BwEP-0, Attachment B, step 1 • 1CS001A/B – BOTH OPEN • 1CS007B – OPEN • Manually open 1CS007A • 1CS019B – OPEN • Place 1A CS pump test switch in TEST • Manually open 1CS019A • 1CS010A/B - BOTH OPEN • 1B CS pump running • Return to 1BwEP-0, step 14.d • Group 6 phase B lights – NOT ALL LIT • Manually close 1CC9413A, 1CC9416, & 1CC9438 • CS eductor suction flow - > 15 gpm on 1FI-CS014 • CS eductor additive flow - > 5 gpm on 1FI-CS016
	BOP/ RO	• Verify Total AF flow: • AF flow > 500 gpm • SG levels maintained between 10% (31%) and 50% • S/G NR levels – NOT rising in an uncontrolled manner
	RO	• Verify ECCS valve alignment • Determine Group 2 Cold Leg Injection monitor lights required for injection - NOT lit • Manually open • 1CV112D • 1SI8801A • Manually close • 1CV112B • 1CV8106

Comments: _____

Scenario No: **NRC 06-2**		Event No. 6 & 7
Event Description:		Large break RCS LOCA/1B RH pump trip
Time	Position	Applicant's Actions or Behavior

	RO/ BOP	• Verify ECCS flow
		  • High Head SI flow >100 gpm (1FI-917)
		  • RCS pressure < 1700 psig
		  • SI pumps discharge flow > 200 gpm
		  • RCS pressure < 325 psig
		  • 1A RH pump discharge flow > 1000 gpm

	RO	• Check at least ONE PZR PORV relief path available:
		  • PORV isol valves – BOTH ENERGIZED
		  • PORV relief path – BOTH PORVs in AUTO, 1RY8000A & B - OPEN

	BOP	• Verify Generator Trip
		  • OCB 1-8 and 7-8 open
		  • PMG output breaker open

	BOP	• Verify DGs running
		  • 1B DG RUNNING
		  • Manually start 1A DG
		  • 1SX169A/B OPEN
		  • Dispatch operator locally to check operation

		Examiners note: US and RO will likely continue in 1BwEP-0 while BOP is performing the next 3 ventilation steps:

Comments: _____

Scenario No: **NRC 06-2**		Event No. 6 & 7
Event Description:		Large break RCS LOCA/1B RH pump trip
Time	Position	Applicant's Actions or Behavior

	BOP	• Verify Control Room ventilation aligned for emergency operations:
		  • VC Rad Monitors – LESS THAN HIGH ALARM SETPOINT
		  • Operating VC train equipment - RUNNING
		  • 0B Supply fan
		  • 0B Return fan
		  • 0B M/U fan
		  • 0B Chilled water pump
		  • 0B Chiller
		  • Operating VC train dampers - ALIGNED
		  • M/U fan outlet damper – 0VC08Y NOT FULLY CLOSED
		  • 0B VC train M/U filter light - LIT
		  • 0VC09Y - OPEN
		  • 0VC313Y - CLOSED
		  • Operating VC train Charcoal Absorber aligned for train B
		  • 0VC44Y - CLOSED
		  • 0VC05Y - OPEN
		  • 0VC06Y - OPEN
		  • Control Room pressure greater than +0.125 inches water on 0PDI-VC038

	BOP	• Verify Auxiliary Building ventilation aligned
		  • Two inaccessible filter plenums aligned
		  • Plenum A
		  • 0VA03CB - RUNNING
		  • 0VA023Y - OPEN
		  • 0VA436Y - CLOSED
		  • Plenum C
		  • 0VA03CE RUNNING
		  • 0VA067Y - OPEN
		  • Damper 0VA052Y - CLOSED

	BOP	• Verify FHB ventilation aligned
		  • 0VA04CB - RUNNING
		  • 0VA055Y - OPEN
		  • 0VA062Y - OPEN
		  • 0VA435Y - CLOSED

Comments: _____

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Scenario No: **NRC 06-2** Event No. 6 & 7		
Event Description: Large break RCS LOCA/1B RH pump trip		
Time	Position	Applicant's Actions or Behavior
	RO	• Check PZR sprays & PORVs • Normal spray valves 1RY455B and 1RY455C - CLOSED • PORVs - CLOSED
	RO	• Maintain RCS temperature control • Check RCP's – NONE RUNNING • Verify RCS average temperature stable at or trending to 557°F • MSIVs closed
	RO	• Check status of RCP's • All RCP's – NONE RUNNING
	BOP/ RO	• Check if SG secondary pressure boundaries are intact: • Check pressure in all SGs: • None decreasing in an uncontrolled manner • None completely depressurized
	BOP/ RO	• Check S/G tubes are intact: • 1PR08J SG Blowdown • 1PR27J SJAE/GS • 1AR 22/23A-D Main steam Lines
	CREW	• Determine RCS in NOT intact • CNMT area rad monitors > alert alarm setpoint • CNMT pressure > 3.4 psig (1PI-CS934-937) • CNMT floor water level > 5 inches (1LI-PC006/007)
	CREW	Transition to 1BwEP-1, 'LOSS OF REACTOR OR SECONDARY COOLANT'
	US	• Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions • Request STA evaluation of status trees • Enter/Implement 1BwEP-1 and direct operator actions of 1BwEP–1 to establish the following conditions:
		Examiners note: When RWST level reaches the low-2 setpoint, the crew will transition to

