

Facility:	DAVIS-BESSE	Scenario No.:	1	Op Test No.:	NRC 2011
Examiners:	_____	Candidates:	_____		SRO
	_____		_____		ATC
	_____		_____		BOP
<u>Initial Conditions:</u>		<ul style="list-style-type: none"> • The unit is at 2% power • MFPT 2 is in service • Boric Acid Pump 1 is OOS. 			
<u>Turnover:</u>		Raise power to 4% IAW DB-OP-06901, PLANT STARTUP, Step 3.30, and then continue with the procedure.			
Event No.	Malf. No.	Event Type*	Event Description		
1		N – SRO R – ATC	Raise power to 4%		
2		I – ATC, SRO TS – SRO	RCS Pressure channel selected for NNI fails hi		
3		TS – SRO	BA Pump 2 trips		
4		C – BOP, SRO	Main Turbine Turning Gear Locks Out		
5		M – ALL	Circ Water System rupture in the Circ Pump house		
6		C – ATC, SRO	Two stuck rods		
7		C – ALL	Both AFPTs trip on overspeed		
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

DAVIS-BESSE 2011 NRC SCENARIO 1

The crew will assume the watch at Step 3.30 of DB-OP-06901, PLANT STARTUP. MFP 2 is in service and power is stable at 2%. Step 3.30 raises power to 4% for turbine warmup. One Boric Acid Pump is OOS.

The crew will raise power to 4%. When power is stable and the crew is preparing to continue in DB-OP-06901, the Lead Evaluator can cue the RCS pressure channel failure. The crew should respond in accordance with DB-OP-02513, PRESSURIZER SYSTEM ABNORMAL OPERATION. The operator should perform the immediate actions for the failed input and then the crew should re-establish normal conditions. The SRO should enter the T.S.

On cue from the Lead Evaluator, an Equipment Operator reports the breaker on the only available Boric Acid Pump is tripped. The SRO should enter the TRM.

When Tech Specs have been addressed, the Main Turbine Turning Gear locks out

On cue from the Lead Evaluator, a major circulating water rupture occurs in the Circ Pump house. The crew will respond to alarms and enter DB-OP-02517, CIRCULATING WATER PUMP TRIP/CIRCULATING WATER SYSTEM RUPTURES.

The SRO should direct a trip of all Circulating Water Pumps and a reactor trip. When the reactor trips, two or more rods will be stuck fully withdrawn and both AFW Pumps overspeed trip.

The crew will work through DB-OP-02000, establishing feedwater flow from the MDFP and boration flow to compensate for the stuck control rods.

Facility:	DAVIS-BESSE	Scenario No.:	2	Op Test No.:	NRC 2011
Examiners:	_____	Candidates:	_____		SRO
	_____		_____		ATC
	_____		_____		BOP
Initial Conditions:	<ul style="list-style-type: none"> • 70% power, MOL • AFPT #1 tagged OOS 				
Turnover: MFPT #1 has a leak on the inboard bearing supply line. The previous shift initiated a power reduction to take MFPT #1 out of service for repairs. Continue the power reduction at 5 MW/minute and remove MFPT #1 from service.					
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 TS-SRO	RCS Pressure instrument selected for NNI input fails low		
5		TS-SRO	120VAC Inverter alarm actuates in the control room		
6		C-ATC, BOP, 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					

DAVIS-BESSE 2011 NRC SCENARIO 2

The crew will take the watch with power holding at approximately 70%. The previous shift initiated a power reduction to take MFPT #1 out of service for repairs using DB-OP-06902, Power Operation. 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.

The Lead Evaluator can cue initiation of failure of the RCS pressure channel selected for NNI input after the plant is stabilized. The crew should respond to alarm 4-4-C in accordance with DB-OP-02004, REACTOR COOLANT ALARM PANEL 4 ANNUNCIATORS. The operator should return the heaters to the correct alignment for the conditions, the channel should be removed from service and the SRO should enter the correct TS. The channel does not have to be removed from service to proceed with the scenario.

Any time after the RCS pressure channel actions are complete, 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.

Facility:	DAVIS-BESSE	Scenario No.:	3	Op Test No.:	NRC 2011
Examiners:	_____	Candidates:	_____		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					
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					
Event No.	Malf. No.	Event Type*	Event Description		
1		N – BPO, 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 – ATC, SRO	Pressurizer level control valve (MU 32) fails to operate in auto		
4		R – ATC N - SRO TS – SRO	Control Rod drop		
5		I – BOP, SRO	Loss of NNI X DC		
6		M – All	Loss of Offsite AC		
7		C – ATC, SRO	Emergency Diesel Generator 1 fails to auto start		
8		C – BOP, SRO	AFW Pump 2 governor valve closes		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

DAVIS-BESSE 2011 NRC 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 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 the TS. The Tech Spec 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) 1 will fail to auto start. EDG 1 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.

Facility:	DAVIS-BESSE	Scenario No.:	4	Op Test No.:	NRC 2011
Examiners:	_____	Candidates:	_____	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-ATC, SRO	RCP 1 st Stage Seal failure on RCP 1-1.		
3		R-ATC N-SRO TS-SRO	Power reduction prior to 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.		
6		C-ATC, SRO	AUTO and MANUAL Reactor trip fails.		
7		M-ALL	PZR Safety Valve fails OPEN, initiating SFAS.		
8		C-ATC, SRO	HPIP 1 trips. HPIP 2 fails to automatically start.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

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