Facility:	Davis-Besse	Scenario No.	1	Op Test No.:	DB1LOT22
Examiners:	_____	Operators:	_____		SRO
	_____		_____		ATC
	_____		_____		BOP

Initial Conditions: 100% Power

Turnover: Maintain 100% Power

Planned: Place Purification Demin 3 in service for 20 minutes per chemistry request.

Critical tasks:

1. Close the PORV Block Valve
2. Restore RCP Seal Return

Event No.	Malf. No.	Event Type*	Event Description
1		(N) ATC	Place Purification Demin 3 I/S per Chemistry request
2		(C) BOP	Trip TPCW Pump 1 Hi Bearing Temp / Start STBY pump
3		(TS) SRO	Inverter YV1 DC input failure (TS)
4		(R) ATC (C) BOP	TPCW Pump 2 trips - Lower power to capacity of 1 TPCW Pump - Minimize TPCW Loads
5		(I) ATC (TS) SRO	Leaking Power Operated Relief Valve (PORV) (TS)
6		Major	Steam Leak in CTMT / Trip Reactor
7		(C) BOP	AFP 1 Trips - Start the MDFP

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

DAVIS-BESSE 2022 SCENARIO 1

Event 1 Place Purification Demin 3 I/S per Chemistry request

The Crew will take the watch with power at 100%. They will then brief placing Purification Demin 3 in service for 20 minutes per Chemistry request. The ATC will swap purification demineralizers IAW DB-OP-06006, Makeup and Purification System, Section 3.14 Switching Purification Demineralizers. When #3 Purification Demin is in service then the Lead Evaluator will cue Event 2, PORV Leakage

Event 2 Trip Turbine Plant Cooling Water (TPCW) Pump due to Hi Bearing Temp / Start STBY pump

TPCW Pump 1 Hi Bearing Temp. The BOP will stop TPCW Pump 1 and start the TPCW Pump 3. The system procedure may be used to swap pumps or the abnormal may be used after stopping #1 TPCW Pump.

Event 3 Inverter YV1 DC input failure (TS)

At the Lead Evaluators cue, INV YV1-YV3 TRBL Annunciator alarm will be received, and an Equipment Operator will report a “Low DC Voltage” light on YV1 and 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 TPCW Pump 2 trips / Lower power to capacity of 1 pump

At the Lead Evaluators cue, TPCW Pump 2 will trip due to a ground fault. The crew will enter Rapid Shutdown and lower power to within the capacity of 1 TPCW Pump, ~65% Power.

Event 5 Leakage Past the Power Operated Relief Valve (PORV) (TS) (CT)

Leakage past the PORV is indicated by additional Pressurizer Heaters energizing and several RCS low pressure annunciators. If no operator action is taken, a reactor Trip could occur in less than 60 seconds with a subsequent Loss of Subcooling Margin. The expected operator action is to close the PORV Block Valve. LCO 3.4.11 is not met.

Event 6 Steam Leak in CTMT From Main Steam Line 2 / Trip reactor (CT)

The Lead Evaluator will cue the Main Steam Line break in Containment. DB-OP-02525, Steam Leaks, will be implemented. The crew will lower power to low level limits (~30% power) then trip the reactor and Initiate and Isolate the Steam and Feedwater Rupture Control System (SFRCS). When the reactor is tripped the steam leak will get bigger causing Safety Features Actuation System (SFAS) Level 3 to actuate due to high Containment pressure. MU38, RCP Seal Return will Auto Close, starting a 30-minute clock to either restore seal return flow to all RCPs or stop any pump not having its seal return flow path restored.

Event 7 Auxiliary Feedwater Pump (AFP) 1 Trips - Start the Motor Driver Feedwater Pump (MDFP)

The crew will route to DB-OP-02000 Section 7 for the overcooling event. The BOP will Close AF599 and blowdown SG #2 to terminate the overcooling. Event 7 will trip AFP 1. The BOP is expected to recognize this failure and either place the MDFP in service for AFP 1 or align AFP 2 to feed SG 1.

When Reactor Coolant Pump (RCP) Seal Return is restored, or the RCPs are stopped the scenario can be terminated.

Op Test No.: 2022	Scenario # 1	Event # 1	Page 1 of 1
Event Description:	Place Purification Demin 3 I/S per Chemistry request		

Time	Position	Applicant's Actions or Behavior
Indications Available: • **MU10B HISMU10B** • **MU1903 HIS1903** • **RCS Letdown Pressure P719 (Computer Point)**		
	SRO	Refer to DB-OP-06006, Makeup and Purification System, Section 3.14 Switching Purification Demineralizers.
	ATC	Notify Radiation Protection the Purification Demineralizers are being switched.
●	ATC	Place #3 Purification Demineralizer in service: • Open MU1903, PURIFICATION DEMIN 3 LETDOWN FLOW INLET, using HIS1903. • Close MU10B, MIXED BED 2 LETDOWN INLET, using HISMU10B.
The crew should set a 20-minute timer. Switching Purification demineralizers back to #2 in service during this scenario is not required.		
Continue with Event 2, TPCW Pump 1 High Temperature Upper Motor Bearing at the direction of the Lead Evaluator.		
NOTE: It takes approximately 2 minutes for the computer point alarm to actuate.		
	ATC	Place #2 Purification Demineralizer in service: • Open MU10B, MIXED BED 2 LETDOWN INLET, using HISMU10B. • Close MU1903, PURIFICATION DEMIN 3 LETDOWN FLOW INLET, using HIS1903.

Op Test No.: 2022	Scenario # 1	Event # 2	Page 1 of 1
Event Description:	TPCW Pump 1 High Temperature Upper Motor Bearing		

Time	Position	Applicant's Actions or Behavior
Indications Available: • **T159 TPCW Pump 1 Upper Motor Bearing Oil Temperature**		
	CREW	Recognize computer alarm T159 indicating high temperature TPCW Pump 1 Upper Motor Bearing Oil Temperature
	BOP	Dispatch Equipment Operator to evaluate TPCW Pump 1
	Booth Cue	***Equipment Operator reports:*** ***There is low oil level indicated in TPCW Pump 1 upper motor bearing sight glass and (if still running) there is a loud sound coming from the bearing.***
	SRO	Direct stopping TPCW Pump 1 • Annunciator 11-1-F TPCW HI-LVL-TK LVL is expected
●	BOP/SRO	Stop TPCW Pump 1 using HIS627
	SRO	Enter DB-OP-02514, TPCW MALFUNCTIONS
	SRO	Direct placing TPCW Pump 3 in service per DB-OP-02514, TURBINE PLANT COOLING WATER MALFUNCTIONS
●	BOP/SRO	Start TPCW Pump 3 using HIS629
	Booth Cue	***Post start check of #3 TPCW Pump is SAT***
	CREW	Monitor TPCW Tank Levels and System flow rate
Proceed to Event 3, Inverter YV1 DC input failure (TS)		

Op Test No.: 2022	Scenario # 1	Event # 3	Page 1 of 1
Event Description:	Inverter YV1 DC input failure (TS)		

Time	Position	Applicant's Actions or Behavior
Indications Available: • **1-6-A INV YV1-YV3 TRBL** • **D1P03 Red Light is Off** • **Computer Point Q424 YV1 TRBL**		
	CREW	Respond to DB-OP-02001, Electrical Distribution Alarm Panel 1 Annunciators, 1-6-A
	CREW	Recognize Inverter YV1 DC input failure • D1P03 red light is off • Computer Point Q424, "YV1 TRBL"
	SRO	Refer to DB-OP-06319, Instrument AC System Procedure, Sect. 5.1, Response to INV YV1 TRBL Alarms
	CREW	Dispatch an Equipment Operator to YV1 and D1P03
	Booth Cue	***Role Play as Equipment Operator and report:*** ***"The LOW DC VOLTAGE red light is ON and Breaker D1P03 for Inverter YV1 is tripped."***
●	SRO	Declare Inverter YV1 Inoperable. • LCO 3.8.7, "The Train 1 and Train 2 inverters shall be OPERABLE", is not met • Enter Condition A: One inverter inoperable • REQUIRED ACTION: A1 Restore inverter to OPERABLE status • COMPLETION TIME: 24 hours
	SRO	Contact Electrical Maintenance to investigate
When Tech Spec has been declared and at Lead Evaluators direction, proceed to Event 4, TPCW Pump 2 Trip		

Op Test No.: 2022	Scenario # 1	Event # 4	Page 1 of 4
Event Description:	TPCW Pump 2 trips/Lower Power to capacity of 1 Pump		

Time	Position	Applicant's Actions or Behavior
Indications Available: • **Green trip light ON, Motor current at zero** • **(11-1-F) TPCW HI LVL TK LVL** • **TPCW HLCWT level lowering as indicated at LI 1588A** • **Q158, CLNG WTR PMP 2 OFF**		
	CREW	Recognize Turbine Plant Cooling Water (TPCW) Pump 2 Trip
	BOP	Dispatch Equipment Operator to check pump and breaker
	Booth Cue	***Role play as Equipment Operator and report:*** • ***There's nothing abnormal at TPCW Pump 2*** • ***There's a 50 GS (ground sensor) flag on Breaker AD206 for TPCW Pump 2***
NOTE: May enter Rapid Shutdown prior to Turbine Plant Cooling Water Malfunctions		
	SRO	Enter DB-OP-02514, Turbine Plant Cooling Water Malfunctions Section 4.1 Loss of One Turbine Plant Cooling Water Pump
	SRO	IF AT ANY TIME the TPCW High Level Cooling Water Tank level (LI1588A) drops to 5 feet, THEN perform the following: a. Direct a Reactor Operator to perform Attachment 1, TPCW Affected Equipment Shutdown. b. Trip the Reactor. c. Initiate AND Isolate SFRCS using MANUAL ACTUATION Switches. d. GO TO DB-OP-02000, RPS, SFAS, SFRCS Trip or SG Tube Rupture.

