

Facility:	Davis-Besse	Scenario No.:	1	Op Test No.:	DB NRC 2015
Examiners:	_____	Operators:	_____	SRO	
	_____		_____	ATC	
	_____		_____	BOP	
Initial Conditions:	100% Power				
	CCW Pump 1 and MUP 2 in service				
Turnover: Maintain 100% Power					
Critical tasks: 1. ATWS (CT24)					
2. Establish FW flow and feed SGs (CT10)					
3. Maintain Radiation Boundary (CT19)					
Event No.	Malf. No.	Event Type*	Event Description		
1		SRO (TS)	AFPT 1 Trip valve fails closed		
2		I-ATC/SRO	Pressurizer Level instrument failure		
3		C-BOP/SRO	Circ Pump high stator temperature		
4		C-ATC/SRO (TS)	Makeup Pump trip		
5		C-BOP/SRO	Rising Condenser pressure		
6		R-ATC/SRO	Steam leak in Containment		
7		M-All	ATWS (trip pushbuttons fail)		
8		C-BOP/SRO	AF3871 fail closed – Start MDFP		
9		C-ATC/SRO	SFAS Channel 1 level 1 output module fails		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Scenario Event Summary

DAVIS-BESSE 2015 NRC SCENARIO 1

The Crew will take the watch with power at 100%. Following turnover the Lead Evaluator will cue the Auxiliary Feed Pump (AFP 1) Turbine Trip Throttle Valve (TTV) to fail closed and annunciator alarm, AFP1 TRBL, will come into alarm. The SRO will declare AFP 1 Inoperable and enter the applicable Tech Spec (TS).

After the AFP TS is entered, the lead evaluator will cue the selected PZR Level instrument failure which will fail over two minutes. Annunciator PZR LVL LO will alarm. The SRO will implement DB-OP-02513, PZR Abnormal Operations. The ATC will place PZR level control valve MU32 in manual, select the alternate instrument, and return MU32 to automatic control.

When MU32 is returned to automatic control the Lead Evaluator can cue the Circulating Water Pump 1 stator temperature increase. The SRO will implement DB-OP-02517, Circulating Water System Malfunctions. The BOP will be directed to stop Circulating Water Pump 1

After Circulating Water Pump 1 is stopped the Lead Evaluator will cue the Makeup Pump trip. The SRO will implement DB-OP-02512, Loss of RCS Makeup. The ATC will close MU2B, RCS Letdown, MU19 Seal injection and MU32 PZR level control. The ATC will start the standby Makeup pump and restore MU flow, Seal Injection flow and Letdown flow. The SRO will enter the applicable TRM for the non-functional pump.

At the Lead Evaluators discretion the rising condenser pressure can commence. The SRO will implement DB-OP-02518, HIGH CONDENSER PRESSURE. The BOP will recognize the Mechanical Hogger (motor vacuum pump) has failed to auto start. The BOP will start the Mechanical Hogger and the pressure increase will stop.

After the Mechanical Hogger is started the Lead Evaluator will cue the SG 2 Steam Leak in Containment. The SRO will implement DB-OP-02525, Steam Leaks and direct DB-OP-02504, Rapid Shutdown. SG 2 steam rupture will activate when CTMT to Annulus D/P reaches 40 inches. SFAS Level 3 will actuate due to high Containment pressure. The ATC will attempt to trip the Reactor per DB-OP-02000. The trip buttons will not function and the ATC will de-energize E2 and F2 (CRD) to trip the Reactor (**CT-24**).

The Steam Feed Rupture Control System will actuate on low pressure in SG 2. AFP 1 is OOS and AFP 2 will start but cannot feed SG 1 due to AF3871 failing to open. The BOP will start the Motor Driven Feed Pump to feed SG1 (**CT-10**).

DB-OP-02000, Overcooling Section 7, will be entered. The BOP will isolated feed to SG2 and open the Atmospheric Vent Valve (AVV) to blowdown SG 2.

The BOP will control RCS temperature using SG1 AVV and the ATC will begin depressurizing the Reactor Coolant System to minimum subcooling margin. When depressurization begins the scenario can be terminated, at the Lead Evaluators discretion.

