

Facility:	Davis-Besse	Scenario No.:	2	Op Test No.:	NRC 2011
Examiners:	_____	Operators:	_____	SRO	
	_____		_____	ATC	
	_____		_____	BOP	
Initial Conditions:	<ul style="list-style-type: none"> • 90% power, MOL • AFPT #1 tagged OOS 				
Turnover:	The plant is at 90% power. MFPT #1 has an increasing vibration on the inboard bearing. The previous shift initiated a power reduction to take MFPT #1 out of service for repairs. Continue the power reduction at 1%/minute and remove MFPT #1 from service. AFWPT 1 is OOS for Governor work Protected Train 2				
Event No.	Malf. No.	Event Type*	Event Description		
1		N-SRO R-ATC	Controlled power reduction		
2		C-BOP, SRO	Increasing vibration on MFPT #1 requiring manual trip		
3		C-ATC, SRO	ICS AUTO Runback fails		
4		I- ATC, SRO	Selected Pressurizer temperature element fails low		
5		TS-SRO	120VAC Inverter alarm actuates in the control room		
6		C- ATC, BOP, TS-SRO	OTSG Tube Leak		
7		M-ALL	MFPT #2 trips		
8		M-ALL	OTSG tube leak rises to rupture following the reactor trip		
9		C-ATC, SRO	PZR Spray Valve fails CLOSED during depressurization		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Scenario Event Summary
2011 NRC Scenario 2

DAVIS-BESSE 2011 NRC SCENARIO 2

The crew will take the watch with power holding at approximately 90%. The previous shift initiated a power reduction to take MFPT #1 out of service for repairs using DB-OP-02504 Rapid Shutdown. Directions will be to continue the power reduction and remove MFPT #1 from service for repair of an oil leak.

Any time after the power reduction is initiated the Lead Evaluator can cue initiation of rising vibration levels on MFPT #1. The crew should respond to alarm 10-3-A in accordance with DB-OP-02010, FEEDWATER ALARM PANEL 10 ANNUNCIATORS. The Auxiliary Operator (AO) will report a vibration level exceeding the threshold for tripping the pump. The crew should trip MFPT #1, recognize that an AUTO runback did not initiate and then manually runback power to within the capacity of one MFWP.

After power has stabilized, the Lead Evaluator can cue the selected Pressurizer temperature element failing low.. Pressurizer level will indicate low. The RCS make-up valve, MU32, will open. Crew will take MU32 to hand to maintain Pressurizer level where it is at. The crew will determine the failure and select a different Pressurizer temperature element.

After the crew has selected a different Pressurizer temperature element, the Lead Evaluator can cue actuation of alarm 1-6-A, INV YV1-YV-3 TRBL. The crew should respond in accordance with DB-OP-02001, ELECTRICAL DISTRIBUTION ALARM PANEL 1 ANNUNCIATORS, and dispatch an AO to investigate. The AO will report that one of the inverters has shifted to the alternate source. The SRO should request maintenance assistance and/or enter the correct TS. If necessary, the maintenance supervisor will report an electrical problem that indicates the normal supply cannot be restored until corrective actions are completed.

Any time after the SRO has entered the TS for the 120VAC problem, the Lead Evaluator can cue initiation of the OTSG tube leak. The crew should respond to alarm 9-4-A, Vac Sys Disch Rad Hi, in accordance with DB-OP-02009, PLANT SERVICES ALARM PANEL 9 ANNUNCIATORS, which will direct them to DB-OP-02531, STEAM GENERATOR TUBE LEAK, for actions. The simulator operator will maintain leak rate greater than the TS limit but less than DB-OP-02000 entry. After the crew has recognized the tube leak and/or the SRO is evaluating the tube leak TS, the Lead Evaluator can cue the MFPT #2 trip. This results in a reactor trip and entry into DB-OP-02000. After the crew has entered DB-OP-02000, the OTSG tube leak will ramp to a size below SFAS actuation. Among other actions, the crew will perform the following high level activities: establish HPI piggyback operation, depressurize the RCS using Pressurizer PORV when the Spray Valve fails closed.

The Lead Evaluator can terminate the scenario when all high level activities have been completed and the evaluators agree the crew can be properly evaluated.

Op Test No.: 2011 Scenario # 2 Event # 1 Page 3 of 15

Event Description: Controlled Power Reduction

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	SRO	Direct Load Reduction to ~450 MWe at 1%/minute IAW DB-OP-02504, Rapid Shutdown
	ATC	Set ULD to ~55% power and ENTER
	ATC	Set ULD for 1%/min and ENTER
	CREW	Monitor plant parameters

On Lead Evaluator's discretion, insert Event 2

Op Test No.:	<u>2011</u>	Scenario #	<u>2</u>	Event #	<u>2</u>	Page	<u>4</u>	of	<u>15</u>
Event Description:		ICS AUTO Runback Fails							
Time	Position	Applicant's Actions or Behavior							

Event 2: Increasing Vibrations on MFPT 1 requiring manual trip

Indications Available:

10-3-A, MFP 1 or BFP 1 BEARING VIB HI

Excessive vibration of MFP 1 Bearings

Excessive vibration of MFPT 1 Bearings

Excessive vibration of MFPT 1 Gear Reducer Bearings

	CREW	Refer to Annunciator Response DB-OP-02010
	BOP	Send EO to locally monitor the MAIN FD PUMPS 1 AND 2 VIBRATION PANEL for Gear Reducer, Booster Pump, and Feed Pump vibration.
	BOP	Obtain vibration reading from ZJR 2538, MAIN TURBINE & MFP TURBINES – BEARING VIBRATION & ECCENTRICITY, points 11 and 12 for MFPT 1.
	SRO/BOP	IF vibration amplitude increases and remains above the second setpoint (5.0 mils) AND Maintenance personnel are NOT immediately available to take vibration readings, THEN trip MFPT 1 using HS 797, TURBINE TRIP.
I/F Role Play		<ol style="list-style-type: none"> 1. Report that Maintenance personnel are NOT available. 2. If asked, EO reports vibration from MFP vibration panel (use value on I/F screen)
	BOP	TRIP MFPT #1

Op Test No.:	<u>2011</u>	Scenario #	<u>2</u>	Event #	<u>3</u>	Page	<u>5</u>	of	<u>15</u>
Event Description:		ICS AUTO Runback Fails							
Time	Position	Applicant's Actions or Behavior							

Event 3: Auto ICS MFP Runback fails**Indications Available:****8-4-A, MFPT 1 TRIP****4-3-E, PZR LEVEL HI****14-3-D, ICS MFP LOSS OR LOW DEAR RUNBACK****14-4-C, ICS RX PWR LIMITED BY FEEDWATER**

		IF an ICS Runback occurs THEN REFER to DB-OP-06401, Integrated Control System Operating Procedure. Runback should occur but does NOT.
	ATC	Places SG/RX DEMAND H/A Station in HAND and initiates runback at 20% power per minute (See Event next page)
		Crew may refer to OP-06401 for runback.
	ATC/BOP	IF the runback was caused by a feed pump trip, THEN perform the following:
	ATC	IF ICS was NOT in TRACK, THEN verify ICS is or has runback at 20%/minute to 55% power. OTHERWISE place HIC ICS13, SG/RX DEMAND station in HAND AND perform the runback at 20%/minute to 55% power. (ULD DEMAND as read on DAAS=514 Mwe)
	ATC	IF the pressurizer spray valve was operated, THEN verify RC2, PRESSURIZER SPRAY VALVE is in AUTO AND closed.
	ATC/BOP	Perform a NIP/HBP comparison for the current power level.
	SRO	REFER to DB-OP-06902, Power Operations, for guidance to operate plant equipment for the current power level.