Op Test No.: 2022	Scenario # 1	Event # 4	Page 2 of 4
Event Description:	TPCW Pump 2 trips/Lower Power to capacity of 1 Pump		

Time	Position	Applicant's Actions or Behavior
NOTE: Power will be reduced until TPCW Hi Level Tank level begins to rise.		
	SRO	Reduce Reactor power until system heat load is within the capacity of one TPCW Pump (approximately 4000 gpm). REFER TO DB-OP-02504, Rapid Shutdown.
●	SRO/ATC	Direct the ATC Operator to perform Attachment 1, Power Reduction Actions ICS Full Automatic • At the LOAD CONTROL Panel, set the rate of change • At the LOAD CONTROL Panel, select the target RTP ○ Monitor power ***Expected Target Load is 50% with 3-5% per minute rate of change***
●	SRO/BOP	○ Notify the System Dispatcher • Adjust generator MVARs to between 0 and 50 MVARs OUT. ***NOTE: 16-2-B may alarm if the AVR lower limit is reached***
	SRO/BOP	Dispatch an EO to locally throttle the running TPCW Pump's discharge valve and maintain discharge pressure greater than 50 psig.
	Booth Cue	***Role play as EO, Discharge pressure on TPCW Pump 3 is ~70 psig, throttling is not required***
	SRO	Notify the Shift Manager to: ○ REFER TO DB-OP-00002, Operations Section Event/Incident Notifications and Actions. ○ REFER TO NOBP-OP-0011, Fleet Reporting and Updates.

Op Test No.: 2022	Scenario # 1	Event # 4	Page 3 of 4
Event Description:	TPCW Pump 2 trips/Lower Power to capacity of 1 Pump		

Time	Position	Applicant's Actions or Behavior
		NOTE: The crew may elect not to complete all actions in Attachment 2 of DB-OP-02514 if TPCW High Level Cooling Water Tank level is rising
●	SRO/BOP	Perform DB-OP-02514 Attachment 2, TPCW Load Reduction. o Dispatch an Operator to adjust the setpoint for TIC 2396B, GEN H2 CLRS WTR OUT TEMP IND CTRL to 113°F and monitor Generator Cold Gas temperature • START the EIAC o Direct an EO to Open SA6445, INSTRUMENT AIR / STATION AIR CROSSTIE SOLENOID. Place the following equipment in LOCKOUT • Station Air Compressor 1 (HIS812) • Station Air Compressor 2 (HIS1494) • Mechanical Hogger (HIS1005). Direct an EO to reduce TPCW flow as follows: o Close CW470, STATION AIR COMPRESSOR 2 COOLING WATER SUPPLY o Close CW1020, MECHANICAL HOGGER COOLER 1 INLET
		The remaining steps are not required to be completed to continue the drill. When TPCW High Level Cooling Water Tank level is rising and At Lead Evaluator's direction, proceed to Event 6, Steam Leak in CTMT/Trip Reactor
	SRO/BOP	Perform Attachment 6, BOP Actions for Rapid Shutdown o At approximately 90% power, notify an EO to remove the AFP Turbine Main Steam Min flow lines from service. Refer to DB-OP-06233, AFW System. o AT ANY TIME, condensate flow is less than 7.0 MPPH (FI578), THEN establish two Condensate pumps in operation o At approximately 675 MWe, notify an EO to coordinate control of MSRs RSLLVs. REFER TO Attachment 9, Controlling RSLLV(s) During Rapid Shutdown

Op Test No.: 2022	Scenario # 1	Event # 4	Page 4 of 4
Event Description:	TPCW Pump 2 trips/Lower Power to capacity of 1 Pump		

Time	Position	Applicant's Actions or Behavior
	SRO	Notify Equipment Operators to commence Attachment 15, Field Actions for a Rapid Shutdown. (DB-OP-02504)
	SRO	REFER TO Attachment 7, Plant Stabilization at a Lower Power Level. (DB-OP-02504)
	SRO	Notify the System Load Dispatcher of current plant conditions
	SRO	WHEN TPCW High Level Cooling Water Tank level is restored to normal, THEN perform the following • IF TIC 2396B, GEN H2 CLRS WTR OUT TEMP IND CTRL setpoint was changed to 113°F in Attachment 2, THEN evaluate plant conditions AND restore TIC2396B setpoint to 110°F • Return to Normal Operations, REFER TO NOP-OP-1002, Conduct of Operations.
NOTE: Ensure plant has stabilized prior to inserting Event 5		
At Lead Evaluator's direction, proceed to Event 5, Leaking Power Operated Relief Valve (PORV) (TS)		

Op Test No.: 2022	Scenario # 1	Event # 5	Page 1 of 2
Event Description:	Leaking Power Operated Relief Valve (PORV) (TS)		

Time	Position	Applicant's Actions or Behavior
Indications Available: • **Annunciator 4-1-D PZR RLF VLV OPEN** • **PORV Acoustic Indication Red Lights Lit**		
	Team	Recognize indications of leakage past the Power Operated Relief Valve (PORV)
***Critical Task**	ATC	***Close RC11 PORV Block using HIS RC11**
	SRO	Implement DB-OP-02513, Pressurizer System Abnormal Operation, Section 4.4 Leaking PORV, RC2A
●	SRO	REFER TO Tech Specs 3.4.11, Pressurizer Pilot Operated Relief Valve (PORV), and comply with requirements. LCO 3.4.11 The PORV and associated block valve shall be operable in MODES 1, 2 and 3 CONDITION A: PORV Inoperable A.1 Close block valve. Completion Time:1 hour AND A.2 Remove power from block valve. Completion Time:1 hour
	Team	Dispatch an EO to open Breaker 1602, RC11 PORV BLOCK
	SRO	Determine the RCS leak rate (may be estimated using 1 inch in MU Tank equals 30 gallons), REFER TO DB-SP-03357, RCS Water Inventory Balance.

Op Test No.: 2022	Scenario # 1	Event # 5	Page 2 of 2
Event Description:	Leaking Power Operated Relief Valve (PORV) (TS)		

Time	Position	Applicant's Actions or Behavior
	SRO / TEAM	REFER TO Tech Specs 3.4.13, RCS Operational Leakage, and comply with requirements. • Determine Closing the PORV Block Valve has stopped all PORV leakage
	SRO / TEAM	REFER TO Tech Specs 3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits • Determine RCS loop pressure ≥ 2064.8 psig
The remaining steps of Event 2 are not required to be observed before proceeding to Event 3, TPCW Pump 1 High Temperature Upper Motor Bearing.		
	TEAM	Verify proper Quench Tank operation. Refer to DB-OP-06004, Quench Tank.
		Consult with Plant Management (Shift manager) as necessary to confirm that normal operation may continue. Request the Shift manager to Refer to the following: • Change in nuclear safety risk • Pressurizer boron concentration buildup. • Technical Requirements Manual for Reactor Coolant System Vents • Technical Requirements Manual for PAM Instrumentation 8.3.7, Table 8.3.7-1, Function 3, RC11 Position Indicator. • NOP-OP-1015, Event Notifications. • DB-OP-01200, Reactor Coolant System Leakage Management. NOP-OP-1010, Operational Decision Making • DB-OP-06003, Pressurizer System Operations (operation with PORV Block closed)
	Booth Cue	***Breaker 1602, RC11 PORV BLOCK is OPEN***
At Lead Evaluator's direction, proceed to Event 6, Main Steam Line break in CTMT		

Op Test No.: 2022	Scenario # 1	Event # 6	Page 1 of 7
Event Description:	Main Steam Line break in CTMT		

Time	Position	Applicant's Actions or Behavior
Indications Available: • **4-4-A CTMT TO ANNULUS ΔP HI/LO** • **CTMT to annulus ΔP rising** • **Indicated MWE output lowering** • **Slightly lowering Containment Radiation levels on Safety Parameters Display System (SPDS) Computer screen.**		
	CREW	Identify symptoms of a steam leak inside containment • Containment (CTMT) to annulus DP rising • Stable CTMT Radiation Levels
	SRO	Implement DB-OP-02525, Steam Leaks
	SRO	Verify no one is in CTMT
	ATC	Monitor Reactor power
	SRO	Refer to DB-OP-02504, Rapid Shutdown to continue the plant shutdown
●	ATC/SRO	Use Attachment 1, Power Reduction Actions ICS Full Automatic Operation, to shutdown the plant • At the LOAD CONTROL Panel, set the rate of change • At the LOAD CONTROL Panel, select the target RTP ○ Monitor power ***Expected Target Load is Low Level Limits (28%) with 3-5% per minute rate of change***

Op Test No.: 2022	Scenario # 1	Event # 6	Page 2 of 7
Event Description:	Main Steam Line break in CTMT		

Time	Position	Applicant's Actions or Behavior
	CREW	Monitor Containment pressure for Safety Features Actuation System (SFAS) or Reactor Protection System (RPS) trip setpoints
	SRO	Notify the Shift Manager to refer to DB-RA-01500, Emergency Classification
	CREW	Determine which Steam Generator has the steam leak ***NOTE: Will not be able to tell at this point in the scenario***
	SRO	Direct the Balance of Plant Operator to continue with Attachment 6, Balance of Plant Actions for Rapid Shutdown for new target power level • Shutdown MFP 1 • Shutdown Heater Drain Pumps
	SRO	Notify Equipment Operators to continue with Attachment 15, Field Actions for a Rapid Shutdown
	SRO	Notify the SCC Load Dispatcher of plant shutdown
	SRO	Notify Chemistry to Monitor Condensate Polisher Operation and sample the RCS for isotopic iodine. Refer to TS 3.4.16.

Op Test No.: 2022	Scenario # 1	Event # 6	Page 3 of 7
Event Description:	Main Steam Line break in CTMT		

Time	Position	Applicant's Actions or Behavior
	ATC	Maintain Makeup Tank Level between 55 and 86 inches
	ATC/SRO	**NOTE: Could also trip the reactor if Safety Features Actuation System (SFAS) OR Reactor Protection System (RPS) trips on High Containment Pressure prior to reaching Low Level Limits** WHEN Steam Generators are on Low Level Limit Control, • Determine which SG has the steam leak, if possible • Trip reactor • Verify power decreasing on the Intermediate Range • Trip the Turbine • VERIFY all Turbine Stop Valves OR Control Valves are closed • Initiate AND Isolate SFRCS using MANUAL ACTUATION Switches
NOTE: SFAS will actuate when the Reactor is Tripped.		
	CREW	Recognize an SFAS Level 3 actuation due to high Containment pressure • 5-1-B, SFAS CTMT PRESS HI CH TRIP **Time SFAS 1-3 Actuation_____**
	SRO	GO TO DB-OP-02000, RPS, SFAS, SFRCS Trip, or SG Tube Rupture
	SRO/ATC	Verify immediate actions: • Trip the Reactor • Verify power decreasing on the Intermediate Range • Trip the turbine • Verify all Turbine Stop Valves OR Control Valves are closed

Op Test No.: 2022	Scenario # 1	Event # 6 & 7	Page 4 of 7
Event Description:	Main Steam Line break in CTMT & AFPT 1 Trip		

