

FINAL AS-ADMINISTERED

SIMULATOR SCENARIOS

**DAVIS BESSE INITIAL EXAM
(OCTOBER 2-6, 2000)**

**THREE SCENARIOS
SROUs ONLY**

Facility: Davis-Besse NPS Scenario No.: 1 Op-Test No.: 1

Examiners: _____ Operators: _____

Objectives: The candidates are to (1) perform the operator actions required for testing the Main Turbine Stop valves, (2) implement the actions for a power range nuclear instrument failing high, (3) determine the need to trip Reactor Coolant Pump 2-2 and reduce power, (4) determine the need to trip the reactor due a secondary steam leak that is hazardous to personnel, (5) successfully trip the reactor when the Reactor Protection System fails insert the control rods, (7) identify that Steam Generator 1 has an unisolable steam leak and (8) recognize that the Steam and Feed Rupture Control System has failed to align the Auxiliary Feedwater system properly and then place the appropriate components in their required configuration.

Turnover: Plant is at 93% power. Planned: Perform DB-SS-04150, Main Turbine Stop Valve Test. In Progress: Release of the Miscellaneous Waste Monitor tank at 25 gpm. Equipment OOS: Stator Coolant Pump B for motor replacement and Station Air Compressor 1 for PMs.

Event No.	Malf. No.	Event Type*	Event Description
1		N(BOP)	Main Turbine Stop valve testing.
2	IMF R3N5 100 IMF R3N1 100	I(RO)	Power Range Nuclear Instrument, NI 5, fails high after Stop valve testing.
3	IMF H104E 1.0	C(RO)	High vibrations on Reactor Coolant Pump 2-2 ramping in over 15 minutes after RPS channel 2 is placed in bypass.
4		R(RO)	Reduce reactor power from 100% to 72% for tripping RCP 2-2.
5	IMF SAM5 0.009	M(BOP)	An isolable steam leak on Main Steam line 1 in the Turbine Building that is a personnel hazard.
6	IMF L4 TRUE IMF L7 TRUE IMF L8 TRUE IMF L502Q TRUE IMF L502C TRUE	I(RO)	Reactor Protection System will fail to trip the reactor automatically or manually, ATWS.
7	IMF SA03C TRUE	M(All)	Fail open a Main Steam Safety Valve on Main Steam line 1.

8	IMF F30AB TRUE IMF F30BB TRUE IMF F30CB TRUE IMF F30DB TRUE	I(BOP)	Fail Steam and Feed Rupture Control System to automatically to actuate due to the low pressure in Steam Generator 1.
9	IMF SA36D 0.4	C(BOP)	After AF608 has been closed fail to 40% open Atmospheric Vent Valve 2.

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

Op-Test No.:	1	Scenario No.:	1	Event No.:	1	Page	1	of	1
Event Description: <u>Main Turbine Control valve and Stop valve testing.</u>									
Time	Position	Applicant's Actions or Behavior							
	SRO	Direct the BOP to perform DB-SS-04150, Main Turbine Stop Valve Test: <ul style="list-style-type: none"> – Hold a pre-job brief. – Should refer to T.S. 3.3.2.3, Anticipatory Reactor Trip System Instrumentation. 							
	BOP	Disable Turbine vibration trips.							
	RO	Using DB-OP-06401, Integrated Control System Operating Procedure, place the Steam Generator/Reactor Demand Station into Hand.							
	BOP	For Main Turbine Stop valve 4 and 3: <ul style="list-style-type: none"> – Place the associated ARTS channel into T-G Bypass. – Cycle the Main Turbine Stop valve. – Restore the associated ARTS channel to Normal. – Verify plant is stabilized prior to continuing. 							
	BOP	Select Turbine Throttle Pressure transmitter PT SP16B using DB-OP-06407, Non-Nuclear Instrumentation System Operating Procedure. <ul style="list-style-type: none"> – Transfer HIS SP16 to the "Y" channel. 							
	BOP	For Main Turbine Stop valve 2 and 1: <ul style="list-style-type: none"> – Place the associated ARTS channel into T-G Bypass. – Cycle the Main Turbine Stop valve. – Restore the associated ARTS channel to Normal. – Verify plant is stabilized prior to continuing. 							
	BOP	Select Turbine Throttle Pressure transmitter PT SP16A using DB-OP-06407, Non-Nuclear Instrumentation System Operating Procedure. <ul style="list-style-type: none"> – Transfer HIS SP16 to the "X" channel. 							
	RO	Using DB-OP-06401, Integrated Control System Operating Procedure, place the Steam Generator/Reactor Demand Station into Automatic.							
	BOP	Enable Turbine vibration trips.							
	SRO	Direct a power increase to 100% per DB-OP-06902, Power Operations, Section 3.0 <ul style="list-style-type: none"> – Notify the Load Dispatcher. – Decrease reactor power to 100% at 5 MWe/min. – NIP and HBP check every 5% power change. 							
	RO	Increase reactor power from < 93% to 100% at 5 MWe/min. <ul style="list-style-type: none"> – Perform a NIP and HBP check every 5% power change 							
	SRO	Review completed test DB-SS-04150.							

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Op-Test No.:	1	Scenario No.:	1	Event No.:	3 & 4	Page	1	of	1
Event Description: <u>High vibrations on Reactor Coolant Pump (RCP) 2-2 ramping in over 15 minutes.</u>									
<u>Reduce reactor power from 100% to 72% for tripping RCP 2-2.</u>									
Time	Position	Applicant's Actions or Behavior							
	RO	Identify that RCP 2-2 has high vibrations: – Computer point, RCP 2-2 Vibrations High. – Annunciator Alarm 6-5-A, MONITOR SYSTEM TRBL, for high vibrations on RCP 2-2.							
	SRO	Direct the implementation of DB-OP-02515, Reactor Coolant Pump and Motor Abnormal Operation: – RO/BOP to reduce power to 72% per DB-OP-02504, Rapid Shutdown. – RO to start RCP 2-2 lift pump and stop RCP 2-2. – BOP to verify that Feedwater to the Steam Generators re-ratios. – BOP to establish a zero ΔT -cold.							
	RO	Transfer the Reactor Demand and Rod Control Panel to automatic, if elected.							
	RO	Perform power reduction to 72% using ICS unit load demand or by using steam generator/reactor demand station in hand.							
	RO	Maintain Imbalance > -10% using axial power shaping rods.							
	SRO	At < 90% power, have an EO remove the Auxiliary Feed Pump Turbine Main Steam Minimum flow line.							
	BOP	Stop one of the Condensate pumps when Condensate flow is < 7.0 MPPH.							
	SRO	At approximately 675 MWe, have an EO open MS 338 and MS 353, MSR 1 and 2 Second Stage Reheat Low Load valves.							
	RO	At < 72% power, start RCP 2-2 lift pump and stop RCP 2-2. (RCP 2-2's shaft may shear prior to the examinee stopping the RCP.)							
	BOP	Verify that Feedwater to the Steam Generators re-ratios.							
	SRO	Advise the Shift Supervisor that Tech. Spec. 3.2.5 was entered, on transitory basis, while RCS pressure was below 2058.7 psig. RCS pressure must be restore to normal within two hours.							
	BOP	Establish a zero ΔT -cold by either using Steam Generator Load Ratio in hand or automatic.							
	SRO	Contact I&T to reduce the high flux trip set points to < 80.6% and verify flux/delta-flux/flow set points have been reduced. Required by Tech. Spec. 3.4.1.1 to be completed within four hours of tripping the RCP.							
	SRO	Contact Chem. Lab. to take a RCS sample and perform an isotopic analysis for Iodine. Required by Tech. Spec. 3.4.8 to be completed within two to six hours of completing the power reduction.							