On Lead Evaluator's discretion, proceed to Event 4

Op Test No.: 2011 Scenario # 2 Event # 4 Page 6 of 15

Event Description:

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

Event 4: Selected Pzr temperature element (TE), RC15-1, fails low**Indications Available:****2-4-C, MU FLOW HI TRN 2****4-2-E, PZR LVL LO**

Time	Position	Applicant's Actions or Behavior
	CREW	Go To DB-OP-02004, RC Alarm Panel 4 Annunciators
	CREW	Refer to DB-OP-02513, Section 4.6.
	ATC	Place MU32, RCS Makeup valve, in HAND
	ATC	Adjust MU32 to obtain desired Makeup flow or Pzr level
	ATC	Compare Pzr Instrument, identify selected TE has failed
	ATC	Select a good TE
	ATC	Place MU32 in AUTO
	SRO	May review TS 3.4.9, Pressurizer Level. Condition A for high level. Restore level with 1 hour

On Lead Evaluator's discretion, proceed to Event 5

Op Test No.:	<u>2011</u>	Scenario #	<u>2</u>	Event #	<u>5</u>	Page	<u>7</u>	of	<u>15</u>
Event Description: 120VAC Inverter Alarm Actuates in the Control Room									
Time	Position	Applicant's Actions or Behavior							

Event 5: 120 VAC Inverter actions in the CTRM
Indications Available:
Annunciator Alarm (1-6-A) INV YVI-YV3 TRBL

	CREW	Refer to Annunciator Response DB-OP-02001
	SRO	Dispatch EO to inspect Essential Inverters YV1 or YV3 to determine which channel(s) caused the alarm.
I/F Role Play		EO reports that the YRF1 input breaker CB1 is open Local Indications: Rectifier AC Power Failure red light is on, Rectifier fans stopped, Fan failure red light on, Inverter Supplying Load yellow light is on, voltage is normal, frequency is normal.
	SRO	REFER to DB-OP-06319, Instrument AC System Procedure, Emergency Operations Section.
	SRO	Refer to Technical Specification: 3.8.7, determines YV1 is operable

On Lead Evaluator's discretion, proceed to Event 6

Op Test No.:	<u>2011</u>	Scenario #	<u>2</u>	Event #	<u>6</u>	Page	<u>8</u>	of	<u>15</u>
Event Description:	OTSG Tube Leak								
Time	Position	Applicant's Actions or Behavior							

Event 6: SG Tube Leak

Indications Available:

9-4-A, VAC SYS DISCH RAD HI

12-1-B, MN STM LINE 2 RAD HI

Makeup flow rising

PZR level lowering

	CREW	Refer to Annunciator Response DB-OP-02009 and/or 02012
	BOP	Confirms reading on RE 1003A/B (Vacuum RE), RE600 (Mn Stm Line RE) on CTRM RIM panel
	SRO	GO to DB-OP-02531, Steam Generator Tube Leak, for guidance.
	CREW	Determine which SG is leaking (SG-2)
	CREW	Calculate a leak rate using Attachment 1, Steam Generator Tube Leak Rate Calculation. (~35 gpm)
	SRO	Notify Chemistry personnel to perform Attachment 2, Chemistry Personnel Responsibilities. Notify Radiation Protection personnel to perform Attachment 3, Radiation Protection Personnel Responsibilities. Perform Attachment 4, Control of Secondary Contamination and Offsite Releases.
	CREW	Determines SGTL is <50 gpm
	SRO	Refer to TS 3.4.13, RCS Operational Leakage, Condition B

Op Test No.: 2011 Scenario # 2 Event # 6 Page 9 of 15

Event Description: OTSG Tube Leak

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	SRO	Determine a shutdown rate to achieve at a minimum less than 50% within 1 hour and be in Mode 3 within the next 2 hours.
	SRO	Refer To DB-OP-02504, Rapid Shutdown
	ATC	At the LOAD CONTROL panel: <ol style="list-style-type: none"> 1. Set the RATE OF CHANGE to a rate specified by the SRO and press ENTER 2. Set the Target Load specified by the SRO and press ENTER
	SRO	IF the leak rate calculation exceeds T.S. 3.4.13 limits restore within 4 hours
	SRO	Notify the System Control Center (SCC) of the unit load reduction.
	SRO	As determined by the SRO, reduce unit load IAW DB-OP-02504 by any of the following methods:

On Lead Evaluator's discretion, proceed to Event 7, 8, 9

Op Test No.: 2011 Scenario # 2 Event # 7, 8, 9 Page 10 of 15

Event Description:

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

Event 7, Trip of MFPT 2 (I/F actuated)

8, SGTL increase to a SG Tube Rupture

9, Pzr Spray Valve fails closed during depressurization

Indications Available:

8-4-b, MFPT 2 Trip

8-1-A, CRD TRIP CONFIRM

	SRO	Refer TO DB-OP-02000, EOP
	ATC	Manually Trip the Reactor <ul style="list-style-type: none"> • Reactor Trip Pushbutton has been depressed AND • Power is decreasing on the Intermediate Range Nuclear Instrumentation
	ATC	Manually trip the Turbine. <ul style="list-style-type: none"> • Turbine Trip Pushbutton has been depressed AND • Turbine Stop Valves 1, 2, 3 AND 4 are closed
	SRO	Implement any necessary Specific Rules
	BOP	SG LEVEL SETPOINTS – May apply. MDFP must be started to feed SG 1 IAW Attachment 5 <ul style="list-style-type: none"> • Enable BOTH MDFP Discharge Valves, HIS 6460 and 6459 • Close Both MDFP Discharge Valves, LIC 6460 and 6459 • Start MDFP • Establish FW flow to SG 1 at less than 1000 gpm

Op Test No.: 2011 Scenario # 2 Event # 7, 8, 9 Page 11 of 15

Event Description:

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	SRO	Implement any necessary Symptom Mitigation Sections <ul style="list-style-type: none"> Section 8.0 STEAM GENERATOR TUBE RUPTURE – does apply. SRO will route to Section 8.0, Step 8.19
CRITICAL TASK*	ATC	IF HPI piggyback operation is NOT in service, THEN line up and start HPI piggyback operation as follows per Att 8: <ul style="list-style-type: none"> *Start the standby CCW Pump. *Start BOTH HPI Pumps *Open HPI Injection Valves, HP2A, 2B, 2C, and 2D *Start BOTH LPI pumps are running *Open DH64 and DH63 *Transfer MU Pump suctions to the BWST Set Pzr Level Controller to 100” *Verify Standby Makeup Pump is running
	ATC	IF BOTH MU Pumps are running, THEN open MU 6421, CTMT ISOLATION FOR ALTERNATE INJECTION LINE.
	ATC	Control MU flow using MU 6419 and MU 32 per Specific Rule 3
	BOP	Verify SG levels are controlled at OR increasing the proper level using Specific Rule 4.
	ATC	Depressurize the RCS as follows:
		Turn off all PZR heaters.

Op Test No.: 2011 Scenario # 2 Event # 7, 8, 9 Page 12 of 15

Event Description:

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	ATC	Use Pressurizer Spray to reduce RCS pressure to maintain minimum adequate subcooling margin.
	ATC	Verify RC 10, PZR SPRAY BLOCK Valve. open
	ATC	Open RC 2, PZR SPRAY Valve (valve does NOT open).
	SRO	IF Pressurizer Spray is NOT available OR is NOT sufficient to reduce RCS pressure THEN REFER to Step 8.25 for guidance on Depressurizing the RCS without PZR Spray.
	ATC	Depressurize the RCS as follows: <ul style="list-style-type: none"> • Turn off all PZR Heaters • Start the QT Circ Pump if available • Close DR 2012A and DR 2012B, CTMT Normal Sump CTMT Isolation valves
	ATC	Reduce RCS pressure to close to the minimum adequate SCM curve (Fig. 1) using one of the following methods: PZR Vent Line Method <ul style="list-style-type: none"> • Open RC 200, PZR VENT TO QT ISOLATION • Open RC239A, PZR STEAM SPACE SAMPLE • Manually Cycle RC239A and PZR heaters to maintain RCS pressure close to minimum adequate SCM OR PORV method <ul style="list-style-type: none"> • Open RC 11, PORV Block Valve • Open RC 2A, PORV • Manually cycle the PORV AND control PZR heaters to maintain RCS pressure close to the minimum adequate SCM