Comments: _____

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Scenario No: **NRC 06-2**		Event No. 6 & 7
Event Description:		Large break RCS LOCA/1B RH pump trip
Time	Position	Applicant's Actions or Behavior
		1BwEP ES-1.3 to align ECCS for cold leg recirc. 1BwEP ES-1.3 actions begin on page 22.
	RO	• Check Status of RCPs: • RCPs – NONE RUNNING

	RO/ BOP	• Check if SG secondary pressure boundaries are intact:
		  • Check pressure in all SGs:
		  • None decreasing in an uncontrolled manner
		  • None completely depressurized
		• Check intact SG levels
		  • SG levels maintained between 10% (31%) and 50%
		  • SG NR levels – NOT rising in an uncontrolled manner
		• Check secondary radiation normal – RM-11 or HMI:
		  • 1PR08J SG Blowdown
		  • 1PR27J SJAE/GS
		  • 1AR 22/23A-D Main steam lines

	RO	• Check at least ONE PZR PORV relief path available:
		  • PORV isol valves – BOTH ENERGIZED
		  • PORV relief path – BOTH PORVs in AUTO, 1RY8000A & B - OPEN

	CREW	• Check if ECCS flow should be reduced
		  • RCS subcooling – NOT acceptable
		• Check if CS should be stopped
		  • 1B CS pump – RUNNING
		  • Reset CS
		  • Spray add tank lo-2 level light – NOT LIT
		  • CS termination requirements
		  • CNMT pressure < 15 psig
		  • Spray operating time < 2 hours
		• Check if RH pumps should be stopped
		  • Reset SI
		  • RH pumps suction aligned to RWST
		  • 1SI8812A & B – OPEN
		  • RCS pressure < 325 psig – go to 1BwEP-1, step 10.

Comments: _____

Scenario No: **NRC 06-2** Event No. 8		
Event Description: 1SI8811A fail to auto open.		
Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator RWST LEVEL LO-2 (1-6-B7) • RWST level <46%.
	CREW	Transition to 1BwEP ES-1.3, 'TRANSFER TO COLD LEG RECIRCULATION'
	US	• Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions • Request STA monitor status trees – BwFRs should not be implemented • Enter/Implement 1BwEP ES-1.3 and direct operator actions of 1BwEP ES-1.3 to establish the following conditions:

	RO/ BOP	• Establish CC flow to RH HXs
		  • 1CC9473A & B – OPEN
		  • CC pumps – TWO RUNNING
		  • Open 1CC 9412A & B
		  • CC to RH HX flows – 1FI-0689 & 1FI-0688 > 5000 gpm
		• Check CNMT floor level – 1LI-PC006 & 1LI-PC007 > 8 inches (13 inches)
		• Align RH pumps suction to CNMT sumps
		  • Place SVAG valve C/Ss to close
		  • Check RH pumps
		  • 1A RH pump – RUNNING
		  • 1B RH pump cannot be started
		• Check CNMT sump isolation valves
		  • 1SI8811B – OPEN
		  • 1SI8811A – CLOSED – go to attachment A, step 1.

Comments: _____

Scenario No: **NRC 06-2** Event No. 8		
Event Description: 1SI8811A fail to auto open		
Time	Position	Applicant's Actions or Behavior

	BOP/ RO
	
	[CT] ES-1.3--A
		• Check if 1A RH pump needs to be aligned to CNMT sump
		  • 1SI8811A – CLOSED
		• Check train A recirc flowpath from CNMT sump available
		  • 1A RH pump – RUNNING
		  • 1SI8811A – energized
		• Manually align 1A RH Pump suction to the containment sump prior to completion of step 3 of 1BwEP ES-1.3.
		  • Place 1A RH pump in PULL OUT
		  • Close 1SI8812A
		  • Place 1A CS pump in PULL OUT
		  • Close 1CS001A
		  • Open 1SI8811A
		  • Start 1A RH pump
		  • Open 1CS001A
		  • Cannot start 1A CS pump (due to loss of Instrument Bus 111)
		  o Manually actuate CS
		• Check if 1B RH pump needs to be aligned to CNMT sump
		  • 1SI8811B – OPEN
		  • Close 1SI8812B
		• Check at least one CNMT sump recirc flowpath established
		  • 1A RH pump - RUNNING
		  • 1SI8811A – OPEN
		  • 1B RH pump – NOT RUNNING
		• Return to 1BwEP ES-1.3, step 3.d

Comments: _____

Scenario No: **NRC 06-2**		Event No. 8
Event Description:		1SI8811A fail to auto open
Time	Position	Applicant's Actions or Behavior

	RO/ BOP	• Verify/close 1SI8812A & B
		• SI pumps – BOTH RUNNING
		• Align SI and CV pumps for cold leg recirc
		  • Verify/close 1CV8110, 1CV8111, 1CV8114, & 1CV8116
		  • Close 1SI8814, 1SI8813, & 1SI8920
		  • Close 1RH8716A & B
		  • Open 1SI8807A, 1SI8807B, & 1SI8924
		  • 1A RH pump – RUNNING
		  • Open 1CV8804A
		  • 1B RH pump – NOT RUNNING

