

Facility: Davis-Besse Scenario No.: 1 Op Test No.: DB NRC 2018

Examiners: _____ Operators: _____ SRO
 _____ ATC
 _____ BOP

- Initial Conditions:
- 5% power / Mode 1
 - Rod Control Panel in Auto
 - MFPT 2 in service
 - MDFP is Unavailable while being aligned for AFW mode

Turnover:

- Plant was shut down for bushing replacement on the Main Transformer.
- Reactor startup is in progress and currently at 5% (Mode 1 entered).
- Continue a plant startup per DB-OP-06901, starting at Step 3.43.
- Completed testing of both AFPTs for operability.

Planned:

- Continue Reactor startup.
- Complete line-ups for placing MDFP in AFW mode (currently in progress).
- Complete venting of FW779 and FW780.

Critical tasks: 1. Trip All Reactor Coolant Pumps (CT1)

2. Initiate HPI Flow Balancing (CT2)

Event No.	Malf. No.	Event Type*	Event Description
1		R-ATC/SRO	Continue Reactor startup from 5% to 10%. Stabilize at 10% to perform NIP to HBP comparison
2		N-BOP/SRO	Place Main Feed Reg Valves in service (Open Block Valves)
3		C-BOP/SRO	Rising Cond pressure - Vacuum Pump auto start fail
4		SRO (TS)	Inverter YV1 DC input failure (TS)
5		C-ATC/SRO	Makeup Filter High diff press
6		I-BOP/SRO (TS)	SFAS CTMT Press transmitter fails low (TS)
7		C-ATC/SRO	RCS Leak – trip Reactor at 100 inches
8		M-ALL	LOCA
9		C-ATC/SRO	HPI Pump trip requiring flow balancing

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

Scenario Event Summary

DAVIS-BESSE 2018 NRC SCENARIO 1

The Crew will be allowed the opportunity to review the in progress DB-OP-06901, Plant Startup, procedure prior to entering Simulator and assuming control.

The Crew will take the watch with power stabilized at approximately 5% (Mode 1 entered). A reactor startup is in progress following a shutdown for bushing replacement on the Main Transformer. The MDFP is unavailable while in the process of being transferred to the Auxiliary Feedwater mode. Direction will be to increase power to 10%, stabilize for NIP to Heat Balance comparison and continue to 14% power (event 1).

An Equipment Operator will report the steps complete for venting the bonnets of the MFW Block Valves. The BOP RO will open the MFW Block Valves placing the Main Feedwater Control Valves in service (event 2).

When the Main Feedwater Control Valves are in service the Lead Evaluator will cue rising condenser pressure. The crew will identify rising pressure from trend recorder data or from receipt of annunciator alarms 15-1-F and/or 15-2-F, Hi/Lo Pressure Condenser Pressure Hi. The Unit Supervisor will enter abnormal procedure DB-OP-02518, High Condenser Pressure. The Mechanical Hogger will fail to auto start and the BOP will manually start the Mechanical Hogger. Condenser pressure will stabilize at less than 5.0 inches HgA and reactor power reduction to maintain less than or equal to 5.0 HgA will not be required (event 3).

At the Lead Evaluators cue, INV YV1-YV3 TRBL Annunciator alarm will be received and an Equipment Operator will report breaker D1P03 found in the tripped position. Inverter YV1 will be declared Inoperable. Tech Spec 3.8.7, Condition A, for Inverters-Operating will be entered (event 4).

At the Lead Evaluators cue annunciator 2-4-A, Letdown or MU Filter Differential Pressure Hi, will alarm due to high differential pressure across the #1 Makeup Filter (PDI MU13 greater than 25 psid). The crew will implement alarm procedure actions, validate #1 Makeup Filter differential pressure is high, and swap to #2 Makeup Filter using DB-OP-06006, Makeup and Purification System (event 5).