Op Test No.:	<u>2011</u>	Scenario #	<u>2</u>	Event #	<u>7, 8, 9</u>	Page	<u>13</u>	of	<u>15</u>
Event Description:									
Time	Position	Applicant's Actions or Behavior							

CAUTION: With the SFAS Low RCS Pressure trips blocked, the operator is responsible for initiating SFAS if the leak rate rises such that PZR level OR RCS pressure can NOT be controlled.		
	CREW	IF SFAS has NOT actuated on Low RCS Pressure, AND if the RCS pressure decrease is being manually controlled with adequate SCM THEN block the SFAS Low RCS Pressure trips when the BLOCK PERMITs come in.
	ATC	Allow HPI and MU to recover PZR level AND maintain PZR level from 80 to 120 inches by controlling HPI and MU.
	SRO	Check for entry into PTS criteria. REFER to Specific Rule 5.
	CREW	Establish a 50°F/hr cooldown rate (<i>limit is ≤100°F/hr</i>)
	BOP	IF SFRCS has tripped the AVVs, THEN block the trip and take control as follows: <ul style="list-style-type: none"> • Place BOTH AVV H/A Stations in HAND • Reduce BOTH demands to zero. • Press the AVV BLOCK pushbuttons (HIS-ICS-11D or HIS-ICS-11C). • Press AUTO on HIS-ICS-11B or HIS-ICS-11A • Control SG pressure using the H/A Station
CRITICAL TASK	CREW	Depressurize the RCS down to AND maintain close to the minimum adequate subcooling margin limit during RCS cooldown.
Scenario may be terminated when RCS depressurization is in progress		

INSTRUCTOR FACILITY CUE SHEET
2011 SIMULATOR SCENARIO 2

NOTE: Role-play as Maintenance/Work Week Manager/Duty Team as necessary

1. Event 2
 - a. Report that Maintenance personnel are NOT available.
 - b. If asked, EO reports vibration from MFP vibration panel (use value on I/F screen)

2. Event 5
 - a. EO reports that the YRF1 input breaker CB1 is open
 - b. Local Indications: Rectifier AC Power Failure red light is on, Rectifier fans stopped, Fan failure red light on, Inverter Supplying Load yellow light is on.

2011 SIMULATOR SCENARIO 2 SETUP

- ~90% power
- AFPT 1 OOS for Governor work
- MFPT 1 has an oil leak
- Protected Train 2

SETUP	
ICS – L3M1A, MFP runback failure	
Tagout AFP 1: SFE8B, closes MS1106 Remote SFE8A, opens MS106 breaker SFEAB, closes MS106A Remote SFEAA opens MS106A breaker Remote SFE1A, trips AFPT 1 trip throttle valve	
Event 1	Event 6 SG 2 Tube Leak
Lower power to remove MFP 1 from service	HH51 from 0.0 to 0.0095 in 300, (~35 gpm)
Event 2, Increasing MFPT 1 vibrations	Event 7 Spurious trip of MFP 2
SFFB from 0.01 to 0.85 in 900 on Event 2 SFFA from 0.01 to 0.9 in 600 on Event 2	SFR6C
Event 3	Event 8 SG2 Tube Rupture, Spray Valve FC
L3M1A, MFP runback failure	HH51 to 0.093 increases SG 2 Tube Leak (~300 gpm) HV00C, RC2 Motor fails close
Event 4, Pzr TE fails low	
H1C1H, TT15-1 RTD short	Event 15, After MFPT 1 is tripped, change vibration
	SFFB from 0.85 to 0 in 900
Event 5 120v inverter failure	SFFA from 0.9 to 0 om 900
Remote E601, open breaker to YRF1	

Facility:	DAVIS-BESSE	Scenario No.:	3	Op Test No.:	NRC 2011
Examiners:	_____	Operators:	_____		SRO
	_____		_____		ATC
	_____		_____		BOP
Initial Conditions:	~60% power, 3 Reactor Coolant Pumps (RCP) running RCP 1-1 is not running Low Pressure Injection Pump 1 is out of service				
<p>Turnover: The crew will assume the watch with the plant at ~60% power. Three RCPs are running. RCP 1-1 was stopped due to low oil level in the lower bearing reservoir. Senior Management is currently deciding when to begin a plant shutdown to repair RCP 1-1. Following turnover the Crew will take action to transfer Gland Steam from Main Steam to Auxiliary Steam in order allow I&C to calibrate the Main Steam Reducer controller. The DB-OP-06205, Gland Steam and Turbine Drains, Section 3.6 prerequisites are complete. Gland Steam pressure is higher than stated in the procedure due to Main Turbine leakoff and has been N/A by the SRO</p>					
Event No.	Malf. No.	Event Type*	Event Description		
1		N – BOP, SRO	Transfer Gland Steam from Main Steam to Auxiliary Steam		
2		TS – SRO	The crew will be notified that Auxiliary Feedwater Pump 1 has no Governor oil		
3		C – BOP SRO	Main Seal Oil Pump shaft shear		
4		C – ATC, SRO	Pressurizer level control valve (MU 32) fails to operate in auto		
5		R – ATC N - SRO TS – SRO	Control Rod drop		
6		I – All	Loss of NNI X DC, manual Rx trip required		
7		M – All	Loss of Offsite AC		
8		C – ATC, SRO	Emergency Diesel Generator 1 fails to auto start		
9		C – BOP, SRO	AFW Pump 2 governor valve closes		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

DAVIS-BESSE 2011 NRC SIMULATOR SCENARIO 3

The crew will assume control with power at ~60% power and 3 Reactor Coolant Pumps in operation.

After turnover is complete the Lead Evaluator will direct the crew to transfer Gland Steam from Main Steam to Auxiliary Steam.

The Lead Evaluator will cue the Auxiliary Feedwater Pump 1 governor oil problem. The crew should review TS and declare AFW 1 inoperable.

The Lead Evaluator will cue the Seal Oil (SO) Pump shaft shear. The Emergency SO Pump (ESOP) will Auto start, but the Main SO Pump will continue to run. The crew will respond to ESOP Annunciator(s)16-1-H. An EO will be sent to investigate and report a Main SO Pump shaft shear. The BOP will turn off the Main SO Pump.

The Lead Evaluator will cue the dropped rod. The RCS temperature will lower and the Pressurizer level will drop due to the dropped control rod. If Pressurizer level drops to 200 inches alarm 4-2-E, PZR LVL LO will alarm. The MU 32 failure to operate in automatic will be inserted when the rod drops. The crew should identify that MU 32 is not responding. The crew should take MU 32 to HAND and control Pressurizer level by adjusting MU 32 position manually.

For the dropped rod, the crew should enter DB-OP-02516, CRD Malfunctions. The SRO should enter TS. The TS Limit with a dropped rod and 3 RCPs running is 45% power (≈ 320 MWE). The crew should reduce power in accordance with DB-OP-02504, Rapid Shutdown.

The Lead Evaluator will cue the Loss of NNI X DC power during control rod recovery. Annunciator 14-1-D, NNI-X 24 VDC BUS TRIP, on MSR/ICS Alarm Panel 14 Annunciators will alarm. The crew should enter DB-OP-2532, Loss of NNI/ICS Power. The crew should recognize a minor transient is in progress due to the mid-scale failure of Turbine Throttle Pressure by transferring the Turbine to MANUAL and transferring the SG/Rx Demand Station to HAND, and lowering the Turbine load.

The Lead Evaluator will cue the Loss of Offsite AC power. The crew will enter DB-OP-02000, RPS, SFAS, SFRCS Trip, or SG Tube Rupture, when the reactor trips. Emergency Diesel Generator (EDG) 2 will fail to auto start. EDG 2 should be started manually.

The AFPT 2 governor valve will fail closed when AFW Pump 2 receives a start signal. The crew should respond by entering DB-OP-02000, Section 6, Lack Of Heat Transfer. The crew should energize non-essential electrical bus D2 from the Station Blackout Diesel Generator or one of the EDGs and align the Motor Driven Feedwater Pump to feed at least one of the Steam Generators.