	RO/ BOP	• CV pumps – BOTH RUNNING
		• SI pumps – BOTH RUNNING
		o Reset SI if necessary
		• Isolate RWST from SI and CV pumps
		  • 1CV8804A – OPEN
		  • Close 1SI8806
		  • Close 1CV112 D & E
		  • Dispatch operator to deenergize 1CV112D & E

		Note: At this point the scenario may be terminated

	US	• US to determine EAL at conclusion of scenario:
		  • Alert FA1
		  • Potential loss of RCS (3.d).
		  • Unisolable RCS leak > capacity of ONE centrifugal charging pump in the normal charging alignment.

Comments: _____

Simulation Facility Braidwood

Scenario No.: Operating Test No.: **2006301**
NRC 06-3

Examiners: _____ Applicant: _____ SRO

_____ _____ RO

_____ _____ BOP

Initial Conditions: IC-18

Turnover: Unit 1 is at 76% power, steady state, equilibrium xenon, MOL. Online risk is green. 1C RCFC is OOS for the past 20 hours for run time meter replacement. LCOAR 3.6.6, Condition C has been initiated. Expected back in service in 12 hours. 1B GC pump is OOS for motor bearing replacement for past 12 hours. Expected back in service in 5 days. 0BwOSR 3.7.10.1-2, Unit Common Control Room Ventilation (VC) Filtration Surveillance (B Train) is scheduled for later in the shift.

Event No.	Malf. No.	Event Type*	Event Description
Preload	IOR ZDI1VP01CCL PTL IOR ZDI1VP01CCH PTL ZDI1GC01PB PTL IMF RP02A IMF RP02B IMF FW48A IMF FW13C 25 0 IMF FW26C 2000 0 IOR ZLO1FW5302 ON IOR ZLO1SLFW530 OFF IOR ZLOMLB6315 OFF IOR ZDI1FW002B OPEN		1C RCFC OOS 1B GC pump OOS Reactor trip breaker A fails to open Reactor trip breaker B fails to open 1A AF pump fails to start 1FW009C fails 25% open 1FW530 fails partially open 1FW002B failed open
1	None	R-RO, US N-BOP	Power ascension
2	IOR ZDI1AF01PB PTL IOR ZLOAUXOIL OFF IOR ZLO1AF01PBC OFF	N-BOP, US	1B AF pump clearance order (Tech Spec)
3	IMF RX 21A 1700 30	I-RO, US	Pressurizer pressure channel 1PT-455 fails low (Tech Spec)
4	IMF RX04E 0 120	I-BOP, US	Feed flow channel 1FT-530 fails low
5	IOR ZDI1FW009C CLS	M-ALL	ATWS
6	IMF RD09 0	C-RO	Auto rod speed failed
7	IMF FW19C 3.5 30	M-ALL	1C FW line break inside containment
8	Preload	C-BOP	1A AF pump fails to auto start
9	Preload	C-BOP	FW isolation failure

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

SCENARIO OVERVIEW

Unit 1 is at 76% power, steady state, equilibrium xenon, MOL. Online risk is green. 1C RCFC is OOS for the past 20 hours for run time meter replacement. LCOAR 3.6.6, Condition C has been initiated. Expected back in service in 12 hours. 1B GC pump is OOS for motor bearing replacement for past 12 hours. Expected back in service in 5 days. 0BwOSR 3.7.10.1-2, Unit Common Control Room Ventilation (VC) Filtration Surveillance (B Train) is scheduled for later in the shift.

After completing shift turnover and relief, Transmission System Operations (TSO) will request Unit 1 raise power to full power at 0.6 MW/min. The crew will commence a power increase at 0.6 mw/min.

After a measurable change in power, the Work Execution Supervisor will bring a clearance order for the 1B AF pump to the Main Control Room. The crew will execute the MCR portion of the clearance order and enter Tech Spec 3.7.5, Condition A for the 1B AF pump. The 1B AF pump will remain unavailable for the remainder of the scenario.

After performing the clearance order for the 1B AF pump, the controlling PZR pressure channel 1PT-455 will fail low, the RO will identify the failure and take manual control of the PZR pressure master controller and 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 is addressed, Feed Flow channel 1FT-530A will fail low, resulting in indications of increased steam flow and opening of 1FW530, 1C S/G Feed Reg Valve to attempt to match feed flow with steam flow. The BOP will diagnose the failure and take manual control of 1FW530 to restore 1C SG level. The US will enter 1BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL-Attachment G.

After the Feed Flow channel has been addressed, a hydraulic leak will develop on 1FW009C, 1C SG FW Isolation Valve. The leak will continue and 1FW009C will fail to mid position and bind. A reactor trip will be required due to lowering 1C SG level. When a reactor trip signal is generated, the reactor will not trip. The resultant transient will cause a feed water line to break inside containment downstream of 1FW009C. When FW isolation actuates, 1FW530, 1C SG Feed Reg Valve, will not fully close and 1FW002B, 1B FW Pump Discharge Valve, will remain open, resulting in FW flow to the 1C SG when SG pressure lowers below the Condensate Booster pumps shutoff head. The 1B AF pump will not automatically start. The crew will take actions per 1BwFR-S.1, RESPONSE TO NUCLEAR GENERATION/ATWS. Automatic rod control will fail, and the RO will manually insert the control rods to add negative reactivity. The crew will manually start the 1A AF pump. The crew will close 1FW006C to isolate feedwater flow to the 1C SG. After completing actions of 1BwFR-S.1, the crew will transition to 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION.