Facility:	Davis-Besse	Scenario No.:	2	Op Test No.:	DB NRC 2015
Examiners:	_____	Operators:	_____	SRO	
	_____		_____	ATC	
	_____		_____	BOP	
Initial Conditions:	<ul style="list-style-type: none"> • 100% Power • EDG 1 OOS 				
Turnover: Maintain 100% Power					
Planned: Swap Main Feed Pump Turbine Main Oil Pumps per the Monthly Activity Log					
Critical tasks: 1. Establish Electrical Power Alignment (CT-8)					
2. Initiate HPI (CT-2)					
Event No.	Malf. No.	Event Type*	Event Description		
1		N-BOP/SRO	Swap MFPT Oil Pumps		
2		SRO (TS)	Startup Transformer 02 Lockout		
3		C-ATC/SRO	Makeup Filter high differential pressure		
4		I-BOP/SRO	Deaerator level transmitter fails low		
5		SRO (TS)	Oil leak on Containment Spray Pump		
6		R-ATC/SRO	RCP 1-1 high vibrations – reduce power		
7		C-ATC/SRO	3 Power Range NIs fail – Trip reactor		
8		Major	Loss of Offsite Power		
9		Major	RCS Leak		
10		C-ATC/SRO	EDG 2 trips after starting		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Scenario Event Summary

DAVIS-BESSE 2015 NRC SCENARIO 2

The Crew will take the watch with power at 100%. Following turnover the Crew will swap running Main Feed Pump Turbine Main Oil Pumps as directed by the Monthly Activity Log.

After the MFPT Oil Pumps are swapped the Lead Evaluator will cue the Startup Transformer 02 Lockout. SU XFMR 02 LOCKOUT will alarm and the SRO will enter the applicable Off-Site AC Sources Technical Specification (TS).

After the SRO has declared the TS for Off-Site AC Sources the Lead Evaluator will cue the Makeup Filter High Differential Pressure. LETDOWN OR MU FILT ΔP HI will alarm and PDI MU13 will indicate >25 PSID. The ATC will implement DB-OP-02002, Letdown/Makeup Alarm Panel 2 Annunciators. The SRO will direct placing the standby Makeup filter in service in accordance with DB-OP-06006, Makeup and Purification System.

When the standby Makeup filter has been placed in service the Lead Evaluator will cue Deaerator Storage Tank 2 level, LT 420, control signal fails low. DEAR TK 1 LVL will alarm. The BOP will manually control Deaerator level by manually controlling CD-421 using LIC421.

Once LIC421 is placed in manual and level control is established the Lead Evaluator will cue the Containment Spray (CS) Pump 1 oil leak. An Equipment Operator will call the control room to report an oil leak on Containment Spray (CS) Pump 1. The SRO will declare the CS Pump Inoperable and enter the applicable TS.

After the SRO has declared the TS for the CS Pump, the Lead Evaluator will cue the RCP 1-1 high vibrations. MOTOR VIB HI and MONITOR SYSTEM TRBL will alarm. The SRO will implement DB-OP-02515, RCP Pump and Motor Abnormal. The SRO will implement DB-OP-02504, Rapid Shutdown to reduce power. The ATC will reduce power to less than 72% and RCP 1-1 will be stopped.

After RCP 1-1 is stopped the Lead Evaluator will cue the 3 of 4 Power Range Nuclear Instruments low failure. The SRO will implement DB-OP-02505, Nuclear Instrument Failures and direct the ATC to trip the Reactor.

When the Reactor is tripped a Loss of Offsite Power will occur and an RCS leak will develop. EDG 2 will trip after starting. Since EDG 1 is OOS this will cause a blackout until the BOP starts Station Blackout Diesel Generator (SBODG) and powers 4160 buses D2 and D1 per Attachment 28 of DB-OP-02000 IAW Specific Rule 6. **(CT-8)**

DB-OP-02000 Loss of Subcooling Margin Section 5 will be entered. Train 2 Makeup and HPI will be placed in service after the SBODG is aligned to D2 and D1 buses. **(CT-2)** The SG Atmospheric Vent Valves will be controlled to maintain RCS temperature constant or slightly lowering.

The scenario can be terminated, at the Lead Evaluators discretion.