Time	Position	Applicant's Actions or Behavior
	CREW	Implement any necessary Specific Rules Actions. • ACTIONS FOR LOSS OF SUBCOOLING MARGIN • STEAM GENERATOR CONTROL • POWER FOR C1 AND D1 BUSES OR EDG START
	ATC	Implement SR 6, POWER FOR C1 AND D1 BUSES OR EDG START
Event 7 is embedded in Event 6		
	SRO/BOP	Recognize AFPT 1 is tripped

●	BOP	Implement Specific Rule 4, STEAM GENERATOR CONTROL
		
		Place the MDFP in service
		• Enable BOTH Motor Driven Feedwater Pump (MDFP) Discharge Valves
		  ◦ HIS 6460
		  ◦ HIS 6459.
		• Close BOTH MDFP Discharge Valves
		  ◦ LIC 6460
		  ◦ LIC 6459
		• Start the MDFP
		OR
		
		Align AFP 2 to feed SG 1
		• Close AF 3872
		• Open AF 3871

	SRO	Implement any necessary Symptom Mitigation Sections • Lack of Adequate Subcooling Margin • Lack of Heat Transfer • Overcooling

Op Test No.: 2022	Scenario # 1	Event # 6 & 7	Page 5 of 7
Event Description:	Main Steam Line break in CTMT		

Time	Position	Applicant's Actions or Behavior
	SRO	Routes to Section 7, Overcooling
	ATC	Performs Attachment 8 • Check both CCW Trains are in service • Check both trains of HPI are in service • Check all HPI Injection valves are open • Verify both trains of LPI are in service Open both piggyback valves. • DH64 • DH63 Transfer Makeup Pump suctions to the BWST AND press OFF • MU6405 • MU3971 • Verify Pressurizer Level Controller is set to 100 inches • Start the standby MU Pump Actions if pressurizer level <40 inches • Lock MU6405/3971 on the BWST • Close MU2B • Check all PZR Heaters off Place alternate injection line in service • Open MU6421 • Throttle MU6419
	BOP	Verify proper Steam and Feedwater Rupture Control System (SFRCS) actuation

Op Test No.: 2022	Scenario # 1	Event # 6 & 7	Page 6 of 7
Event Description:	Main Steam Line break in CTMT		

Time	Position	Applicant's Actions or Behavior
	BOP	Close AF599 to isolate Auxiliary Feedwater (AFW) flow to SG 2
	BOP	Block and open Atmospheric Vent Valve (AVV) 2 to blowdown SG 2
	BOP	If at any time an SFRCS isolation causes the AVV to close during the blowdown of the affected SG then block and reopen the affected AVV
	BOP	When the SG is blown down (SG pressure approaching 0 psig and SG level less than 16 inches) close the AVV
	BOP	Maintain proper SG level in the non-isolated SG with AFW using Specific Rule 4.
	BOP	WHEN SG 2 boils dry (terminating the overcooling), THEN control the AVV on SG 1 to maintain RCS temperature constant or slightly decreasing.
	SRO/ATC	Begin RCS depressurization to minimum subcooling margin using the spray valve (CSRO set band 30°-70°)
	ATC/BOP	Verify proper SFAS actuation for the trip parameters present. REFER TO Table 2.
NOTE: IF SCM is adequate, THEN MU/HPI shall be throttled to prevent exceeding the maximum P/T for cooldown limit line on Figure 1.		
	ATC	Throttle HPI flow as necessary to control Pressurizer level and SCM. REFER TO Specific Rule 3, HPI/LPI/MU Control

Op Test No.: 2022	Scenario # 1	Event # 6 & 7	Page 7 of 7
Event Description:	Main Steam Line break in CTMT		

Time	Position	Applicant's Actions or Behavior
NOTE: It is preferred to establish a minimum seal injection flow prior to opening the seal return flow path, however Seal Return may be restored first.		
	ATC	Restore Seal Injection • Close MU19, FLOW CONTROL • Verify a MU Pump Cross Connect Header isolation valve is open to supply seal injection - MU6408 - MU6409 Block and open the following valves: • MU66A, RCP SEAL INJECTION 2-1 • MU66B, RCP SEAL INJECTION 2-2 • MU66C, RCP SEAL INJECTION 1-1 • MU66D, RCP SEAL INJECTION 1-2 Gradually (over approximately 2 minutes) • Throttle open MU19 to establish Seal Injection Flow of 12-15 gpm (approximately 3 gpm per RCP).
Critical Task*	ATC	Restore Seal Return Verify RCP Seal Return Isolations are closed: • MU59A • MU59B • MU59C • MU59D *Block and Open MU38, RCP SEAL RETURN Block AND Open RCP SEAL RETURN ISO valves: • *MU59A • *MU59B • *MU59C • *MU59D **Time RCP Seal Return is restored OR RCPs are stopped** **TIME_____**
When RCP Seal Return has been restored, the scenario can be terminated.		

Justification for Critical Tasks

The term “Critical Task”, is defined in NUREG-1021, OPERATOR LICENSING EXAMINER STANDARDS FOR POWER REACTORS. The listed critical tasks were compiled based on a review of Areva Technical Document 47-1229003-06, EOP Technical Bases Document, and additional CTs were added based on established DB Operations expectations and standards for previously identified Critical Task.

Close the PORV Block Valve

1. Safety Significance:
   Prevent a Loss of Subcooling Margin.

2. Cues:
   - Lowering RCS pressure
   - Annunciators 4-1-D, 5-1-G, 5-2-G, 4-1-B

3. Measured by:
   - Required Action: Close the PORV Block Valve
   - Failure to meet the Critical Task: The PORV Block valve is not closed in time to prevent a Loss of Subcooling Margin.

4. Feedback:
   - RCS Pressure Stabilizes high enough to prevent a Loss of subcooling Margin
   - Saturation Meters on PAM panels
   - Valve position indication

Technical Basis References:

1. Davis-Besse Tech Spec Bases 3.3.1 Reactor Protection System (RPS) Instrumentation
   a. RC Low Pressure
   b. RC Pressure – Temperature
2. Davis-Besse Tech Spec Bases 3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits
3. Areva Technical Document 47-1229003-06 CT-3, ISOLATE POSSIBLE RCS LEAK PATHS

Justification for Critical Tasks

The term “Critical Task”, is defined in NUREG-1021, OPERATOR LICENSING EXAMINER STANDARDS FOR POWER REACTORS. The listed critical tasks were compiled based on a review of Areva Technical Document 47-1229003-06, EOP Technical Bases Document, and additional CTs were added based on established DB Operations expectations and standards for previously identified Critical Task.

Restore RCP Seal Return flow

1. Safety Significance:
   The actuation of SFAS levels 1-3 results in a loss of the seal return flowpath. Extended operation without an RCP Seal Return flowpath may result in seal failure and unisolable RCS leakage. Loss of the seal return flowpath exposes the last seal to full RCS pressure. RCP seals are designed to withstand full RCS pressure only for a limited time while the pump is running. Davis Besse has established 30 minutes as the maximum time allowed for an operating pump without a seal return flowpath.

2. Cues:
   - Loss of seal return flow as indicated by MU38 closed and RCPs running
   - DB-OP-02515, REACTOR COOLANT PUMP AND MOTOR ABNORMAL OPERATION and DB-OP-02000 Attachment 10

3. Measured by:
   - Required Action – Restore Seal Return or shutdown RCPs
   - Failure to meet the Critical Task –Seal Return not restored within 30 minutes or RCPs not stopped after 30 minutes of operation with MU38 closed (actuation of SFAS levels 1-3 due to high containment pressure).

4. Feedback:
   - MU38, MU59A, MU59B, MU59C and MU59D are opened, or RCPs are stopped.

Technical Basis Reference:

1. DB-OP-02515, Reactor Coolant Pump and Motor Abnormal Operation Procedure, ATTACHMENT 6: Background Information - Loss of RCP Seal Return Flow.
   Continued operation of the Reactor Coolant Pump for up to 30 minutes is allowed to attempt to restore the seal return flowpath. Extended operation without an RCP Seal Return flowpath may result in seal failure.

2. M-508-00087-04 Instrument Manual for Byron Jackson N-9000 Seal Cartridge

SIMULATOR SETUP INFORMATION

1. Simulator Setup

   100% Power

   Ensure Crew has procedure for placing #3 Purification in service

2. Procedures

   DB-OP-06006, MU and Purification System

   DB-OP-02005, Primary Instrumentation Alarm Panel

   DB-OP-03006, Miscellaneous Instrument Shift Checks

   DB-OP-06405, SFAS Procedure

   DB-OP-02514, TPCW Malfunctions Abnormal Procedure

   DB-OP-06263, Turbine Plant Cooling Water Operating Procedure

   DB-OP-02001, Electrical Distribution Alarm Panel 1 Annunciators

   DB-OP-06319, Instrument AC System Procedure

   DB-OP-02504, Rapid Shutdown

   DB OP 02525, Steam Leaks

   DB-OP-02000, RPS, SFAS, SFRCS Trip or SG Tube Rupture

3. Procedures for Simulator Instructor:
   None required

Facility:	Davis-Besse	Scenario No.: 2	Op Test No.:	DB NRC 2022	
Examiners:		Operators:		SRO	
				ATC	
				BOP	

Initial Conditions: 100% Power

Turnover: Maintain 100% Power

Planned: Weekly Run of the Standby Makeup Pump 2 Oil Pumps

Critical tasks:

1. Shutdown Reactor - ATWS
2. Isolate Overcooling Steam Generators

Event No.	Malf. No.	Event Type*	Event Description
1		(C) ATC (TRM) SRO	Weekly Run of the Standby Makeup Pump 2 Oil Pumps (TRM)
2		(I) ATC	Pressurizer Temperature Instrument Fails High
3		(C) BOP	Main Feedwater Pump Turbine 1 High Drain Tank Level
4		(C) BOP	Swap SFP Pumps due to high bearing temp/vibration
5		(R) ATC/(TS) SRO (N) BOP	Dropped Control Rod - Reduce Reactor Power (TS) Stop Condensate pump during down power
6		Major	Main Generator Lockout - ATWS
7		(C) BOP	Stuck Open Main Steam Safety Valve - Overcooling
8		(C) BOP	Steam Feed Rupture Control System fails to automatically align for a low-pressure trip on Steam Generator 1

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

DAVIS-BESSE 2022 NRC SCENARIO 2

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

EVENT 1: Weekly Run of the STBY MU Pump (2) Oil Pumps (TRM)
The ATC will start Makeup Pump 2 Oil Pumps. The local Equipment Operator reports an oil leak from a broken flow glass on the pump motor end bearing. The control room operator is expected to stop the AC Oil Pump. The Makeup Pump should be declared non-functional. The CSRO should enter TNC 8.1.1 Action A.