Op-Test No.:	1	Scenario No.:	1	Event No.:	5 & 6	Page	1	of	1
Event Description: <u>An isolable steam leak on Main Steam line 1 in the Turbine Building that is a personnel hazard.</u>									
<u>Reactor Protection System (RPS) will fail to trip the reactor automatically or manually, ATWS.</u>									
Time	Position	Applicant's Actions or Behavior							
	RO	Identify that a steam leak has occurred on Main Steam Line 1: <ul style="list-style-type: none"> – MWe generated take a step decrease. – Reactor power increases to recover MWe. – Mismatch between Reactor power and MWe generated. – Fire Alarm for the Turbine Building. – Reports from personnel outside of the Control Room. 							
	RO	Verify immediate actions of DB-OP-02525, Steam Leaks, (Steam leak should be identified as hazard to personnel due to the maintenance on the Startup Feedwater Pump): <ul style="list-style-type: none"> – Trip the Reactor. 							
	BPO	Verify immediate actions of DB-OP-02525, Steam Leaks: <ul style="list-style-type: none"> – Manually actuate SFRCS to initiate AFW and isolate both SGs. 							
	SRO	Direct the implementation of DB-OP-02525, Steam Leaks: <ul style="list-style-type: none"> – Verify immediate actions. – Route to DB-OP-02000, RPS, SFAS, SFRCS Trip or SG Tube Rupture. 							
	SRO	Direct the implementation the Immediate Actions of DB-OP-02000, RPS, SFAS, SFRCS Trip, or SG Tube Rupture, due to alarm 5-1-B: <ul style="list-style-type: none"> – RO to trip the reactor. – BOP to trip the turbine. 							
	RO	Trip the reactor.							
	BOP	Trip the turbine.							
	RO	Identify that the reactor failed to trip: <ul style="list-style-type: none"> – Control rods fail to insert. – No annunciator alarm 8-1-A, CRD TRIP CONFIRM. 							
	SRO	Direct the RO to de-energize and re-energize Buses E2 and F2.							
	RO	De-energize and re-energize Buses E2 and F2 and confirm control rods have inserted into the core. Critical Task: 029-EA1.11 3.9/4.1							
	SRO	Recommend to the Shift Supervisor, when the plant conditions allow, to enter the Emergency Plan. An Alert should be declared on EAL 3.A.2.							
	SRO	Recommend to the Shift Supervisor, when the plant conditions allow, to enter Tech. Spec. 3.3.1.1 for manual Reactor trip and Control Rod Drive trip breakers.							

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Op-Test No.:	1	Scenario No.:	1	Event No.:	7, 8 & 9	Page	1	of	3
Event Description: <u>Fail open a Main Steam Safety Valve (MSSV) on Main Steam line 1.</u>									
<u>Fail Steam and Feed Rupture Control System (SFRCS) to automatically to actuate.</u>									
<u>After a AF608 has been closed fail to 20% open Atmospheric Vent Valve 2.</u>									
Time	Position	Applicant's Actions or Behavior							
	SRO	Direct the implementation of the Overcooling Actions of DB-OP-02000, RPS, SFAS, SFRCS Trip, or SG Tube Rupture: <ul style="list-style-type: none"> – RO to isolate Letdown if necessary. – BOP to verify proper SFRCS. – BOP to isolate the affected Steam Generator. – BOP to control RCS temperature. – Maintain SG tube to shell temperature differential. 							
	RO	Isolate Letdown if the Pressurizer level is < 10".							
	BOP	Verify Proper SFRCS actuation: <ul style="list-style-type: none"> – If SG 1 pressure decreases to < 620 psig, the BOP will discover that the SFRCS system has failed to realign the AFW system for a low pressure trip in SG 1. 							
	BOP	Close AF 608, AFW to SG 1. <ul style="list-style-type: none"> – The crew may have taken action to stop the overcooling earlier and close AF 3870, AFP 1 Discharge to SG 1 Stop valve. Critical Task: BW E05-EA1.1 4.4/4.2							
	BOP	Verify that proper level is being maintained in SG 2.							
	BOP	Using the Atmospheric Vent valve, establish control over SG 2 pressure and maintain RCS temperature constant or slightly decreasing.							
	SRO	Check for entry into PTS criteria. PTS should not be required to be invoked.							
	SRO	Commence boration of the RCS to 1% Shutdown Margin.							
	SRO	Determine SG tube to shell temperature differential for SG 1.							
	BOP	Control the RCS temperature to maintain the SG tube to shell temperature differential within limits							
	SRO	Recommend to the Shift Supervisor to enter Tech. Spec.: <ul style="list-style-type: none"> – 3.4.1.2, RCS – 3.4.5, SGs 							

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Event Description: <u>Fail open a Main Steam Safety Valve (MSSV) on Main Steam line 1.</u>									
<u>Fail Steam and Feed Rupture Control System (SFRCS) to automatically to actuate.</u>									
<u>After a AF608 has been closed fail to 20% open Atmospheric Vent Valve 2.</u>									
Time	Position	Applicant's Actions or Behavior							
	BOP	Identify that ICS11A, Atmospheric Vent Valve 2, has failed to 20% open							
	SRO	Direct the implementation of the Overcooling Actions of DB-OP-02000, RPS, SFAS, SFRCS Trip, or SG Tube Rupture: <ul style="list-style-type: none"> — BOP to isolate the remaining Steam Generator. — RO to perform the actions of Attachment 4. — Route to section 12, MU/HPI Cooling, of DB-OP-02000, RPS, SFAS, SFRCS Trip, or SG Tube Rupture. 							
	BOP	Close AF 599, AFW to SG 2. Critical Task: BW05-EA1.1 4.4/4.2							
	RO	Align MU/HPI cooling per Attachment 4 *Critical Task: BW E05-EA1.1 4.4/4.2 <ul style="list-style-type: none"> — *Start standby CCW pump. — *Start both HPI pumps. — *Open HP 2A through D, HPI injection valves. — *Start both LPI pumps. — *Open piggyback valves, DH63 and DH64. — *Start the second Makeup Pump. — *Trip all but one RCP. — Place all pressurizer heaters in off. — *Close Makeup Pump 1 to Seal Injection Valve, MU6409. — *Open Pressurizer Level Control Valve Bypass, MU6420. — *Open Makeup Alternate Injection Line CTMT Isolation, MU6421. — *Open Makeup Alternate Injection Valve, MU6419. — Close Makeup Pump 2 Minimum Recirc., MU6406 — *Open PORV Block Valve, RC11. — *Lock open PORV, RC2A. — Open High Point Vent Valves, RC4608A, RC4608B, RC4610A, RC4610B, RC200 and RC239A. — Close CTMT Normal Sump Valves, DR2012A and DR2012B. — *Trip the last running RCP if subcooling margin is lost (<20°F SCM). 							

Justification for Critical Tasks

A. De-energize 480 Volt Substations E2 and F2.

The Control Rod Drive breakers will fail to open from a Reactor Protection System automatic and manual trip signal. The operator will have to de-energize E2 and F2 enable the Control Rods to insert into the core. Failure to insert the Control Rods will result in a number of safety issues. Continuing to feed a secondary steam leak that is a hazard to station personnel. When the secondary steam plant is isolated to isolate the steam, feedwater capacity will be reduced which will eventually result in overheating of the Reactor Core and fuel damage.

B. Close AF 608, AFW to SG 1 or AF 3870, AFP 1 Discharge to SG 1 Stop Valve.

The Steam and Feed Rupture Control system will fail to isolate the leaking Steam Generator. The operator must close AF 608 or AF 3870 to stop feeding the Steam Generator that has the unisolable steam leak. Continuing to feed the bad Steam Generator will cause an overcooling the Reactor Coolant System and the addition of positive reactivity to the Reactor.

C. Close AF 599, AFW to SG 2.

The Steam and Feed Rupture Control system will fail to isolate the leaking Steam Generator. The operator must close AF 599 to stop feeding the Steam Generator that has the unisolable steam leak. Continuing to feed the bad Steam Generator will cause an overcooling the Reactor Coolant System and the addition of positive reactivity to the Reactor.

D. Establish MU/HPI Cooling

MU/HPI cooling is required to be established when neither Steam Generator is available for heat removal. Establishing MU/HPI cooling will prevent a RCS over pressurization and core damage due to over heating.

