

**Form 3.3-1 Scenario Outline**

Facility:	Davis Besse	Scenario #:	1
Scenario Source:		Op. Test #:	January 2024
Examiners:		Applicants/	
		Operators:	
Initial Conditions:	100% Power, EFW OOS, MOC		
Turnover:	Swap Main Feed Pump Turbine Main Oil Pumps per the Monthly Activity Log per DB-OP-06224, MAIN FEED PUMP AND TURBINE, Sections 3.23 and 3.24		
Critical Tasks:	<ol style="list-style-type: none"> <li>1. Bypass Emergency Core Cooling System Actuation</li> <li>2. Maintain Feedwater Flow Control Avoiding SFRCS Actuation</li> </ol>		

Event No.	Malfunction No.	Event Type*	Event Description
1	N/A	(N) BOP (N) SRO	Swap MFPT Main Oil Pumps
2		(I) BOP (I/TS) SRO	Safety Features Actuation System Borated Water Storage Tank Level Fails High – Channel 1 (TS)
3		(I/MC) ATC (I) SRO	RCP Seal Injection Flow Transmitter Fails Low
4		(C) BOP (R) ATC (C) SRO	Main Condensate Pump 3 High Bearing Temperature Reduce Power due to Stopping Condensate Pump 3
5		(C) ATC (C/TS) SRO	Steam Generator Tube Leak in Steam Generator 1 (TS)
6		(M) CREW	Steam Generator Tube Rupture in Steam Generator 1
7		(C/MC) BOP (C) SRO	Steam Generator 1 Startup Valve Fails Closed
Termination Criteria:			<ul style="list-style-type: none"> <li>• Critical Tasks have been evaluated</li> <li>• RCS Cooldown in progress</li> <li>• At the discretion of the Lead Evaluator</li> </ul>
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS)Tech Spec, (MC)Manual Control			

### CT1: Bypass Emergency Core Cooling System Actuation

- **Initiating Cue:** Both of the following:
  - 5-2-C, SFAS RC PRESS LO BLK PERM in alarm
  - RCS pressure is being manually reduced and under control
  - SFAS Low Pressure Block Permit lights are lit on HIS 7528 through 7531
- **Performance Feedback:**
  - RCS pressure reduced below the SFAS Low Pressure Trip setpoint without an SFAS actuation
- **Success Path:** 3 SFAS Channels are blocked prior to reaching the SFAS RC Pressure Lo Trip Setpoint
- **Measurable Performance Standard:**
  - On Panel C5705, in the RCS DEPRESSURIZATION SFAS BLOCK section, check which SFAS Channel(s) BLOCK PERMIT INDICATION light is ON
  - Depress the PUSH TO BLOCK switch for the SFAS Channel(s) noted in Step 3.2.b
  - Verify the BLOCKED INDICATION light is ON
- **Safety Significance:** During SGTR mitigation with adequate Subcooling Margin, RCS pressure is reduced to minimize tube stress and control primary to secondary side leakage. With RCS pressure under control SFAS actuation should be bypassed to prevent unwanted and unnecessary equipment actuation.

### CT2: Maintain Feedwater Flow Control Avoiding SFRCS Actuation

- **Initiating Cue:** Both of the following:
  - No indicated FW flow to SG 1 on FI SP3B
  - 12-4-A, SG 1 LVL LO in alarm
- **Performance Feedback:** All of the following:
  - Indicated flow on FI SP3B
  - Rising level on Plant Process Computer Screen
- **Success Path:** Manually controlling SG1 level at approximately 40 inches to avoid a low SG level SFRCS actuation using FIC ICS33B.
- **Measurable Performance Standard:** Take manual control of SP7B and maintain SG 1 level on low level limits.
- **Safety Significance:** Restoring Feedwater to SG 1 prevents a release to the environment from a possible SFRCS actuation on Low Level. An SFRCS actuation will result in off-site release which will result in a Site Area Emergency classification.

## **Scenario Executive Summary**

### **Initial Conditions / Turnover:**

The crew will take the watch with the plant at 100% power.