The Lead Evaluator can terminate the scenario when all high level activities have been completed and the evaluators agree the crew can be properly evaluated.

Op-Test No.: 2011 NRC Scenario No.: 3 Event No.: 1 Page 3 of 17

Event Description: Following turnover the Crew will transfer Gland steam from the Main Steam system to the Auxiliary Steam System in accordance with DB-OP-06205 Section 3.6.

Time	Position	Applicant's Actions or Behavior
	BOP	Verify the 235 psig Aux Steam Header is in service
	BOP	Open AS1934, Aux Steam Supply to 5# Condensate Tank 1-1 Control Valve, for 1 minute and then close AS 1934
	BOP	Throttle open GS 2385, Steam Seal Feed Bypass, to control Gland Steam pressure at \approx 4.5 psig using HIS 2385 NOTE: GS2385 may be cracked open with OPEN indication
	BOP	Close GS 2384, Seal Steam Supply Valve using HIS 2384
	BOP	Open GS 2380, Aux Steam Supply Steam Seal Valve, using HIS 2380
	BOP	Close GS 2385 using HIS 2385
	BOP	Verify Steam Seal Header pressure is between 2.5 to 4.5 psig
At Lead Controllers discretion, proceed to Event 2		

Op-Test No.: <u>2011 NRC</u> Scenario No.: <u>3</u> Event No.: <u>2</u> Page <u>4</u> of <u>17</u>		
Event Description: An Equipment Operator will report that AFPT 1 Governor oil sightglass is broken and the oil has leaked out. The SRO should declare AFPT 1 inoperable and entered the AFW Tech Spec		
Time	Position	Applicant's Actions or Behavior
I/F Role Play	SRO	Call CTRM and report that AFPT 1 Governor oil sight glass is broken and the oil has leaked out. Determine AFW Pump 1 is inoperable
	SRO	Refer to Tech Spec 3.7.5, Emergency Feedwater, Condition B
	SRO	Notify Operations Management of the unplanned entry into Tech Specs
	CREW	Turn on AFW Blue Light
	SRO	May evaluate Risk - YELLOW
At Lead Controllers discretion, proceed to Event 3 and 4		

<p>Op-Test No.: <u>2011 NRC</u> Scenario No.: <u>3</u> Event No.: <u>3</u> Page <u>5</u> of <u>17</u></p> <p>Event Description: Main Seal Oil Pump shaft shears</p>		
<i>Time</i>	<i>Position</i>	<i>Applicant's Actions or Behavior</i>
	SRO	Recognizes Indications 16-1-H ESOP ON 16-2-H Seal Oil ΔP
	SRO	Implements DB-OP-02016
	CREW	Dispatch an Operator to the Seal Oil Room to Investigate
I/F Role Play		EO reports that the Main Seal Oil Pump shaft is sheared (If Asked) ESOP parameters are normal
	BOP	Stop Main Seal Oil Pump
<p>At Lead Controllers discretion, proceed to Event 4 and 5</p>		

Op-Test No.: 2011 NRC_ Scenario No.: <u> 3 </u> Event No.: <u> 4 & 5 </u> Page <u> 6 </u> of <u> 17 </u>		
Event Description: (4)Regulating Control Rod 5-8 drops, and (5) MU32 does not operate in auto		
Time	Position	Applicant's Actions or Behavior
	CREW	Recognize a dropped control rod <ul style="list-style-type: none"> • Annunciator 5-1-E, CRD LCO • Annunciator 5-2-E, CRD ASYMETRIC ROD • Control Rod 5-8 Rod Bottom light ON
	SRO	Implement DB-OP-02516, CRD Malfunctions
	ATC	Reduce Reactor power <ul style="list-style-type: none"> • Reduce ULD Power to ~32% power • Set ULD Rate to 3%/MIN
	SRO	Refer to DB-OP-02504, Rapid Shutdown
	SRO	Notify the Load Dispatcher of plant shutdown
	SRO	Contact Chemistry to monitor Condensate Polishers and sample the RCS
	ATC	Maintain Makeup tank level
	BOP	Remove a Main Feed Pump from service <ul style="list-style-type: none"> • Place the ICS controller in HAND and lower speed to 3900 RPM • Null the transfer volts using the MDT 20 output • Place the MDT 20 control in MANUAL • Lower the MDT 20 to the LOW SPEED STOP • Trip the MFPT • Verify the Discharge NRV is closed

Op-Test No.: <u>2011 NRC</u> Scenario No.: <u>3</u> Event No.: <u>4 & 5</u> Page <u>7</u> of <u>17</u>		
Event Description: (4)Regulating Control Rod 5-8 drops, and (5) MU32 does not operate in auto (cont.)		
Time	Position	Applicant's Actions or Behavior
	ATC	Reduce Pressurizer set point to 180 inches if necessary <ul style="list-style-type: none"> Recognize MU 32 is not responding in Automatic control
	ATC	Place MU 32 in HAND in accordance with DB-OP-02512, Makeup and Purification Malfunctions, and manually control Pressurizer level as directed
	SRO	Refer to NG-DB-00230, Reactivity Management
	SRO	Contact Reactor Engineering to determine SDM
	ATC	Contact Work Week Manager/I&C to investigate
	SRO	Refer to DB-OP-02516 Attachment 3 to determine Tech Spec applicability <ul style="list-style-type: none"> Tech Spec. 3.1.4 for the dropped rod
	BOP	Stop both Heater Drain Pumps
At Lead Controllers discretion, proceed to Event 6		

Op-Test No.: 2011 NRC _ Scenario No.: _3_ Event No.: _6_ Page ___8_of ___17		
Event Description: A loss of NNI-X DC power causes a midscale failure of HAND/AUTO stations for MU 32 for Pressurizer level control and MU 19 for Seal Injection flow control. Turbine Throttle Pressure fails midscale. Most indicators and controls powered by NNI-X DC will automatically transfer to NNI-Y DC powered indicators and control. Manual control of Pressurizer heaters, Pressurizer Spray and Pressurizer level will be required		
Time	Position	Applicant's Actions or Behavior
	CREW	Recognize a loss of NNI-X DC Power <ul style="list-style-type: none"> • 14-1-D NNI-X 24 VDC BUS TRIP • Loss of X-DC NNI Power Indicating Light on Control Room Panel C5722
	SRO	Implement DB-OP-02532, Loss of NNI/ICS Power
	ATC	If a significant transient occurs, then <ol style="list-style-type: none"> (1) Trip the Reactor (2) Initiate and Isolate SFRCS using Manual Actuation Switches (3) Go To DB-OP-02000, EOP
I/F		If the Reactor is tripped, insert malfunctions 7, 8, 9
	NOTE	The following actions may or may not occur depending on Operator actions
	CREW	If a minor transient occurs due to a midscale failure of Turbine Throttle Pressure occurs
	BOP	Place the EHC Control Panel in MANUAL
	ATC	Place the SG/Rx Demand Station in HAND
	BOP	Lower Turbine load using the DECREASE pushbutton to restore Turbine Header pressure to 870 to 880 psig
	ATC	Monitor Pressurizer level using uncompensated level indicators

Op-Test No.: <u>2011 NRC</u> Scenario No.: <u>3</u> Event No.: <u>6</u> Page <u>9</u> of <u>17</u>		
Event Description: Loss of NNI-X DC power (cont.)		
Time	Position	Applicant's Actions or Behavior
	ATC	Maintain RCS pressure by manually controlling Pressurizer Heaters and Pressurizer Spray as necessary
	ATC	Place the Makeup System alternate injection line in service <ul style="list-style-type: none"> • Close MU 6422, Makeup Train 2 To RCS Isolation • Open MU 6421, Makeup Train 1 To RCS Isolation • Throttle open MU 6419, Makeup Train 1 Injection, to maintain desired Pressurizer level • Direct an Equipment Operator to open MU 6423B, Makeup Train 1 Flow Controller Bypass
	ATC	Monitor Makeup Tank level using NNI-Y powered indication Manually transfer Makeup Pump suction valves as required
	ATC/BOP	Transfer all NNI selector switches to NNI-Y
I/F Role		Role play as I&C for investigating loss of NNI-X DC
At Lead Controllers discretion, proceed to Event 7, 8, 9		