SIMULATOR SETUP AND CUES

1. Simulator Setup

a. Initial Conditions

- 1) 100% power.
- 2) Hang a magnetic tag for stator coolant water pump B OOS.
 - a) Place on status board that SCW Pump B is OOS for motor replacement.
- 3) Hang a Red tag on SAC 1 control switch.
 - a) Enter on the status board that SAC 1 is OOS for PMs.
- 4) Hang the chemistry sheet on the status board.
- 5) Calculate and print a batch for the current RCS boron concentration, and place on control console A01.
- 6) Performing the following for the release of the MWMT:
 - a) Establish a dilution flow rate of > 20,000 gpm.
 - b) Set computer point F201 low flow alarm to 20,000 gpm.
 - c) Setup a video trend of F201 on CRT 1.
- 7) Verify Pressurizer level transmitter LT RC14A1 is selected.
- 8) Post Protected Train 2.
- 9) Initial malfunctions.
 - a) Rack out Stator Coolant Pump B - IRF UJSB OPEN
 - b) Rack out SAC 1 breaker – IRF KFS1A RACKOUT
 - c) Prevent the Reactor from tripping - IMF L4, IMF L7, IMF L8, IMF L502Q and IMF L502C.
 - d) Fail SFRCS to automatically to trip - IMF F30AB, IMF F30BB, IMF F30CB and IMF F30DB.
- 10) Assign the surrogate to the BOP position.

b. Procedures

- 1) For Crew:
 - a) DB-OP-06902, Power Operations Procedure signed off up to step 8.1.6.
 - b) DB-SS-04150, Main Turbine Stop Valve Test.
 - c) DB-SS-04151, Main Turbine Control Valve Test.
 - d) DB-OP-06401, Integrated Control System Operating Procedure
 - e) DB-OP-06403, Reactor Protection System and Nuclear Instrumentation Operating Procedure
 - f) DB-OP-06407, Non-Nuclear Instrumentation System Operating Procedure.
- 2) For Simulator Instructor:
 - a) DB-SS-04150, Main Turbine Stop Valve Test.

c. Event Triggers

- 1) Activates Event 7 on a SFRCS Trip - TRGSET 4 "RATPW < 10"

d. Events

- 1) Fail NI 5 high - IMF R3N5 (2) 100 and IMF R3N1 (2) 100
- 2) Ramp in high vibrations for RCP 2-2 over 15 minutes - IMF H104E (3) 1.0 15:00 0.0.
- 3) Steam leak in the Secondary plant - IMF SAM5 (5) 0.009.
- 4) Fire alarm for Turbine Building 603 elevation with a 5 second time delay – IMF KN054 (5 0:00:5)
- 5) Fail open MSSV SP17B3- IMF SA03C (7).
- 6) Fail open AVV 2 to 40% - IMF SA36D (9) 0.4.

e. CAEP file.

- 1) Load the batch file - BAT TEMP\SCEN1.TXT|00:00:05|0

2. Cues (non-generic)

a. Event 1

- 1) EO will report that each of the Main Turbine Stop valve slow closed for about 90% of the travel and fast closed at the end of travel.

b. Event 2

- 1) None.

c. Event 3 and 4

- 1) EO will be sent to remove the Auxiliary Feed Pump Turbine Main Steam minimum flow line from service. The EO will NOT have any problems.
- 2) Chem. Lab. will be asked to perform an isotropic analysis of the RCS. The supervisor will ask when they want it performed.

d. Event 5 and 6

- 1) When directed a maintenance worker will call up to report that he is at a gaitronics phone near SAC 1 and cannot see his hand in front of his face. He will inform the Control Room that he was working with two other guys and cannot find them.

e. Event 7 & 8

- 1) None.

SHIFT SUPERVISOR / ASSISTANT SHIFT SUPERVISOR TURNOVER CHECKLIST
Part 1 - Unit Status: Evolutions/ Maintenance/ Procedures

DATE: 9/21/00	SHIFT: DAYS	MODE: 1	PROTECTED TRAIN: 2
Power: 93%	RCS Boron: 1677 ppmB	ICS High Limiter: 102.75%	RPS Hi Flux Trip: 104.5%

License Requirements

None

Alarm Status

9-1-G FIRE OR RADIATION TRBL – Will not alarm when simplex alarms are received.

SECONDARY STATUS/ELECTRICAL STATUS**PREVIOUS**

Tagged out Stator Coolant pump B for motor replacement.
 Tagged out SAC 1 for PMs.
 Power was decreased to 93% with rods per Nuclear Engineering at 5 MWe/min.

GENERAL STATUS

10 gpd leak in SG 1, action level 2 items complete.
 Bayshore Line new meter to be installed soon.
 Outside air temperature is 85 F and Forebay temperature is 75 F.

ZONE 1 OPS BURDENS

None.

ZONE 1 WORKAROUNDS

None.

ZONE 2 OPS BURDENS

None.

ZONE 2 WORKAROUND

None.

GENERAL NOTES

CCW 1 - 90°F CCW 2 - 100°F CCW 3 - 100°F

CHEMISTRY

Intake Chlorination - S/D	Circwater Chlorination - in service	Circwater Dynacool - in service
Demin Skid – in service	MSR Drains: 1→FWD 2→FWD	Polishers 1,2,3,4 in service (CD751 closed)

PRIMARY STATUS/RE STATUS**PREVIOUS SHIFT**

Release of MWMT in progress to be completed in 2 hrs.
 Pzr lvl Transmitter LT RC14-2 fails intermittantly, LT RC14-1 is selected

GENERAL STATUS**ZONE 3 OPS BURDENS**

None.

SHIFT SUPERVISOR / ASSISTANT SHIFT SUPERVISOR TURNOVER CHECKLIST

ZONE 3 WORK AROUNDS

None.

GENERAL NOTES

ZONE 3 UPDATE / RP UPDATE / SHIFT MANAGER / OUTSIDE ASSISTANT

CONTROL ROOM

CTRM BURDENS

Various Plant Computer alarm set points do not match the plant. Plans are to update the Plant Computer when new computer is installed in the plant

MU 32 response causes the Pressurizer level to swing.

CTRM WORKAROUNDS

Boronmeter – New Simulator Boronmeter is being used by the plant for calibration of the new plant Boronmeter
SPDS will remain energized on a loss of power.

MFPTs can be reset without being on the LSS.

CREOOS

PLANNED ACTIVITIES:

Evolutions:

DB-SS-04150, Main Turbine Stop Valve Testing

Tagging:

Testing:

CHEMISTRY ANALYSES STATUS

PRIMARY (RCS)				SECONDARY (FEEDWATER)			
Time: 0830		Date: 10/2/2000		Date: 10/2/2000		Daily Average	
Limits		Value		Limits		Value	
≤100	O ₂	<2	ppb	≤5	O ₂	0.9	ppb
≤150	Cl ⁻	4.42	ppb	≥20	N ₂ H ₄	32.9	ppb
≤150	F ⁻	2.35	ppb	≤20	SiO ₂	<5	ppb
*	Li	2.20	ppm	≤3	Na	<0.1	ppb
	pH	6.88	@ 25°C	≤10	Fe	<10	ppb
25-50	H ₂	35.8	cc/kg	≤5	Cl ⁻	0.07	ppb
	N ₂	1.97	cc/kg	≥9.3	pH	9.82	@ 25°C
≤100	TDG	37.8	cc/kg	Measured H ⁺ Cond.		0.425	μS/cm
≤1.0	DEI-131	1.13E-2	μCi/gm	≤0.2	**Inorganic H ⁺ Cond.		0.06 μS/cm
100/Ē	Specific Act.	0.461	μCi/ml	Condensate Dissolved O ₂		3.2	ppb
	I-131	3.67E-3	μCi/ml	**Inorganic H ⁺ Cond. is a calculated value			
* Per DB-CH-06900, Attachment 1				Highest Condensate Polisher ΔP: <u>1.02</u> psid (to nearest psid)			
COVER GAS							
Tank	%H ₂	%O ₂	%N ₂	Time		Date	
WGST							
CWRT 1							
CWRT 2							
BORON				Primary to Secondary Leakage			
Vessel	PPM	Time	Date	<u>10.0</u> GPD (LLD is 5.0 GPD)			
RCS	1677	0830	10/2/2000	RE 1003 A/B Equivalent cpm for OTSG Leakage Based on RCS Xe-133 <u>1.31E-2</u> μCi/ml Based on FI 1002 <u>13</u> cfm <div style="display: flex; justify-content: space-around;"> RE 1003A RE 1003B </div> 5 GPD <u>N/A</u> cpm <u>N/A</u> cpm 30 GPD <u>4.3E2</u> cpm <u>9E1</u> cpm 100 GPD <u>1.4E3</u> cpm <u>3.0E2</u> cpm 150 GPD <u>2.2E3</u> cpm <u>4.3E2</u> cpm Increase of 60 GPD <u>8.6E2</u> cpm↑ <u>1.4E2</u> cpm↑			
PZR	1677	1220	10/2/2000				
BWST							
BAAT 1							
BAAT 2							
CWRT 1							
CWRT 2							
CFT 1							
CFT 2							
SFP							
Refuel Canal							

Reviewed by _____ Time/Date _____ / _____
 Shift Supervisor

Facility: Davis-Besse NPS Scenario No.: 2 Op-Test No.: 1

Examiners: _____ Operators: _____

Objectives: The candidates are to (1) shutdown MFPT 1, (2) identify the loss of a Condensate pump due to a lock out of C2 bus and reduce power to meet the capacity of one Condensate pump, (3) identify the selected Pressurizer level transmitter has failed low and perform the required operator actions, (4) recognize a small Reactor Coolant system leak and perform the required operator actions, (5) identify that Reactor Coolant system leak rate has increased and (6) perform the necessary actions for the Safety Features Actuation system failing to activate at < 1650 psig in the Reactor Coolant system.