### **Direction(s) for the Shift:**

Swap Main Feed Pump Turbine Main Oil Pumps per the Monthly Activity Log per DB-OP-06224, MAIN FEED PUMP AND TURBINE, Sections 3.23 and 3.24. Auxiliary Operators have been briefed and standing by to complete the evolution.

### **EVENT 1: Swap MFPT Main Oil Pumps**

The BOP will swap the running MFPT Main Oil Pumps per DB-OP-06224, MAIN FEED PUMP AND TURBINE, Sections 3.23 and 3.24.

### **EVENT 2: Channel 1 BWST level instrument fails High**

The BOP will manually trip the associated Safety Features Actuation System (SFAS) BWST level bistable to allow a transfer to the Emergency Sump if conditions require that transfer ability (TS). LCO 3.3.5 is not met.

### **EVENT 3: Reactor Coolant Pump Seal Injection Flow Transmitter Fails Low**

Actual Seal Injection Flow will increase to all 4 Reactor Coolant Pumps due to the flow transmitter failing low. ATC is expected to place MU 19 flow controller in Hand and MANUALLY control seal injection flow.

### **EVENT 4: Condensate Pump 3 High Bearing Temperature / Reduce Power**

Condensate pump 3 bearing temperature will rise to the alarm setpoint of T186 and continue past the trip criteria of 212°F. The ATC is expected to reduce power to within the capacity of 2 Condensate pumps. 7 MPPH is the expected maximum flow with 2 Condensate Pumps. During a normal power reduction, the first Condensate pump will be removed from service by the BOP when condensate flow is less than 7 MPPH.

### **EVENT 5: SG 1 Steam Generator Tube leak**

After power is stabilized with 2 Condensate pumps, the steam generator tube leak (SGTL) is inserted. The crew will enter DB-OP-02531 and begin a power reduction to take the plant off-line. LCOs 3.4.13 and 3.4.17 are not met.

### **EVENT 6: Major – SG 1 Tube Rupture (CT)**

When the manual plant runback has been completed or when directed by the lead evaluator, the steam generator tube rupture (SGTR) can be inserted. The crew will reduce power to Low Level Limits (approximately 30%), transfer steam loads from the main turbine to the turbine bypass valves, then trip the reactor. The crew will lower RCS Pressure to isolate the faulted SG. SFAS RCS Low Pressure trip will be blocked as pressure is lowered.

### **EVENT 7: SG 1 Startup Valve Fails Closed (CT)**

After a programmed time delay of 2 minutes after the reactor trip, SG 1 startup level valve will fail closed. The BOP will be required to place SP7B in Hand and MANUALLY control level prior to reaching the SG Low Level SFRCS Actuation.

### **Scenario Termination**

The scenario is terminated when the Critical Tasks have been evaluated, the crew has performed the RCS pressure reduction and commenced the RCS Cooldown, and at the discretion of the Lead Evaluator.

### Form 3.3-1 Scenario Outline

Facility:	<u>Davis Besse</u>	Scenario #:	<u>2</u>
Scenario Source:	<u></u>	Op. Test #:	<u>January 2024</u>
Examiners:	<u></u>	Applicants/	<u></u>
	<u></u>	Operators:	<u></u>
Initial Conditions:	5% Power, Startup in Progress, MUP #2 OOS and non-functional		
Turnover:	Raise reactor power to 10% RTP per DB-OP-06901, PLANT STARTUP, Step 3.42 and then place Main Feed Reg Valves in service per Step 3.43.		
Critical Tasks:	<ol style="list-style-type: none"> <li>1. Start High Pressure Injection Pump</li> <li>2. Start Standby CCW Pump</li> </ol>		