Completion criteria is completion of step 27 of 1BwEP-0

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. Manually start the 1A AF pump prior to completion of step 3 of 1BwFR-S.1
   (ERG Critical Task number - FR-S.1--B) (K/A number – 000029EA1.15 importance – 4.1/3.9)

3. Isolate the 1C Steam Generator prior to completion of step 14 of 1BwFR-S.1.
   (ERG Critical Task number - E-2--A) (K/A number - 000040AA1.10 importance - 4.1/4.1)

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, 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).
- Run **caep NRC 06-3 SETUP** from disk and verify the following actuate:
    - IOR ZDI1VP01CCL PTL
    - IOR ZDI1VP01CCH PTL
    - IOR ZDI1GC01PB PTL
    - IMF RP02A
    - IMF RP02B
    - IMF FW48A
    - IMF FW13C 25 0
    - IMF FW26C 2000 0
    - IOR ZLO1FW5302 ON
    - IOR ZLO1SLFW530 OFF
    - IOR ZLOMLB6315 OFF
    - IOR ZDI1FW002B OPEN
- Place 1C RCFC high and low speed fans and 1B GC pump C/S's in PTL.
- Place danger tags on 1C RCFC high and low speed fans and 1B GC pump C/S's.
- Set ΔI Target Curve slopes to 0.06 (6%)
- Provide students with turnover sheets, 1BwOS NR-1, critical parameter sheet, load swing instruction sheets, and ReMa form.

Event 1: Power ascension

As Transmission System Operations, contact the MCR by phone (TSO phone) and request Unit 1 raise power to full power at 0.6 MW/min due to grid demand.

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

Acknowledge as Transmission System Operations initiation of ramp.

Event 2: 1B AF pump clearance order

As SM acknowledge the failure, LCO 3.7.5, condition A entry, and request for on line risk assessment.

As SM, inform US on line risk is yellow.

After operator places 1B AF pump C/S in PTL, insert the following to disable the 1B AF pump

- IOR ZDI1AF01PB PTL
- IOR ZLOAUXOIL OFF
- IOR ZLO1AF01PBC OFF

Event 3: Pressurizer pressure channel 1PT-455 fails low

Insert **IMF RX 21A 1700 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 **(COLOR)**, maintenance support, and IR initiation.

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
  - MRF RX032 TRIP
  - MRF RX034 TRIP
  - MRF RX035 TRIP
  - MRF RX033 TRIP
  - MRF RX013 TRIP
  - MRF RX135 TRIP
  - MRF RP20 CLOSE

Event 4: Feed flow channel 1FT-530 fails low

Insert **IMF RX04E 0 120**

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

Event 5: ATWS

Run **caep NRC 06-3 EVENTS 5_6** from disk and verify the following actuate:

- IOR ZDI1FW009C CLS
- IMF FW19C 3.5 30
- IMF RD09 0

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

- DMF RP02A
- DMF RP02B

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

- IRF RP01 TRIP
- IRF RP02 TRIP

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

Event 6: 1C FW line break inside containment

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

After STA requested, as STA report CSF status:

Event 7: 1A AF pump fails to auto start (preload)

Event 8: FW isolation failure (preload)

If dispatched as NLO to locally close 1FW002B, wait 5 minutes and report 1FW002B is mechanically bound open.

Scenario No: **NRC 06-3** Event No. 1		
Event Description: Raise power at 0.6 MW/min		
Time	Position	Applicant's Actions or Behavior
	CUE	o Call from Transmission System Operations to raise power to full power at 0.6 MW/min.
	US	• Acknowledge request to raise power • Implement actions of 1BwGP 100-3 o Perform pre-job brief per HU-AA-1211 "PRE-JOB, HEIGHTENED LEVEL OF AWARENESS, INFREQUENT PLANT ACTIVITY, AND POST JOB BRIEFINGS" for load ramp.
	US	• Direct raising load to full power at 0.6 MW/min. • Initiate load swing instruction sheet, 1BwGP 100-4T2.
	CREW	• Review applicable Precautions, and Limitations and Actions
	RO	• Verify rod position and boron concentration. • Perform dilution boundary calculation per 1BwGP 100-4T2 • Initiate dilution, if required (BwOP CV-5) • Determine required PW volume: (approximate band: 3000 gal – 4500 gal) o Braidwood Boration Dilution Tables • Determine required PW flow rate. • Set 1FK-111 PW Flow Cont to desired PW flow rate. • Set 1FY-0111 PW/Total Predet Counter to desired PW volume. • Place MAKE-UP CONT SWITCH to STOP position. • Set MODE SELECT to DIL/ALT DIL position. • Place MAKE-UP CONT Switch to START o 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) o Turn on PZR backup heaters OR

Comments: _____

Scenario No: **NRC 06-3** Event No. 1		
Event Description: Raise power at 0.6 MW/min		
Time	Position	Applicant's Actions or Behavior
		Batch addition of PW: • Open CV110B. • Open CV111A. When desired amount of primary water added: Batch addition of PW: • Open CV110B. • Open CV111A. • When desired amount of primary water added: Close CV111A. • Close CV110B.