Turnover: Plant is currently at ~50%, Planned: Shutdown Main Feedwater Pump 1 for work on the Lube Oil system. In Progress: Release of the Miscellaneous Waste Monitor tank at 25 gpm. Equipment OOS: TPCW Pump 1 for PMs.

Event No.	Malf. No.	Event Type*	Event Description
1		N(BOP)	Shutdown MFPT 1.
2	IMF H150E 1.0	I(RO)	Pressurizer Level Instrument, LT RC14A1, failed low.
3	IMF E1AC TRUE IRF E229 1.0	C(BOP)	Lockout 4160 Volt Bus C2 and AC Transformer after MFPT 1 is shutdown.
4	IMF HH42 0.000025	C(RO)	Small Reactor Coolant System leak of 25 gpm.
5	IMF HH46 0.0009	M(All)	Medium sized break of 1000 gpm in the Reactor Coolant System.
6	IMF L6ADC TRUE IMF L6ACDC TRUE IMF L6ABDC TRUE IMF L6ADDC TRUE	I(RO)	Safety Features Actuation System fails to actuate at < 1650 psig in the Reactor Coolant System.
7			

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

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Op-Test No.:	1	Scenario No.:	2	Event No.:	3	Page 1 of 1
Event Description: <u>Lockout 4160 Volt Bus C2 and AC Transformer.</u>						
Time	Position	Applicant's Actions or Behavior				
	RO/BOP	Identify that Bus C2 and AC Transformer have locked out. <ul style="list-style-type: none"> – Annunciator 1-1-D, XFMR AC LOCKOUT. – All breakers on Bus C2 open. 				
	SRO	Direct the Implementation of DB-OP-02521, Loss of AC Bus Power Sources: <ul style="list-style-type: none"> – Determine what loads are lost. – Identify that the MWDT release must be stopped and contact the EO to stop the release. – Direct a plant shutdown to a power level that is within the capacity of one Condensate pump. – Contact the Shift Manager/Electricians to investigate the lockout on Bus C2 and AC Transformer. – Direct that BOP to start a Cooling Tower Make-up pump if necessary. 				
	SRO	Direct the implementation of DB-OP-06902, Power Operations: <ul style="list-style-type: none"> – Notify the Load Dispatcher and Chem. Lab. that the power decrease is continuing. – Contact an EO to monitor Second Stage Reheat pressure. – RO to lower power to until Condensate flow is within the capacity of one Condensate pump. (Crew may elect to reduce power to Low Level Limits, ~28% power.) – BOP to place the MFP 2 ICS station into hand prior to Low Level Limits. – BOP to align secondary systems for the shutdown. 				
	RO	Reduce Reactor power, using the ULD or Steam Generator/Reactor Demand stations, to a level that is within the capacity of one Condensate pump.				
	BOP	Open the LP Stop valve drains for MFPT 2.				
	BOP	Stop Heater Drain pump 2 using DB-OP-06227, Low Pressure Feedwater Heaters.				
	BOP	Align the Main Turbine Extraction Steam line drains.				
	BOP	Adjust set point of FC 438, Main Feed Pump 2 Recirculation Valve Controller, to control at 4.0 MPPH, if directed by the SRO.				
	BOP	Prior to going on to Low Level Limits, place the Main Feedwater Pump 2 ICS station into hand.				
	BOP	Start Cooling Tower Make-up pump 2, if directed, per DB-OP-06232, Circulating Water System and Cooling Tower Operation, section 3.13.				
	SRO	Advise the Shift Supervisor to enter Tech. Spec. 3.8.1.1, and to perform DB-SC-03023, Off-Site AC Sources Lined Up and Available, and DB-SC-03041, On-Site AC Bus Sources Lined Up, Available and Isolated.				

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Op-Test No.: 1 Scenario No.: 2 Event No.: 5 & 6 Page 1 of 4Event Description: Medium sized break of 1000 gpm in the Reactor Coolant System.Safety Features Actuation System fails to actuate at < 1650 psig in the Reactor Coolant System.

Time	Position	Applicant's Actions or Behavior
	RO	Identify the RCS leak rate has increase: <ul style="list-style-type: none"> – Makeup Tank level rate of decrease has increased. – Increase in Makeup system flow. – CTMT Normal sump level rate of rise increases. – Annunciator 4-2-E, PZR LVL LO. – Annunciator 4-3-A, CTMT NORM SUMP LVL HI. – Annunciator 4-4-C, HOT LEG PRESS LO.
	SRO	Route back to section 4.1 of DB-OP-02522, Small RCS Leaks and direct the following: <ul style="list-style-type: none"> – RO to isolate Letdown. – RO to determine that Pressurizer level is still decreasing. – Route to section 4.3. – RO to start the second Makeup pump. – Direct a rapid shutdown per DB-OP-05204, Rapid Shutdown. – BOP to line up and start piggyback operations. – RO to trip the Reactor at 100" in the Pressurizer. – Route to DB-OP-02000, RPS, SFAS, SFRCS Trip or SG Tube Rupture.
	RO	Isolate Letdown by closing MU 2B, Letdown Isolation valve.
	RO	Start the second Makeup pump per DB-OP-06006, Makeup and Purification System.
	RO	If the plant is on Low Level Limits then begin a shutdown by placing the Reactor Demand station into hand and decreasing Reactor power. Otherwise continue the plant shutdown using the ULD.
	SRO	De-energize the CTMT Normal sump pumps by having an EO open the local breakers, if determined to be necessary.
	BOP	Line up and start piggyback operations: <ul style="list-style-type: none"> – Verify Makeup Pump Suction valves on the BWST. – Verify standby CCW Pump starts. – Verify both HPI pumps start. – Verify HP 2A through D, HPI Injection valves open. – Start both LPI Pumps. – Open Piggyback valves, DH63 and DH64.
	RO	Identify the Pressurizer level has decreased to 100" and the Reactor is required to be tripped.

(If subcooling margin is lost then go to page 4 for Specific Rule 1 actions and Section 5 actions)

8 of 13

Op-Test No.:	1	Scenario No.:	2	Event No.:	5 & 6	Page	3	of	4
Event Description: <u>Medium sized break of 1000 gpm in the Reactor Coolant System.</u>									
<u>Safety Features Actuation System fails to actuate at < 1650 psig in the Reactor Coolant System.</u>									
Time	Position	Applicant's Actions or Behavior							
	SRO	Direct the implementation of Specific Rule 1.							
	RO	Perform Specific Rule 1 when subcooling margin is lost. – Trip all running RCPs with two minutes. Critical Task: E13-EK3.4 3.5/3.7 – Lock makeup pump suction valves on the BWST. – Verify standby CCW Pump starts. – Start both LPI Pumps. – Open piggyback valves, DH63 and DH64. – Open MU 6420, MU 32 bypass valve. – Verify both HPI pumps start. – Verify HP 2A through D, HPI injection valves open.							
	RO	Isolate the following: – Letdown, by closing MU 2B. – PORV block, by closing RC 11. – Pressurizer spray block, by closing RC 10.							
	RO	Verify the RCS high point vents are isolated.							
		(After completing the actions on page 2.)							
	SRO	Direction the implementation of Section 5 of DB-OP-02000, RPS,SFAS,SFRCS trips or SG Tube Ruputure: – Determine if SCM can be restored. – After SCM has been restored then direct the throttling of Makeup and HPI per Specific Rule 2. – Restart at least one RCP per loop – Route to Section 8 of DB-OP-02000.							
	RO	Throttle Makeup and HPI per Specific Rule 2 – Close MU 6420, Pressurizer Level Control Valve Bypass, and throttle MU 32, Pressurizer Level Control valve. – Throttle MU 6419, Makeup Alternate Injection. – Block and throttle HP 2A through HP 2D. – Maintain SCM >20F.							
	RO	Restart at least one RCP in each loop using DB-OP-06005, RC Pump Operations.							
		(Return to page 3 for the remaining actions.)							