At the Lead Evaluators cue SFAS Channel 4 Containment Pressure Transmitter will fail low. Annunciator 5-4-B, SFAS CTMT PRESS LO FAIL will alarm. The SRO will enter Tech Spec 3.3.5 Condition A and the BOP will trip the required Bistables in SFAS Channel 4 (event 6).

On Lead Evaluators cue an RCS leak will develop in Containment resulting in Pressurizer level dropping below 100 inches and requiring the ATC to trip the reactor per DB-OP-02522, Small RCS Leaks, immediate action (event 7).

When the reactor is tripped the RCS leak will increase resulting in a loss of Adequate Subcooling Margin which will require tripping of all 4 Reactor Coolant Pumps (CT-1) (event 8).

High Pressure Injection Pump 2 will trip requiring HPI Flow Balancing to be performed (CT-2) (event 9).

When HPI Flow Balancing has been performed the scenario can be terminated.

Facility: Davis-Besse Scenario No.: 2 Op Test No.: DB NRC 2018

Examiners: _____ Operators: _____ SRO
 _____ ATC
 _____ BOP

Initial Conditions: • 100% Power

Turnover: Maintain 100% Power
 Routine activities

Planned: Add 50 gallons of water to the Makeup Tank (MUT) to verify proper operation of batch controller (FIN request)

Critical tasks: 1. Shutdown the Reactor - ATWS (CT-24)

2. Initiate MU/HPI PORV Cooling (CT-14)

Event No.	Malf. No.	Event Type*	Event Description
1		N-ATC/SRO	Add 50 gal of water to the RCS Makeup tank
2		C-BOP/SRO (TS)	NI Power Range NI5 fails low
3		I-ATC/SRO	Selected PZR Level Transmitter fails Low
4		C-BOP/SRO (TS)	Isolable steam Leak – loss AFP
5		C-BOP/SRO	Main Feed Turbine Pump 1 High Vibrations
6		R-ATC/SRO	MFP Runback fails – reduce power
7		Major	Loss of all Feedwater – ATWS (Momentarily de-energize 480 Volt Unit Substations E2 and F2)
8		C-ATC/SRO	STBY MUP trips – establish MU/HPI PORV Cooling

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

DAVIS-BESSE 2018 NRC SCENARIO 2

The crew will take the watch with power at 100%. The ATC will add 50 gallons of water to the Makeup Tank (MUT) to verify proper operation of batch controller (event 1).

The Lead Evaluator will cue Power Range NI 5 to fail low which will cause RPS Ch 2 to trip on $\phi/\Delta\phi$ /flow. The SRO will enter DB-OP-02505, NI Failures, and enter Technical Specification 3.3.1 Condition A, and will direct the BOP to place RPS Channel 2 in Manual Bypass (event 2).

The Lead Evaluator will cue the selected PZR Level instrument failure which will fail low over two minutes. Annunciator 4-2-E, 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 (event 3).

The Lead Evaluator will cue an isolable steam leak which will result in the loss of #2 AFP. The crew will respond to annunciator 12-2-A, SG 1 to AFP 2 Mn Stm Press Lo, and implement abnormal procedure DB-OP-02525, Steam Leaks. The steam leak will be determined to be in AFPT Room 2, and attachment 1 of DB-OP-02525 will be used to isolate the steam leak. The Unit Supervisor will review applicable Technical Specifications and enter 3.7.5 Condition A and B for Inoperable Steam Supply (event 4).

The Lead Evaluator will then cue Main Feedwater Pump Turbine (MFPT) 1 High Vibrations. The SRO will direct the BOP to trip MFPT #1 as directed by DB-OP-02010 Feedwater Alarm Panel 10 (event 5).

When MFPT 1 is tripped the auto runback will fail requiring the ATC to place HIC ICS13, SG/RX DEMAND, in HAND and perform the runback at 20% / minute to 55% power per DB-OP-06401, Integrated Control System Operating Procedure (event 6).