EVENT 2: Pressurizer Temperature Instrument fails High
TT RC 15-1 Fails High, resulting in pressurizer level indicating above the high level annunciator setpoint. The crew is expected to place MU 32 in hand and control pressurizer level using the non-compensated level instruments until a functional alternate temperature transmitter is selected.

EVENT 3: MFPT 1 Drain Level High
A sheared shaft on the running drain pump will cause level in the LP drain header to rise. The standby drain pump does not auto start as expected. The BOP will manually start the standby pump. Level will return to normal after the standby pump is started.

EVENT 4: Swap Spent Fuel Pool Pumps (SFP) due to high bearing temp/vibration
An equipment operator will contact the CTRM and notify them that the running SFP Pump Bearing is hot and vibrating, no oil is in the sight glass. The BOP will be directed to shut down the pump. The crew will enter DB-OP-02547, Spent Fuel Pool Malfunctions and start the STBY Pump. The Shift Manager will direct swapping pumps only, Heat Exchangers will be aligned later.

EVENT 5: Dropped Control Rod 4-9 – Reduce Power (TS)
Control Rod 4-9 drops into the core. The plant responds with a reduction in both average RCS temperature and Nuclear Instrument power. The crew will respond in accordance with DB-OP-02516, CRD Malfunctions. Power is reduced to 50% using the Unit Load Demand (ULD) Max Load Limit (MLL) at 3% per minute. The BOP will establish two Condensate Pump Operation when directed by DB-OP-02504, Rapid Shutdown. The following Tech Specs are not met: 3.1.4, 3.1.5, 3.1.7

EVENT 6: Major Transient -The Main Generator will Lockout when directed by the lead examiner – ATWS (CT)
During the power reduction the Main Turbine trips in response to a Main Generator Lockout. The expected Reactor Trip does not occur and the Immediate Actions of DB-OP-02000 are performed to verify the reactor is tripped. The test trip key does not trip the reactor and E2 and F2 are de-energized to trip the reactor.

EVENT 7: Main Steam Safety Valve (MSSV) fails open on Steam Generator (SG) 1 (CT)
Overcooling is initiated by the failure of a MSSV. The overcooling section of DB-OP-02000 will be entered in response to this event. The crew will attempt to reseat the failed valve by reducing SG pressure to 700 psig before manually initiating and isolating the Steam Feedwater Rupture Control System (SFRCS). SFRCS will not automatically align the AFW system when pressure lowers to the SFRCS setpoint of 630 psig. Feeding the faulted SG is terminated by closing AF 608 or AF 3870.

EVENT 8: Steam and Feedwater Rupture Control System (SFRCS) fails to automatically align for a low pressure trip of SG 1

When SG pressure reaches 630 psig, SFRCS fails to align for a low pressure trip. BOP is expected to manually align AFW for a low pressure trip in SG 1

At the direction of the lead evaluator or when the faulted Steam Generator (SG) is isolated and minimum subcooling margin (SCM) is being maintained, the scenario can be terminated

Op Test No.: 2022	Scenario # 2	Event # 1	Page 1 of 2
Event Description:	Weekly Run of Lube Oil Pumps for the Standby Makeup Pump		

Time	Position	Applicant's Actions or Behavior
Indications Available: • **HIS MU24B1 Makeup Pump 2 AC Oil Pump** • **HIS MU24B2 Makeup Pump 2 DC Oil Pump** • **HIS MU24B3 Makeup Pump 2 Aux Gear Oil Pump**		
	SRO	Direct the ATC to perform the weekly run of the Makeup Pump 2 oil pumps using DB-OP-06006 Section 3.13
	ATC	Direct an Equipment Operator to stand by the #2 Makeup pump and monitor the start of the oil pumps
●	ATC	Start the AC oil pump for #2 Makeup pump using HIS MU24B1 and check the following occurs as expected: – AC oil pump starts and continues to run – DC oil pumps starts, then stops – Aux Gear Oil pump starts and continues to run
	Booth Cue	***Local Operator reports the following:*** ***There's an oil leak from the flow glass on the pump motor end bearing. It looks like the glass is cracked.***
NOTE: The crew may elect to stop all MUP 2 oil pumps.		
	SRO/ATC	Stop the AC Oil Pump using HIS MU24B1
NOTE: The crew may elect to disable MUP 2		

Op Test No.: 2022	Scenario # 2	Event # 1	Page 2 of 2
Event Description:	Weekly Run of Lube Oil Pumps for the Standby Makeup Pump		

Time	Position	Applicant's Actions or Behavior
●	SRO	Declare One Boron System Flow Path Nonfunctional for Technical Normal Condition (TNC) A
●	SRO	REFER to TRM 8.1.1 Boration Systems – Operating: • TNC 8.1.1 The Boration Systems shall be FUNCTIONAL consisting of the following: • a. A flow path from the concentrated FUNCTIONAL boric acid addition system (BAAS) via a FUNCTIONAL boric acid pump and a FUNCTIONAL makeup pump to the Reactor Coolant System (RCS); AND • b. A flow path from the OPERABLE borated water storage tank via a FUNCTIONAL makeup pump to the RCS System. • Separate Makeup pumps are required to be FUNCTIONAL in MODES 1, 2 and 3, and in MODE 4 when RCS pressure is ≥ 150 psig. Enter TNC 8.1.1 Action A: • A1 Restore the nonfunctional flow path to FUNCTIONAL status within 72 Hours
On Lead Evaluators direction, insert Event 2 Pressurizer Temperature Failure		

Op Test No.: 2022	Scenario # 2	Event # 2	Page 1 of 1
Event Description:	Pressurizer Temperature Failure		

Time	Position	Applicant's Actions or Behavior
Indications Available: • **Compensated Pressurizer Level High** • **Annunciator 4-3-E Pressurizer Level high** • **MU 32 Normal Injection Flow Valve Closed**		
	TEAM/ ATC	Recognize Pressurizer Temperature failed High
	SRO	Enter DB-OP-02513 Pressurizer System Abnormal Operation
●	ATC	• Place MU32 in HAND. • Adjust demand on MU32 to obtain desired Makeup Flow or Pressurizer Level.
●	ATC/SRO	○ Compare Pressurizer Temperature instruments. • Select a functional alternate Temperature instrument. – Temperature (HSRC15) – TT RC15-2 (T777)
●	ATC	When a functional instrument is selected, THEN return MU32 to AUTO.
On Lead Evaluators direction, insert Event 3, MFPT High Drain Tank Level		

Op Test No.: 2022	Scenario # 2	Event # 3	Page 1 of 1
Event Description:	MFPT 1 High Drain Tank Level and Standby Drain Pump fails to automatically start		

Time	Position	Applicant's Actions or Behavior
Indications Available: • **Annunciator 10-6-C Main Feed Pump Turbine (MFPT) 1 DRN LVL HI** • **HIS 1973 MFPT Drain Pump 1-1** • **HIS 1969 MFPT Drain Pump 1-2**		
	BOP	BOP Refers to DB-OP-02010 for Annunciator 10-6-C
●	BOP	Start Drain Pump 2 for Main Feedwater Pump Turbine (MFPT) 1 using HIS 1969
	BOP	Direct an Equipment Operator to locally check the status of both MFPT 1 Drain Pumps
If asked to locally check the status of MFPT 1 Drain Pump 1, report the pump is running with a broken shaft. The valve lineup is correct. ***If asked, Report the following status of MFPT 1 Drain System:*** ***If Drain pump 2 is running*** ***Drain Header LG 1949 is approximately 13 inches above the bottom of the sight glass and lowering*** ***Exhaust Casing LG 1322 is just above the bottom of the sight glass and steady***		
	BOP	Position HIS 1973 to Lockout OR Direct the local Equipment Operator to open BE 3276 on E32B for Drain Pump 1
	Booth Cue	***If directed, report opening BE 3276***
On Lead Evaluators direction, proceed to Event 4, Spent Fuel Pool Cooling Pump Vibration		

Op Test No.: 2022	Scenario # 2	Event # 4	Page 1 of 1
Event Description:	Spent Fuel Pool Pump High Vibration		

Time	Position	Applicant's Actions or Behavior
Equipment Operator contacts the Control room: The running Spent Fuel Pool Pump is vibrating so much I could hear it when I got off the elevator. There's oil under the bearing.		
	CSRO	Directs stopping the running Spent Fuel Pool (SFP) pump and refers to DB-OP-02547 Spent Fuel Pool Cooling Malfunctions.
●	BOP	Stops SFP Pump 2
	CSRO	IF the Loss of SFP Cooling is due to a loss of the operating SFP or DHR Cooling Train, THEN perform the following: • Restore the previously operating SFP Cooling Train to service. OR • Alter the existing SFP Cooling System alignment to place at least one SFP Pump AND Heat Exchanger in Service. REFER TO DB-OP-06021, Spent Fuel Pool Operating Procedure.
	SM CUE	***(If necessary)*** ***The Shift Manager directs you to switch SFP Pumps only, Heat Exchangers can be switched later when an equipment operator is available***
	SM CUE	***(If necessary)*** ***Direct the BOP to start SFP Pump 1***
●	BOP	Place SFP Pump 1 in service as follows: – Notify the Control Room annunciator alarm (3-5-B), SFP HX TOTAL FLOW LO, will be LIT. • Start SFP Pump 1 using HIS 1602, SFP PUMP 1.
Insert Event 5 after SFP pumps have been switched		

Op Test No.:	2022	Scenario #	2	Event #	5	Page	1	of	4
Event Description:	Dropped Control Rod 4-9								

Time	Position	Applicant's Actions or Behavior
Indications Available: • **Annunciator 5-1-E CRD System Fault** • **Annunciator 5-2-E CRD Asymmetric Rod** • **Control Rod Group 4 indications for Rod 4-9** • **Loop 2 Average RCS Temperature Lowering** • **Annunciator 14-2-C ICS Rx Demand Hi Limit**		
	TEAM	Recognize available indications show the expected plant response to a dropped control rod.
	SRO	Refer to DB-OP-02516 Control Rod Drive (CRD) System Malfunctions
●	ATC	Perform the following actions directed by DB-OP-02516 CRD Malfunctions: o Check only one control rod has dropped using the control rod position indication panel o Check power has stabilized above 5% o With the Unit Load Demand in Automatic, reduce reactor Power to 50% Rated Thermal Power (RTP) • Set the Max Load Limit to 50% RTP • Set ULD Rate of Change set to 3% per minute
	SRO	Refer to DB-OP-02504 Rapid Shutdown
	ATC	IF annunciator (4-2-E) PZR LEVEL LO alarms due to the dropped rod Tave transient, THEN reduce MU32 setpoint to approximately 180 inches