Facility:	Davis-Besse	Scenario No.:	3	Op Test No.:	NRC 2015
Examiners:	_____	Operators:	_____	SRO	
	_____		_____	ATC	
	_____		_____	BOP	
Initial Conditions:	<ul style="list-style-type: none"> • 70% Power • RCP 1-1 OOS • EDG 1 OOS 				
Turnover: Maintain 70% Power					
Planned: Perform MFPT 1 Stop Valve Test, DB-SS-04052					
Critical tasks: 1. Isolate RCS Leak Path (CT-3)					
2. Establish FW flow and feed SGs (CT-10)					
3. Control HPI (CT-5)					
Event No.	Malf. No.	Event Type*	Event Description		
1		N-BOP/SRO	MFPT 1 Stop Valve Test, DB-SS-04052		
2		C-ATC/SRO (TS)	PORV Leakage		
3		I-ATC/BOP SRO	RCS Hot Leg RTD slowly drifts HI		
4		C-BOP	MFPT Low Oil pressure – trip MFPT		
5		R-ATC SRO (TS)	Dropped Rod – Power reduction		
6		Major	SG Tube Rupture – trip Reactor		
7		C-BOP/SRO	Loss of Feedwater -SFRCS fails auto actuation		
8		C-ATC/SRO	PZR Spray valve fails closed		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

DAVIS-BESSE 2015 NRC SCENARIO 3

The Crew will take the watch with power at 70% with 3 RCPs in operation. Following turnover the BOP will perform DB-SS-04052, MFPT 1 Stop Valve Test.

On cue from the Lead Evaluator, a leak will be introduced on the PZR Power Operated Relief Valve (PORV). The crew will respond to computer and Panel 4 annunciator alarms and isolate the PORV IAW DB-OP-02513, PRESSURIZER SYSTEM ABNORMAL OPERATION (**CT-3**). The SRO will enter the applicable TS for the PORV.

When the SRO has declared the TS for the PORV, the Lead Evaluator will cue the selected Thot RTD transmitter (TT RC3A1) to slowly fail high. HOT LEG TEMP HIGH annunciator alarm will sound and the Integrated Control System (ICS) will begin reducing power to lower Tave. The ATC will place the Rod Control Panel in manual and the BOP will place Feedwater Loop Demands in manual to stabilize the plant. The good instrument will be selected and Tave will be restored to 582 °F. Rod Control Panel and Feedwater Loop Demand control stations will then be returned to AUTO.

When ICS is returned to Auto the Lead Evaluator will cue the MFPT oil leak. MFPT 2 LUBE OIL TK LVL will alarm. The BOP will implement DB-OP-02010, Feedwater Alarm Panel 10 Annunciators. An Equipment Operator will report MFP 2 bearing oil header spraying oil and the pump making a squealing sound. The SRO will direct tripping the MFPT and ICS will run the plant back to 55% power OR direct power reduction to 55% and then tripping pump.

After the MFPT is removed from service the Lead Evaluator will cue the dropped control rod. Alarms CRD LCO and CRD ASYMETRIC ROD will sound and a Rod bottom light will be ON. The SRO will implement DB-OP-02516, CRD Malfunctions. The ATC will be directed to reduce power to 33% per DB-OP-02504, Rapid Shutdown. The SRO will enter the applicable TS for the Inoperable control rod.

After the TS has been declared for the Inoperable control rod the Lead Evaluator will cue the Steam Generator Tube Rupture. Alarms MN STM LINE 2 RAD HI and VAC SYS DISCH RAD HI will sound. Rising MU flow with lowering MUT level and PZR level will be observed. The SRO will implement DB-OP-02531, Steam Generator Tube Leak. The ATC will evaluate the leak to be greater than 50 gpm and the SRO will route to B-OP-02000, Section 8, SG Tube Rupture.

The BOP will place HPI/LPI/MU in service and the ATC will reduce power to SG low level limits. The BOP will transfer steam loads from the Turbine to the Turbine Bypass Valves. When load is less than 50 MWe the ATC will trip the Reactor.

When the reactor is tripped the remaining MFPT will trip and Auxiliary Feedwater will fail to automatically actuate. The BOP will depress the SFRCS pushbuttons to initiate AFW and isolate Main Feedwater and Main Steam (**CT-10**).

The ATC will be directed to reduce RCS pressure to minimum subcooling margin. When this is attempted it will be recognized that the PZR spray valve is failed closed and the alternate PZR Vent Line method will be used. The ATC will control HPI to maintain RCS inventory (**CT-5**). When the pressure reduction has begun the scenario can be terminated, at the Lead Evaluators discretion.