Justification for Critical Tasks

- A. Place the Pressurizer Level Control valve, MU 32, into hand.

The failed Pressurizer Level Instrument will result in the Pressurizer Level Control valve, MU 32, to fail open. The operator placing the Pressurizer Level Control valve station, MU 32, in hand and manually decreasing demand to zero will close the valve. Failing to control Pressurizer level will result in Pressurizer going solid. The Pressurizer Code Safeties will lift to control the Reactor Coolant System pressure. The Pressurizer Code Safeties will stick open due to being hydraulically lifted resulting in an unisolable Reactor Coolant System leak.

- B. Manually position Safety Features Actuation System components.

The Safety Features Actuation System will fail to actuate on < 1650 psig in the Reactor Coolant System. This will result in a failure of Containment isolation to occur and the automatic starting of key safety pumps. The operator is required to verify proper actuation of all safety system. Failing to place the components in their proper position will result in a radiation release to the general public that may be in excess of USAR limits.

- C. Trip all running RCPs within two minutes. (Only if SCM is lost.)

The pressurizer code safety failing open will cause a loss of subcooling margin, which requires that Specific Rule 1 be implemented. The RCPs are required to be tripped within two minutes due to an analysis showing that the reactor core may be uncovered if the RCPs were to trip after the two minutes expired. The operator tripping the RCPs within two minutes eliminate the chance of the reactor core being uncovered.

SIMULATOR SETUP AND CUES

1. Simulator Setup

a. Initial Conditions

- 1) ~60% power with reactor decrease in progress with:
 - a) Both MFPs in service.
 - b) Condensate Pumps 1 and 2 in service.
 - c) TPCW pumps 2 and 3 in service.
 - d) Set MFPT 1 and 2 Recirculation controller to 4.0 MPPH.
- 2) Hang "Do Not Operate" tags on TPCW Pump 1.
 - a) Place on status board that TPCW Pump 1 is OOS at 0700 (present date) for preventative maintenance.
- 3) Hang the Chemistry sheet on the status board.
- 4) Performing the following for the release of the MWMT:
 - a) Establish a dilution flow rate of > 20,000 gpm.
 - b) Set computer point F201 low flow alarm to 20,000 gpm.
 - c) Setup a video trend of F201 on CRT 1.
- 5) Verify Pressurizer level transmitter LT RC14A1 is selected.
- 6) Post Protected Train 2 signs.
- 7) Calculate and print a batch for the current RCS boron concentration, and place on control console A01.
- 8) Initial malfunctions.
 - a) Rack out TPCW Pump 1 - IRF KDP1B REMOVE and IRF KDP1A RACKOUT
 - b) Fails SFAS to automatically to trip - IMF L6ADC, IMF L6CDC, IMF L6BDC and IMF L6DDC.

b. Procedures

- 1) For Crew:
 - a) DB-OP-06902, Power Operations Procedure signed off appropriately to Step 5.4.3.
 - b) DB-OP-06001, Boron Concentration Control
 - c) DB-OP-06224, Main Feed Pump and Turbine Procedure.
 - d) DB-OP-06401, Integrated Control System Operating Procedure.
 - e) DB-OP-06221, Condensate System Procedure.
- 2) For Simulator Instructor:
 - a) DB-OP-06224, Main Feed Pump and Turbine Procedure.

c. Event Triggers

- 1) None.

d. Events

- 1) Fail Pressurizer Level transmitter, LT RC14A1, low - IMF H150E (2) 1.0.
- 2) Lock out of AC Transformer (initiate with CAEP line 2) - IMF E1AC (3)
- 3) Small RCS leak – IMF HH42 (4) 0.000025
- 4) Medium sized RCS leak ramping in over 10 minutes - IMF HH46 (5) 0.0008 10:00 0.0.

e. CAEP file.

- 1) Load the batch file - BAT TEMP\SCEN2.TXT|00:00:05|0
- 2) Lock out C2 bus - SET "TFEL1383=1"|4:00:00|1

2. Cues (Non-generic)

a. Event 1 & 2.

1) None.

b. Event 3

1) When an EO is sent to the High Voltage SwitchGear Room, he will report that the 86 lockout relays have actuated for C2 bus and AC transformer.

2) If an EO is sent to AC transformer, he will find an alarm for Winding Temp Danger and current winding temperature is 145 C.

c. Event 4

1) None.

d. Event 5

1) None.

e. Event 6 & 7

1) None.

SHIFT SUPERVISOR / ASSISTANT SHIFT SUPERVISOR TURNOVER CHECKLIST
Part 1 - Unit Status: Evolutions/ Maintenance/ Procedures

DATE: 9/21/00	SHIFT: DAYS	MODE: 1	PROTECTED TRAIN: 2
Power: 50%	RCS Boron: 1690 ppmB	ICS High Limiter: 102.75%	RPS Hi Flux Trip: 104.5%

License Requirements

None

Alarm Status**9-1-G FIRE OR RADIATION TRBL** – Will not alarm when simplex alarms are received.**SECONDARY STATUS/ELECTRICAL STATUS****PREVIOUS**

Tagged out TPCW pump 1 for PMs

Decreased power to 50% for shutdown of MFPT 1.

GENERAL STATUS

10 gpd leak in SG 1, action level 2 items complete.

Bayshore Line new meter to be installed soon.

Outside air temperature is 85 F and Forebay temperature is 75 F.

ZONE 1 OPS BURDENS

None.

ZONE 1 WORKAROUNDS

None.

ZONE 2 OPS BURDENS

None.

ZONE 2 WORKAROUND

None.

GENERAL NOTES**CCW 1 - 90°F CCW 2 - 100°F CCW 3 - 100°F****CHEMISTRY**

Intake Chlorination - S/D

Circwater Chlorination - in service

Circwater Dynacool - in service

Demin Skid – in service

MSR Drains: 1→FWD 2→FWD

Polishers 1,2,3,4 in service (CD751 closed)

PRIMARY STATUS/RE STATUS**PREVIOUS SHIFT**

Release of MWMT in progress to be completed in 2 hrs.

Pzr lvl Transmitter LT RC14-2 fails intermittantly, LT RC14-1 is selected

GENERAL STATUS**ZONE 3 OPS BURDENS**

None.

SHIFT SUPERVISOR / ASSISTANT SHIFT SUPERVISOR TURNOVER CHECKLIST

ZONE 3 WORK AROUNDS

None.

GENERAL NOTES

ZONE 3 UPDATE / RP UPDATE / SHIFT MANAGER / OUTSIDE ASSISTANT

CONTROL ROOM

CTRM BURDENS

Various Plant Computer alarm set points do not match the plant. Plans are to update the Plant Computer when new computer is installed in the plant

MU 32 response causes the Pressurizer level to swing.

CTRM WORKAROUNDS

Boronmeter – New Simulator Boronmeter is being used by the plant for calibration of the new plant Boronmeter
SPDS will remain energized on a loss of power.

MFPTs can be reset without being on the LSS.

CREOOS

PLANNED ACTIVITIES:

Evolutions:

Shutdown of MFP 1.

Tagging:

MFPT 1 for lube oil system maintenance.