Op Test No.: 2022	Scenario # 2	Event # 5	Page 2 of 4
Event Description:	Dropped Control Rod 4-9		

Time	Position	Applicant's Actions or Behavior
●	BOP	IF AT ANY TIME condensate flow is less than 7.0 MPPH on FI 578, THEN establish two Condensate pumps in operation
	ATC	• Monitor Reactor Power to confirm power is being reduced at approximately the expected rate (NI vs. Heat Balance) • Monitor Regulating Rod Insertion Limits during the Shutdown per Technical Specification 3.2.1 using current Reactor Operator Guidance (ROG) provided by Nuclear Engineering.
	BOP	• At approximately 90 percent power, notify an Equipment Operator to remove the Auxiliary Feed Pump Turbine Main Steam Minimum flow lines from service. Refer to DB-OP-06233, Auxiliary Feedwater System. • At approximately 675 MWe, notify an Equipment Operator to coordinate control of Moisture separator Reheater (MSR) Reheat Steam Low Load Valves (RSLLVs). REFER TO Attachment 9, Controlling RSLLV(s) During Rapid Shutdown
	SRO	Notify the Shift Manager to: • REFER TO NOP-OP-1004, Reactivity Management. • REFER TO NOP-OP-1015, Event Notifications • REFER TO NOBP-OP-1015, Event Notifications. • Notify the Duty Engineering Manager OR the Reactor Engineering Supervisor that a Control Rod has been dropped. REFER TO Attachment 5, Reactor Engineering Guidance For CRD Malfunctions.
	SRO	Request I&C to perform the following: • REFER TO Attachment 1, Specific Control Rod Recovery Guidelines as necessary to aid in troubleshooting. • Reduce High Flux Trip Setpoints

Op Test No.: 2022	Scenario # 2	Event # 5	Page 3 of 4
Event Description:	Dropped Control Rod 4-9		

Time	Position	Applicant's Actions or Behavior
	SRO	Notify the System Control Center (SCC) Load Dispatcher of the unit load reduction.
	SRO	Evaluate for continued Mode 1 operation by performing the required actions for the applicable LCO(s). REFER TO Technical Specifications AND Attachment 3, Tech Spec Condition Tracking Aid.
		Determine the following Tech Specs are not met: 3.1.4, 3.1.5, 3.1.7
●	SRO	**TS 3.1.4** CONTROL ROD GROUP ALIGNMENT LIMITS Each CONTROL ROD shall be OPERABLE, AND Each CONTROL ROD shall be aligned to within 6.5% of its group average height. A. One CONTROL ROD not aligned to within 6.5% of its group average height. Within 1 Hour • A.1.1 Verify SDM is within limit. OR • A.1.2 Initiate boration to restore SDM to within limit. AND Within 2 Hours • A.2 Reduce THERMAL POWER to ≤ 60% of the ALLOWABLE THERMAL POWER. AND Within 10 Hours • A.3 Reduce the High Flux trip setpoint to ≤ 70% of the ALLOWABLE THERMAL POWER.

Op Test No.: 2022	Scenario # 2	Event # 5	Page 4 of 4
Event Description:	Dropped Control Rod 4-9		

Time	Position	Applicant's Actions or Behavior
	SRO	**TS 3.1.5** EACH SAFETY ROD SHALL BE FULLY WITHDRAWN. A. One safety rod not fully withdrawn. Within 1 Hour • A.1.1 Verify SDM is within limit. OR • A.1.2 Initiate boration to restore SDM to within limit. AND • A.2 Declare the rod misaligned.
	SRO	**TS 3.1.7** The Absolute Position Indicator (API) channel and the Relative Position Indicator (RPI) channel for each CONTROL ROD and APSR shall be OPERABLE A. RPI channel inoperable for one or more rods Within 8 hours A.1 Determine the absolute position indicator channel for the rod is OPERABLE – Repeat once per 8 hours thereafter.
	SRO	Verify SDM within limit – Contact Reactor Engineering to perform Attachment 6, START PROGRAM SHUTDOWN MARGIN
		Request I&C to perform the following: • REFER TO Attachment 1, Specific Control Rod Recovery Guidelines as necessary to aid in troubleshooting. • Reduce High Flux Trip Setpoints
Insert Event 6 at the direction of the Lead Evaluator		

Op Test No.: 2022	Scenario # 2	Event # 6	Page 1 of 2
Event Description:	Main Generator Lockout / ATWS		

Time	Position	Applicant's Actions or Behavior
	TEAM	Recognize a Main Generator Lockout and Main Turbine Trip above 40% power without a corresponding Reactor Trip
***Critical Task**	ATC	Perform Immediate Actions for a Reactor Trip: • At the Rod Control Panel depress both manual Reactor Trip Pushbuttons • Recognize the reactor DID NOT trip • At the Rod Control Panel, insert the Reactor Trip Test key AND rotate clockwise to depower the CRDMs • Recognize the reactor DID NOT trip ***Momentarily de-energize E2 and F2 using HIS 6242 and HIS 6246** per DB-OP-02000, step 3.3 Response Not Obtained (RNO)" • Recognize the reactor is tripped by verifying power is lowering on the Intermediate Range NI meters
	SRO/ATC	Verify DB-OP-02000 Immediate Actions • Trip the reactor • VERIFY Reactor Power is lowering on the Intermediate range • Trip the turbine • VERIFY all Turbine Stop Valves OR Control Valves are closed

Op Test No.: 2022 Scenario # 2 Event # 6 Page 2 of 2

Event Description: Main Generator Lockout / ATWS

Time	Position	Applicant's Actions or Behavior
	TEAM	Implement Specific Rules • ACTIONS FOR LOSS OF SUBCOOLING MARGIN • STEAM GENERATOR CONTROL • POWER FOR C1 AND D1 BUSES OR EDG START
	TEAM	Check for Symptoms • Lack of Adequate Subcooling Margin • Lack of Heat Transfer • Overcooling • Steam Generator Tube Rupture
Event 7, SG 1 Main Steam Safety Valve (MSSV) Failure / Overcooling, begins on the next page. Event 7 is triggered by the Reactor Trip.		

Op Test No.: 2022	Scenario # 2	Event # 7	Page 1 of 3
Event Description:	SG 1 Main Steam Safety Valve (MSSV) Failure / Overcooling / SFRCS Failure		

Time	Position	Applicant's Actions or Behavior
Indications Available: **SG 1 Pressure on PI SP12B and PI SP12B2**		
	TEAM	Recognize an Overcooling on SG 1 based on SG pressure <960 psig due to a secondary side malfunction: • Enter DB-OP-02000 Section 7
If security is asked to check for steam on the aux building roof, report the following: There is a lot of steam blowing around the aux building roof, but we can't positively identify where it's coming from		
	SRO/ATC/ BOP	Implement Attachment 8, Place Makeup / High Pressure Injection / Low Pressure Injection (MU/HPI/LPI) in Service • Start the STBY CCW Pump • Start both HPI Pumps • Open HP 2A, HP 2B, HP 2C and HP 2D • Start both LPI Pumps • Open DH 64 and DH 63 • Transfer MU Pump suctions to the BWST AND press OFF
●	SRO/BOP	Implement DB-OP-02000 Attachment 20 to try a reseat the failed MSSV on SG1: • Reduce SG 1 pressure to approximately 700 psig using SG 1 Turbine Bypass Valves ○ Recognize the Main Steam safety Valve (MSSV) **does not reseat**
If security is asked to check for steam on the aux building roof, report the following: There is a lot of steam blowing around the aux building roof, but we can't positively identify where it's coming from, it looks the same as when we checked a few minutes ago.		

Op Test No.: 2022	Scenario # 2	Event # 7	Page 2 of 3
Event Description:	SG 1 Main Steam Safety Valve (MSSV) Failure / Overcooling / SFRCS Failure		

Time	Position	Applicant's Actions or Behavior
Indications Available: **SG 1 Pressure on PI SP12B and PI SP12B2**		
●	BOP	Initiate and Isolate the SFRCS system using HIS 6403 and HIS 6404
	BOP	Verify proper SFRCS for a Manual Initiation and Isolation ***Note: The CSRO may direct aligning the Steam and Feedwater Rupture Control System (SFRCS) for a low-pressure trip of SG 1.*** ***If the Crew aligns SFRCS for a low-pressure trip of SG 1 then the required actions for Event 8 will be completed.***
Monitor Annunciator 12-1-C or the PPCS Station Summary to determine when SG 1 pressure is < 630 psig.		
***Critical Task**	BOP	Isolate AFW to the affected SG, ***Close AF608 or AF 3870** **If applicable Time SG 1 Pressure < 630 psig _____** **Time AF 608 or AF 3870 Closed: _____**
	BOP	Verify proper operation of AFW trains feeding Steam Generator 2
	TEAM	Check Reactor Coolant System Cooldown Rate lowers to less than 100 degrees per hour
	BOP	Control RCS temperature constant or slightly lowering using the Atmospheric Vent Valve on Steam generator 2, ICS11A

Op Test No.: 2022	Scenario # 2	Event # 7	Page 3 of 3
Event Description:	SG 1 Main Steam Safety Valve (MSSV) Failure / Overcooling / SFRCS Failure		

Time	Position	Applicant's Actions or Behavior
	ATC	Begin to depressurize the RCS using the Pressurizer Spray Valve, RC2 AND Heaters to maintain pressure close to the minimum adequate subcooling margin, but above the RCP NPSH limits
	ATC	IF the Safety Features actuation System (SFAS) has NOT actuated AND the RCS pressure drop is being manually controlled, THEN block the SFAS Low RCS Pressure trips when the BLOCK PERMITs come in.
Event 8, SFRCS Failure, begins on the next page. SFRCS is failed as part of the initial setup.		