Facility:	Davis-Besse	Scenario No.:	4	Op Test No.:	NRC 2015
Examiners:	_____	Operators:	_____	SRO	
	_____		_____	ATC	
	_____		_____	BOP	
Initial Conditions:	<ul style="list-style-type: none"> • 2% power • MFP 2 maintaining 800-1000 RPM • 2 TBVs per side are isolated 				
Turnover:	<ul style="list-style-type: none"> • Plant was shut down for bushing replacement on the Main Transformer. • Plant startup per DB-OP-06901, complete through Step 3.25 • Reactor startup is in progress and currently at 2%. • Mode 1 checklist is complete 				
Planned:	<ul style="list-style-type: none"> • Continue a plant startup per DB-OP-06901, starting at Step 3.26. • Raise Reactor power to 4% in preparation for mode change • Place MFP 2 in service and continue the power rise 				
Critical tasks: 1. Initiate HPI (CT-2)					
2. Trip All Reactor Coolant Pumps (CT-1)					
3. Implementation of CTRM habitability (CT-27)					
Event No.	Malf. No.	Event Type*	Event Description		
1		N-BOP/SRO	Transfer from Motor Driven Feed Pump to MFP 1		
2		R-ATC/SRO	Increase power to 4%		
3		C-BOP/SRO (TS)	Service Water Pump Trip		
4		C-ATC/SRO	MU32, PZR LVL Control valve, fails open		
5		I-BOP/SRO	SG 2 Pressure Instrument Fails High		
6		C-ATC/SRO (TS)	RCS Leak in Containment		
7		M-ALL	Large LOCA		
8		C-BOP/SRO	CCW Pump fails to start		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Scenario Event Summary

DAVIS-BESSE 2015 NRC SCENARIO 4

The scenario begins with the plant in Mode 2 ~2% power plant startup in progress. . Aux Boiler is in service. MFP 2 is ready to place in service, currently maintaining 800-1000 RPM. 2 TBVs per side are isolated. DB-OP-06901 is completed up to step 3.25. The BOP will place MFP 2 in service and the ATC will raise Reactor Power while controlling heatup rate at less than 35°F/Hr. The BOP will place the Anticipatory Reactor Trip System (ARTS) test toggle switches for the Operating Main Feed Pump in OPERATE.

Once power has been raised to 4% and stabilized the Lead Evaluator can cue the Service Water Pump supplying secondary loads to trip. SW HDR PRESS alarm will sound and the SRO will implement DB-OP-02511, Loss of Service Water Pumps/ System. The BOP will isolate Service Water (SW) to that train Containment Air Cooler (CAC) and verify Circulating Water aligned to cool secondary loads. The SRO will enter the applicable TS and direct the spare SW Pump to be placed in service. The BOP will restore secondary loads and restore CAC SW flow.

After Service Water is restored to normal, the Lead Evaluator will cue Normal Makeup Line, MU32, PZR level control valve to fail open. MU FLOW HI TRN 2 will alarm. The ATC will need to isolate MU32 and the SRO will implement DB-OP-02512 Makeup and Purification System Malfunctions for loss of normal makeup and place the alternate injection line in service.

When the alternate injection line is placed in service and PZR level is restored, the Lead Evaluator will cue the SG 2 pressure transmitter PT SP12A2 failing high, resulting in SG2 TBVs and AVV opening. The BOP will close the AVV, isolate the in service TBV, select an alternate pressure transmitter and restore the TBV and AVV to service.

With the alternate SG 2 pressure transmitter selected and the plant stabilized the Lead Evaluator will cue the RCS leak in Containment. The SRO will implement DB-OP-02522, Small RCS Leaks to mitigate the leak. The reactor will require tripping per immediate actions of DB-OP-02522 due to PZR level below 100 inches.

When the Reactor is tripped the RCS leak will increase to a large LOCA. The Emergency Diesel Generators will start on SA level 2 actuation. The standby Component Cooling Water Pump will fail to auto start and will be started from the control panel.

Subcooling margin will be lost requiring the RCPs to be tripped (**CT-1**). Section 5 of DB-OP-02000, Loss of Subcooling Margin, will be entered. HPI, LPI and MU will be placed in service (**CT-2**). Transition will be made to Section 10, Large LOCA. Control Room EVS will be placed in service (**CT-27**).

When Control Room EVS is placed in service the scenario can be terminated at the Lead Evaluators discretion.