	BOP	• Initiate turbine load increase:
		  • Depress LOAD RATE MW/MIN
		  • Enter desired load rate (0.6 MW/min)
		  • Depress REF
		  • Enter desired MW on REFERENCE DEMAND Window (1120 MW)
		  • When ready to begin load increase, depress GO
		  • Verify load increase occurring

	RO/
	BOP
		• Monitor reactor power and load increase:
		  • Monitor NI's, Tave, ΔI, Pzr press/level
		  • Monitor MWe, Turb loading, EHC
		
		• During dilution:
		  • Monitor VCT level
		  • Verify RCS boron concentration lowering
		  • Monitor PW/Total flow predet counter
		  • Verify dilution auto stops at preset value.
		  • Return Reactor Makeup System to automatic at current boron concentration.

		After measurable change in power and lead examiner approves, initiate the next event.

Comments: _____

Scenario No: **NRC 06-3**		Event No. 2
Event Description:		1B AF pump clearance order
Time	Position	Applicant's Actions or Behavior
	CUE	• Request from Work Control supervisor to place emergent C/O on 1B AF pump
	US	• Recognize entry conditions for TS LCO 3.7.5, condition A. • Inform SM of TS LCO 3.7.5 condition A entry and request risk assessment. • Direct RO & BOP to place C/O on 1B AF pump

	RO/ BOP	• Place 1B AF pump C/S in pull out
		  • Place danger tag on 1B AF pump C/S
		• Close 1AF17B
		  • Place danger tag on 1AF017B C/S
		• Close 1AF013E, G, & H
		• Place danger tags on 1AF013E, G, & H C/Ss
		• Notify US of completion of C/O placement

		NOTE: 1B AF pump will remain unavailable for remainder of scenario.

Comments: _____

Scenario No: **NRC 06-3** Event No. 3		
Event Description: Pressurizer pressure channel 1PT-455 fails low		
Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator PZR PRESS LOW RX TRIP STPT ALERT (1-12-A1) • Annunciator PZR PRESS LOW (1-12-B1) • Annunciator PZR PRESS CONT DEV LOW HTRS ON (1-12-C1) • Annunciator OTΔT HIGH ROD STOP C-3 (1-10-C5) • Annunciator OTΔT HIGH RX TRIP ALERT (1-14-B1) • PZR pressure indicators 1PRY456/457/458 rising o PZR spray valve demand lowering • Master PZR pressure controller demand lowering
	RO	• Identify/report failure of 1PT-455 • Take manual control to restore PZR pressure • Place 1PK-455A in manual and raise demand prior to PZR PORVs automatically opening • Refer to BwARs
	CREW	• Identify entry conditions for 1BwOA INST-2, "OPERATION WITH A FAILED INSTRUMENT CHANNEL"
	US	• Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions • Enter/Implement 1BwOA INST-2, "OPERATION WITH A FAILED INSTRUMENT CHANNEL", Attachment B "PRESSURIZER PRESSURE CHANNEL FAILURE" and direct operator actions of 1BwOA INST -2 to establish the following conditions. o Direct BOP/RO to stop load ramp/dilution
	RO	• Control PZR pressure in manual • Select operable PZR pressure channel • Place pressure control channel select switch to 457/458 position • Check PZR PORVs - CLOSED • Check PZR spray valves – NORMAL • Check PZR heaters – NORMAL

Comments: _____

Scenario No: **NRC 06-3**		Event No. 3
Event Description:		Pressurizer pressure channel 1PT-455 fails low
Time	Position	Applicant's Actions or Behavior

	RO	• Check PZR pressure control in auto
		  • PZR PORVs in auto
		  • PZR spray valves in auto
		  • Place Master PZR pressure controller in auto
		• Select operable channels to recorders
		  • PZR pressure recorder selected to CH456, CH457, or CH458
		  • Loop ΔT recorder selected to 1B, 1C, or 1D

	BOP	o Stop turbine load ramp
		  o Depress DEHC HOLD pushbutton
		o Assist US & RO
		  o Refer to BwARs
		  o Monitor plant instrumentation
		  o Refer to Tech Specs

	US	• Perform pre-job brief per HU-AA-1211 for bistable tripping • Complete 1BwOL 3.3.1, Attachment A, "INSTRUMENT CONDITION TRACKING LOG"

	Extra NSO/ BOP	• Locally trip bistables for 1PT-455/BOP verifies correct bistable operation
		  • PB455A C1-153 BS-1
		  • PB455C C1-153 BS-4
		  • PB455D C1-153 BS-3
		  • PB455B C1-153 BS-2
		  • TB411C C1-124 BS-3
		  • TB411D C1-124 BS-4
		• Check P11 interlock
		  • RCS pressure > 1930 psig – P11 NOT lit

	US	• Determine TS 3.3.1 conditions A, E, & K are applicable. • Determine TS 3.3.2 conditions A & D are applicable • Determine TS 3.3.4 condition A is applicable • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.
		The next event is to be inserted following the above actions by the US and Lead Examiner concurrence.