Event No.	Mal. No.	Event Type*	Event Description
1		(R) ATC	Continue Reactor startup from 5% to 10%.
2	N/A	(N) BOP (N) SRO	Place Main Feed Reg Valves in service (Open Block Valves)
3		(TS) SRO	Broken High Pressure Injection Pump 2 Oil Flow Sight Glass (TS)
4		(I/MC) BOP (I) SRO	Condensate Deaerator Level Control Transmitter Failure
5		(I) ATC (I) BOP (I/TS) SRO	Power Range Nuclear Instrument 5 Fails High (TS)
6		(M) CREW	TPCW Service Water Supply pipe rupture Trip the Reactor / Initiate and Isolate the Steam and Feedwater Rupture Control System / ABDC1 fails open
7		(C/MC) BOP (C) SRO	Auxiliary Feedwater Pump 2 Fails to Automatically Start
8		(C/MC) ATC (C) SRO	C2 Lockout – EDG 1 Auto Starts – Start STBY CCW Pump
9		(M) CREW	Loss of Coolant Accident / Loss of Subcooling Margin
10		(C/MC) ATC (C) SRO	Start High Pressure Injection Pump 1
Termination Criteria:			<ul style="list-style-type: none"> <li>• Critical Tasks have been evaluated</li> <li>• At the discretion of the Lead Evaluator</li> </ul>
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS)Tech Spec, (MC)Manual Control			

### CT1: Start Standby CCW Pump

- **Initiating Cue:** Both of the following:
  - CCW Pump 1 panel indications
  - 1-3-B, EDG 1 CCW FLOW LO in alarm
- **Performance Feedback:**
  - Annunciator 1-3-B is Clear
  - CCW Pump 1 Red Light Lit
- **Success Path:** Manually start CCW Pump 1.
- **Measurable Performance Standard:** Start CCW Pump 1 within 11 minutes of the C2 Lockout.
- **Safety Significance:** When the Loss of Subcooling Margin occurs with HPI Pump 2 unavailable, HPI Pump 1 will be needed to increase the total flow reaching the RCS. With C2 locked out and Breaker ABDC1 out of service, EDG 1 is the only available power source for C1. Starting CCW Pump 1 is necessary to maintain EDG available.

Operation without CCW or SW will lead to EDG overheating and failure. The EDG is shutdown if SW or CCW is not available. PCAQ 98-1883 reviewed the time available to perform the EDG Shutdown. Based on discussions with EDG vendor (documented in the PCAQ), in a loaded condition, the EDG Jacket Water would reach the high temperature shutdown setpoint in approximately 3 minutes. If the EDG continued to run, the cylinder head would likely crack in approximately 6 minutes, and the EDG would likely seize in 11 to 14 minutes. The critical task time of 11 minutes will prevent diesel failure.

### CT2: Start High Pressure Injection Pump 1

- **Initiating Cue:** All of the following:
  - Only a single HPI pump is available
  - HPI Flowmeters FYI HP3C and FYI HP3D
  - DB-OP-02000 Specific Rule 3 and Attachment 11, HPI Flow Balancing applicable
- **Performance Feedback:** All of the following:
  - HPI Flowmeters FYI HP3C and FYI HP3D
  - HPI Pump running indication
- **Success Path:** Start HPI Pump 1.
- **Measurable Performance Standard:** HPI Pump started and providing core cooling vice entry into Attachment 24, RCS Cooldown during a Loss of SCM with no Makeup/HPI.

**Safety Significance:** Whenever Subcooling Margin is lost, HPI flow is established to provide core heat removal. Use of Attachment 24 exceeds Technical Specification cooldown rate limits.

## **Scenario Executive Summary**

### **Initial Conditions / Turnover:**

The crew will take the watch with the plant at 5% Power with a startup in progress per DB-OP-06901, PLANT STARTUP.

### **Direction(s) for the Shift:**

Raise reactor power to 10% RTP per DB-OP-06901, PLANT STARTUP, Step 3.42 and then place Main Feed Reg Valves in service per Step 3.43.

### **EVENT 1: Continue Reactor startup from 5% to 10%**

The ATC will increase power to 10% and stabilize power for Nuclear Instrument Power to Heat Balance comparison per DB-OP-06901, PLANT STARTUP, Step 3.42.

### **EVENT 2: Place Main Feed Reg Valves in service (Open Block Valves)**

An Equipment Operator will report the steps complete for venting the bonnets of the MFW Block Valves. The BOP will open the MFW Block Valves placing the Main Feedwater Control Valves in service per DB-OP-06901, PLANT STARTUP Step 3.43.