The Lead Evaluator will then cue the loss of all feedwater event. Main Feedwater Pump 2 will trip. AFW Pump 1 **will start and the** Motor Driven Feedwater pump will fail to start. The CREW will determine an ATWS has occurred. The ATC will be required to **momentarily de-energize 480 Volt Unit Substations E2 and F2** to de-energize the CRDMs and shut down the reactor (CT-24) (event 7).

The Crew will stabilize the plant and route through DB-OP-02000 supplemental section. After 10 minutes the remaining AFW Pump will trip resulting in a loss of all feedwater. The ATC will start the standby Makeup Pump per specific rule 4.

The SRO will enter Section 6, Lack of Heat Transfer and direct the ATC to prepare for MU/HPI Cooling. One minute after the standby Makeup Pump is started Annunciator Alarm 2-1-B, MU PMP 1 LUBE OIL PRESS LO, will sound and the standby Makeup Pump will trip. The CREW will determine Specific Rule 4 applies and the SRO will direct immediate initiation of MU/HPI PORV Cooling (CT-14) (event 8).

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DAVIS-BESSE 2018 NRC SCENARIO 3

The Crew will take the watch with power at 70% and RCP 1-1 shutdown three days ago due to high vibrations. Following shift turnover the Crew will swap running Main Feed Pump Turbine Main Oil Pumps as required by the Monthly Activity Log (event 1).

After the MFPT Oil Pumps are swapped the Lead Evaluator will cue the Main Seal Oil Pump shaft shear. The Emergency Seal Oil Pump (ESOP) will Auto start, but the Main Seal Oil 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 Seal Oil Pump shaft shear. The BOP will turn off the Main Seal Oil Pump. (event 2).

When the Main Seal Oil Pump is stopped the Lead Evaluator will cue the PORV to fail open. The crew will respond with immediate actions to isolate the PORV IAW DB-OP-02513, PRESSURIZER SYSTEM ABNORMAL OPERATION (CT-3). The SRO will declare the PORV Inoperable, enter T.S. 3.4.11 Condition A, and direct opening breaker BE1602 for RC11, PORV Block Valve (event 3).

The Lead Evaluator will cue #1 TPCW pump upper motor bearing high oil temperature requiring pump shutdown and start of standby pump. The crew will diagnose the trend and shutdown #1 TPCW Pump and start the standby TPCW Pump. The system procedure may be used to swap pumps or the abnormal may be used after stopping #1 TPCW Pump (event 4).

The Lead Evaluator will then cue indications of a tube leak in #2 Steam Generator (approximately 25 gpm). The crew will respond to annunciator 12-1-B, MN STM LINE 2 RAD HI, in accordance with DB-OP-06012, STM GEN/SFRCS Alarm Panel 12 Annunciator and then enter DB-OP-02531, STEAM GENERATOR TUBE LEAK. The crew will evaluate the SG leakage and determine the leak rate is in excess of T.S. 3.4.13 (TS) and start a rapid shutdown (event 5).

When a rapid shutdown is in progress the Lead Evaluator will cue a loss of ICS DC power which will require the crew to implement immediate actions of DB-OP-02532 and trip the reactor and manually initiate and isolate SFRCS. The crew will then implement the Emergency Procedure DB-OP-02000 (event 6).

After the Reactor is tripped the Lead Evaluator will cue the tube leak to increase to a tube rupture at approximately 400 gpm. The Unit Supervisor will implement the Emergency Procedure by routing to section 8 for Steam Generator Tube Rupture. (event 7)

The BOP will control RCS temperature using the AVVs and the ATC will begin depressurizing the Reactor Coolant System to minimum subcooling margin (CT-7). When the RCS spray valve is opened it will fail and the spray valve block valve will also fail to close. The SRO will direct the ATC to shut down the loop 2 RCP 2-2 and RCP 2-1 to reduce spray flow to zero per DB-OP-02000, Table 5 or DB-OP-02513, Pressurizer Abnormal Attachment 1 (event 8).

When the RCS Pressure reduction is controlled the scenario can be terminated.