Comments: _____

Scenario No: **NRC 06-3** Event No. 4		
Event Description: Feed flow channel 1FT-530 fails low		
Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator SG 1C FLOW MISMATCH STM FLOW LOW (1-15-C3) • Annunciator SG 1C FLOW MISMATCH FW FLOW LOW (1-15-C4) • Annunciator SG 1C LEVEL DEVIATION HIGH/LOW (1-15-C9) • 1C SG NR levels rising • FW flow rising on 1FI-531
	BOP	• Identify/report failure of 1FT-530 • Take manual control to restore SG level • Place 1FK-530 in manual and lower demand prior to receiving P14 turbine trip/FW isolation. • Refer to BwARs
	CREW	• Identify entry conditions for 1BwOA INST-2, "OPERATION WITH A FAILED INSTRUMENT CHANNEL"
	US	• Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions • Enter/Implement 1BwOA INST-2, "OPERATION WITH A FAILED INSTRUMENT CHANNEL", Attachment G "FEEDWATER FLOW CHANNEL FAILURE" and direct operator actions of 1BwOA INST-2 to establish the following conditions. o Direct BOP/RO to stop load ramp/dilution

	BOP	o Stop turbine load ramp
		  o Depress DEHC HOLD pushbutton
		• Restore 1C SG level to 60%
		  • Control 1FW530 in manual
		• Select operable FW flow channel
		  • Place FW flow select switch to F-531 position
		• Establish automatic level control
		  • Place 1FK-530 in auto when SG level restored to normal
		• Check HD system operation
		  • 1HD046A & B position normal

Comments: _____

Scenario No: **NRC 06-3** Event No. 4		
Event Description: Feed flow channel 1FT-530 fails low		
Time	Position	Applicant's Actions or Behavior
	RO	o Monitor reactor power o Ensure correct response of rod control system o Assist US & BOP o Refer to BwARs o Monitor plant instrumentation
	US	• Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.
		• **The next event is to be inserted following the above actions by the US and Lead Examiner concurrence**

Comments: _____

Scenario No: **NRC 06-3**		Event No. 5 & 6
Event Description:		ATWS/1C FW line break inside containment
Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator FWIV NOT FULL OPEN (1-1-A4) (1-15-E7) • Annunciator FWIV HYD/PNEU PRESS LOW (1-1-B4) • SG 1C FLOW MISMATCH FW FLOW LOW (1-15-C4) • Annunciator SG 1C FLOW MISMATCH STM FLOW LOW (1-15-C3) • 1C SG NR levels lowering
	RO/ BOP	• Identify/report 1FW009C partial closure • Refer to BwARs
	US	• Notify SM of plant status • Direct operator to trip reactor
	CREW	o Initiate a manual reactor trip and transition to 1BwEP-0
	US	• Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions • Enter/Implement 1BwEP-0 and direct operator actions of 1BwEP-0

	RO	Perform immediate operator actions of 1BwEP-0:
		• Verify reactor trip
		  • Rod bottom lights - NONE LIT
		  • Reactor trip & Bypass breakers - CLOSED
		  • Neutron flux – NOT DROPPING
		  • Manually trip the reactor
		  • 1PM05J
		  • 1PM06J
		  • PR channels > 5%
		  • GO TO 1BwFR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS

	US	• Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions Enter/Implement 1BwFR-S.1 and direct operator actions of 1BwFR-S.1

Scenario No: **NRC 06-3**	Event No. 5, 6, & 7

Comments: _____

Event Description:		ATWS/1C FW line break inside containment/1B AF pump fails to auto start
Time	Position	Applicant's Actions or Behavior

	RO
	
	[CT] FR-S.1--C
		Perform immediate operator actions of 1BwFR-S.1:
		• Verify reactor trip
		  • Rod bottom lights - NONE LIT
		  • Reactor trip & Bypass breakers - CLOSED
		  • Neutron flux – NOT DECREASING
		  • Manually trip the reactor
		  • 1PM05J
		  • 1PM06J
		• Determine control rods NOT inserting automatically
		• Manually insert control rods at greater than or equal to 48 steps per minute prior to completion of step 1 of 1BwFR-S.1.

	BOP	Perform immediate operator actions of 1BwFR-S.1:
		• Verify Turbine Trip
		  • All Turbine throttle valves - CLOSED
		  • All Turbine governor valves – CLOSED

	BOP
	
	[CT] FR-S.1--B
		Perform immediate operator actions of 1BwFR-S.1:
		• Check AF pumps running
		  • AF pump run lights – NONE LIT
		  • Manually start the 1A AF pump prior to completion of step 3 of 1BwFR-S.1

	RO/
	BOP
		• Initiate emergency boration of the RCS
		  • CV pumps – BOTH RUNNING
		  • Open 1CV8104
		  • Start boric acid transfer pump
		  • Emergency boration flow > 30 gpm (1FI-183A)
		  • Charging flow > 30 gpm (1FI-121A) or (1FI-917)
		  • PZR pressure < 2335 psig
		• Dispatch operator to locally trip reactor