### **EVENT 3: Broken High Pressure Injection Pump 2 Oil Flow Sight Glass**

Equipment Operator reports a broken sight glass for the lube oil system on HPI Pump 2. The crew is expected to Refer to TS 3.5.2 ECCS – Operating for Modes 1,2 and 3 and enter LCO Action B, Restore the train to operable status within 72 hours. The crew should disable the automatic start of HPI Pump 2. If HPI Pump 2 is not disabled it will fail 1 minute after starting.

### **EVENT 4: Condensate Deaerator Level Control Transmitter Failure**

LT421 for Condensate D/A #1 will fail high causing CD421 to close. The BOP is expected to take manual control of LIC421 and MANUALLY control #1 D/A level.

### **EVENT 5: Power Range Nuclear Instrument 5 Fails High**

Power Range Nuclear Instrument NI5 will fail high. The SRO will enter TS 3.3.1 RPS INSTRUMENTATION, Condition A, Functions 1, 7, and 8 on RPS Channel 2. The BOP will place RPS Channel 2 in MANUAL BYPASS and place the Power Range Test Module to TEST OPERATE.

### **EVENT 6: Major – TPCW Service Water Supply Pipe Rupture**

TPCW Service Water pipe rupture indicated by service water tunnel sump alarms and lowering pressure in the service water header. DB-OP-02511, Attachment 15 will direct tripping the reactor and initiating and isolating the SFRCS system.

### **EVENT 7: Auxiliary Feedwater Pump 2 Fails to Automatically Start**

MS5889B does not open when SFRCS is initiated. The BOP is expected to MANUALLY open MS5889B to start AFP 2.

### **EVENT 8: C2 Lockout – EDG 1 Auto Starts – Start STBY CCW Pump (CT)**

The Standby CCW pump (1) does not start automatically. The ATC operator is expected to MANUALLY start CCW Pump 1 to supply cooling water to EDG 1.

### **EVENT 9: Major - Loss of Coolant Accident / Loss of Subcooling Margin**

After the plant is stabilized post-trip, an RCS leak develops causing a loss of subcooling margin (SCM) will be indicated by Annunciator 4-1-B SUBCOOL MARGIN LO and at least one SCM meter on the Post Accident Monitoring Panels indicating less than 20 degrees SCM. The crew is expected to stop all 4 RCPs per Specific Rule 2 of DB-OP-02000.

### **EVENT 10: Start High Pressure Injection Pump 1 (CT)**

The output module for HPI 1 and the associated discharge valves are failed. With a loss of subcooling margin and only a single HPI pump available for makeup, the ATC is expected to establish HPI flow to provide cooling for the reactor.

### **Scenario Termination**

The scenario is terminated when the Critical Tasks have been evaluated and at the discretion of the Lead Evaluator.

**Form 3.3-1 Scenario Outline**

Facility:	Davis-Besse	Scenario #:	3
Scenario Source:		Op. Test #:	January 2024
Examiners:		Applicants/	
		Operators:	
Initial Conditions:	80% Power, MOC, MUP 2 OOS and non-functional		
Turnover:	Complete the Function check of BAF3		
Critical Tasks:	<ol style="list-style-type: none"> <li>1. Manually trip the Rx</li> <li>2. Supply C1 or D1 from the SBODG</li> </ol>		

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	(N) BOP (N) SRO	Complete the functional check of BAF3 alternate source Breaker for substation F3
2		(I) ATC (I/MC) BOP (I) SRO	Loop 1 MFW flow indication fails mid-scale
3		(TS) SRO	Containment Spray Pump (CSP) Oil Leak (TS)
4		(C) ATC (C/TS) SRO	Approximately 10 GPM unidentified RCS leak inside containment (TS)
5		(R) ATC (R) BOP	Rapid Shutdown due to RCS leakage
6		(M) CREW	LOCA inside containment
7		(C/MC) ATC (C) SRO	RPS fails to trip the Rx
8		(C/MC) ATC (C) SRO	Loss of offsite power EDG 1 and 2 both fail to start/lockout
9		(C/MC) BOP (C) SRO	AF6452 fails OPEN due to a SG Level Instrument Failure
Termination Criteria:			<ul style="list-style-type: none"> <li>• Critical Tasks have been evaluated</li> <li>• Attachment 8 completed</li> <li>• At the discretion of the Lead Evaluator</li> </ul>
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS)Tech Spec, (MC)Manual Control			