Op Test No.: 2022	Scenario # 2	Event # 8	Page 1 of 2
Event Description: SFRCS Failure			

Time	Position	Applicant's Actions or Behavior
Indications Available: • **SG 1 Pressure on PI SP12B and PI SP12B2**		
Closing AF 3870 is only Critical if AF 608 was NOT Closed earlier.		
Monitor Annunciator 12-1-C or the PPCS Station Summary to determine when SG 1 pressure is < 630 psig.		
***Critical Task**	BOP	Verify proper SFRCS actuation for the trip parameters present. REFER TO Table 1 of DB-OP-02000. • Recognize SG 1 pressure is less than 630 psig and perform the following: • ***Verify closed AF 3870** • Verify open AF 3869 • Close MS 106 • Close MS 107A **(IF Applicable) Time SG 1 Pressure < 630 psig: _____** **(IF Applicable) Time AF 3870 Closed: _____**
	SRO	Check for entry into Pressurized Thermal Shock (PTS) criteria. REFER TO Specific Rule 5.
	ATC	Check for Adequate Subcooling Margin (SCM).
	TEAM	Check a Steam Generator Tube Rupture (SGTR) does NOT exist: • Verify the Main Steam Line Radiation Monitors are in GROSS Mode (SCA light is off) • Check MS Line 1 RE • Check MS Line 2 RE • Check Pressurizer Level

Op Test No.: 2022	Scenario # 2	Event # 8	Page 2 of 2
Event Description:	SG 1 Main Steam Safety Valve (MSSV) Failure / Overcooling/ SFRCS Failure		

Time	Position	Applicant's Actions or Behavior
Determining SG Tube to Shell Delta Temperature is NOT required to terminate the scenario		
	TEAM	Determine SG Tube and Average SG Shell temperatures for the isolated SG
	TEAM	IF RCS Tave is less than the average SG Shell temperature, THEN maintain RCS temperature as follows: • Block SFRCS to the AVV on the non-overcooling SG AND use the AVV to maintain RCS temperature constant. • Maintain RCS pressure close to the minimum adequate subcooling margin curve. • Allow losses to ambient to cool the shell of the SG.
Termination Criteria: • ***Subcooling Margin is being maintained as directed by the CSRO AND*** • ***SFRCS has been aligned for a low-pressure trip of Steam Generator 1 AND*** • ***Lead Evaluator Direction***		

Justification for Critical Tasks

The term “Critical Task”, is defined in NUREG-1021, OPERATOR LICENSING EXAMINER STANDARDS FOR POWER REACTORS. The listed critical tasks were compiled based on a review of Areva Technical Document 47-1229003-06, EOP Technical Bases Document, and additional CTs were added based on established DB Operations expectations and standards for previously identified Critical Task.

1**: Shutdown Reactor- ATWS**

1. Safety Significance:
   When the Main Turbine Trips, the Reactor should trip due to exceeding the RPS high pressure trip setpoint. RPS, the Reactor Trip pushbuttons and the Reactor Test Trip Key all fail to cause a reactor trip. The priority action at this point is the shutdown of the reactor. This should be achieved prior to taking additional mitigating actions because post-trip transient mitigation, from this point forward, assumes the reactor is shutdown (subcritical).

2. Cues:
   - Reactor power not lowering on the Intermediate Range
   - DB-OP-02000, Perform RNO IAs for ATWS

3. Measured by:
   - Required Action – Momentarily de-energize Busses E2 and F2
   - Failure to meet the Critical Task – Continuing the mitigation strategy of the EOP prior to the reactor being tripped

4. Feedback:
   - E2 and F2 deenergized
   - Reactor Power is lowering on the Intermediate Range

Technical Basis References:

1. Davis-Besse Tech Spec Bases 3.3.1 Reactor Protection System (RPS) Instrumentation
   a. RC High pressure
2. Areva Technical Document 47-1229003-06 CT-24, SHUTDOWN REACTOR - ATWS

2: Isolate Overcooling Steam Generators

1. Safety Significance:
   Mitigate excessive heat flow from the core to available heat sinks and its effect on RCS inventory

2. Cues:
   - SG Pressure <960 psig caused by a secondary side malfunction
   - DB-OP-02000, Symptom Checks

3. Measured by:
   - Required Action – Close AF 608 or AF 3870 to Isolate AFW to SG 1
   - Failure to meet the Critical Task – AFW flow continues to feed SG 1 for greater than 10 minutes after SG 1 reaches 630 psig

4. Feedback:
   - Green (Closed) indicating lights on valves
   - AFW Flow lowering
   - SG level lowering

Technical Basis References:

1. Areva Technical Document 47-1229003-06 CT-17, ISOLATE OVERCOOLING SG(s)

SIMULATOR SETUP INFORMATION

1. Simulator Setup
   - 100% Power
   - ATWS (Requires de-energizing E2 and F2 Busses)
   - SFRCS Fails to automatically actuate.
   - Makeup Pump 1 and CCW Pump 2 in service

2. Procedures
   - DB-OP-06006, Makeup and Purification System Operating Procedure
   - DB-OP-02513 Pressurizer System Abnormal Operation
   - DB-OP-02010, Feedwater Panel 10 Annunciators
   - DB-OP-02547, Spent Fuel Pool Cooling Malfunctions
   - DB-OP-06021, Spent Fuel Pool Operating Procedure
   - DB-OP-02516, Control Rod Drive System Malfunctions
   - DB-OP-02504, Rapid Shutdown
   - DB-OP-02000, RPS, SFAS, SFRCS Trip or SG Tube Rupture

3. For Simulator Instructor
   - None

Facility:	Davis-Besse	Scenario No.: 3	Op Test No.:	DB NRC 2022	
Examiners:	_____	Operators:	_____	SRO	
	_____		_____	ATC	
	_____		_____	BOP	

Initial Conditions: 50% Power

Turnover: Shutdown Main Feedwater Pump (MFP) 1 to 1000 RPM
Auxiliary Feedwater Pump (AFP) 1 Out of Service

Planned: Complete the Shutdown of Main Feedwater Pump 1

Critical tasks:

1. Trip all 4 RCPs
2. Initiate High Pressure Injection Cooling
3. Start the STBY CCW Pump

Event No.	Malf. No.	Event Type*	Event Description
1		(N) BOP	Remove Main Feedwater Pump 1 from service
2		(C) ATC/(TS) SRO (N) BOP	Component Cooling Water Pump 2 Trips (TS) Stop the standby CRD booster pump
3		(TS) SRO	Bus F7 Failure / Motor Driven Feedwater Pump Inop (TS)
4		(C) BOP	Station Air Compressor 2 setpoint failure - Low air header pressure
5		(R) ATC (C) BOP	Rising Main Condenser Pressure – Reduce Reactor Power Trip the Main Turbine
6		Major	Trip the Reactor - Initiate / Isolate Steam Feedwater Rupture Control system
7		(C) ATC	Loss of All Feedwater - Makeup / High Pressure Injection / PORV Cooling

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

DAVIS-BESSE 2022 NRC SCENARIO 3

The crew will take the watch with the plant at 50% power. Preparations for Condenser Waterbox cleaning are scheduled to begin on the following shift.

EVENT 1: Remove Main Feed Pump (MFP) 1 from service
The BOP will perform actions to shutdown MFPT 1 to 1000 RPM. This will include placing the associated ARTS toggle switches for MFP 1 in the trip position.

EVENT 2: Component Cooling Water (CCW) Pump 2 Trips (TS)
The standby CCW pump fails to automatically start on low flow in the opposite train. ATC is expected to manually start the standby CCW Pump. **(CT)** The time required for flow to degrade to the point of aligning the associated CCW non-essential isolation valves results in the loss of RCS letdown from high temperature and the start of the standby Control Rod Drive (CRD) booster pump. The crew will restore letdown flow and stop the standby CRD booster pump. Loss of Train 2 CCW pump makes that train of CCW inoperable (TS) and the associated Emergency Diesel Generator (EDG) inoperable (TS). LCOs 3.7.7 and 3.8.1 are not met.

EVENT 3: Bus F7 Failure / Motor Driven Feedwater Pump (MDFP) Inop (TS)
The failure of Bus F7 results in the MDFP being inoperable (TS) and the Emergency Instrument Air Compressor (EIAC) being unavailable. LCO 3.7.5 is not met

EVENT 4: Station Air Compressor (SAC) 2 setpoint failure - Low air header pressure
SAC 2 will start controlling Instrument Air (IA) header pressure below the annunciator setpoint. SAC 1 will not automatically start when it's setpoint is reached, requiring the BOP to manually start the compressor. Instrument Air header pressure will be restored once SAC 1 is started.

EVENT 5: Rising Main Condenser Pressure-Reduce Reactor Power
CSRO will enter DB-OP-02518. The crew will reduce power to maintain condenser pressure less than 5 inHgA.

EVENT 6: Trip the Reactor - Initiate / Isolate Steam Feedwater Rupture Control system
Condenser pressure will continue to rise, and the crew will trip the reactor and initiate and isolate the SFRCS system due to the loss of both Main feedwater Pumps (Trip at 12.5 inHgA).

EVENT 7: AFP 2 Trips / EFW Pump does not start – Loss of All Feedwater – Makeup / High Pressure Injection / PORV Cooling
AFP 2 will overspeed trip. With AFP 1 and the MDFP unavailable, the BOP will start the Emergency Feedwater (EFW) Pump IAW Specific Rule 4. The EFW pump will not start. With no feedwater available, the crew is directed to start the standby makeup pump.

Makeup pump 2 fails to start, making it necessary to immediately perform Attachment 4 of DB-OP-02000, Makeup / High Pressure Injection / PORV Cooling **(CT).** When Minimum Sub Cooling Margin is lost, Specific Rule 2 actions will be performed, and all RCPs tripped **(CT).**

When directed by the lead evaluator or Subcooling Margin has been restored with lowering incore temperatures, the scenario may be terminated.

Op Test No.: 2022	Scenario # 3	Event # 1	Page 1 of 2
Event Description:	Shutdown MFPT 1 to 1000 RPM		

Time	Position	Applicant's Actions or Behavior
Indications Available: • **MFPT 1 Speed SI 2707B** • **MFP 1 Discharge Pressure PI 473** • **MFP 1 Booster Feed pump Flow FI 428**		
	SRO	Direct the BOP to Shutdown Main Feedwater Pump Turbine (MFPT) 1 to 1000 RPM in accordance with DB-OP-06224 Section 3.8
	BOP	Verify FW423, DEAERATING STORAGE TANKS DISCHARGE CROSSOVER, is open
●	BOP	Place the following test toggle switches to the TRIP position in all four Anticipatory Reactor Trip System (ARTS) cabinets: • CH 1, C5784A MAIN FEED PUMP INPUT TEST, for MFP-1 • CH 2, C5784B MAIN FEED PUMP INPUT TEST, for MFP-1 • CH 3, C5784C MAIN FEED PUMP INPUT TEST, for MFP-1 • CH 4, C5784D MAIN FEED PUMP INPUT TEST, for MFP-1.
Door annunciator 5-5-F is expected when opening the ARTS cabinets		
	BOP	Assign an Equipment Operator to Close FW488, FW488 Air Supply and vent air from the FW488 actuator
When directed report you are standing by to Close FW488 air supply and vent air		

Op Test No.: 2022	Scenario # 3	Event # 1	Page 2 of 2
Event Description:	Shutdown MFPT 1 to 1000 RPM		