Op-Test No.: 2011 NRC_ Scenario No.: 3 Event No.: 7,8,9 Page 10 of 17

Event Description: A loss of offsite electrical power causes a Reactor trip and a loss of all RCPs. The loss of the RCPs causes a SFRCS actuation. AFPT 1 will start and overspeed trip due to the loss of governor oil. AFPT 2 fails to start requiring the use of the MDFP. D2 Bus will have to be reenergized to provide power to the MDFP. EDG 2 fails to automatically start but can be started manually from the Control Room

Time	Position	Applicant's Actions or Behavior
	CREW	Recognize a loss of offsite power and Reactor trip
	ATC	Perform DB-OP-02000 Immediate Actions <ul style="list-style-type: none"> Manually trip the reactor Verify power decreasing in the intermediate range Manually trip the turbine
	SRO	Route to DB-OP-02000, Section 3 Verify immediate actions
	CREW	Route to Section 4, Supplemental Action Implement Specific Rules
	ATC/BOP	*Use Attachment 6 of DB-OP-02000 to re-power D2 Bus - From the Station Blackout DG <ul style="list-style-type: none"> Verify AD213 close Open ABDD2 Verify AD 110 is open Start the SBODG by pressing START at the SBODG Control Panel C5740 Check SBODG speed approximately 900 RPM Verify AD213 is closed Close AD 301 to energize Bus D2 Verify Bus D2 energized Verify AD2DF7 is closed Verify BDF7 is closed

*Critical Task

Op-Test No.: 2011 NRC_ Scenario No.: 3 Event No.: 7,8,9 Page 11 of 17 **Event Description:** Continued

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	<p>*Use Attachment 6 of DB-OP-02000 to re-power D2 Bus</p> <p>- From EDG 2</p> <ul style="list-style-type: none"> • Verify AD301, SBODG BKR is open • Verify AD205, XFMR BDF6 is open • Verify AD206, CLNG WTR PMP 2 is open • Verify AD201, STA AIR CMPSR 2 is open or lock out • Verify AD202, CLNG TWR MU PMP 2 is open • Verify AD204, HTR DRN PMP 2 is open • Verify AD207, CNDS PMP 2 is open • Verify AD210, MOTOR DRIVEN FEED PUMP is open • Open ABDD2, HIS 6228, ABDD2 • Place D1 SYNC SELECT to BKR to D2 • Close AD110, HIS 6233, AD110 • Verify D2 is energized • Place D1 SYNC SELECT in the OFF • Close AD2DF7 • Verify BDF7 is closed <p>- From EDG 1</p> <ul style="list-style-type: none"> • Verify AD301, SBODG BKR is open • Verify ABDD2, BUS TIE XFMR BD is open • Verify AD205, XFMR BDF6 is open • Verify AD206, CLNG WTR PMP 2 is open • Verify AD201, STA AIR CMPSR 2 is open or lock out • Verify AD202, CLNG TWR MU PMP 2 is open • Verify AD204, HTR DRN PMP 2 is open • Verify AD207, CNDS PMP 2 is open • Verify AD210, MOTOR DRIVEN FEED PUMP is open • Verify AD110 is open, HIS 6233, AD110 • Verify HBBD is open, HIS 6214, HBBD • Verify AC110 is open, HIS 6223, AC110 • Place the C1 SYNC SELECT Switch to BKR TO XBD • Close ABDC1, HIS 6220, ABDC1 • Place the C1 SYNC SELECT Switch to OFF • Close ABDD2, HIS 6228, ABDD2 • Verify D2 is energized • Close AD2DF7 • Verify BDF7 is closed

***Critical Task**

Op-Test No.: <u>2011 NRC</u> Scenario No.: <u>3</u> Event No.: <u>7,8,9</u> Page <u>12</u> of <u>17</u>		
Event Description: Continued		
Time	Position	Applicant's Actions or Behavior
	BOP	*Use Attachment 5 of DB-OP-02000 to start the MDFP <ul style="list-style-type: none"> - Enable BOTH MDFP Discharge Valves <ul style="list-style-type: none"> • HIS 6460 • HIS 6459 - Close BOTH MDFP Discharge Valves <ul style="list-style-type: none"> • LIC 6460 • LIC 6459 - Start the MDFP - Establish feedwater flow to a Steam Generators at less than 1000 gpm indicated flow on the MDFP Flow Indicator FI 5876
	BOP	Verify proper SG level control using Specific Rule 4, Steam Generator Control, Level should be controlled at 49"
	BOP	Direct an Equipment Operator to locally shift MDFP recirculation to the CST
	ATC	Implement Specific Rule 6 <ul style="list-style-type: none"> • Verify MU Pump 2 breaker is open • Manually start EDG 2 • Verify D1 Bus is energized • Verify CCW Pump 2 is running • Verify Service Water Pump 2 is running
	CREW	Recognize lowering Instrument Air pressure
	BOP	Verify the EIAC starts

*Critical Task

Op-Test No.: 2011 NRC_ Scenario No.: <u> 3 </u> Event No.: <u> 7,8,9 </u> Page <u> 13 </u> of <u> 17 </u>		
Event Description: Continued		
Time	Position	Applicant's Actions or Behavior
	CREW	Check for symptom direction
	ATC	Check for all Group 1-7 Control Rods fully inserted
	ATC	Perform Attachment 1, Primary Inventory Control Actions <ul style="list-style-type: none"> • Start MUPs • Transfer MU Pump suction to the BWST • Manually control MU 6419 to control Pressurizer level at 80 to 120 inches • Brief the SRO on Primary Plant status
	BPO	Perform Attachment 2, Steam Generator Inventory and Pressure Control Actions <ul style="list-style-type: none"> - Verify Steam Generator Levels are being controlled at ≈49 inches with the MDFP - Place the Atmospheric Vent Valves in manual using Attachment 3 <ul style="list-style-type: none"> • Place the AVV Hand/Auto Stations in HAND • Reduce the AVV demands to zero • Press the AVV BLOCK pushbuttons • Press AUTO on the AVV Hand Indicating Switches • Control Steam Generator Pressure as required from the Hand/Auto stations to maintain RCS Tave constant or slightly lowering - Establish one Condensate Pump operation
I/F Role Play		Role play as an Equipment Operator to investigate the loss of both AFW Pumps. Report AFPT 1 tripped on overspeed due to no Governor control and AFPT 2 governor valve is stuck closed

Op-Test No.: 2011 NRC_ Scenario No.: <u> 3 </u> Event No.: <u> 7,8,9 </u> Page <u> 14 </u> of <u> 17 </u>		
Event Description: Continued		
Time	Position	Applicant's Actions or Behavior
	ATC	Check for NNI Power available - With NNI X DC power lost, then perform the following: <ul style="list-style-type: none"> • Operate PZR Heaters and Spray manually to maintain RCS pressure • If uncompensated PZR Level is less than 60 inches then turn off all PZR Heaters • Alternate Injection Line may be used to maintain PZR Level per Specific Rule 3
	BOP	Check for ICS Power available
	BOP	Check for Instrument Air available
	ATC	Check SFAS has not actuated
	BOP	Verify proper SFRCS actuation for the trip parameters present using Table 1
	CREW	Check for: <ul style="list-style-type: none"> • Adequate subcooling margin • Proper primary to secondary heat transfer • SG Tube Rupture
		Termination criteria <ul style="list-style-type: none"> • MDFP supplying AFW to both SGs • Pressurizer level at proper level using the Alternate Injection Line

CUE SHEET
2011 NRC Scenario 3

NOTE: Role Play as Maintenance/Work Week Manager/Operations as needed.