### CT1: Manually trip the reactor prior to tripping the Main Turbine

- **Initiating Cue:** ALL of the following:
  - CRs NOT FULLY INSERTED
  - Reactor Power greater than 5%
- **Performance Feedback:** All of the following:
  - CRs fully inserted
  - Reactor power is lowering on the IR NI
- **Success Path:** Entry into DB-OP-02000, RPS, SFAS, SFRCS TRIP, OR SG TUBE RUPTURE and performing a manual reactor trip, this will insert all control rods into the core shutting down the nuclear chain reaction as part of steps 3.2 and 3.3.
- **Measurable Performance Standard:** Insert negative reactivity into the core prior to completing step 3.3 RNO of DB-OP-02000. The reactor trip using the manual Reactor Trip pushbuttons will not be successful. The crew will be successful in tripping the reactor when they insert the Reactor Trip Test key and rotate the key clockwise at the Rod Control Panel.
- **Safety Significance:** If the Main Turbine is tripped prior to the reactor being shutdown, steam generator pressures will rise resulting in excessive cycling of the SG code safeties. Main Steam Safety valves will fail open resulting in an overcooling event which will exacerbate the ATWS condition.

### CT2: Supply C1 or D1 from the SBODG

- **Initiating Cue:** All of the following
  - C1 and D1 are de-energized by observing voltage meters
  - Procedure Direction: DB-OP-02000, Specific Rule 6
  - LOOP - Control Room Lighting off
- **Performance Feedback:**
  - Bus C1 or D1 energized
- **Success Path:** By manually starting the Station Blackout Diesel Generator and aligning it to Bus C1 or D1 within 10 minutes from the time Specific Rule 6 step 6.2 has been verified.
- **Measurable Performance Standard:** Energize either C1 or D1 by starting and loading the Station Blackout Diesel within 10 minutes. 10 minutes is associated with ELAP Time Sensitive Operator Action.
- **Safety Significance:** Plant electrical power is necessary for the operation of normal and emergency plant equipment. Therefore, it is important that the plant operator provide normal AC power, usually supplied through the station startup transformer(s). If normal AC power cannot be supplied, then actions are necessary to initiate operation of the emergency AC source(s). Both EDGs become unavailable therefore the crew must start the SBODG to supply C1 or D1.

## **Scenario Executive Summary**

### **Initial Conditions / Turnover:**

Davis Besse Unit 1 will be at 100% during the middle of the operating cycle. No Xenon transient is in progress. No equipment is out of service.

### **Direction(s) for the Shift:**

Complete the functional check of BAF3 Alternate Source Breaker for Substation F3 by performing a live bus transfer of unit substation F3 to normal power.

### **EVENT 1: Complete the functional check of BAF3**

Crew will complete the functional check of BAF3 Alternate Source Breaker for Substation F3 by performing a live bus transfer of unit substation F3 to normal power using DB-OP-06317, section 3.6. This event is completed when the live bus transfer is complete and unit substation F3 is on its normal power supply and with the concurrence of the lead evaluator.

### **EVENT 2: Loop 1 MFW flow indication fails mid-scale**

An instrument failure will occur on SP2A-1 MFW flow transmitter in such manner that SASS will not auto swap to the redundant instrument. The crew will respond by placing the following ICS stations to manual/hand: Rod Control diamond, BOTH FW stations, Loop 1 MFW Control Valves, and adjusting control rods and FW flow to stabilize RCS temperature and reduce power less than 100%. The crew may also respond per DB-OP-02526, PRIMARY – SECONDARY HEAT TRANSFER UPSET, Immediate Actions if the failure is not immediately recognized. This event is complete when the plant is stabilized below 100%, RCS Pressure and Temperature are stabilized, manual control responsibilities and control bands have been established, and with the concurrence of the Lead Evaluator.