	BOP	• Verify CNMT vent isolation • Group 6 CNMT vent isolation monitor lights – LIT

Comments: _____

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Scenario No: **NRC 06-3**		Event No. 5 & 6
Event Description:		ATWS/1C FW line break inside containment
Time	Position	Applicant's Actions or Behavior

	RO	• Verify reactor subcritical
		  • PR channels > 5%
		  • IR channels startup rate – NOT NEGATIVE

	BOP	• Isolate steam dumps • Place steam dump bypass interlock switches in – OFF RESET

	RO/
	BOP
		• Check if the following trips have occurred
		  • Reactor trip
		  • Turbine trip
		• Check SG levels
		  • At least one SG level > 10% (31%)
		  • SG levels maintained between 10% (31%) and 50%
		  • 1SD002A-H – CLOSED
		• Verify dilution paths isolated
		  • 1CV111A & B – CLOSED
		  • BTRS mode selector switch – OFF
		  • Dispatch operator to locally verify dilution paths isolated
		• Stop reactivity insertion from RCS cooldown
		  • RCS temperature – DECREASING IN AN UNCONTROLLED MANNER
		  • 1C SG pressure - DECREASING IN AN UNCONTROLLED MANNER
		• Check MS isolation
		  • MSIVs and MSIV bypass valves – CLOSED
		• Identify faulted SG
		  • 1C SG pressure - DECREASING IN AN UNCONTROLLED MANNER
		  • 1C SG pressure – COMPLETELY DEPRESSURIZED

Comments: _____

Scenario No: **NRC 06-3**		Event No. 5, 6, & 8
Event Description:		ATWS/1C FW line break inside containment/FW isolation failure
Time	Position	Applicant's Actions or Behavior

	RO/
	BOP
	[CT]
	E-2--A
		• Isolate the 1C Steam Generator prior to completion of step 14 of 1BwFR-S.1.
		  • 1FW009C and 1FW530 FW isol monitor lights – NOT LIT
		  • 1FW009C – NOT FULLY CLOSED
		  • 1FW035C & 1FW039C – CLOSED
		  • 1FW530 – NOT FULLY CLOSED
		  • Close 1FW006C
		  • 1FW510 – CLOSED
		  • Close 1AF013C & G
		  • 1MS018C – CLOSED
		  • 1SD002G & H – CLOSED
		  • 1SD005D – CLOSED

	RO/
	BOP
		• Check CETCs < 1200°F
		• Verify reactor subcritical
		  • PR channels < 5%
		  • IR channels – NEGATIVE SUR
		• Return to 1BwEP-0

	US	• Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions • Enter/Implement 1BwEP-0 and direct operator actions of 1BwEP-0

	RO	Perform immediate operator actions of 1BwEP-0:
		• Verify reactor trip
		  • Rod bottom lights - ALL LIT
		  • Reactor trip & Bypass breakers - OPEN
		  • Neutron flux - DROPPING

	BOP	Perform immediate operator actions of 1BwEP-0:
		• Verify Turbine Trip
		  • All Turbine throttle valves - CLOSED
		  • All Turbine governor valves - CLOSED

Comments: _____

Scenario No: **NRC 06-3**		Event No. 5 & 6
Event Description:		ATWS/1C FW line break inside containment
Time	Position	Applicant's Actions or Behavior
	BOP	Perform immediate operator actions of 1BwEP-0: • Verify power to 4KV busses • ESF Buses – BOTH ENERGIZED (141 & 142)

	CREW	• Check SI Status
		  • SI First OUT annunciator - LIT
		  • SI ACTUATED Permissive Light - LIT
		  • SI Equipment – AUTOMATICALLY ACTUATED
		  • Both SI pumps - RUNNING
		  • Both CV pump to cold leg isolation valves OPEN – 1SI8801A/B
		  • Manually actuate SI

	BOP	• Verify FW isolated
		  • FW pumps - TRIPPED
		  • Isolation monitor lights – NOT ALL LIT
		  • 1FW006C - closed
		  • FW pumps discharge valves – 1FW002B NOT CLOSED
		  • Dispatch operators to locally close 1FW002B

	RO/
	BOP
		• Verify ECCS pumps running
		  • Both CV pumps - RUNNING
		  • Both RH pumps - RUNNING
		  • Both SI pumps - RUNNING

	BOP	• Verify RCFCs running in Accident Mode
		  • Group 2 RCFC Accident Mode lights – LIT for 1A, 1B, & 1D RCFCs (1C RCFC OOS)
		• Verify Phase A isolation
		  • Group 3 Cnmt Isol monitor lights - LIT
		• Verify Cnmt Vent isolation
		  • Group 6 Cnmt Vent Isol monitor lights - LIT

Comments: _____

Scenario No: **NRC 06-3**		Event No. 5 & 6
Event Description:		ATWS/1C FW line break inside containment
Time	Position	Applicant's Actions or Behavior

	BOP	• Verify AF system:
		  • 1B AF pump – RUNNING
		  • AF isolation valves
		  • 1AF13 A, B, D, E, F, & H – OPEN
		  • 1AF013C & G - CLOSED
		  • AF flow control valves - THROTTLED
		  • 1AF005A-H