Event 1 - Transfer Gland Steam from Main Steam to Aux Steam

Role play as an Equipment Operator to open AS1934, Aux Steam Supply to 5# Condensate Tank 1-1 Control Valve, for 1 minute and then close AS 1934

Event 2 - Loss of oil in AFPT 1 governor

Role play as an Equipment Operator to call the Control Room to report the oil sight glass on the AFPT 1 governor is broken and the oil has leaked out of the governor

Event 3 – Main Seal Oil Pump shaft shear

Role play as an Equipment Operator to report the Main Seal Oil Pump has a sheared shaft. (If asked) ESOP is working properly

Event 5 - Dropped Control Rod

Role play as Operations Management for Reactivity Management notifications

Role play as I&C for investigating the dropped rod

Role play as the System Dispatcher to acknowledge the power reduction

Event 6 - Loss of NNI-X DC

Role play as I&C for investigating loss of NNI-X DC

Event 7, 8 and 9 - Loss of offsite power, Reactor trip, failure of EDG 2 to automatically start and loss of both AFW Pumps

Role play as an Equipment Operator to investigate the loss of both AFW Pumps. Report AFPT 1 tripped on overspeed due to no Governor control and AFPT 2 governor valve is stuck closed

Simulator Setup Instructions
2011 NRC Scenario 3

1. Verify the following:
 - a. Previous data on Yokogawa recorders is cleared
 - c. Applicable procedures are wiped cleaned
 - d. Used Alarm Typer paper is removed
 - e. Computer alarms are cleared/acknowledged
2. Initialize at 50 to 60% power
3. Equipment Status:
 - a. Hang License Requirement Sheet on the status board for LPI Train 1 and RCP 1-1
 - b. Tag out LPI Pump 1
 - c. Turn on the LPI blue status
 - d. Hang Protected Train 2 signs
4. Set Up Batch File
 - a. Initial Setup
 - Rackout the breaker for LPI Pump 1
IRFBDP1A to Ractout
IRF BDPIE to TRUE
 - EDG 2 fails to automatically start
IMF XXXX to DEFEAT
 - Stop RCP 1-1
 - b. Triggers
 - AFPT 2 Gov Valve closes when AFPT 2 steam admission valve opens
TRGSET 8 "SXA5889B>0.2"

c. Events

Event 1 - Transfer GS from Main Steam to Auxiliary Steam

Event 2 - Loss of oil from AFPT 1 governor

IMF SFEJA (2)

Event 3 - Main Seal Oil Pump shaft shear

IMF USMSC

Event 4 - Rod 5-8 drops, location M-5

IMF LI53B (3)

Event 5 - Blown fuse causes MU32 to fail to control in automatic

IMF H170 to 4.00000 (4)

Event 6 - Loss of NNI X DC

IMF NP19B

Event 7 - Loss of offsite power

IMF PLZZ (6)

Event 8 - EDG 2 fails to automatically start
Part of the setup

Event 9 - AFPT 2 Gov Valve closes when the AFP starts

IMF SFERE after 300(8) TRUE

Facility:	Davis-Besse	Scenario No.:	4	Op Test No.:	NRC 2011
Examiners:	_____	Operators:	_____	SRO	
	_____		_____	ATC	
	_____		_____	BOP	
Initial Conditions:	<ul style="list-style-type: none"> • 80% power, MOL • AFPT #1 tagged OOS 				
Turnover:	Hold at 80% power while the Reactor Engineer reviews the calorimetric calculation completed at the end of the last shift.				
Event No.	Malf. No.	Event Type*	Event Description		
1		TS-SRO	AO reports oil leak on Train 1 Containment Spray Pump.		
2		C-All	RCP 1 st Stage Seal failure on RCP 1-1.		
3		R-ATC N-SRO, <i>BOP</i> TS-SRO	Power reduction prior to <i>associated with</i> ¹ stopping RCP 1-1.		
4		I-ATC, BOP, SRO	RCS Hot Leg RTD slowly drifts HI.		
5		M-ALL	RCP 1-2 Breaker trips. Reactor Trip required. AUTO and MANUAL Reactor trip fails.		
6		M-ALL	PZR Safety Valve fails OPEN, initiating SFAS.		
7		C-ATC, SRO	HPIP 1 trips. HPIP 2 fails to automatically start.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

¹ Changed to reflect that power reduction actions occur both before and after pump stop and include actions by the BOP operator.

DAVIS-BESSE 2011 NRC SCENARIO 4

The crew will take the watch with power holding at 80% power while the Reactor Engineer reviews the calorimetric calculation completed at the end of the last shift.

On cue from the Lead Evaluator, an AO will call the control room to report an oil leak on Containment Spray (CS) Pump #1. The SRO should request assistance from maintenance and/or enter the applicable TS. If necessary, a maintenance supervisor will report that the pump must be tagged OOS in order to make the repairs.

After the SRO has declared the TS for the CS Pump, the Lead Evaluator will cue the RCP 1-1 seal failure. The crew should respond to alarm 6-3-A in accordance with DB-OP-02006, REACTOR COOLANT PUMP ALARM PANEL 6 ANNUNCIATORS, and then enter DB-OP-02515, REACTOR COOLANT PUMP AND MOTOR ABNORMAL OPERATION. DB-OP-02515 will require the crew to reduce power to $\leq 72\%$ in accordance with DB-OP-02504, RAPID SHUTDOWN, and stop the affected RCP. The SRO should enter the proper TS after the RCP is stopped.

On cue from the Lead Evaluator, the RCS Thot selected on HIS3A and for "Tave" or "UNIT" will begin to drift HI. The crew should respond to alarm 4-2-B or indications in accordance with DB-OP-02004, REACTOR COOLANT ALARM PANEL 4 ANNUNCIATORS. The affected controls should be shifted to an alternate channel and the channel should be removed from service. The channel does not have to be removed from service to proceed with the scenario.

The Lead Evaluator can cue RCP 1-2 breaker trip when evaluation on the Thot failure is complete. The crew should recognize that an AUTO reactor trip should have occurred and attempt to initiate a MANUAL reactor trip. This will fail and the ATC should initiate a reactor trip by momentarily de-energizing Busses E2 and F2. Coincident with the reactor trip a PZR Safety Valve will fail sufficiently open to cause an SFAS actuation. HPIP #1 will trip and HPIP #2 will fail to automatically start. The crew should enter DB-OP-02000 - RPS, SFAS, SFRCS TRIP, OR S/G TUBE RUPTURE, and, among other actions, perform the following high level activities: verify the reactor is tripped, start HPIP #2, complete the actions for lack of adequate subcooling margin.

The Lead Evaluator can terminate the scenario when all high level activities have been completed and the evaluators agree the crew can be properly evaluated.

Op Test No.: 2011 NRC Scenario # 4 Event # 1 Page 3 of 15

Event Description: AO Reports Oil Leak On Train 1 Containment Spray Pump

Time	Position	Applicant's Actions or Behavior
		When directed by Lead Evaluator, Call the control room to report an oil leak on Containment Spray Pump 1. Role play as Maintenance/Work Week Manager/Operations as necessary.
	SRO	Refers to Tech Spec LCO 3.6.6
	ATC/BOP	Manually energize CS pump 1 blue light.
	SRO	May Call Work Week Manager.
	SRO	May refer to Risk Matrix (Yellow).
At Lead Evaluator's discretion, proceed to Event 2		

Op Test No.:	<u>2011 NRC</u>	Scenario #	<u>4</u>	Event #	<u>2 & 3</u>	Page	<u>4</u>	of	<u>15</u>
Event Description:	RCP 1 st Stage Seal Failure on RCP 1-1; Power Reduction Prior to Stopping RCP 1-1								
Time	Position	Applicant's Actions or Behavior							

Indications Available:**6-3-A - 1-1 SEAL RET FLOW HI.****6-5-A – Monitor System TRBL****High controlled bleedoff flow of RCP 1-1 seal water.**

	Crew	Respond to Annunciator Alarm (6-3-A) 1-1 SEAL RET FLOW HI.
	ATC	Observe High controlled bleedoff flow of RCP 1-1.
	SRO	Refer to DB-OP-02515, Reactor Coolant Pump and Motor Abnormal Operation.
	CREW	Determine IF any of the following RCP conditions exist: <ul style="list-style-type: none"> ▪ Seal Return Temp $\geq 200^{\circ}\text{F}$ ▪ Total seal leakage for the affected RCP ≥ 2.0 gpm. ▪ Seal stage pressure drop greater than 1440 PSIG
	CREW	Determines total seal leakage is > 2.0 gpm.
	CREW	IF a Reactor Shutdown to take the Unit off line is NOT desired, THEN, perform those steps necessary to reduce reactor power to the desired power level, AND REFER TO Attachment 1,
	ATC	Reduce reactor power to 72 percent using DB-OP-02504, Rapid Shutdown At the Load Control Center Panel: <ul style="list-style-type: none"> • Set the rate of change and Enter • Select the reactor power to the target load and Enter • IF the APSRs are available, THEN attempt to maintain Axial Power Imbalance between 0 and negative 20 percent.