### **EVENT 3: Containment Spray Pump (CSP) Oil Leak**

The Lead Evaluator will then cue event 3. An EO performing normal rounds will call the control room and report the oil has leaked out of the CSP 1 inboard bearing reservoir. The SRO will declare the CSP 1 Inoperable and enter TS LCO 3.6.6 (Containment Spray and Air Cooling Systems), Condition A. The crew will direct disabling CSP 1 from starting.

### **EVENT 4: Approximately 10 GPM RCS leak in containment resulting in manual downpower**

A small reactor coolant leak (approximately 10 gpm) will develop that will result in PZR level lowering (less than max charging capability) and lowering PZR pressure. The crew will enter DB-OP-02522, SMALL RCS LEAKS and determine the RCS leak rate. The ATC will perform leak isolation procedure steps but will not be able to specify the location other than that it is in containment. The crew will determine that based on location and leak rate that a downpower is required per step 4.11. The crew will brief and begin a Reactor shutdown. This event is completed when Reactor power has been lowered to less than 75%, actions have been taken

for a leak in containment, and with the concurrence of the lead evaluator. The SRO will analyze Technical Specifications and determine TS LCO 3.4.13 (RCS Leakage), Condition A and TS LCO 3.4.15 (RCS Leakage Detection Instrumentation), Condition A entry are required.

#### **EVENT 5: Major – Small break Loss of Coolant Accident inside containment**

At approximately 70% power, the small coolant leak will propagate quickly into a small break LOCA (exceeding charging pump capacity) such that the crew will attempt to trip the reactor prior to PZR Level reaching 100 inches. The crew will enter DB-OP-02000, RPS, SFAS, SFRCS TRIP or SG TUBE RUPTURE. The manual Reactor Trip Pushbuttons will not be successful in tripping the reactor. The crew will address the failed reactor trip (outlined below).

#### **EVENT 6: Manual Reactor Trip Successful in Inserting Control Rods (CT)**

The crew will manually trip the reactor and verify Rx power is lowering in the Intermediate Range when they insert the Reactor Trip Test key and rotate the key clockwise at the Rod Control Panel. The crew will progress through DB-OP-02000 Immediate Actions then implement any necessary Specific Rules Actions. When the reactor is tripped, a loss of offsite power will occur.

#### **EVENT 7: Loss of offsite power, with a failure of both EDG1 and 2 to start automatically (CT)**

The loss of offsite power results in a loss of RCPs and secondary non-vital loads. The crew will implement SR 2, Actions For Loss Of Subcooling Margin and SR 6, Power for C1 and D1 buses OR EDG start. SR 6 Step 6.2 will direct the crew to perform Attachment 28, Restore Power to C1 or D1 Bus from the SBODG. The crew will then perform symptom checks and route to Section 5 for Loss of SCM.

#### **EVENT 8: AF6452 fails to open on SFRCS initiation signal**

A malfunction with SG 1 Level Instrument will cause AF6452 to fail OPEN which will result in SG 1 overfeed. The crew will implement SR 4, Steam Generator Control and Attachment 5 Guidelines for Restoring Feedwater to place LIC6452 in manual and adjust SG 1 level to 124".

#### **Scenario Termination**

The scenario is terminated when the Critical Tasks have been evaluated, the crew has completed Attachment 8, and at the discretion of the Lead Evaluator.