Time	Position	Applicant's Actions or Behavior
●	BOP	Place HIC ICS36B Hand/Auto Station for Main Feed Pump 1 Speed, in Hand AND Begin reducing MFPT1 speed to its lowest setting
●	BOP	Transfer Speed control to MDT20 AND Reduce MFPT Speed to 1000 RPM
	BOP	When discharge pressure is less than 150 psig, direct an EO to place MFP 1 warmup valve in service
Insert Event 2 after MFPT 1 speed has been reduced to 1000 RPM		

Op Test No.: 2022	Scenario # 3	Event # 2	Page 1 of 3
Event Description:	Operating Component Cooling Water Pump Trip (2)		

Time	Position	Applicant's Actions or Behavior
Indications Available: • **ANNUNCIATOR 6-5-B SEAL CCW FLOW LO** • **ANNUNCIATOR 5-6-D CRD BOOSTER PMP ΔP HI/FLOW LO** • **CTRM PANEL C5721 HIS1418 FOR CCW PUMP 2**		
	TEAM	Recognize Component Cooling Water (CCW) Pump 2 is Tripped
***Critical Task 3**	ATC	Verify Component Cooling Water pump 1 starts due to low flow o Recognize CCW Pump 1 fails to automatically start • *Manually start CCW Pump 1
	CSRO	Enter DB-OP-02523 CCW System Malfunctions
	TEAM	Direct an Equipment Operator to locally inspect CCW Pump 1 and 2, and Breaker AD113 for CCW Pump 2
IF directed to locally check CCW Pumps and its associated Breaker, Report the following: • ***There are no abnormal indications locally at CCW Pump 2*** • ***Post start checks on CCW Pump 1 are sat*** • ***AD113 has a 50/51 C Overcurrent trip relay actuated***		
	BOP	Verify the Non-Essential CCW Isolation valves are aligned for the CCW loop in service

Op Test No.: 2022	Scenario # 3	Event # 2	Page 2 of 3
Event Description:	Operating Component Cooling Water Pump Trip (2)		

Time	Position	Applicant's Actions or Behavior
●	SRO (TS)	LCO 3.7.7 Two CCW loops shall be OPERABLE in MODES 1,2,3 and 4 • Enter Action A.1 • 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources - Operating," for emergency diesel generator made inoperable by CCW. • Restore CCW Loop to Operable Status within 72 hours LCO 3.8.1.b Two emergency diesel generators (EDGs) each capable of supplying one train of the onsite Class 1E AC Electrical Power Distribution System; • Enter Actions B.1, B.2, B.3 and B.4 • Perform SR 3.8.1.1 for OPERABLE offsite circuit(s) Within 1 Hour AND • B.2 Declare required feature(s) supported by the inoperable EDG inoperable when its redundant required feature(s) is inoperable within 4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s) AND • B.3.1 Determine OPERABLE EDG is not inoperable due to common cause failure. OR • B.3.2 Perform SR 3.8.1.2 for OPERABLE EDG with 24 hours AND • B.4 Restore EDG to OPERABLE status within 7 days
	SRO	Contact Field Supervisor to perform SR 3.8.1.1 for OPERABLE offsite circuit(s) (1Hour Action)

Op Test No.: 2022	Scenario # 3	Event # 2	Page 3 of 3
Event Description:	Operating Component Cooling Water Pump Trip (2)		

Time	Position	Applicant's Actions or Behavior
	TEAM	Recognize the loss of RCS Letdown flow due to high letdown temperature • Annunciator 2-3-A Letdown Temperature High Alarm • MU2B is Closed
NOTE: 4-3-E, PZR LVL HI comes in at 226 inches		
	SRO	LCO 3.4.9 The pressurizer shall be OPERABLE with Pressurizer water level ≤ 228 inches Action: A.1 Restore level to within limit. 1 hour
	CSRO / TEAM	• Direct an equipment operator to disable EDG 2 by closing DA 31 and DA 45 • Turn on the blue lights for CCW and EDG
NOTE: May route to Loss of Letdown or DB-OP-06006 to restore letdown.		
●	ATC	Restore RCS Letdown Flow: ○ Direct an Operator to Open MU104 • Close MU10B • Hold Open MU2B, MU1A and MU1B until 2-3-A, Letdown Temperature High, clears • Open MU10B ○ Direct an Operator to Close MU104
	Booth cue	***Provide cues for the following as required*** ***- MU104, Purification Demin Bypass and DA*** ***- DA31, DG AIR RECEIVER 1-2-1 DISCHARGE ISOLATION*** ***- DA45, DG AIR RECEIVER 1-2-2 DISCHARGE ISOLATION***
NOTE: The crew may leave the standby Control Rod Drive Booster Pump running		
○	BOP	Refer to annunciator 5-6-D CRD BOOSTER PMP ΔP HI/FLOW LO - Stop the standby Control Rod Drive Booster Pump
	SRO	Direct the Field Supervisor to line up #3 CCW Pump as 2.
Insert Event 3 after RCS Letdown is restored, when directed by the Lead Evaluator		

Op Test No.: 2022	Scenario # 3	Event # 3	Page 1 of 1
Event Description:	Bus F7 Failure		

Time	Position	Applicant's Actions or Behavior
Indications Available: • **Annunciator 1-5-J BUS F7 TRBL** • **Zero Volts indicated on EI 6465** • **BDF7 Indicates Open**		
	TEAM	Annunciator 1-5-J BUS F7 TRBL
	TEAM	Direct an Equipment Operator to inspect Bus F7
If directed to inspect Bus F7, report the following: The supply breaker for F7 is tripped open with a faint electrical smell in the area. No indications of smoke or fire. We'll need electricians to inspect the breaker.		
	TEAM	Refer to E1040A to determine loads lost by the failure of F7. • Recognize the loss of F7 makes the Motor Driven Feedwater Pump Inoperable due to the loss of the electric lube oil pump
●	SRO (TS)	LCO 3.7.5 Three EFW trains shall be OPERABLE, consisting of: a. Two Auxiliary Feedwater (AFW) trains; and b. The Motor Driven Feedwater Pump (MDFP) train. Enter LCO 3.7.5 Action D for Two EFW trains inoperable for reasons other than Condition C in MODE 1, 2, or 3. • D.1 Be in MODE 3 within 6 hours AND • D.2 Be in MODE 4 within 12 hours
	SRO	Enter DB-OP-02504, Rapid Shutdown for an LCO required shutdown and REFER to Attachment 17
NOTE: It takes approximately 3 minutes for the low air pressure alarm to actuate		
Insert Event 4, Station Air Compressor 2 Setpoint Failure, after the SRO announces entry into the Rapid Shutdown Procedure		

Op Test No.: 2022	Scenario # 3	Event # 4	Page 1 of 1
Event Description:	Station Air Compressor 2 Setpoint Failure		

Time	Position	Applicant's Actions or Behavior
Indications Available: • **Lowering Air Pressure on PI810 Instrument Air Header** • **Lowering Air Pressure on PI 811 Station Air Header** ***It takes approximately 3 minutes for the low air pressure alarms to actuate.***		
	TEAM	9-1-F INSTR AIR HDR PRESS LO 9-3-E STA AIR HDR PRESS LO
	BOP	Check status of the operating Station Air Compressor (SAC 2) and report current Station Air Pressure
If asked to investigate the status of SAC 2 locally, report the following: ***SAC 2 is cycling at a much lower than normal pressure and the control panel is locked up, not allowing me to check the setpoints.***		
	SRO	Enter DB-OP-02528, INSTRUMENT AIR SYSTEM MALFUNCTIONS Section 4.4 for Stable Low Instrument Air Header Pressure
The crew may enter Section 4.1 for Severe Loss of Instrument Air if they do not recognize air pressure is stable at a lower than normal setpoint. Starting SAC 1 is the expected action regardless of which section is entered.		
	SRO	IF AT ANY TIME a severe secondary plant upset occurs, OR the Instrument Air header pressure drops to 75 PSIG (PI810, INSTRUMENT AIR HEADER PRESS), THEN perform the following: a. Trip the Reactor. b. Initiate and Isolate SFRCS using Manual Actuation Switches.
●	BOP	Start Station Air Compressor 1
	BOP	Dispatch an operator to SAC 1
Insert Event 5, Rising Main Condenser Pressure, after SAC 1 is started		

Op Test No.: 2022	Scenario # 3	Event # 5	Page 1 of 1
Event Description:	Rising Main Condenser Pressure		

Time	Position	Applicant's Actions or Behavior
Indications Available: • **Yokogawa PR530 and PR541** • **Annunciator 15-1-F HP CNDSR PRESS HI** • **Annunciator 15-2-F LP CNDSR PRESS HI** • **PPCS Station Summary Monitor**		
	TEAM	Recognize Rising Main Condenser Pressure
	SRO	Enter DB-OP-02518 High Condenser Pressure
	ATC	IF AT ANY TIME Reactor Power exceeds the maximum allowed power (normally 100% RTP) THEN reduce Reactor Power to less than or equal to the maximum allowed power
	BOP	Announce over the GAI-Tronics, "Attention all station personnel the station is experiencing a loss of condenser vacuum all available operators investigate and report any vacuum leaks to the Control Room immediately."
	SRO	Reduce power as necessary in accordance with DB-OP-02504, Rapid Shutdown
●	ATC	Using the Unit Load Demand (ULD) in Automatic, reduce power as necessary to maintain condenser pressure below 5 inHg Absolute. The target load and rate of change will be set by the SRO as plant conditions change. Expected rate of change is 3-5% per minute
	SRO	May direct shutting down Main Feed Pump 1 from service
●	BOP	Trip the Main Turbine: • Condenser pressure exceeds 7.5 in Hg Absolute • Condenser pressure exceeds 5 in Hg Absolute with less than 280 MWE

Op Test No.: 2022	Scenario # 3	Event # 6 and 7	Page 1 of 5
Event Description:	Reactor Trip, Total Loss of Feedwater, PORV Cooling		

Time	Position	Applicant's Actions or Behavior
Event 6: Condenser pressure continues to rise after the Turbine is tripped requiring a Reactor Trip and Actuation of SFRCS, when Main Condenser Pressure exceeds 10 in Hg Absolute. ***Event 7: Loss of all Feedwater, begins when the Reactor is tripped***		
	ATC	• Trip the Reactor • Initiate and Isolate SFRCS
	SRO	Enter DB-OP-02000 RPS, SFAS, SFRCS TRIP, OR SG TUBE RUPTURE: • Trip the Reactor. • VERIFY Reactor Power is lowering on the Intermediate Range • Trip the Turbine • VERIFY all Turbine Stop Valves OR Control Valves are closed
	SRO	Implement any necessary Specific Rules Actions. • ACTIONS FOR LOSS OF SUBCOOLING MARGIN • STEAM GENERATOR CONTROL • POWER FOR C1 AND D1 BUSES OR EDG START