Op Test No.: 2011 NRC Scenario # 4 Event # 2 & 3 Page 5 of 15Event Description: RCP 1st Stage Seal Failure on RCP 1-1; Power Reduction Prior to Stopping RCP 1-1

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	BOP	Place ΔT_c Controller in Auto
	ATC/BOP	Stop the affected RCP.
	BOP	Verify proper Feedwater flow ratios of 2.4 to 1.
	ATC/BOP	Verify Tave control transferred to the RC loop with two RCPs.
	CREW	Verify RCS flow is greater than the flow required by T.S. 3.4.1.
	SRO	Within four hours verify the $\emptyset/\Delta\emptyset$ /Flow AND High Flux Trips setpoints have been reduced in accordance with TS 3.4.4.
	SRO	Notify the Steam Control Center (SCC). Load dispatcher of the unit load reduction.
	SRO	Request Chemistry to perform the following: <ul style="list-style-type: none"> • Monitor Condensate Polisher operation • Sample the RCS for an isotopic analysis of Iodine.
	SRO	May review/implement TS 3.2.1 Rod Insertion Limit TS 3.4.9, Pzr Level
	BOP	May reset SASS per DB-OP-02014, push SASS ACKNOWLEDGE and RESET buttons

Op Test No.:	2011 NRC	Scenario #	4	Event #	2 & 3	Page	6	of	15
Event Description:	RCP 1 st Stage Seal Failure on RCP 1-1; Power Reduction Prior to Stopping RCP 1-1								
Time	Position	Applicant's Actions or Behavior							

	ATC	<p>Boric Acid/water may be added to RCS to adjust rod position. To Batch, at the Batch Controller per DB-OP-06001</p> <p>NOTE: ("number") is the keypad number</p> <ol style="list-style-type: none"> 1. Press BATCH SET 2. Press number keys for size of batch 3. Press ENTER 4. Press DISPLAY ("lower") to exist BATCH SET 5. Press BATCH ("4") to display batch size 6. Press DISPLAY ("lower") 7. Press TOTAL ("7") 8. Press TOTAL RESET("6") 9. Press DISPLAY (upper) 10. Press RATE ("*8") 11. Press RUN 12. Open MU40 using HISMU40 13. Start a Boric Acid Pump using HIS MU50A/B 14. Adjust MU flow, if necessary, with MU23 using HC MU23 15. Open WC 3526 using HIS 3526 16. When batch is complete, verify MU40 is closed 17. Close WC 3526 using HIS 3526
At Lead Evaluator's discretion, proceed to Event 4		

Op Test No.: <u>2011 NRC</u>	Scenario # <u>4</u>	Event # <u>4</u>	Page <u>7</u> of <u>15</u>
Event Description: RCS Hot Leg RTD Slowly Drifts HI			
Time	Position	Applicant's Actions or Behavior	

Booth Operator Instructions:**When directed, insert command for Event 4****Indications Available:****4-2-B, HOT LEG TEMP HIGH****14-4-D, ICS FW LIMITED BY RX POWER****14-4-E, ICS INPUT MISMATCH****14-6-D, ICS IN TRACK****4-2-E, PZR LVL LO****Loop 2 That indication rising**

	ATC	Check the alarm by observing Loop 1 and Loop 2 Hot Leg Tis.
	ATC	Verify the ICS is reducing Rx power to lower Tave to 582°F
	ATC	Compare Hot Leg Temperature Indicators TI RC3A1 and T1 RC3B1 on RC Panel C5718.
	ATC	IF the selected Hot Leg Temperature Transmitter failed, THEN verify SASS has transferred to unfaulted instrument.
	Crew	May Respond to Annunciator Alarm (4-2-E) PZR LVL LO IAW with DB-OP-02004, Reactor Coolant Alarm Panel 4 Annunciators
	ATC	Observes Low Pressurizer level as indicated on LRS RC14 if low Pressurizer level occurs
	ATC	IF Pressurizer Level is due to a Tave transient, THEN perform the following: <ul style="list-style-type: none"> • Reduce MU-32 Setpoint to ~ 180" • WHEN Tave is restored to ~ 582°F, AND Pressurizer Level is stable, THEN restore MU-32 to 220 inches as directed by the CTRM SRO.

Op Test No.: 2011 NRC Scenario # 4 Event # 4 Page 8 of 15

Event Description: RCS Hot Leg RTD Slowly Drifts HI

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	CREW	Determine which instrument pair has caused the alarm. (Thot)
	SRO	Refer to DB-OP-06404 NNI System and Operating procedure, and/or DB-OP-02526, Primary to Secondary Heat Transfer Upset
	ATC	Place SG/Rx Demand station in HAND Place Rx Demand station in HAND
	ATC	Place Rod Control Panel in Manual and adjust power.
	BOP	Place BOTH FEEDWATER DEMAND H/A Stations in HAND.
	BOP	Maintain Feedwater flow matched with Plant power using SP6A and SP7A AND LOOP 1 FEEDWATER DEMAND H/A Station.
	ATC/BOP	Check for ICS module, component, or instrument failures.
At Lead Evaluator's discretion, proceed to Event 5		

Op Test No.: 2011 NRC Scenario # 4 Event # 5, 6, & 7 Page 9 of 15

Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

Booth Operator Instructions:**When directed, insert command for Event 5****Indications Available:****5-3-H, RPS POWER – PUMPS TRIPPED****5-1-G, H, I, J, RPS CH 1, 2, 3, 4 TRIPPED****ZL4265A and ZL 4265A red lights lit – Safety Valve Open indication**

	ATC	Manually Trip the Reactor Reactor Trip Pushbutton has been depressed Power is decreasing on the Intermediate Range Nuclear Instrumentation (NO) IF the reactor is NOT shutdown, THEN perform the following actions until the reactor is shutdown.
CRITICAL TASK	ATC	1. Momentarily deenergize 480-Volt Unit Substations E2 AND F2 simultaneously.
		• Maintain balanced primary to secondary heat transfer:
		1. IF MFW is less than Reactor power, THEN manually control MFW flow to match Reactor power.
	ATC	Manually trip the Turbine Turbine Trip Pushbutton has been depressed Turbine Stop Valves 1, 2, 3 AND 4 are closed OR Turbine Control Valves 1, 2, 3, AND 4 are closed

Op Test No.:	<u>2011 NRC</u>	Scenario #	<u>4</u>	Event #	<u>5, 6, & 7</u>	Page	<u>10</u>	of	<u>15</u>
Event Description:	RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start								
Time	Position	Applicant's Actions or Behavior							