**Form 3.3-1 Scenario Outline**

Facility:	Davis-Besse	Scenario #:	4
Scenario Source:	New	Op. Test #:	January 2024
Examiners:		Applicants:	
Initial Conditions:	92% Power, MOC, EFW Pump OOS		
Turnover:	Shift Condensate pumps to a lineup of condensate pumps 2 and 3 running and 1 in standby IAW DB-OP-06221		
Critical Tasks:	<ol style="list-style-type: none"> <li>1. Initiate and isolate SFRCS when the main turbine fails to trip</li> <li>2. Initiate HPI/MU cooling</li> </ol>		
Event No.	Malf. No.	Event Type*	Event Description
1	N/A	(N) BOP (N) SRO	Start Condensate pump 3, stop Condensate pump 1 per DB-OP-06221
2	N/A	(I/MC) ATC (I) BOP (I/TS) SRO	RCS Press NNI input fails low (TS)
3	N/A	(R) ATC (TS) SRO	A control rod from group 5 drops fully into the core (TS)
4	N/A	(M) CREW	Second control rod drops into the core
5	N/A	(C/MC) ATC (C) SRO	Main Turbine FAILS to trip: <ul style="list-style-type: none"> <li>Turbine stop valve #2 fails to close.</li> <li>All Turbine control valves fail to close.</li> </ul>
6	N/A	(C) CREW	Complications on the Reactor Trip <ul style="list-style-type: none"> <li>AFW pump #2 fails to start.</li> <li>AFW pump #1 trips on overspeed with a damaged trip linkage.</li> <li>MDFP trips immediately on overcurrent</li> <li>STBY makeup pump fails to start</li> </ul>
7	N/A	(C) ATC (C) BOP (C) SRO	Plant is aligned for MU/HPI cooling
Termination Criteria:			<ul style="list-style-type: none"> <li>Critical Tasks have been evaluated</li> <li>PORV opened to initiate HPI/MU cooling</li> <li>At the discretion of the Lead Evaluator</li> </ul>
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS)Tech Spec, (MC)Manual Control			

### CT1: Manually Initiate and Isolate SFRCS prior to SFAS actuation

- **Initiating Cue:** All of the following
  - TSV #2 not closed
  - TCVs not closed
  - Turbine Header pressure lowering
- **Performance Feedback:** All of the following
  - MSIVs closed
  - Slower rate of change for RCS temperature
- **Success Path:** Entry into DB-OP-02000 and performing a manual SFRCS initiation and actuation, this will close MSIVs, isolating steam to the main turbine.
- **Measurable Performance Standard:** Directing isolation of steam to the Main Turbine prior to SFAS actuation.
- **Safety Significance:** Actuating SFRCS upon a failure of the turbine to trip provides a faster response than other actions such as tripping EHC pumps and will work independent of the EHC system or Turbine control and stop valves. Closing both Main Steam Isolation Valves will secure steam flow to the main turbine and will stop the overcooling event.

### CT2: Initiate MU/HPI cooling

- **Initiating Cue:** ALL of the following:
  - A loss of all MFW
  - A loss of all AFW
  - A second MU pump cannot be started
- **Performance Feedback:** All of the following
  - Open indication on MU6419 MU ALTERNATE INJECTION LINE
  - Lock open RC2A PORV
  - Lowering RCS temperature
- **Success Path:** Establishing MU/HPI cooling per Attachment 8 prior to RCS pressure reaching the automatic opening setpoint of the PZR PORV ensures adequate core cooling and an unnecessary loss of RCS inventory.
- **Measurable Performance Standard:** Establish MU/HPI cooling per Attachment 8 prior to exceeding  $T_{HOT}$  of 600F for greater than 10 minutes.
- **Safety Significance:** In the event all feedwater is lost, HPI cooling provides backup cooling of the core. If only one MU pump is operational, then MU/HPI cooling must be initiated immediately. If corrected  $T_{HOT}$  remains less than 600F, then adequate core cooling is assured. Hot leg temperature is allowed to exceed 600F for a period not to exceed 10 minutes based on the analysis contained in FCR 85-0261.

## **Scenario Executive Summary**

### **Initial Conditions / Turnover:**

Unit is at 92% during the middle of the operating cycle with MU pump 1 running. No Xenon transient is in progress.

The EFW pump is out of service for planned maintenance and is expected back within 12 hours.

### **Direction(s) for the Shift:**

Shift Condensate pumps to a lineup of condensate pumps 2 and 3 running and 1 in standby IAW DB-OP-06221.

### **Event 1: Shift running condensate pumps**

Crew will swap condensate pumps such that Condensate pumps 2 and 3 are running, and Condensate pump 1 is in standby IAW DB-OP-06221. Event is complete when condensate pumps 2 and 3 are running and condensate pump 1 is in standby and/or with the concurrence of the lead evaluator.