Testing:

CHEMISTRY ANALYSES STATUS

PRIMARY (RCS)				SECONDARY (FEEDWATER)																								
Time: 0830		Date: 10/2/2000		Date: 10/2/2000		Daily Average																						
Limits		Value		Limits		Value																						
≤100	O ₂	<2	ppb	≤5	O ₂	0.9	ppb																					
≤150	Cl ⁻	4.42	ppb	≥20	N ₂ H ₄	32.9	ppb																					
≤150	F ⁻	2.35	ppb	≤20	SiO ₂	<5	ppb																					
*	Li	2.20	ppm	≤3	Na	<0.1	ppb																					
	pH	6.88	@ 25°C	≤10	Fe	<10	ppb																					
25-50	H ₂	35.8	cc/kg	≤5	Cl ⁻	0.07	ppb																					
	N ₂	1.97	cc/kg	≥9.3	pH	9.82	@ 25°C																					
≤100	TDG	37.8	cc/kg	Measured H ⁺ Cond.		0.425	μS/cm																					
≤1.0	DEI-131	1.13E-2	μCi/gm	≤0.2 **Inorganic H ⁺ Cond.		0.06	μS/cm																					
100/Ē	Specific Act.	0.461	μCi/ml	Condensate Dissolved O ₂		3.2	ppb																					
	I-131	3.67E-3	μCi/ml	**Inorganic H ⁺ Cond. is a calculated value																								
* Per DB-CH-06900, Attachment 1				Highest Condensate Polisher ΔP: <u>1.02</u> psid (to nearest psid)																								
COVER GAS																												
Tank	%H ₂	%O ₂	%N ₂	Time		Date																						
WGST																												
CWRT 1																												
CWRT 2																												
BORON				Primary to Secondary Leakage																								
Vessel	PPM	Time	Date	<u>10.0</u> GPD (LLD is 5.0 GPD)																								
RCS	1677	0830	10/2/2000	RE 1003 A/B Equivalent cpm for OTSG Leakage Based on RCS Xe-133 <u>1.31E-2</u> μCi/ml Based on FI 1002 <u>13</u> cfm <table style="width: 100%; margin-top: 10px;"> <thead> <tr> <th></th> <th>RE 1003A</th> <th>RE 1003B</th> </tr> </thead> <tbody> <tr> <td>5 GPD</td> <td><u>N/A</u> cpm</td> <td><u>N/A</u> cpm</td> </tr> <tr> <td>30 GPD</td> <td><u>4.3E2</u> cpm</td> <td><u>9E1</u> cpm</td> </tr> <tr> <td>100 GPD</td> <td><u>1.4E3</u> cpm</td> <td><u>3.0E2</u> cpm</td> </tr> <tr> <td>150 GPD</td> <td><u>2.2E3</u> cpm</td> <td><u>4.3E2</u> cpm</td> </tr> <tr> <td>Increase of</td> <td></td> <td></td> </tr> <tr> <td>60 GPD</td> <td><u>8.6E2</u> cpm↑</td> <td><u>1.4E2</u> cpm↑</td> </tr> </tbody> </table>					RE 1003A	RE 1003B	5 GPD	<u>N/A</u> cpm	<u>N/A</u> cpm	30 GPD	<u>4.3E2</u> cpm	<u>9E1</u> cpm	100 GPD	<u>1.4E3</u> cpm	<u>3.0E2</u> cpm	150 GPD	<u>2.2E3</u> cpm	<u>4.3E2</u> cpm	Increase of			60 GPD	<u>8.6E2</u> cpm↑	<u>1.4E2</u> cpm↑
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Increase of																												
60 GPD	<u>8.6E2</u> cpm↑	<u>1.4E2</u> cpm↑																										
PZR	1677	1220	10/2/2000																									
BWST																												
BAAT 1																												
BAAT 2																												
CWRT 1																												
CWRT 2																												
CFT 1																												
CFT 2																												
SFP																												
Refuel Canal																												

Reviewed by _____ Time/Date _____ / _____
Shift Supervisor

Facility: Davis-Besse NPS Scenario No.: 3 Op-Test No.: 1

Examiners: _____ Operators: _____

Objectives: The candidates are to (1) perform the necessary operator actions to raise Reactor power in order to lift off of Low Level Limits, (2) perform the required operator actions for a loss of Service Water pump supplying primary loads and align Service Water pump 3 as 2, (3) recognize the Turbine Header Pressure transmitter has failed to mid-scale and take the necessary actions to stabilize the plant, (4) identify a Steam Generator Tube Leak of 1 gpm and being a plant shutdown (5) recognize the Steam Generator Tube Leak Rate has increase to 150 gpm and take the actions for a Steam Generator Tube Rupture, (6) recognize the failure of Emergency Diesel Generator 2 to automatically start and take the actions to recover at least one of the essential 4160V buses and (7) identify an overcooling event due to a Turbine Bypass valve failing open and take the necessary actions to isolate the Turbine Bypass valve.

Turnover: Reactor power is 28%. Planned: Lift off of Low Level Limits. In Progress: Release of the Miscellaneous Waste Monitor tank at 25 gpm. Equipment OOS : EDG 1 to change out contaminated lube oil, SAC 1 for PMs.

Event No.	Malf. No.	Event Type*	Event Description
1		N(BOP)	Raise reactor power from 28% to 35% to lift of Low Level Limits.
2	IMF KEP115 TRUE	C(RO)	Service Water pump 1, supplying Primary loads, has sheared shaft.
3	IMF L1T2N 0.5	I(BOP)	Turbine Header Pressure transmitter fails to mid-scale.
4	IMF HH51 0.001	C(BOP)	Steam Generator tube leak of 1 gpm in Steam Generator 1.
5	IMF HH51 0.035 IMF B2M1I TRUE	M(All)	Steam Generator Tube Rupture of 150 gpm in Steam Generator 1 with Makeup Pump 1 failing to start.
6	IMF P8BJ TRUE IMF P8BK TRUE	M(All)	Lockout of J and K buses when the Main Turbine is tripped.
7	IMF G532B TRUE	C(RO)	Emergency Diesel Generator 2 will fail to automatically start.

8	IMF SA34D TRUE IMF F300 TRUE	C(BOP)	Turbine Bypass Valve on Main Steam line 1 will fail open on Reactor Trip and SFRCS will fail to automatically actuate.
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* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

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Op-Test No.:	1	Scenario No.:	3	Event No.:	5	Page 1 of 1
Event Description: <u>Steam Generator Tube Rupture of 150 gpm in Steam Generator 1with Makeup Pump 1 failing to start.</u>						
Time	Position	Applicant's Actions or Behavior				
	RO	Identify that the Steam Generator 1 Tube leak rate has increased: <ul style="list-style-type: none"> – Pressurizer level begins to lower. – Annunciator alarm 12-1-A, MN STM LINE 1 RAD HI. 				
	SRO	Direct the implementation of DB-OP-02531, Steam Generator Tube Leak: <ul style="list-style-type: none"> – RO to close letdown Isolation valve, MU2B. – Route to DB-OP-02000, RPS,SFAS, SFRCS Trip or SG Tube Rupture, Section 8.0, when the RO determines that Pressurizer level is still lowering with all available Makeup flow. 				
	RO	Close Letdown Isolation Valve, MU2B, if not already closed.				
	RO	Identify that Pressurizer level is still lowering with all available Makeup flow.				
	SRO	Direct the implementation of DB-OP-02000, RPS,SFAS, SFRCS Trip or SG Tube Rupture, Section 8.0: <ul style="list-style-type: none"> – RO to align the Makeup system. – RO to control Pressurizer level, > 100" if possible, using Pressurizer Level Control Valve, MU 32. – May direct RO to start HPI/MU piggyback to help maintain Pressurizer level. – RO/BOP to place the Steam Generator/Reactor Demand station into hand and reduce Reactor power to Low Level Limit if it is not already on Low Level Limits. – Direct an EO to start the Auxiliary Boiler. – BOP to place both Feedwater demands into hand and reduce them to zero. – BOP to place both Turbine Bypass Valve controllers into hand and reduce Main Turbine load to < 50 MWe. – RO to trip the Reactor. – BOP to trip the Main Turbine. – Route to DB-OP-02000, RPS,SFAS, SFRCS Trip or SG Tube Rupture, Step 3.2: 				
	RO	Lock Makeup pump suctions on to the BWST.				
	RO	Control pressurizer level, > 100" if possible, using Pressurizer Level Control Valve, MU 32.				
	RO	May elect to initiate HPI and Make up in the piggyback mode which would not be useful until RCS pressure is <1800 psig..				
	RO/BOP	Place the steam generator/reactor demand station into hand and reduce reactor power to low level limit if it is not already on low level limits.				
	BOP	Place both Feedwater demands into hand and reduce them to zero.				
	BOP	Place both Turbine Bypass Valve controllers into hand and reduce turbine load to < 50 MWe.				
	RO	Trip the reactor.				
	BOP	Trip the Main Turbine.				

Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7, & 8 Page 1 of 3

Event Description: Lockout of J and K buses when the Main Turbine is tripped..

Emergency Diesel Generator 2 will fail to automatically start.

Turbine Bypass Valve on Main Steam line 1 will fail open on Reactor Trip and SFRCS will fail to automatically actuate.

Time	Position	Applicant's Actions or Behavior
	All	Identify the loss of J and K buses when the Main Turbine is tripped.
	SRO	Direct the implementation of DB-OP-02000, RPS, SFAS, SFRCS Trip or SG Tube Rupture: <ul style="list-style-type: none"> Verify immediate actions. RO to verify that buses C1 and D1 are de-energized. RO to start EDG 2. BOP to identify Instrument air is not available, and manually initiates AFW and isolates both SGs. If power restored to C1 bus, have the RO place Makeup pump 1 in service. BOP to verify proper SFRCS. Route to section 7.0, Overcooling, of DB-OP-02000, RPS, SFAS, SFRCS Trip or SG Tube Rupture.
	RO	Verify that buses C1 and D1 are de-energized.
	RO	Start EDG 2 : <ul style="list-style-type: none"> Open the breaker for Makeup pump 2. Press the start pushbutton for EDG 2. (Critical task: 055-EA1.04 4.3/4.4) Verify EDG 2 Output breaker, AD101, closes. Verify the CCW pump and SW pump start on train 2.
	BOP	Manually initiate AFW and isolate both SGs (Critical Task: 065-AK3.08 3.7/3.9)
	RO	If directed, re-energize C1 bus from D1 bus or SBODG.
	RO	When power is restore to D1 bus start restore Makeup and Seal injection: <ul style="list-style-type: none"> Close Seal Injection Control Valve, MU 19, and Pressurizer Level Control Valve, MU 32. Start Makeup pump 1 2 HP Restore Makeup flow using Pressurizer Level Control Valve, MU 32. Restore Seal Injection using the Seal Injection Control Valve, MU 19.
	BOP	Verify proper SFRCS: <ul style="list-style-type: none"> Verify proper alignment of secondary equipment. Verify both AFW pump start and delivering AFW flow to the SGs. Have an EO align AFW pump recirc back to the CSTs.

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Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7, & 8 Page 3 of 3Event Description: Lockout of J and K buses when the Main Turbine is tripped..Emergency Diesel Generator 2 will fail to automatically start.Turbine Bypass Valve on Main Steam line 1 will fail open on Reactor Trip and SFRCS will fail to automatically actuate.

Time	Position	Applicant's Actions or Behavior
	SRO	Direct the implementation of section 8 of DB-OP-02000, RPS, SFAS, SFRCS Trip or SG Tube Rupture: <ul style="list-style-type: none"> – RO to line up and start HPI Piggyback operation. – Contact the Load Dispatcher to restore J and K buses. – RO to control RCS near minimum SCM limit. – RO to control Pressurizer level. – Check for entry into PTS, Specific Rule 4. – BOP to begin RCS cooldown to 520F and 1000 psig in the RCS.
	RO	Perform Piggyback operations on both trains if power is available to C1 bus. <ul style="list-style-type: none"> – Start CCW pump 1 and SW pump 1. – Start HPI pumps 1 and 2. – Open HP 2A through D. – Start LPI pumps 1 and 2. – Open DH 63 and 64.
	RO	Depressurize the RCS to near the minimum SCM limit: <ul style="list-style-type: none"> – Turn off all Pressurizer heaters – Cycle the Pressurizer High Point vent or the PORV, RC 2A, as necessary to lower RCS pressure.
	RO	Control Pressurizer level by throttling HP 2A through D to maintain 80-120".
	BOP/RO	Establish a 100F/Hr cooldown, using the AVVs, by coordinating with the RO.
	SRO	Recommend to the Shift Supervisor that he enter the E-Plant under E.A.L. 2.A.3.
	SRO	Recommend to the Shift Supervisor to enter the plant in T.S. 3.3.2.2 for SFRCS, 3.5.2 for ECCS, 3.6.1.2 for CTMT Spray, 3.6.2.2 for CACs, 3.6.3.1 for CTMT Isolation valves, 3.6.5.1 for EVS, 3.7.3.1 for CCW, 3.7.4.1 for SW, 3.7.6.1 for CTRM EVS, 3.8.1.1 for Off-Site Electrical, 3.8.2.1 for On- Site Electrical and 3.8.2.3 for Station DC.

Justification for Critical Tasks

- A. Manually start EDG 2 to re-energize bus D1 or manually start the SBODG to re-energize bus C1 or D1.

Failure to re-energize one of the Essential 4160V bus will result in a loss of RCS make-up capability from the Make-up system, the HPI system and the LPI system. Communication between the SGs and the Reactor will eventually be lost and overheating of the core will occur. The operator can manually start EDG 2 from the Control Room or send an EO to locally start EDG 2. Once the EDG 2 is running the output breaker will automatically close to re-energize bus D1. If the operator manually starts the SBODG then he will have to manually align breakers to re-energize bus C1 or D1.

- B. Manually actuate SFRCS to initiate AFW and isolate both SGs or close MS 101.

A failure of the SFRCS to automatically actuate will result in an overcooling of the RCS and uncontrolled release of radioactive materials into the secondary plant. The operator must manually actuate SFRCS to initiate AFW and isolate both SGs or close MS 101, Main Steam Line 1 Isolation valve, to terminate the overcooling.

SIMULATOR SETUP AND CUES

1. Simulator Setup

a. Initial Conditions

- 1) ~28% power with reactor startup in progress with:
 - a) MFPT 2 in service.
 - b) Ensure Rod Index is about 270.
- 2) Place SAC 1 control switch in lockout and hang a Red tag on the control switch.
 - a) Place on the status board that SAC 1 is OOS for PMs.
- 3) Hang Red tags on EDG 1 start pushbutton and AC101 breaker switch.
 - a) Place on status board:
 - EDG 1 is OOS at three hours prior the start of the scenario for changing out contaminated lube oil.
 - Hang the T. S. sheet for EDG 1 inoperable.
 - DB-SC-03070 is due the same time as the EDG 1 was listed as inoperable but on the next day.
 - DB-SC-03023 is due four hours after the start of the scenario on the present day.
 - DB-SC-04000 is due four hours after the start of the scenario on the present day.
 - DB-SC-04271 was completed seven days prior.
 - b) Turn on the BLUE light for the EDG being inoperable.
- 4) Hang the chemistry sheet on the status board.
- 5) Calculate and print a batch for the current RCS boron concentration, and place on control console A01.

- 6) Performing the following for the release of the MWMT:
 - a) Establish a dilution flow rate of > 20,000 gpm.
 - b) Set computer point F201 low flow alarm to 20,000 gpm.
 - c) Setup a video trend of F201 on CRT 1.
- 7) Verify Pressurizer level transmitter LT RC14A1 is selected.
- 8) Post Protected Train 2.
- 9) Verify the MDFP is the AFW mode.
- 10) Open MS 315 and MS 317
- 11) Place on a trend pen computer point H300.
- 12) Initial malfunctions.
 - a) Rack out SAC 1 - IRF KFS1A RACKOUT.
 - b) Rack out AC101 - IRF G535A RACKOUT.
 - c) Remove close power fuses from AC101 - IRF G535C REMOVE.
 - d) Close EDG 1 air start motor air supply - IRF GD43 CLOSE and IRF GD44 CLOSE.
 - e) Fail EDG 2 to automatically to start – IRF G532B DEFEAT
 - f) Fail SFRCS to automatically trip - IMF F300.
 - g) Fail Makeup pump 1 breaker open – IMF B2M1I

b. Procedures

- 1) For crew:
 - a) DB-OP-06902, Power Operations, with steps 3.1.1, 3.1.2, 3.1.5, 3.1.6, 3.2.7.b and 3.2.7.c signed off.
 - b) DB-OP-06001, Boron Concentration Control.
 - c) DB-OP-06006, Makeup and Purification System.
 - d) DB-OP-06401, Integrated Control System Operating Procedure.
 - e) DB-OP-06407, Non-Nuclear Instrumentation System Operating Procedure.
 - f) DB-OP-06314, 13.8 KV Buses Switching Procedure.
 - g) DB-OP-06221, Condensate System.
 - h) DB-OP-06262, Component Cooling Water System Operating Procedure.

c. Event Triggers

- 1) Activates Event 6 on a Main Turbine Trip – TRGSET 6 “L7:340C == 1” (May have to enter it manually on the Event Trigger Screen.)

d. Events

- 1) Shear the shaft on SW Pump 1 - IMF KEP115 (2).
- 2) Fail Turbine Header Pressure transmitter to mid-scale - IMF L1T2N (3) 0.5 15 0.45
- 3) One gpm leak in SG 1 - IMF HH50 (4) 0.0005.
- 4) Fault on J bus - IMF P8BJ (6).
- 5) Fault on K bus - IMF P8BK (6).
- 6) Fail open a TBV on Main Steam Line 1 - IMF SA34D (6)

e. CAEP file.