	SRO	CHECK FOR SPECIFIC RULE OR SYMPTOM DIRECTION
		<p>Implement any necessary Specific Rules.</p> <ul style="list-style-type: none"> • Specific Rule 2, ACTIONS FOR LOSS OF SUBCOOLING MARGIN Applies • Specific Rule 3, MU\HPI\LPI FLOW INITIATION, THROTTLING, AND TERMINATION Applies • Specific Rule 4, Steam Generator Level Control Applies
	SRO	<p>Implement any necessary Symptom Mitigation Sections</p> <ul style="list-style-type: none"> • LACK OF ADEQUATE SUBCOOLING MARGIN (Section 5.0) applies
	SRO	Directs tripping remaining RCP's IAW specific Rule 2 when subcooling is lost.
CRITICAL TASK	ATC	Trips all remaining RCPs
	ATC	Transfer SCM inputs to Incore Thermocouples
CRITICAL TASK*	ATC	<p>MU\HPI Initiation per Specific Rule 3 and Attachment 8</p> <p>Start the standby CCW Pump.</p> <p>*Start BOTH HPI Pumps.</p> <ul style="list-style-type: none"> • HPI Pump 1 (Tripped) • HPI Pump 2 <p>*Open HPI Injection Valves.</p> <ul style="list-style-type: none"> • HP 2A • HP 2B • HP 2C (may/may not be opened) • HP 2D (may/may not be opened)

Op Test No.: 2011 NRC Scenario # 4 Event # 5, 6, & 7 Page 11 of 15

Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

Time	Position	Applicant's Actions or Behavior
		<p>Verify Both LPI Trains are in service</p> <p>Open Piggyback Valves (DH64 and DH63)</p> <p>Lock MU Pump Suctions in the BWST position.</p> <ul style="list-style-type: none"> • MU 3971 • MU6405 <p>Start the second MU Pump</p> <p>If Pressurizer level is <40 inches</p> <ul style="list-style-type: none"> • Isolate Letdown using MU2B • Verify all Pressurizer heaters are off • Open MU 6421 • Open MU6419
	ATC	<p>IF only one HPI train is available, THEN REFER TO Attachment 11, HPI Flow Balancing.</p> <p>Stop Makeup flow through HPI Train 2 by closing MU 6422, MU CTMT ISOLATION.</p> <p>Verify HPI Train 2 Injection Valves are fully open.</p> <ul style="list-style-type: none"> • HP2A, HIGH PRESSURE INJECTION LINE 2-1 ISOLATION • HP2B, HIGH PRESSURE INJECTION LINE 2-2 ISOLATION <p>Determine which injection line has the lower flow and REFER TO Figure 3, HPI Balancing.</p> <ul style="list-style-type: none"> • FYI HP3A • FYI HP3B <p>IF only the lower flow is NOT in the acceptable region, THEN throttle the higher flow line until:</p> <ul style="list-style-type: none"> • The lower flow line is in the acceptable region OR • The high flow line reaches the lower limit of the acceptable region • IF MU 6422 was closed in during HPI flow balancing, THEN open MU 6422, MU CTMT ISOLATION.

Op Test No.:	<u>2011 NRC</u>	Scenario #	<u>4</u>	Event #	<u>5, 6, & 7</u>	Page	<u>12</u>	of	<u>15</u>
Event Description:	RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start								
Time	Position	Applicant's Actions or Behavior							

	BOP	<p>Using Attachment 5 to start the the MDFP</p> <p>Enable BOTH MDFP Discharge Valves</p> <ul style="list-style-type: none"> • HIS 6460 • HIS 6459 <p>Close BOTH MDFP Discharge Valves</p> <ul style="list-style-type: none"> • LIC 6460 • LIC 6459 <p>Start MDFP</p> <p>Establish feedwater flow to a Steam Generator at less than 1000 gpm indicated flow on MDFP flow indicator FI5876</p>
	ATC	Monitor RCS Pressure.
	SRO	Routes to DB-OP-02000, section for LACK OF ADEQUATE SUBCOOLING MARGIN
	ATC	<p>Trip all RCPs. (Already performed.)</p> <p>Verify MU, HPI, and LPI are in service per Attachment 8 (Already performed)</p>
	CREW	Verify proper SFAS response using SAM lights (on DIM) or Table 2
	BOP	Verify proper SFRCS actuation for the trip parameters present using Table 1.
	BOP	<p>Verify proper SG level control by AFW using Specific Rule 4</p> <ul style="list-style-type: none"> • SG level at 49 inches without an SFAS • SG level at 124 inches with an SFAS

Op Test No.:	<u>2011 NRC</u>	Scenario #	<u>4</u>	Event #	<u>5, 6, & 7</u>	Page	<u>13</u>	of	<u>15</u>
Event Description:	RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start								
Time	Position	Applicant's Actions or Behavior							

	ATC	Isolate Possible RCS Leaks using Attachment 19 NOTE: this is an unisolable leak at the top of the Pzr
	ATC	Verify CFT Isolation Valves are open. <ul style="list-style-type: none"> • CF1A • CF1B
	SRO	If adequate subcooling margin exists, THEN GO TO Step 5.18.
	CREW	Throttle MU and HPI as necessary to maintain adequate subcooling margin. REFER TO Specific Rule 5, PTS Requirements.
<p>Scenario may be terminated when crew reaches Step 5.18.</p> <p><i>Scenario may be terminated if crew has control of RCS cooldown and depressurization and SCM does not exist.</i></p>		

**SIMULATOR INSTRUCTIONS
2011 NRC Scenario 4**

1. Verify the following
 - a. Previous data o Yokogawa recorders is cleared
 - b. Applicable procedures are wiped clean
 - c. Used Alarm Typer paper is removed
 - d. Computer alarms are cleared/acknowledged

2. Initialize at 80% power

3. Equipment Status
 - a. Hand License Requirement Sheet on the Status Board
 - b. Tag out AFPT 1 speed changer
 - c. Turn on the AFW blue light
 - d. Hang Protected Train 2 sign

4. Set Up Batch Files
 - a. Initial Setup
 - (1) Remove AFPT 1 from service

(a) Trip the Trip Throttle Valve:	IRF SFE1A to CLOSE
(b) Close MS106A	IMF SFEAB
(c) Open MS106A breaker, BE1271	IRF SFEAA to OPEN, delete in 10
(d) Close MS106	IMF SFE8B
(e) Open MS106 breaker	IRF SFE8A to OPEN, delete in 10

 - (2) Fail the Reactor to automatically Trip:

(a) RPS trip override	IMF L4
(b) ARTS trip override	IMF L8
(c) DSS Ch 1 Opto-Isol failure	IMF L5D1
(d) DSS Ch 2 Opto-Isol failure	IMF L5D2

 - (3) Fails HPI 2 to AUTO START

	IMF BFP2E
--	-----------

 - b. Events

(1) CSP 1 breaker, BE111RACK OUT	IRF BDP3A to TRUE
(2) RCP 1-1 first stage seal failure	IMF HN09 in 300
(3) Power Reduction	
(4) RCS Loop 2 Th RTD slowly drifts high	IMFL1T6H from 0.81 in 120
(5) RCP 1-2 breaker fails open	IMF H102J
(6) RO must trip E2 and F2	
(7) Pzr Safety fails open	IMF HV40C
(8) HPIP 1 trips	IMF BFP1C

SIMULATOR INSTRUCTIONS
2011 NRC Scenario 4

5. Instructor Station Cues

NOTE: Role Play as Maintenance/Work Week Managers/Operations as applicable

- a. Event 1 – CTMT Spray Pump 1 Oil Leak
 - (1) Role Play as a Plant Operator to report the oil sight glass for the outboard bearing on CSP 1 is broken and oil from the bearing has leaked onto the floor.
 - (2) Role Play to remove close power fuses of racked out breaker for CSP 1
- b. Event 2 – RCP 1-1 Seal Failure and power reduction to stop RCP -1
 - (1) Role Play as the System Dispatcher, if contacted
 - (2) Role Play as Equipment Operator, if contacted
- c. Event 3 – Selected Thot RTD transmitter (TT RC3A1) fails high
- d. Event 4 – RCP 1-2 breaker trip
- e. Event 5 – ATWS
- f. Event 6 – Pressurizer Safety fails open
- g. Event 7 – HPI Pump 1 trips, HPI Pump 2 fails to auto start