Op Test No.: 2022	Scenario # 3	Event # 6 and 7	Page 2 of 5
Event Description:	Reactor Trip, Total Loss of Feedwater, PORV Cooling		

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize the loss of Auxiliary Feedwater Pump (AFP) 2 with AFP 1 and the MDFP unavailable
	BOP	Implement Specific Rule 4 Actions: • Attempt to start the Emergency Feedwater (EFW) Pump by placing the control switch to START, HISEF310-2.
	BOP	Recognize the EFW Pump fails to start. White running light is NOT lit and no indicated flow on FIEF34-2, EFWP DISCHARGE FLOW • Declare a Total Loss of Feedwater
	SRO/BOP /ATC	Implement Specific Rule 4 Actions for a Total loss of Feedwater • Start the standby Makeup Pump AC Lube Oil Pump. • Attempt to start the standby Makeup Pump. • Recognize the Standby Makeup Pump fails to start • Immediately GO TO Attachment 4, Initiate Makeup / High Pressure Injection (MU/HPI) Cooling (SRO Directed).
	ATC	Trip all but one RCP. NOTE: Leaving RCP 2-2 in service is recommended for PZR Spray flow.
NOTE: Thot indication is located on the PAM Panel		
Critical Task 2		**Time Thot reaches 600 degrees: _____**

Op Test No.: 2022	Scenario # 3	Event # 6 and 7	Page 3 of 5
Event Description:	Reactor Trip, Total Loss of Feedwater, PORV Cooling		

Time	Position	Applicant's Actions or Behavior
***Critical Task 2**	BOP	***NOTE: The crew may elect to start Train 1 equipment only due to the loss of CCW Pump 2.*** Verify Attachment 8, Place HPI/LPI/MU in Service: • ***Start High Pressure Injection (HPI) Pump 1** • Start HPI Pump 2 • ***Open HP 2A, HP 2B,** • Open HP 2C and HP 2D • ***Start Low Pressure Injection (LPI) Pump 1** • Start LPI Pump 2 • ***Open DH 64** • Open DH 63
***Critical Task 2**	ATC	• Place all Pressurizer (PZR) Heaters in OFF. • Lock BOTH Makeup Pump Suctions on the Borated Water Storage Tank (BWST) MU6405 and MU3971 • Close MU6408 MU PUMP CROSS CONNECT HEADER ISOLATION • ***Open MU6421, MU ALTERNATE INJECTION LINE CTMT ISOLATION is open.** • ***Open MU6419, MU ALTERNATE INJECTION LINE.** • Close MU6407, MU PUMP 1 MINIMUM RECIRC. • Close MU6406, MU PUMP 2 MINIMUM RECIRC. • Verify RC11, PORV BLOCK is open
	SRO	Verify Attachment 8, Place HPI/LPI/MU in Service, is complete.

Op Test No.:	2022	Scenario #	3	Event #	6 and 7	Page	4	of	5
Event Description:	Reactor Trip, Total Loss of Feedwater, PORV Cooling								

Time	Position	Applicant's Actions or Behavior
NOTE: Thot indication can be found on the PAM Panel		
Critical Task 2		**Time RCS Thot reaches 600 degrees: _____**
***Critical Task 2**	ATC	***Lock open RC2A, Power Operated Relief Valve (PORV).** **Time PORV Locked Open: _____** **Time must be within 10 minutes after Thot reaches 600 degrees to successfully complete the Critical Task**
Note: Loss of SCM is indicated at <20°F, located on the PAM Panel or Annunciator 4-1-B		

***Critical Task 1**	ATC	IF AT ANY TIME **Adequate Subcooling Margin is lost**, THEN perform the following:
		
		Time for LSCM: _____
		• ***Trip all Reactor Coolant Pumps.**
		
		Time last RCP is stopped: _____
		
		• Transfer Subcooled Margin Inputs to Incore Thermocouples:
		  • Post Accident Monitoring Panel 1
		  • Post Accident Monitoring Panel 2
		  • Safety Parameter Display System (SPDS).
		
		RCPs must be stopped within 10 minutes of the loss of subcooling margin to successfully complete the Critical Task

	ATC	• Open Loop 1 High Point Vents RC4608B and RC4608A . • Open Loop 2 High Point Vents RC4610B and RC4610A • Open PZR High Point Vents RC200 and RC239A
	TEAM	Check for entry into PTS Criteria. REFER TO Specific Rule 5

Op Test No.:	2022	Scenario #	3	Event #	6 and 7	Page	5	of	5
Event Description:	Reactor Trip, Total Loss of Feedwater, PORV Cooling								

Time	Position	Applicant's Actions or Behavior
	TEAM	IF MU Pump room cooling is NOT available AND the area is accessible, THEN prop open the MU Pump room door
	ATC	• Close either of the following to isolate Letdown. MU2B, LETDOWN ISO or MU3, LETDOWN CLRS OUTLET • Prevent transfer of water from CTMT Normal Sump to the Auxiliary Building as follows Close DR 2012A, CTMT NORMAL SUMP and DR 2012B, CTMT NORMAL SUMP
	SRO	GO TO Section 12, MU/HPI PORV Cooldown.
Termination Criteria: When directed by the lead evaluator OR Subcooling Margin has been restored with lowering incore temperatures		

Justification for Critical Tasks

The term “Critical Task”, is defined in NUREG-1021, OPERATOR LICENSING EXAMINER STANDARDS FOR POWER REACTORS. The listed critical tasks were compiled based on a review of Areva Technical Document 47-1229003-06, EOP Technical Bases Document, and additional CTs were added based on established DB Operations expectations and standards for previously identified Critical Task.

1. Trip all Reactor Coolant Pumps

1. Safety Significance:
   - Analyses were performed which used both conservative and realistic Appendix K assumptions with the objective of meeting the requirements of 10CFR50.46.
   - Using conservative Appendix K assumptions, it was shown that RCPs must be tripped within two minutes after losing adequate SCM to prevent the RCS from evolving to a high enough void fraction such that the core would be uncovered if the RCPs were tripped at a later time.
   - Using realistic Appendix K assumptions with 2 HPI Pumps available, the maximum allowed time for tripping the RCPs was determined to be 10 minutes.

2. Cues:
   - Subcooling Margin Meters on Post Accident Monitoring Panels C5789 and C5799
   - Annunciator 4-1-B SUBCOOL MARGIN LO
   - DB-OP-02000 Specific Rule 2, Actions for a Loss of Subcooling Margin

3. Measured by:
   - Required Action - Stop all RCPs
   - Failure to Meet the Critical Task – All 4 RCPs not stopped within 10 minutes after Subcooling Margin drops below 20 Degrees in either RCS Loop.

4. Feedback:
   - Each RCP ammeter drops to Zero Amps
   - RCP Green Indicating Lights

Technical Basis Reference:

1. Areva Technical Document 74-1152414-12 Vol. 3
2. Areva Technical Document 47-1229003-06 CT-1, TRIP ALL RCPs

Justification for Critical Tasks

2. Initiate High Pressure Injection Cooling (HPI)

1. Safety Significance:
   Immediate initiation of MU/HPI/PORV cooling with one Makeup Pump available prevents the collapsed level of the RCS from dropping below the top of the core and increases the margin to the onset of Inadequate Core Cooling.

2. Cues:
   - DB-OP-02000 Specific Rule 4, Total Loss of Feedwater
   - Lack of Primary to Secondary heat Transfer with a single Makeup Pump available

3. Measured by:
   - Required Action – Refer to DB-OP-02000 Attachment 4, Initiate MU/HPI Cooling.
     - Makeup Pump 1 piggybacked from LPI, flow through the Alternate injection line
     - HPI Pump 1 piggybacked from LPI, flow through both associated injection lines
     - PORV Locked Open

   - Failure to Meet the Critical Task: Failure to Initiate Feed and Bleed Cooling with the PORV Open within 10 minutes after any Thot indication reaches 600 degrees.

     NOTE: Any of the following injection sources is required for this scenario; HPI Train 1, HPI Train 2, or Makeup Line Injection (Normal or Alternate).

4. Feedback:
   - Incore Thermocouple Temperatures Lowering
   - Makeup, HPI, and LPI Pump indications
   - PORV Valve position

Technical Basis Reference:
1. DB-OP-02515, Bases and Deviation Document for DB-OP—02000
2. AREVA Technical Document 74-1152414-12
3. AREVA Technical Document 47-1229003-04 CT-14 INITIATE HPI COOLING FOR DAVIS-BESSE

3. <u>Start the STBY CCW Pump</u>

1. Safety Significance:
   The standby CCW pump fails to automatically start on low flow in the opposite train. If the STBY CCW Pump is not started in a timely manner the RCPs will overheat and trip. This will cause a reactor trip with complications.

2. Cues:
   - ANNUNCIATOR 6-5-B SEAL CCW FLOW LO
   - ANNUNCIATOR 5-6-D CRD BOOSTER PMP ΔP HI/FLOW LO
   - CTRM PANEL C5721 HIS1418 FOR CCW PUMP 2

3. Measured by:
   - Required Action – Start the STBY CCW Pump
   - Failure to Meet the Critical Task – The STBY CCW Pump is not started prior to receiving high RCP Temperature Trip criteria.

4. Feedback:
   CCW Pump 1 running indications:
   - Normal running amps indicated
   - HIS Red Light on

   CCW Non-Essential valves swapping to CCW Loop 1

Technical Basis Reference:
- DB-OP-02523, CCW System Malfunctions
- DB-OP-02515, RC Pump and Motor Abnormal Operation

SIMULATOR SETUP INFORMATION

1. Simulator Setup
    - 50% Power
    - Both Main Feed Pumps in service
    - Blue light on for AFW
    - Caution Tags on AFW Steam Supply valves and Gov.
    - DB-OP-06224 3.7 Transferring MFPT 1 Speed Control Between MDT 20 and ICS
    - DB-OP-06224 3.8 Shutdown to Out of Service for MFP 1

2. Procedures
    - DB-OP-02004, Reactor Coolant Alarm Panel 4 Annunciators
    - DB-OP-02512, Makeup and Purification System Malfunctions
    - DB-OP-02001, Electrical Distribution Alarm Panel 1 Annunciators
    - DB-OP-02521, Loss of AC Bus Power Sources
    - DB-OP-06902, Power Operations
    - DB-OP-02000, RPS, SFAS, SFRCS Trip or SG Tube Rupture

3. For Simulator Instructor
    - None