	BOP	• Verify CC pumps – BOTH RUNNING • Verify SX pumps- -BOTH RUNNING

	RO/
	BOP
		• Check Main Steamline Isolation not required
		  • 1Cl S/G pressure < 640 psig
		  • CNMT pressure > 8.2 psig

	BOP	• Check CS not required
		  o CNMT pressure remained < 20 psig
		  o CNMT pressure rose > 20 psig
		  o Stop all RCPs
		  o Group 6 CS monitor lights – LIT
		  o Group 6 phase B lights – LIT
		  o CS eductor suction flow > 15 gpm (1FI-CS013/14)
		  o CS eductor additive flow > 5 gpm (1FI-CS015/16)

	BOP/
	RO
		• Verify Total AF flow:
		  • AF flow > 500 gpm
		  • SG levels maintained between 10% (31%) and 50%
		  • Check status of S/G NR levels
		  • None rising in an uncontrolled manner

Comments: _____

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Scenario No: **NRC 06-3**		Event No. 5 & 6
Event Description:		ATWS/1C FW line break inside containment
Time	Position	Applicant's Actions or Behavior

	RO/ BOP	• Verify ECCS valve alignment
		  • Group 2 Cold Leg Injection monitor lights required for injection – LIT
		• Verify ECCS flow
		  • High Head SI flow >100 gpm (1FI-917)
		  o RCS pressure < 1700 psig
		  o SI pump discharge flow > 200 gpm

	RO	• Check at least ONE PZR PORV relief path available:
		  • PORV isolation valves – ENERGIZED
		  • PORV relief paths – PORVs in AUTO, PORV isolation valves OPEN

	BOP	• Verify Generator Trip
		  • OCB 1-8 and 7-8 open
		  • PMG output breaker open

	BOP	• Verify DGs running
		  • Both DGs RUNNING
		  • 1SX169A/B OPEN
		  • Dispatch operator locally to check operation

		Examiners note: US and RO will likely continue in 1BwEP-0 while BOP is performing the next 3 ventilation steps:

Comments: _____

Scenario No: **NRC 06-3**		Event No. 5 & 6
Event Description:		ATWS/1C FW line break inside containment
Time	Position	Applicant's Actions or Behavior

	BOP	• Verify Control Room ventilation aligned for emergency operations:
		  • VC Rad Monitors – LESS THAN HIGH ALARM SETPOINT
		  • Operating VC train equipment - RUNNING
		  • 0B Supply fan
		  • 0B Return fan
		  • 0B M/U fan
		  • 0B Chilled water pump
		  • 0B Chiller
		  • Operating VC train dampers - ALIGNED
		  • M/U fan outlet damper – 0VC08Y NOT FULLY CLOSED
		  • 0B VC train M/U filter light - LIT
		  • 0VC09Y OPEN
		  • 0VC313Y CLOSED
		  • Operating VC train Charcoal Absorber aligned for train B
		  • 0VC44Y CLOSED
		  • 0VC05Y OPEN
		  • 0VC06Y OPEN
		  • Control Room pressure greater than +0.125 inches water on 0PDI-VC038

	BOP	• Verify Auxiliary Building ventilation aligned
		  • Two inaccessible filter plenums aligned
		  • Plenum A
		  • 0VA03CB - RUNNING
		  • 0VA023Y - OPEN
		  • 0VA436Y - CLOSED
		  • Plenum C
		  • 0VA03CF RUNNING
		  • 0VA072Y - OPEN
		  • Damper 0VA438Y - CLOSED

Comments: _____

Scenario No: **NRC 06-3**		Event No. 5 & 6
Event Description:		ATWS/1C FW line break inside containment
Time	Position	Applicant's Actions or Behavior
	BOP	• Verify FHB ventilation aligned • 0VA04CB - RUNNING • 0VA055Y - OPEN • 0VA062Y - OPEN • 0VA435Y - CLOSED
	RO	• Check PZR sprays & PORVs • Normal spray valves - CLOSED • PORVs – CLOSED
	RO	• Maintain RCS temperature control o RCPs - RUNNING o Verify RCS average temperature stable at or trending to 557°F o RCPs – NONE RUNNING o Verify RCS cold leg temperature stable at or trending to 557°F o Throttle AF flow
	RO	• Check status of RCPs o All RCPs - RUNNING o RCP trip criteria NOT met

Comments: _____

Scenario No: **NRC 06-3**		Event No. 5 & 6
Event Description:		ATWS/1C FW line break inside containment
Time	Position	Applicant's Actions or Behavior
	BOP/ RO	• Check if SG secondary pressure boundaries are intact: • Check pressure in all SGs: • 1C SG pressure decreasing in an uncontrolled manner
	CREW	• Transition to 1BwEP-2, 'FAULTED STEAM GENERATOR ISOLATION'
		Note: At this point the scenario may be terminated
	US	• US to determine EAL at conclusion of scenario: • Site Area Emergency MS3 – Auto and manual reactor trip not successful • Failure of RPS to initiate AND complete an automatic reactor trip AND • Failure of manual reactor trip

Comments: _____