### **Event 2: RCS Press NNI input fails low (TS)**

Event 2 will be initiated at Leads Evaluator's direction. RCS pressure instrument selected for NNI fails low. The crew will implement DB-OP-02513, Pressurizer System Abnormal Operation, for Failure of Pressure Input to Heaters, Spray and PORV. Manual control of heaters will be required due to input pressure signal failing low. The pressure input to NNI will be swapped to the non-faulted signal IAW DB-OP-06403, RPS and NNI Operating Procedure. Heater controls will then be returned to automatic control. The Unit Supervisor will enter Technical Specification 3.3.1 Condition A for the pressure instrument failure. The TS required action will be completed since the channel will already be tripped due to the failure. The SRO should direct bypassing RPS CH 1 to obtain 2 out of 3 RPS Trip Logic. When Technical Specification 3.3.1 Condition A has been entered and at Leads Evaluator's direction, proceed to Event 3.

### **Event 3: A group 5 control rod drops fully into the core (TS)**

One group 5 control rod will drop fully into the core. Crew will recognize reactor power lowering and respond to various annunciators (specifically, 5-2-E, CRD ASYMMETRIC ROD). Crew will enter DB-OP-02516 (CRD malfunctions) and diagnose that one group 5 control rod will have dropped fully into the core. Crew will take action per section 4.1.3 and reduce reactor power to < 50% with the unit load demand at 3%/minute. The SRO will refer to LCO 3.1.4 and 3.1.7 and enter determine both are NOT MET and enter 3.1.4 Condition A (Control Rod group alignments, various actions) and 3.1.7 Condition A (API / RPI operable for each control rod, Determine API within 8 hours). Event is completed when the downpower is in progress with reactor power < 80%, and with the concurrence of the lead examiner.

### **Event 4: Major – Second control rod drops into the core requiring a manual reactor trip**

The crew will determine a second control rod has dropped into the core and will be required to manually trip the reactor per If At Any Time (IAAT) step 4.1.1. Event is completed when the reactor is manually tripped. This will automatically continue to event #6 with no additional action steps required.

### **Event 5: Turbine stop valve #2 and all Turbine control valves will fail to close on the turbine trip (CT)**

When the manual reactor trip is inserted, Turbine stop valve #2 and all Turbine control valves will fail to close when the turbine is tripped (auto AND manual trips will FAIL to close these valves). Crew will take the Response not obtained (RNO) action in step 3.5 of DB-OP-02000 and initiate and isolate SFRCS using the manual actuation switches.

### **Event 6: Complications after Reactor Trip (AFW failure, MDFP trips on overcurrent, STBY M/U pump sheared shaft)**

Additionally, when the AFW actuation signal is sent by SFRCS, AFW pump #1 will overspeed and be unavailable due to a damaged trip linkage. AFW pump #2 will fail to start and be unavailable due to bound steam admission valve.

IAW DB-OP-2000 Step 4.1 (Supplemental Actions), crew will transition to Specific Rule (SR) 4 (Steam Generator Control, page 285) and place the MDFP in service.

When the MDFP start is attempted, a malfunction with the MDFP will cause the breaker to trip on overcurrent. Crew will utilize RNO for step 4.1 of SR 4. Crew will identify a total loss of feedwater (EFW is OOS from initial conditions). Crew will be directed to start a standby Makeup Pump.

The standby Makeup pump will start as indicated by a red light but will immediately trip. Crew will determine that two MU pumps are not available and GO TO Attachment 4, Initiate MU/HPI cooling, immediately.

### **Event #7 – Plant aligned for MU/HPI Cooling (CT)**

Crew will take the actions specified in Attachment 4, Initiate MU/HPI cooling to include: tripping all but 2-2 RCP, performing Attachment 8, turning off all PZR heaters, locking M/U suction to the BWST, opening PZR PORV.

### **Scenario Termination**

The scenario is terminated when the Critical Tasks have been evaluated, the crew has opened RC-2A PORV, and at the discretion of the Lead Evaluator.