- 1) Load the batch file - BAT TEMP\SCEN3.TXT|00:00:05|0
- 2) 150 gpm leak on SG 1 – IMF HH50 0.035|04:00:00|1

2. Cues (Non-generic)

a. Events 1

1) None.

b. Events 2

1) EO sent to investigate SW pump 1 will report that the shaft is sheared at the coupling.

c. Event 3

1) None.

d. Event 4

1) None.

e. Event 5

1) EO sent to the MUP Room will report oil covering the floor and the skid of Makeup pump 2.

2) The EO sent to the High Voltage Switch Gear room will report a 50/51 relay actuated, for timed overcurrent, on AD105.

f. Event 6

1) None.

g. Event 7, 8 & 9

1) If an EO is sent to EDG 2 investigate the failure to automatically start, report that there are no alarms and no apparent reason that it did not start.

TECH SPEC STATUS

<u>Tech Spec</u>	<u>Date/Time Entered</u>	<u>Equip Name/Reason</u>	<u>Action Required/When Remarks</u>
3.8.1.1	10/2/2000 0600	EDG 1 due to changing out of contaminated lube oil.	<p>Restore to operable status within 7 days.</p> <p>Expires 10/9/2000 @ 0600</p> <p>DB-SC-03071 due 10/3/2000 @ 0600</p> <p>At least once per 8 hours perform DB-SC-03023 due 10/2/2000 @ 1330</p> <p>At least once per 8 hours perform DB-SC-04000 due 10/2/2000 @ 1330</p> <p>SB-SC-04271 completed 9/24/00</p>

CHEMISTRY ANALYSES STATUS

PRIMARY (RCS/)				SECONDARY (FEEDWATER)			
Time: 0830		Date: 10/2/2000		Date: 10/2/2000		Daily Average	
Limits		Value		Limits		Value	
≤100	O ₂	<2	ppb	≤5	O ₂	0.9	ppb
≤150	Cl ⁻	4.42	ppb	≥20	N ₂ H ₄	32.9	ppb
≤150	F ⁻	2.35	ppb	≤20	SiO ₂	<5	ppb
*	Li	2.20	ppm	≤3	Na	<0.1	ppb
	pH	6.88	@ 25°C	≤10	Fe	<10	ppb
25-50	H ₂	35.8	cc/kg	≤5	Cl ⁻	0.07	ppb
	N ₂	1.97	cc/kg	≥9.3	pH	9.82	@ 25°C
≤100	TDG	37.8	cc/kg	Measured H ⁺ Cond.		0.425	μS/cm
≤1.0	DEI-131	1.13E-2	μCi/gm	≤0.2	**Inorganic H ⁺ Cond.	0.06	μS/cm
100/Ē	Specific Act.	0.461	μCi/ml	Condensate Dissolved O ₂		3.2	ppb
	I-131	3.67E-3	μCi/ml	**Inorganic H ⁺ Cond. is a calculated value			
* Per DB-CH-06900, Attachment 1				Highest Condensate Polisher ΔP: <u>1.02</u> psid (to nearest psid)			
COVER GAS							
Tank	%H ₂	%O ₂	%N ₂	Time		Date	
WGST							
CWRT 1							
CWRT 2							
BORON				Primary to Secondary Leakage			
Vessel	PPM	Time	Date	<u>10.0</u> GPD (LLD is 5.0 GPD)			
RCS	1790	0830	10/2/2000	RE 1003 A/B Equivalent cpm for OTSG Leakage Based on RCS Xe-133 <u>1.31E-2</u> μCi/ml Based on FI 1002 <u>13</u> cfm			
PZR	1790	1220	10/2/2000				
BWST				RE 1003A RE 1003B			
BAAT 1				5 GPD <u>N/A</u> cpm <u>N/A</u> cpm			
BAAT 2				30 GPD <u>4.3E2</u> cpm <u>9E1</u> cpm			
CWRT 1				100 GPD <u>1.4E3</u> cpm <u>3.0E2</u> cpm			
CWRT 2				150 GPD <u>2.2E3</u> cpm <u>4.3E2</u> cpm			
CFT 1				Increase of			
CFT 2				60 GPD <u>8.6E2</u> cpm↑ <u>1.4E2</u> cpm↑			
SFP							
Refuel Canal							

Reviewed by _____ Time/Date _____ / _____
Shift Supervisor

SHIFT SUPERVISOR / ASSISTANT SHIFT SUPERVISOR TURNOVER CHECKLIST
Part 1 - Unit Status: Evolutions/ Maintenance/ Procedures

DATE: 9/21/00	SHIFT: DAYS	MODE: 1	PROTECTED TRAIN: 2
Power: 28%	RCS Boron: 1779 ppmB	ICS High Limiter: 102.75%	RPS Hi Flux Trip: 104.5%

License Requirements

T.S. 3.8.1.1 – EDG 1 due to changing out of contaminated lube oil.

Alarm Status

9-1-G FIRE OR RADIATION TRBL – Will not alarm when simplex alarms are received.
1-1-A EDG 1 TRBL due to EDG 1 being tagged out.
1-2-A EDG 1 AIR RCVR PRESS LO due to EDG 1 being tagged out.
1-5-D BUS C1 BKRS NTNM due to AC101 being racked out.
1-6-D C1/D1 CONTROL PWR TRBL due to AC101 being racked out.

SECONDARY STATUS/ELECTRICAL STATUS**PREVIOUS**

Tagged out EDG 1 for change out of contaminated lube oil.
 Tagged out SAC 1 for PMs.
 Aligned and tested the MDPF in the AFW mode.

GENERAL STATUS

10 gpd leak in SG 1, action level 2 items complete.
 Bayshore Line new meter to be installed soon.
 Outside air temperature is 85 F and Forebay temperature is 75 F.

ZONE 1 OPS BURDENS

None.

ZONE 1 WORKAROUNDS

None.

ZONE 2 OPS BURDENS

None.

ZONE 2 WORKAROUND

None.

GENERAL NOTES

CCW 1 - 90°F **CCW 2** - 100°F **CCW 3** - 100°F

CHEMISTRY

Intake Chlorination - S/D	Circwater Chlorination - in service	Circwater Dynacool - in service
Demin Skid – in service	MSR Drains: 1→FWD 2→FWD	Polishers 1,2,3,4 in service (CD751 closed)

PRIMARY STATUS/RE STATUS**PREVIOUS SHIFT**

Release of MWMT in progress to be completed in 2 hrs.
 Pzr lvl Transmitter LT RC14-2 fails intermittently, LT RC14-1 is selected

SHIFT SUPERVISOR / ASSISTANT SHIFT SUPERVISOR TURNOVER CHECKLIST
GENERAL STATUS

ZONE 3 OPS BURDENS

None.

ZONE 3 WORK AROUNDS

None.

GENERAL NOTES

ZONE 3 UPDATE / RP UPDATE / SHIFT MANAGER / OUTSIDE ASSISTANT

CONTROL ROOM

CTRM BURDENS

Various Plant Computer alarm set points do not match the plant. Plans are to update the Plant Computer when new computer is installed in the plant
MU 32 response causes the Pressurizer level to swing.

CTRM WORKAROUNDS

Boronmeter – New Simulator Boronmeter is being used by the plant for calibration of the new plant Boronmeter
SPDS will remain energized on a loss of power.
MFPTs can be reset without being on the LSS.

CREOOS

PLANNED ACTIVITIES:

Evolutions:

Lift off of Low Level Limits and continue power increase at 5 MWe/min per Load Dispatcher.

Tagging:

Testing: