

# **Final Submittal**

(Blue Paper)

1. As Given Simulator Scenario Operator Actions ES-D-2

**WATTS BAR EXAM 2002-301**

**50-390**

**NOVEMBER 26 &  
DECEMBER 9 - 13, 2002**

Facility: <b>WATTS BAR</b>	Scenario No.: <b>1</b>	Op-Test No.: _____
Examiners: _____ Operators: _____ _____ _____		
<b>Initial Conditions:</b> Rx Power 43%, ramping up per GO-4, Step 5.1.12 Imp-Out on turbine control <b>Turnover:</b> 1A-A MDAFW Pump Out Of Service		

Event No.	Malf. No.	Event Type*	Event Description
0		R (RO)	<b>Power Increase</b>
1		N (BOP)	<b>Place 2<sup>nd</sup> feed pump in service</b>
2	CV51	I (RO)	<b>Failure of FT-62-142 - Inhibits ability to dilute</b> The failure will affects RO's ability to dilute. There are no alarms, so it will be necessary to require dilution in this timeframe for diagnosis of this failure. Plan to setup conditions for dilution as part of turnover, then insert this problem during second batch addition or after approximately 500 gallons has been added from the first batch (if large batch is used initially). Operators will have to determine quantities/batch sizes for their power ascension.
3	RX11	I (RO,BOP SRO)	<b>P imp fails low PT-1-73</b> Affects auto rod control Tref program Steam dumps Should require RO to take control of control rods. BOP will have to take actions for steam dumps. To continue ramp, with this instrument failed should require the RO to <b>manually operate the rods</b> . Tech Spec 3.3.1 Condition S..
4	(CC07A) (CC03A)	C (BOP)	<b>CCP-1A-A Sheared Shaft with failure of Standby Pump to Auto start.</b> Affects A-Train Component Cooling Water, letdown, RCP cooling, etc. Should require BOP to diagnose, and start CCP-1B-B when failure to start recognized or determination that CCP-1A-A is not pumping forward. US will implement AOI-15 Section 3.2. RO will notice that CVCS Demin is bypassed, and after recovery of cooling may recommend restoration of flow to demin. Tech Spec 3.7.7
5	(TC02)	C (BOP)	<b>Failure of EHC Auto control</b> Turbine power begins to increase. The rate of increase is slow. The intent is to set the rate for a very slow increase. There are no alarms specific to this component failure. The BOP can terminate load increase by placing turbine control valves in manual or by lowering the valve position limiter. This is the last event prior to the Major Transient. So if they trip, we will go straight into the MT.

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

Facility: <b>WATTS BAR</b> Scenario No.: <b>1</b> Op-Test No.: _____			
Event No.	Malf. No.	Event Type*	Event Description
6	(MS02C)	M (ALL)	<b>Main Steam Line Break Outside Containment</b> At the point that the crew gets control of the turbine ramp or trips, this malfunction will be input. Assuming that they haven't tripped, the intent is to ramp this starting at a rate similar to the rate that was caused by the EHC failure and increase it as necessary to drive them into the EOP's.

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

**TITLE:** Main Steam Line Break Outside Containment

**REVISION:** 0

**DATE:** 11/22/02

**PROGRAM:** WBN Operator Training - Initial License

**PREPARED BY:** \_\_\_\_\_ / \_\_\_\_\_  
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(Operations Superintendent) (Date)

Nuclear Training Revision/Usage Log				
REVISION NUMBER	DESCRIPTION OF REVISION	DATE	PAGES AFFECTED	REVIEWED BY
0	Initial Issue	11/22/02	ALL	

**PROGRAM:** WBN Operator Training

**SUBJECT:** Simulator Examination Guide

**TITLE:** Main Steam Line Break Outside Containment.

**LENGTH:** ~1.2 Hours

**REFERENCES:**

	Reference	Title	Rev No.
A.	Tech Specs		
B.	SPP - 10.0	Plant Operations	2
C.	OPDP - 1	Conduct of Operations	1
D.	EPIP-1	Emergency Plan Classification Flow Chart	20
E.	GO-4	Normal Power Operation	21
F.	SOI-2&3.01	Condensate and Feedwater System	72
G.	SOI-62.02	Boron Concentration Control	28
H.	AOI-2	Malfunction of Reactor Control System	25
I.	AOI-15	Loss of Component Cooling Water (CCS)	22
J.	AOI-38	Main Steam or Feedwater Line Leak	6
K.	E-0	Reactor Trip Or Safety Injection	17
L.	E-2	Faulted Steam Generator Isolation	10
M.	E-1	Loss of Reactor or Secondary Coolant	11
N.	ES-1.1	SI Termination	11

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**SCENARIO OBJECTIVES:**

1. Evaluate the candidates ability to use normal and abnormal procedures and control the plant during normal and transient conditions.
2. Evaluate the candidates ability to use E-0 and E-2 in response to a Faulted Steam Generator.

## SCENARIO SUMMARY:

### Initial conditions:

- 43% power, Cb = 1410 ppm.
- The Train Week is "A". Channel Week I or III ok.
- $\Delta I$  is out of target band on the high side requiring dilution to correct.
- Power ascension, GO-4, Section 5.1, Step 12 in progress.
- MDAFW pump 1A-A is out of service for maintenance.

### Scenario Events and Sequence:

Set up simulator to IC-144

0. Performs dilution per SOI-62-02 to correct  $\Delta I$  and continues power ascension.
1. Place second Main Feedwater Pump in service and continues power ascension.
2. 1-FT-62-142, Primary Water Flow Transmitter, failure.
3. Turbine Impulse Pressure Transmitter 1-PT-1-73 fails Low affecting rod control, steam dumps, and Tref program.
4. CCS Pump 1A sheared shaft with failure of standby pump to auto start.
5. Failure of EHC auto control.
6. Main Steam Line Break Outside Containment.
7. MSIV on # 3 S/G fails to close.
8. 1B-B MD AFW Pump fails to start.

**EVENT 0 - Raise reactor power from 43% to 100% power.**

The crew continues power ascension from 43% power in accordance with General Operating Instruction, GO-4.

Malfunctions required: None

Objectives:

- Evaluates the candidates ability to perform dilution for  $\Delta I$  correction.
- Evaluates the candidates use of GOs to continue power escalation from 43% power.
- Evaluates the candidates ability to conduct operations associated with power escalation from 43% power including turbine load ascension and corresponding rise in reactor power.

Success Path:

- Conduct power escalation from 43% power IAW GO-4.

**EVENT 1 - Place the second Main Feedwater Pump in service**

1B Main Feedwater Pump is placed in service between 40 and 45% power.

Malfunctions required: None

Objectives:

- Evaluate the CREW use of GO-4, Normal Power Operation, and SOI-2&3.01, Condensate and Feedwater System, for placing the second Main Feedwater Pump in service.
- Evaluates candidates ability to manually control Main Feedwater Pump speed and establish proper delta P for S/G level control.

Success Path:

- Crew implements the appropriate procedures to place 1B MFW Pump in service with master controller in automatic maintaining S/G level program.



### **EVENT 2 - Failure of 1-FT-62-142, Primary Water to Blender Flow Transmitter**

1-FT-62-142 fails and after 30 seconds the PRIMARY WATER TO FLOW DEVIATION alarm will annunciate and terminate the dilution by closing 1-FCV-62-128 to the VCT. If 1-FCV-62-128 is reopened manually, flow will be reestablished but there will be no flow indication or audible clicking from the batch counter. A dilution incident could be the result.

Malfunctions required: 1

- **CV51**

Objectives:

- Evaluate the candidates' ability to recognize loss of dilution flow
- Evaluate the candidate's ability to monitor reactor parameters to ensure dilution stopped and/or prevent from occurring.

Success Path:

- Crew ensures dilution stopped and maintenance notified for repair of controller.

### **EVENT 3 - 1-PT-1-73, Turbine Impulse Pressure Transmitter, Fails LOW**

Turbine Impulse Transmitter, 1-PT-1-73, fails low causing control rods to begin insertion at a maximum rate. Operator will be required to take manual control of rods. Steam Dump control will be required to be placed in Steam Pressure Mode. Operators should respond using AOI-2.

Malfunctions required: 1

- rx11 0, Turbine Impulse Pressure Transmitter, 1-PT-1-73, fails low.

Objectives:

- Evaluate the candidates ability to implement AOI-2 when Turbine Impulse Pressure Transmitter fails low.
- Evaluates candidates ability to access control board indications to determine event in progress.

Success Path:

- Crew implements AOI-2, section 3.2, to respond to Turbine Impulse Pressure Transmitter failure, places rod control to Manual, and places Steam Dump Control in Pressure Mode.

#### **EVENT 4 - CCS Pump 1A-A Sheared Shaft with Failure of Stby Pump to Start**

1A CCS Pump shears its shaft bringing in multiple flow alarms associated with Alpha Train. The red pump light will be illuminated causing possible misdiagnosis to be made. The Bravo Train pump will not auto start on low pressure, and will require manual action to start. If not started, RCP motor temperatures will rise creating a reactor trip requirement and RCPs to be taken out of service. AOI-15 should be implemented.

Malfunctions required: 2

- **CC07A and CC03B**

Objectives:

- Evaluate the candidate's ability to diagnose a loss of the "A" Train CCS Pump from control board indicators and annunciators.
- Evaluate the candidate's ability to determine that automatic action should have started the 1B CCS Pump and take manual action to start it.

Success Path:

- Crew recognizes conditions for entry and implements AOI-15 in response to Component Cooling System Pump 1A sheared shaft. Conditions will dictate starting of the 1B CCS Pump to restore flows, and the second running Thermal Barrier Booster Pump (TBBP) to be shutdown and returned to A-P Auto.

#### **EVENT 5 - Failure of EHC Auto Control**

Turbine load starts to slowly rise with REFERENCE window on the turbine control panel slowly counting up. Reactor power will rise as turbine load rises and Tavg will drop giving the same indications as that of a small steam leak.

Malfunctions required: 1

**TC02** ramped in over 10 minutes to 40% severity

Objectives:

- Evaluate candidate's ability to recognize turbine control malfunctioning and take manual corrective actions.
- Evaluate candidate's ability to diagnose a steam leak in the plant vs. an internal problem with turbine controls.

Success Path:

- Placing the turbine controls to MANUAL or placing it on the Valve Position Limiter will stop the load rise.

### **EVENT 6 - Main Steam Line Break Outside Containment**

# 3 Steam Generator develops a leak outside containment complicating the cooldown by the above failure resulting in loss of RCS temperature control. If not monitored closely Tavg will drop below the minimum temperature for criticality setpoint. Manual reactor trip, SI, and MSIV closure should be directed. 1-FCV-1-22, MSIV on # 3 S/G will fail to close and the 1B-B MD AFW Pump will fail to auto start.

Malfunctions: 3

- **MS02C**, ramped over 10 minutes to 10% severity, **MS06C**, and **SI08H**

Objectives:

- Evaluate the candidate's ability to diagnose a steam line break, and transition from E-0 to E-2, Faulted Steam Generator Isolation, and then to ES-1.1, SI Termination.

Success path;

- Crew implements E-2 to identify and isolate the faulted SG and terminate SI IAW ES-1.1

## CONSOLE OPERATORS INSTRUCTIONS

ELAPSED TIME	IC/MF/RF/OR	DESCRIPTION
0	rst 144, switch check, select RUN	43 % RTP, BOL, C <sub>b</sub> =1410 ppm, Bank D at 172 steps.
0	Turn audible simulator fault alarm to "off" (down position)	Prevents unnecessarily alerting crew of a simulator problem that may not effect simulator dynamics.
0	Place "A" Train Week" sign	On entrance side panel. Channel Week I or III ok.
0	Place Dynamic AFD Display on OAC computer screen.	Will indicate on positive side of target band. Setup to require dilution on trunover.
0	Place 1 HS-3-118A in PTL and tag 1 HS-3-118A and 1-HS-3-355.  NOTE: IC 144 has been setup for this scenario. If unavailable, new setup for positive ΔI and power level will be required.	Simulates 1A-A MDAFWP OOS for maintenance.
0	ior zlohs3355[1] off ior zlohs3355[2] off	Simulates 1-FCV-3-355, 1A-A MDAFWP Recirc, tagged closed.
0	ior zlohs3118a[1] off	Simulates 1A-A MDAFWP hand switch light out.
0	imf ms06c 100	Fails S/G # 3 MSIV open.
0	imf si08h	Prevents auto start of MD AFW Pump 1B-B.
0	imf cc03B	CCS Pump 1B-B fails to auto start.

CONSOLE OPERATORS INSTRUCTIONS  
(Continued)

ELAPSED TIME	IC/MF/RF/OR	DESCRIPTION
0	imf cv51 (e2)	1-FT-62-142, primary water to blender flow transmitter, signal fails low. Results in no flow indication or audible click.
0	imf rx11a (e3) 0	1-PT-1-73, impulse pressure transmitter fails low.
0	imf cc07a (e4)	CCS Pump 1A-A sheared shaft.
0	imf tc02 (e5) 40 10:	EHC auto control failure (raises turbine load) with ramp of 10 minutes to a 40% final severity.
0	imf ms02c (e6) 10 10:	Main steam line break outside containment with ramp of 10 minutes to a 10% final severity.

CONSOLE OPERATORS INSTRUCTIONS  
(Continued)

ELAPSED TIME	IC/MF/RF/OR	DESCRIPTION
After crew assumes shift:		
0		<b>ROLE PLAY:</b> As TB AUO, when requested, assist in startup of 1B MFWPT IAW SOI-2&3.01, Section 5.10.
When directed by the evaluator for <b>Event 2</b> ( <i>insert during batch dilution</i> )	imf itrigger2  dmf cv51 - only if evaluator request it	1-FT-62-142, primary water to blender transmitter fails low.  <b>ROLE PLAY:</b> As Work Control, inform the crew that the transmitter work package will be initiated.  <b>ROLE PLAY:</b> If/when cued by the evaluator for repair of flow Tx, as maint., state the transmitter was improperly valved in and can be signed off by performing makeup as PMT.
When directed by the evaluator for <b>Event 3</b>	imf itrigger3	1-PT-1-73, Turbine impulse pressure transmitter, fails low.  <b>ROLE PLAY:</b> As Work Control, when contacted, inform the crew that this transmitter will be added to the work scope and ask for a priority between the two transmitters.
When directed by the evaluator for <b>EVENT 4</b>	imf itrigger4	CCS Pump 1A sheared shaft.  <b>ROLE PLAY:</b> As AB AUO, when requested, report the coupling on the 1A CCS Pump is broken.  <b>ROLE PLAY:</b> As Work Control, inform the crew maintenance will look at the pump and initiate work package.

CONSOLE OPERATORS INSTRUCTIONS  
(Continued)

ELAPSED TIME	IC/MF/RF/OR	DESCRIPTION
When directed by the evaluator for <b>EVENT 5</b>	imf ittrigger5	<p>EHC auto control failure causing turbine load to rise.</p> <p><b>ROLE PLAY:</b> As AUO, if requested, state no steam leaks can be found.</p> <p><b>ROLE PLAY:</b> As Work Control, inform the crew that MIG, upon their approval, will look at the EHC panel in Aux Instrument Room to assess problem. No work will be done.</p>
When directed by the evaluator for <b>EVENT 6</b>	imf ittrigger6	<p>Main Steam Line Break outside containment.</p> <p><b>ROLE PLAY:</b> As Outside AUO, if requested, report steam coming from the North Valve Vault Room.</p>

## **APPENDIX A INFORMATION TO EVALUATORS**

1. Assign Crew Positions: Assign positions based on evaluation requirements for personnel.  
  
US - Unit Supervisor  
OAC - Operator at Controls  
CRO - Control Room Operator
2. Review the Shift Briefing Information with the operating crew. Provide the US with a copy of Appendix B, Shift Turnover Checklist.
3. Allow the crew to familiarize themselves with current control panel condition (up to 10 minutes).
4. Ensure recorders are inking and recording and ICS is active and updating. Note any deficiencies during shift briefing.
5. If not previously done, review any major differences between plant and simulator.
6. Review CONSOLE OPERATORS INSTRUCTION for INITIATING CUES.



OP Test No: _____ Scenario No.: <u>1</u> Event No.: <u>1</u> Page <u>1</u> of <u>5</u>			
Event Description:		Crew will continue power ascension from 43% power using GO-4. Startup of 2 <sup>nd</sup> MFW Pump and Dilution to correct $\Delta I$ .	
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>CREW</b>	Walks control boards down in preparation for raising power.	
	<b>US</b>	Reviews GO-4 and determines power level is sufficient for placing the second MFW pump in service and addresses the delta I target band concern.	
	<b>US</b>	Directs OAC to determine dilution requirements and setup for dilution per SOI-62.02, Section 6.2	<b>See page 17 for dilution.</b>
	<b>US</b>	Directs CRO to place 1B MFW Pump in service per SOI-2&3.01, Section 5.10 for hot start.	These two tasks may be performed separately due to peer checks.
	<b>CRO</b>	Ensures 1-PIC-3-40, MFW Deaeration Line Backpressure, set to 1200 psia and 1-PCV-3-40 is closed.	
	<b>CRO</b>	If hot startup, then reset selected MFP Turbine with 1-HS-46-36A, MFPT B Trip-Reset.	
	<b>CRO</b>	Ensures the following valves open: <ul style="list-style-type: none"> <li>• 1-BYV-2-749, MFPT Condenser 1B 1-FCV-2-211</li> <li>• 1-BYV-2-776, MFPT Condenser 1B 1-FCV-2-216.</li> </ul>	
	<b>CRO</b>	Ensures selected MFPT condenser valves open: <ul style="list-style-type: none"> <li>• 1-FCV-2-211, MFPT B Condenser Condensate Outlet.</li> <li>• 1-FCV-2-216, MFPT B Condenser Condensate Outlet.</li> </ul>	

OP Test No: \_\_\_\_\_ Scenario No.: 1 Event No.: 1 Page 2 of 5

Event Description: Crew will continue power ascension from 43% power using GO-4.  
Startup of 2<sup>nd</sup> MFW Pump and Dilution to correct  $\Delta I$ .

Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	CRO	Ensures local vibration monitors reset at 1-L-792 [el. 755].	
	CRO	Ensures selected MFP Recirc closed and pump casing filled: <ul style="list-style-type: none"> <li>1-FCV-30-84, Main Feedwater Pump B Recirc.</li> </ul>	
	CRO	Verify selected MFP casing within 50°F. of suction supply.	
	CRO	Close selected miniflow warm-up line: <ul style="list-style-type: none"> <li>1-HCV-3-84, Main Feedwater Pump B Recirc Warming.</li> </ul>	
	CRO	Place selected MFP(s) in service: <ul style="list-style-type: none"> <li>Ensure MFP speed changer control in manual, and set to minimum <ul style="list-style-type: none"> <li>1-SIC-46-20B, MFPT B Speed Control.</li> </ul> </li> <li>Open MFP B discharge valve, 1-FCV-3-81.</li> <li>Ensures miniflow control valve, 1-FCV-3-84 in auto at 65%.</li> <li>Ensures 1-PI-2-129, MFW Pmps Suction Pressure as follows: <ul style="list-style-type: none"> <li>Greater than 100 psig (below 50% load).</li> <li>Greater than 250 psig (above 50% load).</li> </ul> </li> <li>Place MFP 1B 1-HS-46-43A, MFPT B HP Stop Valve, or 1-HS-46-44A, MFPT B LP Stop Valve in raise to open the LP and HP stop valves simultaneously.</li> </ul>	

OP Test No: \_\_\_\_\_ Scenario No.: 1 Event No.: 1 Page 3 of 5

Event Description: Crew will continue power ascension from 43% power using GO-4.  
Startup of 2<sup>nd</sup> MFW Pump and Dilution to correct  $\Delta I$ .

Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	CRO	<ul style="list-style-type: none"> <li>Ensures 2 Hotwell Pumps running.</li> <li>Place selected Governor Valve Positioner, 1-HS-46-40A, to Raise to roll MFP, and verify Governor Valve Positioner is at maximum position by red light indication on controller panel (green light off).</li> <li>Load the MFP Turbine as desired with 1-SIC-46-20B, MFPT B Speed Control.</li> <li>If placing second MFPT in service and Auto operation is desired, then perform the following: <ul style="list-style-type: none"> <li>Ensure MFP speed changer control in manual, 1-SIC-46-20B, and set to minimum and "bias" setpoint knob set to 50%.</li> <li>Slowly adjust MFP B speed controller output to match the Master Controller PC-46-20.</li> <li>Place MFP B speed changer, 1-SIC-36-20B, in Auto.</li> <li>Adjust "bias" setpoint slowly to achieve desired flow balance,</li> </ul> </li> <li>Ensure MFP B Recirc, 1-FIC-3-84, opens by auto or manual action within one minute after pump start, and remains open as long as TDMFP flow is less than <math>2 \times 10^6</math> PPH/4000 gpm.</li> <li>When TD MFP flow is <math>&gt;2 \times 10^6/4000</math> gpm, then ensure 1-FCV-3-84 Main Feedwater Pump B Recirc is closed.</li> </ul>	<p># 1 Heater Relief is set at 1650 psig.</p> <p>May take recirc valve to manual.</p> <p>Raising "bias" setpoint (<math>&gt;50\%</math>) will lower MFP speed, lowering setpoint (<math>&lt;50\%</math>) will raise MFP speed. Should not bias <math>&lt;50\%</math> because it may prevent MFPT from fully loading.</p>

OP Test No: _____ Scenario No.: <u>1</u> Event No.: <u>1</u> Page <u>4</u> of <u>5</u>			
Event Description:		Crew will continue power ascension from 43% power using GO-4. Startup of 2 <sup>nd</sup> MFW Pump and Dilution to correct $\Delta I$ .	
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	CRO	<ul style="list-style-type: none"> <li>Adjust MFP B oil temp control, 1-TCV-24-56B, as necessary to maintain oil temp leaving bearings 140° to 160°F</li> </ul>	
	CRO	When in service MFPT is loaded greater than 40% (approx. $3 \times 10^6$ PPH), then close selected MFP Turbine drains: <ul style="list-style-type: none"> <li>1-HS-46-14, MFPT A Drain VLVS.</li> <li>1-HS-46-41, MFPT B Drain VLVS.</li> </ul>	
	CRO	When selected MFP is in service and will remain in service, then close the following valves; <ul style="list-style-type: none"> <li>1-BYV-1-618, MFPT 1B HP Steam Warming Line Isolation.</li> <li>1-BYV-1-684, MFPT 1B HP Steam Warming Line Isolation.</li> </ul>	
		<b>The following are OAC steps necessary for dilution:</b>	
	OAC	Determines required quantity of water to achieve desired RCS Cb.	
	OAC	Ensures 1-FC-62-142, PW To Blender dial, set to 35% (70 gpm), and Manual-Auto toggle in Auto.	
	OAC	Adjust 1-FQ-62-142, PW Batch Counter, for required quantity.	
	OAC	Place 1-HS-62-140B, VCT Makeup Mode in DIL.	

OP Test No: _____ Scenario No.: <u>1</u> Event No.: <u>1</u> Page <u>5</u> of <u>5</u>			
Event Description:		Crew will continue power ascension from 43% power using GO-4. Startup of 2 <sup>nd</sup> MFW Pump and Dilution to correct $\Delta I$	
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	OAC	Turn 1-HS-62-140A, VCT Makeup Control to Start and verify red light is lit.	
	OAC	Ensures 1-HS-68-341H, Backup Heater C is on to equalize Pzr-RCS Cb.	
	OAC	Monitors the following parameters: <ul style="list-style-type: none"> <li>• 1-PI-62-122----VCT Press.</li> <li>• 1-LI-62-129A---VCT Level.</li> <li>• 1-FI-62-142----PW to Blender Flow.</li> <li>• 1-FQ-62-142---PW Batch Counter.</li> <li>• 1FQ-62-139----BA Batch Counter.</li> </ul>	
	OAC	Monitors NIS and rod movement to verify expected response.	Rods will insert to depress delta I.
	OAC	If 1-LI-62-129A ,VCT Level rises to 60%, then ensure 1-FCV-62-118A, Letdown Divert to HUT, diverts to the HUT.	Cue Console Operator for failure of 1-FT-62-142 <b>EVENT 2</b>

OP Test No: _____ Scenario No.: <u>1</u> Event No.: <u>2</u> Page <u>1</u> of <u>1</u>			
Event Description:		1-FT-62-142, Primary Water To Blender, Flow Transmitter Fails Low	
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	OAC	Recognizes dilution has stopped either from flow indication going to 0, audible clicking noise from 1-FQ-62-142 stopped, or alarm window 112-E, PW TO BLENDER FLOW DEVIATION.	
	OAC	<p>Addresses ARI on window 112-E and reviews probable cause and corrective actions:</p> <ul style="list-style-type: none"> <li>• If dilution controls in Auto, then verify 1-FCV-62-128 and 1-FCV-62-144 Close.</li> <li>• Ensure VCT makeup control system lined up per SOI-62-02, Boron Concentration Control.</li> <li>• If manual operation of VCT makeup is required, then go to SOI-62.02 for system alignment and operation.</li> <li>• Refer to AOI-3, Malfunction of Reactor Makeup Control.</li> </ul>	<p>Controls will be in dilute.</p> <p><b>Potential Critical Step</b> (Unplanned dilution)</p> <p>Reference to AOI-3 will be of no assistance unless dilution event created by the candidate.</p>
	US	May direct returning controls to automatic operation and notifying Work Control of malfunction.	No flow indication will be available, but flow can be established if valve to VCT is manually opened. No clicking of controller will be heard.
	US	Should postpone power ascension until primary water flow transmitter fixed.	Pulling rods with turbine ramp will not correct delta I problem.

OP Test No: _____ Scenario No.: <u>  1  </u> Event No.: <u>  0  </u> Page <u>  1  </u> of <u>  1  </u>			
Event Description: <span style="float: right;">Continue Power Ascension</span>			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
		<b>The following are steps associated with a power ascension if directed</b>	If power ascension is desired, cue Console Operator to delete 1-FT-62-142 malfunction.
	<b>CRO</b>	When reactor power is 45%, ensure Turbine Throttle Valve leakoffs Locked Open.	
	<b>CRO</b>	Ensures the following as system parameters permit: <ul style="list-style-type: none"> <li>3 HW Pumps running.</li> <li>CBPs running when required.</li> <li>2 MFPs running</li> <li>2 # 3 HD Pumps running.</li> </ul>	
	<b>CRO</b>	Starts the 2 <sup>nd</sup> # 7 HD Pump per SOI-5 & 6.01.	
	<b>CRO</b>	Place remaining CCW Pumps in service to maintain maximum condenser vacuum per SOI-27.01.	
	<b>CRO</b>	Verifies generator H <sub>2</sub> pressure sufficient for anticipated load per SOI-47.02, Appendix E, Capability Curve.	
	<b>US</b>	Before exceeding 50% reactor power, perform 1-SI-0-2 to verify AFD and QPTR within limits.	Cue Console Operator for 1-PT-1-73 failure low. <b>EVENT 3</b>

OP Test No: \_\_\_\_\_ Scenario No.: 1 Event No.: 3 Page 1 of 2

Event Description: 1-PT-1-73 Turbine Impulse Pressure Transmitter Fails Low

Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	OAC	Places rod bank selector switch in manual, and verifies rods stop.	Rods step in at 72 steps per minute.
	US	Refers to and implements AOI-2, Section 3.2.	
	OAC	Maintains Tavg on program by use of control rods or adjusting turbine load (Attachment 2).	Control rods should be stepped back out to 172 steps if not moved since turnover.
	OAC	Checks loop Tavg channels normal.	
	OAC	Checks Auct Tavg normal on 1-TR-68-2B.	
	OAC	Checks NIS power range channels normal.	
	CRO	Identifies failure of PT-1-73 and places steam dumps in pressure mode. <ul style="list-style-type: none"> <li>Place steam dumps to OFF.</li> <li>Place mode selector HS to STEAM PRESS.</li> <li>Adjust steam dump demand to zero.</li> <li>Place steam dumps to ON.</li> <li>Ensure controller set at 84%.</li> </ul>	
	OAC/CRO	Monitors core power distribution parameters: <ul style="list-style-type: none"> <li>Power range channels</li> <li>flux indicators</li> <li>Tavg</li> <li>Loop <math>\Delta T</math></li> <li>Incore TCs</li> <li>Feed flow/Steam flow</li> </ul>	



OP Test No: _____ Scenario No.: <u>  1  </u> Event No.: <u>  3  </u> Page <u>  2  </u> of <u>  2  </u>			
Event Description: <b>1-PT-1-73 Turbine Impulse Pressure Transmitter Fails Low</b>			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>US</b>	Notifies Work Control to have channel repaired.	
	<b>US</b>	Refer to Tech Spec and enters LCO 3.3.1.16. f Condition S.	
	<b>US</b>	Determines power change not greater than 15%, and Chemistry does not need to be notified.	Cue Console Operator for CCS Pump 1A sheared shaft. <b>EVENT 4</b>

OP Test No: _____ Scenario No.: <u>1</u> Event No.: <u>4</u> Page <u>1</u> of <u>1</u>			
Event Description CCS Pump 1A Sheared Shaft			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	CRO	Acknowledge multiple CCS System alarms.	
	US/CRO	Checks running pump indications for cause of alarms: Should see abnormal flows and sharp drop in pressure, if recorder is checked.	CCS Pump 1A will have red light lit but no flow.
	US	Enters AOI-15, Section 3.2, for loss of CCS and directs crew actions. Sends AUO to investigate cause for pump problem.	OAC should be aware that demineralizers will bypass due to high temp.
	CRO	Realizes U-1 Train A header supply pump running and not pumping forward, and starts 1B CCS Pump.	
	CRO	Checks any Train B header supply pump running and pumping forward.	
	CRO	Places 1A-A CCS pump in pull-to-lock.	
	CRO	Checks flows returned to normal.	
	CRO	Checks A & B side surge tank levels between 57% and 85%.	
	US/CRO	Evaluates affected equipment operation using Appendix A.	
	CRO	When CCS returned normal, checks only one CCS pump per Train and one TBBP running.	Stops one running TBBP and returns HS to A-P Auto.
	US	Contacts work control to initiate repairs to CCS Pump.	
	US	Refers to Tech Specs and enters LCO 3.7. 7 Condition A.	Cue Console Operator for EHC failure. <b>EVENT 5</b>

OP Test No: \_\_\_\_\_ Scenario No.: 1 Event No.: 5 Page 1 of 3

Event Description: Failure of EHC Auto Control

Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>CREW</b>	Recognizes rise in turbine load and reactor power with corresponding drop in Tavg with no operator input.	Will give similar indications as a small steam leak. Rods are in manual. REFERENCE window on Turbine Control Panel counts up at a slow rate
	<b>US/CRO</b>	Dispatches personnel to look for steam leaks both in the inside and outside plant areas.	<b>If Turbine Trip directed, go to page 26.</b>
	<b>CRO</b>	Places EHC Control in Manual or places the governor valves on Valve Position Limiter.	This will stop the load rise.
	<b>US</b>	Implements AOI-38, Main Steam or Feedwater Line Leak if above step not performed.	
	<b>CRO</b>	Checks S/G PORVs closed.	
	<b>CRO</b>	Checks steam dump valves closed	
	<b>OAC</b>	Checks reactor power less than or equal to 100% <ul style="list-style-type: none"> <li>• Loop <math>\Delta T</math>.</li> <li>• NIS power range monitors.</li> </ul>	
	<b>OAC</b>	Ensures Tavg and Tref within 3°F.	
	<b>OAC/CRO</b>	Monitors leak less than 3% of required steam or FW flow.	Will not be able to be determined since no steam is being lost.

OP Test No: _____ Scenario No.: <u>  1  </u> Event No.: <u>  5  </u> Page <u>  2  </u> of <u>  3  </u>			
Event Description: Failure of EHC Auto Control			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>CRO</b>	Monitors CST volume greater than 200,000 gallons.	
	<b>CRO</b>	Ensures S/G levels on program.	Temperature may sag below the minimum temperature for criticality of 555°F.
	<b>OAC</b>	Checks containment conditions normal.	
	<b>US</b>	If Turbine Control problem not detected, directs manual turbine trip.	See next page.  Cue Console operator for MSLB. <b>EVENT 6</b>

OP Test No: \_\_\_\_\_ Scenario No.: 1 Event No.: 5 Page 3 of 3

Event **Alternate Path - AOI-17, Turbine Trip**  
Description:

Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>US</b>	Implements AOI-17, Section 3.2, and directs actions of the crew.	Cue Console Operator for MSLB. <b>EVENT 6</b> Crew may trip reactor at any point while in AOI-17.
	<b>CRO</b>	Ensures turbine trip with all stop valves closed.	
	<b>CRO</b>	Ensure steam dump or S/G PORV operation normal.	
	<b>OAC</b>	When Rx power less than 15%, then place rods in manual.	Will require manual rod insertion due to 1-PT-1-73 failure.
	<b>CRO</b>	Announce turbine trip over PA system.	
	<b>OAC</b>	Reduce reactor power to within feedwater capabilities, and maintain zero startup rate: <ul style="list-style-type: none"> <li>Between 6 and 10% with MFW in service.</li> <li>Less than 4% with AFW in service.</li> </ul>	
	<b>CRO</b>	Ensure station service transferred: <ul style="list-style-type: none"> <li>6.9 KV Unit Boards</li> <li>RCP Boards</li> </ul>	
	<b>CRO</b>	Close extraction steam FCVs to # 1 and # 2 feedwater heaters.	
	<b>CRO</b>	Ensure MFW mode switch, 1-HS-3-45, in Forward Flush.	
	<b>CREW</b>	Recognizes lowering Tavg, Pzr Level and Pressure and feedwater/steam flow mismatch.	

OP Test No: _____ Scenario No.: <u>  1  </u> Event No.: <u>  6  </u> Page <u>  1  </u> of <u>  4  </u>			
Event Description: <b>Main Steam Line Break</b>			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>US</b>	Directs reactor trip and closure of MSIVs. May direct manual Safety Injection.	
	<b>OAC</b>	Initiates manual reactor trip/ safety injection.	
	<b>CRO</b>	Closes MSIVs as directed by US. Informs crew that # 3 S/G MSIV failed to close.	Dispatch of personnel to locally close MSIV should be done after first 4 steps of E-0 completed.
	<b>US</b>	Implements E-0 and directs crew actions.	
	<b>CREW</b>	Performs immediate actions of E-0.	
	<b>OAC</b>	Ensures reactor trip and safety injection.	
	<b>CRO</b>	<ul style="list-style-type: none"> <li>• Ensures turbine trip.</li> <li>• Ensures shutdown boards energized.</li> </ul>	
	<b>CRO</b>	Identifies that 1B-B AFWP failed to start, informs crew, and manually starts.	
	<b>CRO</b>	Ensures MFW isolation: <ul style="list-style-type: none"> <li>• MFW isolation valves closed</li> <li>• MFW bypass isolations closed</li> <li>• MFW reg and bypass reg valves closed</li> <li>• MFWPT A and B tripped</li> <li>• Standby MFWP stopped</li> <li>• Cond demin pumps tripped</li> <li>• Cond booster pumps tripped</li> </ul>	

OP Test No: _____ Scenario No.: <u>1</u> Event No.: <u>6</u> Page <u>2</u> of <u>4</u>			
Event Main Steam Line Break Description:			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	CRO	Evaluate SI support systems using E-0, Appendix A.	
	OAC	<ul style="list-style-type: none"> <li>Monitors ECCS operation by checking pumps running and alignments.</li> <li>Ensures cntmt isolations by checking Phase A, and CVI on status panels.</li> <li>Checks cntmt pressure &lt; 2.8 psig.</li> </ul>	
	CRO	Ensure secondary heat sink available. <ul style="list-style-type: none"> <li>AFW flow.</li> <li>SG level.</li> </ul>	
	US	May direct isolation of AFW flow to #3 S/G on completion of Step 12 E-0.	
	OAC	Determines RCS temperature dropping below 557°F. <ul style="list-style-type: none"> <li>Checks steam dumps closed</li> <li>Check steam dump controls in OFF.</li> </ul>	
	OAC	Checks excess letdown valves closed (1-FCV-62-54 and 1-FCV-62-55).	
	OAC	Check PZR safety valves, PORVs and PZR spray valves closed.	
	CRO	Determines #3 S/G pressure dropping in uncontrolled manner.	
	US	Transitions to E-2 and directs crew actions.	
	CREW	Commences monitoring of Status Trees	
	CRO	Verifies MSIVs and bypasses closed. Verifies steam dump controls are OFF.	AUOs should have been dispatched earlier to close.

OP Test No: _____ Scenario No.: <u>1</u> Event No.: <u>6</u> Page <u>3</u> of <u>4</u>			
Event Description: Main Steam Line Break			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>CRO</b>	Verifies at least 1 intact S/G available.	
	<b>CREW</b>	Determines # 3 S/G as the faulted S/G.	
	<b>CRO</b>	Isolates # 3 S/G: <ul style="list-style-type: none"> <li>• Isolates AFW to # 3 S/G.</li> <li>• Ensures MFV isolated to # 3 S/G.</li> <li>• Ensures # 3 S/G PORV closed.</li> <li>• Ensures # 3 S/G Blowdown isolated.</li> <li>• Ensures TD AFW supplied from intact S/G.</li> </ul>	<b>Critical Step</b>
	<b>CRO</b>	Monitors CST level >200,000 gallons.	
	<b>US</b>	Directs CRO to control RCS temp stable with intact S/G PORV operation when faulted S/G is blown down.	
	<b>US</b>	Transitions to E-1 and directs crew actions.	
	<b>OAC</b>	Checks RCPs off if RCS pressure < 1500 psig.	
	<b>US</b>	Refers to EPIP-1 or notifies the SM.	
	<b>CRO</b>	Checks S/G pressure is controlled and Faulted SG has completed, or will soon, complete blowdown.	
	<b>CRO</b>	Maintain intact SG NR levels. <ul style="list-style-type: none"> <li>• Monitors levels &gt; 10%[25%ADV]</li> <li>• Control level between 10% and 50% [25% and 50% ADV].</li> </ul>	



OP Test No: _____ Scenario No.: <u>  1  </u> Event No.: <u>  6  </u> Page <u>  4  </u> of <u>  4  </u>			
Event            Main Steam Line Break Description:			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>CRO</b>	Checks secondary side radiation normal. May contact Chem Lab and RADCON since MSIVs closed.	
	<b>CRO</b>	Ensures cntmt hydrogen analyzers in service to monitor concentration.	
	<b>OAC</b>	Checks PZR PORVs closed and at least one block valve open.	
	<b>OAC</b>	Determines cntmt spray never started.	
	<b>OAC/CRO</b>	Ensures pocket sump pumps stopped (1-HS-77-410 & 1-HS-77-411).	
	<b>US</b>	Determines that SI can be terminated and transitions to ES-1.1 and directs crew actions.	
	<b>OAC</b>	Resets SI, and Phase A. Ensures Cntmt Air in service.	
	<b>OAC</b>	Stops one running charging pump.	
	<b>OAC</b>	Determines RCS pressure stable or rising.	
		<b>TERMINATE THE EXERCISE</b>	

**APPENDIX B**  
**SHIFT TURNOVER CHECKLIST**  
Page 1 of 3

SHIFT TURNOVER CHECKLIST			
		Page ____ of ____	
<input type="checkbox"/>	SM		
<input checked="" type="checkbox"/>	US/MCR	Unit	
<input type="checkbox"/>	UO	Unit	Off-going - Name
<input type="checkbox"/>	AUO	Station	
<input type="checkbox"/>	STA (STA Function)		On-coming - Name
<b>Part 1 - Completed by off-going shift/Reviewed by on-coming shift:</b>			C <sub>b</sub> =1410 ppm
<ul style="list-style-type: none"> <li>• Abnormal equipment lineup/conditions: <div style="border-bottom: 1px solid black; margin: 2px 0;">1A-A MDAFW Pump is tagged for oil leak repair of motor outer bearing.</div> <div style="border-bottom: 1px solid black; margin: 2px 0;">LCO 3.7.5 Condition B for past 12 hours.</div> <div style="border-bottom: 1px solid black; margin: 2px 0;">Medium Risk associated with equipment out of service.</div> </li> <li>• SI/Test in progress/planned: (including need for new brief) <div style="border-bottom: 1px solid black; margin: 2px 0;">See schedule</div> </li> <li>• Major Activities/Procedures in progress/planned: <div style="border-bottom: 1px solid black; margin: 2px 0;">Rx power at 43% ready for 1B MFW Pump to be placed in service. ΔI is out of target band on the positive.</div> <div style="border-bottom: 1px solid black; margin: 2px 0;">side requiring dilution to correct</div> <div style="border-bottom: 1px solid black; margin: 2px 0;">Volunteer Load Coordinator request load be brought to 100% as soon as practical due to high load demand.</div> </li> <li>• Radiological changes in plant during shift: <div style="border-bottom: 1px solid black; margin: 2px 0;">None</div> </li> </ul>			
<b>Part 2 - Performed by on-coming shift</b>			
<input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less (N/A for AUOs) <input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only) Review the following programs for changes since last shift turnover: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div> <input type="checkbox"/> Standing Orders </div> <div> <input type="checkbox"/> LCO(s) in actions (N/A for AUOs) </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div> <input type="checkbox"/> Immediate required reading </div> <div> <input type="checkbox"/> TACF (N/A for AUOs) </div> </div>			
<b>Part 3 - Performed by both off-going and on-coming shift</b>			
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs) <div style="display: flex; justify-content: space-between; margin-top: 10px;"> Relief Time: _____ Relief Date: _____ </div>			

**APPENDIX B**  
**SHIFT TURNOVER CHECKLIST**  
Page 2 of 3

<b>SHIFT TURNOVER CHECKLIST</b>			
Page _____ of _____			
<input type="checkbox"/> SM <input type="checkbox"/> US/MCR <input checked="" type="checkbox"/> UO <input type="checkbox"/> AUO <input type="checkbox"/> STA (STA Function)	Unit _____ Unit _____ Station _____	Off-going - Name _____ On-coming - Name _____	
<b>Part 1 - Completed by off-going shift/Reviewed by on-coming shift:</b>			
$C_b=1410$ ppm			
<ul style="list-style-type: none"> <li>• Abnormal equipment lineup/conditions:  <div style="border-bottom: 1px solid black; margin: 2px 0;">1A-A MDAFW Pump is tagged for oil leak repair of motor outer bearing.</div> <div style="border-bottom: 1px solid black; margin: 2px 0;"></div> <div style="border-bottom: 1px solid black; margin: 2px 0;"></div> </li> <li>• SI/Test in progress/planned: (including need for new brief)  <div style="border-bottom: 1px solid black; margin: 2px 0;">1-SI-0-2</div> <div style="border-bottom: 1px solid black; margin: 2px 0;">Other SIs will be performed by extra operators called in for plant startup.</div> <div style="border-bottom: 1px solid black; margin: 2px 0;"></div> </li> <li>• Major Activities/Procedures in progress/planned:  <div style="border-bottom: 1px solid black; margin: 2px 0;">Rx power at 43% ready for 1B MFW Pump to be placed in service. Hot startup of pump is appropriate. <math>\Delta I</math> is out of target band on the positive side.</div> <div style="border-bottom: 1px solid black; margin: 2px 0;">Rx Engineering has requested a dilution to be started as soon as possible to address the <math>\Delta I</math> concern.</div> <div style="border-bottom: 1px solid black; margin: 2px 0;"></div> </li> <li>• Radiological changes in plant during shift:  <div style="border-bottom: 1px solid black; margin: 2px 0;">None</div> <div style="border-bottom: 1px solid black; margin: 2px 0;"></div> </li> </ul>			
<b>Part 2 - Performed by on-coming shift</b>			
<input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less (N/A for AUOs) <input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only) Review the following programs for changes since last shift turnover: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div> <input type="checkbox"/> Standing Orders  <input type="checkbox"/> Immediate required reading </div> <div> <input type="checkbox"/> LCO(s) in actions (N/A for AUOs)  <input type="checkbox"/> TACF (N/A for AUOs) </div> </div>			
<b>Part 3 - Performed by both off-going and on-coming shift</b>			
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs) <div style="display: flex; justify-content: space-between; margin-top: 5px;"> Relief Time: _____ Relief Date: _____ </div>			

APPENDIX B  
Page 3 of 3  
**REACTIVITY MANAGEMENT BRIEF**

**BOL**

1. Our method of maintaining the 8 hour average reactor power at or below 3459 MWt will be:
  - ⇒ Maintain the 1 hour average reactor power at or below 3459 MWt.
  - ⇒ Adjustments to the main turbine governor valve position by utilizing the governor valve position limiter (VPL).
  - ⇒ Maintain reactor coolant temperature 587.5°F - 588.5°F via RCS boron adjustments in appropriate size batches of water or acid, as needed.  
The Boron Worth will remain at ~ 5.7 - 6.0 pcm/ppm until ~8000 MWD/MTU  
Reference NuPOP Figure 6-21. Use TI-59 or REACTINW as required. (Preferred Method)
  - ⇒ Control rod motion is acceptable (maintaining 5% target band).  
In lieu of many small boron adjustments rods may be used for fine control; however, maintain rods above 212 steps. (Alternate method)
2. Our method of maintaining Delta I within the target band will be:
  - Moving control rods in or out in ½ or 1 step increments.  
Nominal rod step @ 220 is worth: ~ 1.5 - 2.5 pcm.  
Nominal rod step @ 212 is worth: ~ 3.0 - 6.5 pcm.  
(Reference NuPOP Figures 6-24 and 25)
  - The Boron Worth will remain at ~ 5.7 - 6.0 pcm/ppm until ~8000 MWD/MTU reference
  - Our current full power Delta I target band is (-7.4%) - (+2.6%).
  - Our present Delta I value is +7. (Fill in the blank)
  - Control rods are in AUTO / MANUAL. (Circle one)
3. Peer checking by another licensed person prior to performing reactivity manipulations is required.
4. In the event of a runback initiation without rod motion the boration requirement is approximately 36.0 gallons/% power runback.
5. Projected reactivity effect is negative / positive / none (circle one) if the idle CCP is placed in service.  
(Based on RCS C<sub>B</sub> being 1410 ppm when the idle CCP pump was last run.
6. Additional reactivity management issues:  
Power ascension in progress.

Facility: <b>WATTS BAR</b>	Scenario No.: <b>2</b>	Op-Test No.: _____
Examiners: _____ Operators: _____ _____ _____		
<u>Initial Conditions:</u> Rx Power 98%  <u>Turnover:</u> 1B MDAFW out of service. Maintenance has completed work on Turbine Governor Valve #2, Perform portion of TRI 47-3 for Post Maintenance Test of Turbine Governor Valve #2		

Event No.	Malf. No.	Event Type*	Event Description
1	-	N (BOP, SRO)	<b>Perform PMT on Turbine Governor Valve #2</b> (Normal for BOP).
2	(RX05A)	I (RO, SRO)	<b>Pressurizer Level Transmitter LT-68-339 Fails low</b> Annunciators for Pzr Level Hi/Lo and Pzr Level Lo-Heaters OFF and Letdown Closed illuminate. RO should determine an instrument failure and go to AOI-20, Malfunction of the Pzr Level Control System. Manual control of charging should be taken (normal charging may be isolated due to loss of letdown), the channel transferred and letdown returned to service. Tech Spec 3.3.1 Condition X
3	(CV52)	I - (RO)	<b>Fail Letdown Pressure Control Transmitter PT-62-81 High</b> Annunciator for Letdown Pressure High Or High Letdown Flow illuminates. RO should recognize that instrument has failed high and that PCV-62-81 is fully open due to this failure. RO should establish manual control of valve.
4	(ED12 C)	C (SRO, BOP)	<b>Loss of 125VDC Vital Battery Board III</b> This event causes several annunciators, removes control power from the TDAFW pump. It starts all 4 EDG's. A number of Tech Specs will apply both electrical and AFW. The BOP to perform App C of AOI-21.03 to realign ventilation systems. The TDAFW control power transfer per AOI-21.03 will fail (preparatory to main transient) Also the MDAFW pump 1A-A will fail to auto start when initiated, and MCB pump switch will not work, but can be started locally.

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

Facility: <b>WATTS BAR</b> Scenario No.: <b>2</b> Op-Test No.: _____			
Event No.	Malf. No.	Event Type*	Event Description
		C (SRO, BOP)	<b>1B EDG Failure due to Low Lube Oil Pressure.</b> Five minutes after loss of the 125VDC Vital Battery Board, DG 1B Low Lube Oil Pressure illuminates requiring BOP to dispatch operator. The expectation is that the DG-1B will shutdown normally or by emergency shutdown.
5	FW67 C	C (BOP)	<b>Intermediate Heater String C (Heaters 2, 3, &amp; 4) Isolation due to failed Level Switch.</b> There will be some Heater alarms, related to the isolation of heater string. It is expected to affect efficiency.
6	(FW18)	(ALL)	<b>1A Main Feedwater Turbine Vibration High</b> Annunciators for 1A MFWPT Abnormal and Turbine Vibration High.
7	(FW03 A)  (FW05 B)	R (RO)  C (BOP)	<b>Heater Drain Tank Pump 1A Trip on IOC. Heater Drain Tank Pump 1B Trip on IOC five minutes after pump 1A trip.</b> Event will initiate a reason for load reduction (turbine runback possible). Loss of second pump will ensure need for load reduction. After load reduction and Operators are boring, then role play FWP 1A vibration is excessive locally, recommend immediate pump trip.
8	(RD)*	C - RO	<b>Rods fail to move on demand</b> Rods will fail to move in auto or manual. RO will have to initiate boration to lower power. May go to AOI-2, Malfunction of Rod Control System prior to tripping. RO may trip reactor (attempt) if unable to lower power quickly enough on ramp back of power.
9	(RP01 B)	M (ALL)	<b>Failure of Auto Reactor Trips</b> Crew will have to recognize need for manual trip due to lowering SG levels. If auto trip setpoint is reached, the Rx will not auto trip.
POST MT	(FW06)		<b>Standby Feedwater pump fails to Start</b> At this point there should be no feedwater available and drive the crew into FR-H.1. If Operator is dispatched to 1A MDAFW pump breaker, finds no targets or problems. If directed to close breaker locally, the pump will start. If action was taken to initiate repair the DC Transfer switch, allow repair to be completed, then transfer TDAFW Pump control power. We will allow this success path, after an appropriate time to achieve the action locally. Any other procedure path to success is acceptable (i.e. Main Feedwater pumps, condensate pumps or feed and bleed.)
			This scenario ends after a success path is demonstrated (e.g. Feed and bleed, feeding with 1A MDAFW pump, or TDAFW pump, or any secondary pump.

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

**TITLE:** Rods Fail to Move on Demand, Failure of Auto Reactor Trip, Total Loss of Feedwater

**REVISION:** 0

**DATE:** 11/20/02

**PROGRAM:** WBN Operator Training - Initial License

**PREPARED BY:** \_\_\_\_\_ / \_\_\_\_\_  
(Operations Instructor) (Date)

**VALIDATION BY:** \_\_\_\_\_ / \_\_\_\_\_  
(Operations Instructor) (Date)

**REVIEWED BY:** \_\_\_\_\_ / \_\_\_\_\_  
(Lead Operations Instructor) (Date)

**APPROVED BY:** \_\_\_\_\_ / \_\_\_\_\_  
(Operations Training Manager) (Date)

**CONCURRED:** \_\_\_\_\_ / \_\_\_\_\_  
(Operations Superintendent) (Date)

Nuclear Training Revision/Usage Log				
REVISION NUMBER	DESCRIPTION OF REVISION	DATE	PAGES AFFECTED	REVIEWED BY
0	Initial Issue	11/20/02	ALL	



**PROGRAM:** WBN Operator Training

**SUBJECT:** Simulator Examination Guide

**TITLE:** Rods Fail to Move on Demand, Failure of Auto Reactor Trip, Total Loss of Feedwater

**LENGTH:** ~1.5 Hour

**REFERENCES:**

	Reference	Title	Rev No.
A.	Tech Specs		
B.	SPP - 10.0	Plant Operations	2
C.	OPDP - 1	Conduct of Operations	1
D.	EPIP-1	Emergency Plan Classification Flow Chart	20
E.	1-TRI-47-3	Main Turbine Steam Inlet Valve Testing	1
F.	AOI-2	Malfunction of Reactor Control System	25
G.	AOI-20	Malfunction of Pressure Level Control System	23
H.	AOI-21.03	Loss of 125V DC Vital Battery BD III	17
I.	AOI-37	Turbine Runback Response	11
J.	E-0	Reactor Trip Or Safety Injection	17
K.	ES-0.1	Reactor Trip Response	13
L.	FR-H.1	Loss of Secondary Heat Sink	15

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**SCENARIO OBJECTIVES:**

1. Evaluate the candidates in their use of Abnormal Operating Instructions to address various failures or transients.
2. Evaluate the candidates use of E-O, Reactor Trip or Safety Injection, to respond to manual reactor trip and subsequent transition to ES-0.1, Reactor Trip Response.
3. Evaluate the candidates in their transition to FR-H.1, Loss of Secondary Heat Sink on low S/G levels after transition from ES-0.1.

## SCENARIO SUMMARY:

### Initial conditions:

- Reactor is operating at 98% RTP, Cb = 947 ppm.
- The Train Week is "B". Channel Week II or IV ok.
- MDAFW pump 1B-B is out of service for maintenance.
- Maintenance has completed work on Turbine Governor Valve # 2.
- Portions of 1-TRI-47-3, Main Turbine Steam Inlet Valve Testing, need to be performed for Post Maintenance Testing.

### Scenario Events and Sequence:

Set up simulator to IC-145

1. Perform PMT on Turbine Governor Valve # 2 per 1-TRI-47-3.
2. Pressurizer Level Transmitter, 1-LT-68-339, fails low requiring isolation of charging flow, defeat of channel, and re-establishment of charging and letdown.
3. Letdown Pressure Control Transmitter, 1-PT-62-81, fails high requiring manual valve manipulation to control letdown pressure. 1-PI-62-81 indicates 600 psig with no other available control room indication.
4. Loss of 125VDC Vital Battery Board III. This removes control power from the Turbine Driven AFW Pump requiring a Tech Spec shutdown on loss of two trains.
5. 1B D/G low oil pressure alarm annunciates requiring emergency stop of the D/G.
6. Intermediate Feedwater Heater String C isolates requiring local response to determine cause.
7. 1A Main Feedwater Pump vibration high. Alarm only with vibration at 4 Mils. Vibration worsens requiring trip of pump.
8. #3 Heater Drain Tank 1A trips on instantaneous over current (IOC). Pump 1B trips on timed overcurrent five minutes after pump 1A requiring manual load reduction and/or turbine runback.
9. Rods fail to move on demand in auto and manual requiring boration to lower power to match turbine load. With two heater drain tank pumps tripped and the 1A MFWP tripped, S/G levels will drop requiring manual reactor trip.
10. Failure of Auto Reactor Trips ensures manual action to trip the reactor.
11. Entry into FR-H.1, Loss of Secondary Heat Sink, entry due to AFW flow being unavailable.

### **EVENT 1 - Perform PMT on Turbine Governor Valve # 2 per 1-TRI-47-3**

Turnover has reactor power at 98% RTP with the # 4 Governor Valve at the mostly closed position for performance of 1-TRI-47-3 on the # 2 Governor Valve.

Malfunctions required: None

Objectives:

- Evaluates the candidates ability in the use of 1-TRI-47-3, Main Turbine Steam Inlet Valve Testing.

Success Path:

- Candidates verify # 2 governor valve operates freely with no evidence of interference with valve stem movement. Valve will be cycled from full open to full closed and returned to the fully open position to verify operability.

### **EVENT 2 - Pressurizer Level Transmitter, 1-LT-68-339, Fails Low**

1-LT-68-339 fails low resulting in letdown isolation and subsequent manual isolation of charging flow. Manual control of charging valve controller, 1-HIC-62-93A, is required. Failed channel must be defeated and charging and letdown restored. Operators should respond using AOI-20.

Malfunctions required: 1

- **RX05A 0**

Objectives:

- Evaluates the candidates use of AOI-20 for failure of 1-LT-68-339 low.
- Evaluates candidates ability to properly diagnose control board indications to determine event in progress.

Success Path:

- Crew recognizes conditions for entry and implements AOI-20 in response to PZR level transmitter, 1-LT-68-339 (channel I) failing low.
- Manual control of PZR level established.
- Stabilizes the plant and restore PZR heaters, charging and letdown to service. Returns charging flow control valve to auto position.
- Determines the correct conditions to enter for the appropriate LCOs.

### **EVENT 3 - Letdown Pressure Control Transmitter, 1-PT-62-81 Fails High**

1-PT-62-81 fails high causing Letdown Pressure Control Valve, 1-PCV-62-81, to come full open resulting in low letdown pressure. Flashing may occur in the letdown line with possible relief valve opening to the PRT. Manual valve control must be taken to close valve until proper letdown pressure restored. Complicated by the lack of MCR indication to restore proper pressure setpoint of 320 psig (indication failed at 600 psig).

Malfunctions required: 1

#### **CV52 100**

##### **Objectives:**

- Evaluates the candidates ability to recognize low letdown pressure conditions.
- Evaluates the candidate's ability to take manual control of the Letdown Pressure Control Valve and restore normal pressure conditions using alternate means of indication.

##### **Success Path:**

- Places 1-PIC-62-81A in manual and close the valve to restore normal letdown pressure control of ~320 psig.
- Dispatches personnel to verify correct valve response to MCR input.

#### **EVENT 4 - Loss of 125VDC Vital Battery Board III**

Several annunciators will alarm and control power will be removed from the TDAFW Pump. All D/Gs will auto start. Tech Specs will apply to the board loss and to the loss of the second train of AFW. Local transfer of control power to the TDAFW Pump will fail resulting in a Tech Spec driven plant shutdown.

Malfunctions required: 1

- **ED12C**

Objectives:

- Evaluate the candidate's response to a loss of 125VDC Vital Battery Bd III and implementation of AOI-21.03.
- Evaluate the candidate's ability to evaluate Technical Specifications and determine the need to enter the appropriate conditions and commence preparations for plant shutdown.

Success Path:

- Recognize entry conditions and implement AOI-21.03 in response to 125VDC Vital Battery Board III.
- Determine the correct conditions to enter for the appropriate LCOs recognizing that two AFW Trains are inop and requires shutdown to Mode 3 and then Mode 4.

#### **EVENT 4A - 1B Diesel Generator Low Oil Pressure**

1B D/G Low Oil Pressure Alarm annunciates on 0-M-26 after D/Gs are all started five minutes after loss of the 125VDC Vital Battery Bd III. This will require D/G 1B to be emergency stopped since the D/Gs did not receive a valid emergency start signal.

Malfunctions required:

- **AN:OV:07c071 alarm**

Objectives:

- Evaluate the candidate's response to a low oil pressure alarm on a running diesel generator per ARI.
- Evaluate the candidate's ability to evaluate Technical Specifications and determine the need to enter the appropriate conditions.

Success Path:

- Emergency stop Diesel Generator 1B per ARI.
- Determines the correct conditions to enter for the appropriate LCOs.

### **EVENT 5 - Intermediate String Heaters C (Heaters 2, 3, and 4 isolate)**

High level alarm will result on # 1C Feedwater heater due to bypassing flow to condenser due to intermediate string isolation. Reactor thermal power will rise but should not be a problem due to power drop to 98% for governor valve testing.

Malfunctions required: 1

#### **FW 67C**

Objectives:

- Evaluate the candidate's response to an intermediate string of heaters isolating.
- Evaluate the candidate's ability to evaluate the associated ARI to determine required actions.

Success Path:

- Crew responds to alarm per appropriate ARI and dispatches personnel locally to determine cause.
- Monitors reactor thermal power to ensure RTP of 3459 MWt not exceeded.

### **EVENT 6 - 1A Main Feedwater Pump Vibration High**

This malfunction will bring in 1A Main Feedwater Pump Vibration High Alarm and will indicate just above alarm setpoint of 4 mils requiring monitoring but not shutdown of pump. After event 7 with inability to drive rods and boration in progress 1A MFW Pump vibration, through role play, will worsen requiring 1A MFWPT to be tripped.

Malfunctions required: 1

#### **FW18A set to 16%**

Objectives:

- Evaluates the candidates ability to recognize 1A MFW Turbine high vibration conditions.
- Evaluates the candidate's ability to determine that turbine vibration is in a range not requiring shutdown but closer monitoring.

Success Path:

- Responds to alarm per appropriate ARI and maintains 1A MFWP in service with closer monitoring of turbine vibration. May vary pump speed to lower vibration.
- Remove pump from service on role play of excessive vibration with recommendation to trip pump.

### **EVENT 7 - 1A and 1B # 3 Heater Drain Tank Pumps Trip**

Trip of 1A # 3 Heater Drain Tank Pump (HDTP) will require a manual turbine load reduction to 900 MWe or an automatic turbine runback will occur. Trip of the 1B # 3 HDTP five minutes later will ensure a load reduction with lower capacity to keep feedwater flow and steam flow equal. Boration will be required.

Malfunctions required: 2

- **FW03A and FW03B**

Objectives:

- Evaluate the candidate's ability to recognize trip of # 3 Heater Drain Tank Pumps 1A and 1B.
- Evaluate the candidate's ability to assess board indications and execute AOI-37, Turbine Runback Response.

Success Path:

- Recognize entry conditions and implementation of AOI-37 to respond to turbine runback event.
- Recognize lowering S/G levels and need of manual reactor trip.

### **EVENT 8 - Rods Fail To Move On Demand**

Turbine load will be dropped to  $\leq 900$  MWe due to # 3 HDT pump problem but rods will not move in auto or manual to match  $T_{avg}$  to  $T_{ref}$ . Lowering level in all S/Gs will result which should drive the crew to initiate a manual reactor trip.

Malfunctions required: 1

- **RD08** Rods fail to move on demand.

Objectives:

- Evaluate candidates ability to monitor S/G levels and initiate manual Reactor trip due to approaching low levels in the S/Gs. Auto reactor trip failure will prevent automatic trip.

Success Path:

- Manually trip the reactor from 1-M-4 or 1-M-6 MCR Handswitches.
- Crew implements E-0 and then transitions to ES-0.1, Reactor Trip Response.

### **EVENT 9 - FR-H.1, Loss Of Secondary Heat Sink**

Aux Feedwater flow is not available and a transition to FR-H.1 will be made when no S/G is > 10% Narrow Range level. The Standby Main Feedwater Pump will fail to start and the 1A MDAFW Pump will not start from the MCR but can be started locally.

Malfunctions required: 2

- **FW06 Standby Main Feedwater Pump Failure**
- **ZDIHW3118A STOP Prevents MCR start of 1A MDAFWP**

Objectives:

- Evaluate the candidate's ability to recognize a loss of secondary heat sink and implements FR-H.1.
- Evaluate the candidate's ability to restore feedwater flow from available sources or initiate bleed and feed.

Success Path:

- Crew diagnoses loss of secondary heat sink and implements FR-H.1.
- Crew restores feed flow to the S/Gs and/or initiates bleed and feed as required by three S/G Wide Range levels  $\leq 34\%$ .



## CONSOLE OPERATORS INSTRUCTIONS

ELAPSED TIME	IC/MF/RF/OR	DESCRIPTION
0	rst 145, switch check, select RUN	98 % RTP, BOL, C <sub>b</sub> =947 ppm.
0	Turn audible simulator fault alarm to "off" (down position)	Prevents unnecessarily alerting crew of a simulator problem that may not effect simulator dynamics.
0	Place "B" Train Week" sign on control board	Entrance side panel. Channel week II or IV OK.
0	Reduce power to 98% for gov valve testing	Lowers Governor Valve # 4 for testing of Governor Valve # 2.
0	Place 1 HS-3-128A in PTL and tag 1 HS-3-128A and 1-HS-3-359 with HO  NOTE: IC 145 has been setup for this scenario. If unavailable, rst 50 and continue rest of setup.	Simulates 1B-B MDAFWP OOS for maintenance.
Sim Setup	ior zlohs3128a[1] off ior zdihs3359 ior zlohs3359[1] off ior zlohs3359[2] off	1-HS-3128A green light off 1B MDAFWP. 1-HS-3-359 1B MDAFWP Recirc tagged. 1-HS-3-359 green light off. 1-HS-3-359 red light off.
0	ior zdihs3118a stop	MCR Handswitch will not start 1A MDAFW Pump.
0	imf SI08G	Failure of Auto SI and Blackout start of 1A MDAFW Pump.
0	imf fw06	Trip-out of the Standby MFW Pump on start.
0	imf rp01b	Automatic reactor trip signal failure.

CONSOLE OPERATORS INSTRUCTIONS  
(Continued)

ELAPSED TIME	IC/MF/RF/OR	DESCRIPTION
0	imf 05a (e2) 0	1-LT-339, Pzr Level Transmitter, fails low.
0	imf cv52 (e3) 600	1-PT-62-81 fails high (600 psig).
0	imf ed12c (e4) ior an:ov:07c071 (e4) 5: on	Loss of 125VDC Vital Battery Bd III. D/G 1B-B low oil pressure alarm in 5 minutes after Battery Bd III loss.
0	imf fw67c (e5)	1-LS-6-66D failure causing Intermediate Heater String C isolation (Heaters 2C, 3C, & 4C).
0	imf fw18a (e6) 16	1A MFWPT vibration at 4 mils.
0	fw03a (e7) fw03b (e7) 5:	1A # 3 HDTP trip. 1B # 3 HDTP trip five minutes after the 1A pump trip.
0	imf rd08 (e8)	Rods fail to move on demand in auto or manual positions.

CONSOLE OPERATORS INSTRUCTIONS  
(Continued)

ELAPSED TIME	IC/MF/RF/OR	DESCRIPTION
After crew assumes shift:		
0		<b>ROLE PLAY:</b> As TB AUO, when requested, report the #2 Governor Valve operates freely with no signs of binding when valve is stroked.
When directed by the evaluator for <b>EVENT 2</b>	imf itrigger2 (Use ETM Screen)	1-LT-68-339, Pzr Level Transmitter fails low.  <b>ROLE PLAY:</b> As Work Control, when contacted, inform the crew a work package will be initiated for repairs.
When directed by the evaluator for <b>EVENT 3</b>	imf itrigger3 (Select PTP on CV1 for popup on 1-PT-62-81C to view actual press)	1-PT-62-81, Letdown Pressure Control Transmitter fails high.  <b>ROLE PLAY:</b> As AB AUO, when requested, report that the valve is responding to control input. If AUO sent to Aux Control Room, report actual letdown pressure.  <b>ROLE PLAY:</b> As Work Control, when contacted, inform the crew the pressure transmitter will be added to the work scope and package initiated.
When directed by the evaluator for <b>EVENT 4</b>  (Event 4 continued on next page)	imf itrigger4	Loss of 125VDC Vital Battery III.  <b>ROLE PLAY:</b> As CB AUO, when requested, report the board has no voltage but no apparent reason for the loss.  <b>ROLE PLAY:</b> As AB AUO, when requested to transfer control power to the TDAFW Pump, report 1-XSW-46-DC will not move to the Emergency position.

CONSOLE OPERATORS INSTRUCTIONS  
(Continued)

ELAPSED TIME	IC/MF/RF/OR	DESCRIPTION
		<b>ROLE PLAY:</b> As Maintenance, if requested, and after an appropriate time delay, report the main battery fuse has blown and requires replacing.
After 5 minute time delay from 125VDC Vital Battery loss	ior an:ov:07c071 (e4)	Window 205-B - D/G LUBE OIL PRESS LO alarm  <b>ROLE PLAY:</b> As Outside AUO, report D/G 1B has an oil pressure of 12 psig on the 1B1 engine. 1B2 engine oil pressure is normal.
When requested by the evaluator for <b>EVENT 5</b>	Imf itrigger5	C Intermediate String Heaters isolate on faulty level switch.  <b>ROLE PLAY:</b> As TB AUO, when requested, report the levels in the # 2C & # 4C Heaters are low. Cannot see reason for isolation.  <b>ROLE PLAY:</b> As Maint/Work Control, if requested, inform the crew that 1-LS-6-66D shows signs of overheating and needs replacing.
When requested by the evaluator for <b>EVENT 6</b>	imf itrigger6	Window 54D - PUMP VIBRATION HI alarm. Steady around 4.1 mils - just above alarm setpoint.  <b>ROLE PLAY:</b> As AUO, when requested, report some difference in vibration from beginning of shift. Request vibration personnel be notified to confirm vibration problem.  <b>ROLE PLAY:</b> When cued by the examiner, report to the crew as AUO that vibration is rising rapidly on 1A MFP and maintenance insist on trip of pump before it self destructs. Bad rub sounds coming from pump.

CONSOLE OPERATORS INSTRUCTIONS  
(Continued)

ELAPSED TIME	IC/MF/RF/OR	DESCRIPTION
<p>When requested by the evaluator for <b>EVENT 7</b></p> <p><u>Trigger 8 required when rods step in ~ 10 steps.</u></p>	imf itrigger7	<p>1A # 3 Heater Drain Tank Pump trips and 1B # 3 Heater Drain Tank Pump trips 5 minutes after 1A Pump trip.</p> <p><b>ROLE PLAY:</b> As AUO, when requested, report 1A pump tripped on IOC and the 1B pump tripped on timed overcurrent.</p>
<p><u>After rods run in ~ 10 steps insert EVENT 8</u></p>	imf itrigger8	<p>Rods fail to move on demand.</p> <p><b>ROLE PLAY:</b> As CB AUO, if requested, report urgent failure light in logic cabinet illuminated.</p>
<p>On evaluator cue after bleed and feed established</p>	<p>dor zdihs3118a</p> <p>mrf edr68 aux</p>	<p><b>ROLE PLAY:</b> As CB AUO, report that the breaker for the 1A MD AFW Pump has been swapped out and is available for service.</p> <p>As an alternative, transfer the 1-XSW-46-DC to alternate power and inform the crew the TDAFWP is available.</p>

## **APPENDIX A INFORMATION TO EVALUATORS**

1. Assign Crew Positions: Assign positions based on evaluation requirements for personnel.

US - Unit Supervisor  
OAC - Operator at Controls  
CRO - Control Room Operator

2. Review the Shift Turnover Checklist with the operating crew. Provide the US with a copy of Appendix B, Shift Briefing Information.
3. Allow the crew to familiarize themselves with current control panel condition (up to 10 minutes).
4. Ensure recorders are inking and recording and ICS is active and updating. Note any deficiencies during shift briefing.
5. If not previously done, review any major differences between plant and simulator.
6. Review CONSOLE OPERATORS INSTRUCTION for INITIATING CUES.

OP Test No: \_\_\_\_\_ Scenario No.: 2 Event No.: 1 Page 1 of 2

Event Description: Perform PMT on Turbine Governor Valve # 2

Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>CREW</b>	Walks down control boards.	
	<b>CRO</b>	Reviews Sections 3.0, and 4.0 before Performance Section 6.0 of 1-TRI-47-3 is initiated.	
	<b>CRO</b>	Establishes communications between the MCR and turbine front standard.	
	<b>US</b>	Records generator load and ensures load is not 505-700 MW.	
	<b>CRO</b>	Ensures 1-XX-47-1000, EHC Control, is in OPER AUTO.	
	<b>CRO</b>	Ensures 1-XX-47-1000, EHC Control, is in IMP IN.	
	<b>CRO</b>	Records Valve Position Limit setting.	
	<b>CRO</b>	Sets Valve Position Limit to $\geq 100\%$ .	
	<b>CRO</b>	Position person locally at valve to observe smooth valve operation.	
	<b>CRO</b>	Push and hold GV Close pushbutton for 1-FCV-1-65, Main Steam Governor Valve NO. 2 until the valve is fully closed.	
	<b>CRO</b>	Verify the following: <ul style="list-style-type: none"> <li>GV Open light is not lit.</li> <li>GV Closed light is lit.</li> <li>Valve position Indicator Meter for GV being tested indicates 0%.</li> </ul>	

OP Test No: _____ Scenario No.: <u>  2  </u> Event No.: <u>  1  </u> Page <u>  2  </u> of <u>  2  </u>			
Event Description: Perform PMT on Turbine Governor Valve # 2			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>CRO</b>	Push and hold GV Open pushbutton for 1-FCV-1-65, Main Steam governor Valve No. 2 until open and close pushbutton lights are not lit.	
	<b>CRO</b>	Check for smooth valve operation by local observation. Annotates and reports unexpected valve response.	
	<b>CRO</b>	Returns Valve Position Limit to it's as-found setting in step [4].	
	<b>US</b>	Reviews Section 5.0 for satisfactory completion of acceptance criteria.	Not a step in the TRI but is expected at some point before or after valve stroke.
	<b>US</b>	Directs crew to raise power to 100%.	Cue Console Operator for 1-LT-68-339 failure low. <b>EVENT 2</b>



OP Test No: _____ Scenario No.: <u>2</u> Event No.: <u>2</u> Page <u>1</u> of <u>3</u>			
Event Description:		Controlling PZR level transmitter 1-LT-68-339 fails low.	
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	OAC	Recognize PZR level channel I failure and informs crew. <ul style="list-style-type: none"> <li>Channel I level indication fails low.</li> <li>PZR level alarms:</li> <li>PZR LEVEL HI/LO [92-A]</li> <li>PZR LEVEL LO-HTRS OFF &amp; LETDOWN CLOSED [92-C]</li> </ul>	
	OAC	Recognizes letdown isolation and should isolate charging. (1-HS-62-90A & 1-HS-62-91A).	Expected response to isolate charging if inventory problem does not exist.
	US	Implement AOI-20 and directs the actions of the crew.	
	OAC	Checks PZR level program signal NORMAL, recorder 1-LR-68-339. (green pen)	
	OAC	Determines that 1-XS-68-339E is selected to FAILED channel.	
	OAC	Determines that channel I, 1-LT-68-339 failure is low.	
	OAC	Places 1-HIC-62-93A in Manual, and closes 1-FCV-62-89.	
	OAC	Maintains RCP seal flow between 8 and 13 gpm with 1-HIC-62-93A.	
	OAC	Selects operable channel for controlling channel using 1-XS-68-339E ( selects LI-68-335 B320).  Ensure operable channel selected for recording with 1-XS-68-339B. (Channel 339 not selected.)	

OP Test No: \_\_\_\_\_ Scenario No.: 2 Event No.: 2 Page 2 of 3

Event Description: Controlling PZR level transmitter 1-LT-68-339 fails low.

Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>OAC</b>	<p>Establishes normal charging and letdown per attachment 1 of AOI-20</p> <ul style="list-style-type: none"> <li>• Closes 1-FCV-62-89.</li> <li>• Ensures Charging Pump running</li> <li>• Opens/check open 1-FCV-62-90 and 1-FCV-62-91.</li> <li>• Ensures 1-FCV-62-85 or -86 open</li> <li>• Adjusts 1-FCV-62-93 to maintain 8-13 gpm seal flow.</li> <li>• Ensure letdown isolation valves OPEN 1-FCV-62-69, 1-FCV-62-70 and 1-FCV-62-77.</li> <li>• Place Letdown Hx temperature control valve (1-HIC-62-78A) in MANUAL at 25% open.</li> <li>• Places letdown pressure control (1-HIC-62-81A) in MANUAL at 25% open.</li> <li>• Establish charging flow 75 gpm or greater &amp; 8-13 gpm seal injection flow to each RCP.</li> <li>• Establish letdown by opening letdown orifices as needed. 1-FCV-62-73 or 74, or 72 or 76.</li> <li>• Adjust letdown pressure (1-HIC-62-81A) to ~320psig and place in AUTO.</li> <li>• Place 1-HIC-62-78A, letdown hx outlet temp TCV-70-192 cntl, in AUTO.</li> <li>• Returns PZR level to program</li> <li>• Return 1-HIC-62-93A, charging flow pzs level control, to AUTO.</li> </ul>	

OP Test No: \_\_\_\_\_ Scenario No.: 2 Event No.: 2 Page 3 of 3

Event Description: Controlling PZR level transmitter 1-LT-68-339 fails low.

Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>OAC</b>	Restores pzs level control to normal: <ul style="list-style-type: none"> <li>• Controls charging and letdown to return pzs level to program.</li> <li>• Ensures pzs control heater bank D red light lit.</li> <li>• Momentarily places pzs backup heater bank C HS to off.</li> <li>• Checks pzs program level normal on 1-LR-68-339 (green pen).</li> <li>• Returns charging valve controller, 1-HIC-62-93A to auto.</li> </ul>	Will probably restore level to program before placing in auto.
	<b>US</b>	Notifies work control to remove failed channel from service.	
	<b>US</b>	Evaluates Tech Specs and enters LCOs 3.3.1.9 Condition X and 3.3.3 Condition A.	Cue Console Operator for letdown pressure transmitter, 1-PT-62-81 failure high. <b>EVENT 3</b>

OP Test No: \_\_\_\_\_ Scenario No.: 2 Event No.: 3 Page 1 of 2

Event Description: Letdown Pressure Control Transmitter, 1-PT-62-81 fails high

Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>OAC</b>	<p>Recognizes high pressure indication on letdown and informs crew.</p> <ul style="list-style-type: none"> <li>Letdown pressure transmitter, 1-PT-62-81 failed high.</li> <li>Letdown alarm: <ul style="list-style-type: none"> <li>LO PRESS LTDN FLOW/PRESS HI [110B]</li> </ul> </li> </ul>	
	<b>US/OAC</b>	<p>Refers to Annunciator Response Instruction and considers following corrective actions:</p> <ul style="list-style-type: none"> <li>Check letdown flow, 1-FI-62-82, and letdown pressure, 1-PI-62-81 and determines 1-PI-62-81 indicating top of scale at 600 psig.</li> <li>Ensure 1-PCV-62-81 is maintaining 320 to 350 psig on 1-PI-62-81 and determines press indicating 600 psig and 1- HIC-62-81A indicating valve in the full open position.</li> <li>Ensure proper orifices are aligned to supply letdown flow 45 to 120 gpm.</li> <li>If conditions persist, then consider taking normal charging and letdown out of service and placing excess letdown in service per SOI-62.01.</li> </ul>	<p>Flow is normal @ ~72 gpm.</p> <p>Should determine valve can be controlled in manual with failed indication. No MCR indication will be available. If AUO sent locally, determination of proper valve operation can be confirmed.</p> <p>Aux Control Room will have proper letdown press indication if utilized.</p>
	<b>US</b>	<p><b>ALTERNATE PATH</b></p> <p>Directs taking normal charging and letdown OOS if not properly diagnosed and placing excess letdown in per SOI.</p>	<p>If valve is taken to the closed position causing relief valve to open and LD HI TEMP alarm, the crew may decide to remove from service.</p>

OP Test No: _____ Scenario No.: <u>2</u> Event No.: <u>3</u> Page <u>2</u> of <u>2</u>			
Event Description: Letdown Pressure Control Transmitter, 1-PT-62-81 fails high			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>US</b>	Notifies RADCON Shift Supervisor of intent to place excess letdown in service.	
	<b>OAC</b>	Per SOI-62.01, Section 8.3, Establishing Excess Letdown: <ul style="list-style-type: none"> <li>• Opens excess letdown CCS Valves, 1-HS-70-143A and 1-HS-70-85A.</li> <li>• Checks 1-HS-62-59, CVCS Excess Letdown Divert Flow CNTL in NORM or DIV.</li> <li>• Opens 1-HS-62-54A and 1-HS-62-55A, excess letdown isolation valves.</li> <li>• Slowly opens 1-HIC-62-56A, Excess LTDN Flow Control, to maintain Excess LD Hx outlet temperature below 206°F and Excess LD Hx CCS outlet temperature below 135 °F.</li> </ul>	Alarm will annunciate if letdown temperature exceeds 200°F.
			Cue Console Operator for loss of Vital Battery Bd III. <b>EVENT 4</b>

OP Test No: _____ Scenario No.: <u>2</u> Event No.: <u>4a, 4b</u> Page <u>1</u> of <u>2</u>			
Event Description: Loss of 125VDC Vital Battery Board III			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>CRO</b>	<p>Recognize failure of 125VDC Vital Battery Board III and informs crew.</p> <p>Indications:</p> <ul style="list-style-type: none"> <li>• All D/Gs start but do not tie onto bd.</li> <li>• TDAFW Pump loses control power.</li> <li>• Loss of control pwr to various bds.</li> </ul> <p>Alarms:</p> <ul style="list-style-type: none"> <li>• 125 DC VITAL CHGR/BATT III ABNORMAL [19-A]</li> <li>• 125 DC VITAL BATT BD III ABNORMAL [19-B]</li> <li>• 6.9 SD BD 1A-A UV/OV/CONTROL PWR FAILURE [12-B]</li> <li>• 480V SD BD 1A1-A/1A2-A FAILURE/ABN [10-D]</li> </ul>	
	<b>US</b>	Implements AOI-21.03, Loss of 125V DC Vital Battery BD III and directs crew actions.	
	<b>CRO</b>	Dispatches personnel to restore power using SOI-236.03, 125V DC Vital Battery Board III.	
	<b>CRO</b>	Responds to alarm on D/G panel, DG LUBE OIL PRESS LO and dispatches AUO to investigate.	<b>EVENT 4b</b>
	<b>US/CRO</b>	Directs emergency stop of D/G 1B after AUO verifies oil pressure of 1B1 engine to 12 psig.	<b>EVENT 4b</b>
	<b>CRO</b>	Directs 1-XSW-46-DC, TD AFWP DC Man Transfer Switch to emergency.	Transfer switch will not operate causing loss of two trains of AFW.

OP Test No: _____ Scenario No.: <u>2</u> Event No.: <u>4a, 4b</u> Page <u>2</u> of <u>2</u>			
Event Description: Loss of 125VDC Vital Battery Board III			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>CRO</b>	Ensures ERCW flow to all running D/Gs.	All D/Gs are running.
	<b>US/CRO</b>	Directs AUO to transfer Shutdown Board 125V DC control power to alternate supply using Appendix A.	
	<b>US/CRO</b>	Directs performance of Appendix C to place ventilation in service.	
	<b>US/CRO</b>	Directs Handswitch 43TL, in 6.9KV Logic Panel 2A-A, be placed in the Test Position.	
	<b>US/CRO</b>	Directs stopping D/Gs and placing in Standby.	
	<b>US</b>	Notifies Work Control to assist in determining cause of loss.	
	<b>US</b>	Refers to Tech Specs and enters LCO 3.8.4 Condition A and LCO 3.7.5 Condition C. Determines that a Tech Spec shutdown is require with entry into Mode 3 in six hours due to two trains AFW inop.	Cue Console Operator for C Heater String Isolation. <b>EVENT 5</b>

OP Test No: _____ Scenario No.: <u>2</u> Event No.: <u>5</u> Page <u>1</u> of <u>1</u>			
Event Description: Intermediate Heater String C Isolation			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>CRO</b>	<p>Recognizes C Heater String isolation by feedwater inlet, outlet and extraction valves closing and/or alarm.</p> <p>Alarms:</p> <ul style="list-style-type: none"> <li>• HP HEATER C1 LEVEL HI/LO [38-A]</li> <li>• HEATER A2 LEVEL HI/LO [36-B]</li> <li>• HEATER B2 LEVEL HI/LO [37-B]</li> </ul>	These heater levels will go high due to more steam flow or drain path isolation.
	<b>CRO</b>	ARI should be addressed for the alarms listed above. (Alarm for heater string that isolated will NOT be in alarm)	Completion of heater string isolation should be directed per SOI-5 & 6.01.
	<b>CRO</b>	Dispatches AUO to investigate actual levels and cause of isolation.	Will not be able to diagnose problem without maintenance assistance.
	<b>US</b>	Addresses thermal power concern due to loss of efficiency from heater string isolation.	<p>RTP=3459 MWt</p> <p>Since power started at 98%, thermal limits may not be a concern.</p>
	<b>US</b>	Notify Work Control to generate troubleshooting package.	Cue Console Operator for 1A MFWPT vibration high. <b>EVENT 6</b>



OP Test No: _____ Scenario No.: <u>2</u> Event No.: <u>6</u> Page <u>1</u> of <u>1</u>			
Event Description: 1A Main Feedwater Pump Vibration High			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>CRO</b>	Responds to and announces alarms: <ul style="list-style-type: none"> <li>• MFPT 1A ABNORMAL [50-A]</li> <li>• PUMP VIBRATION HI [54-D]</li> </ul>	
	<b>CRO</b>	Refers to Annunciator Response Instruction and considers following corrective actions: <ul style="list-style-type: none"> <li>• Determines affected MFP from windows 50-A and 50-B.</li> <li>• Monitors affected MFP vibration on ICS or panel 1-L-792 [el 755] and determines pump vibration just above alarm setpoint of 4 mils.</li> <li>• Dispatches operator to:               <ul style="list-style-type: none"> <li>• Check for sounds of vibration or rubbing.</li> <li>• Check lube oil temperature and adjust as necessary.</li> <li>• Reset local indicator at 1-L-792.</li> </ul> </li> <li>• Evaluate unit load and condition, and adjust MFPT speed to lower vibration if possible.</li> <li>• If vibration problem valid and greater than or equal to 5 mils, then evaluate unit load reduction to allow MFP removal from service.</li> </ul>	
	<b>US</b>	Notifies Work Control to initiate corrective action.	Console Operator (AUO) will request maintenance verification of alarm.
			Cue Console Operator for # 3 HDT Pump trips. <b>EVENT 7</b>

OP Test No: _____ Scenario No.: <u>2</u> Event No.: <u>7, 8, 9, MT</u> Page <u>1</u> of <u>6</u>			
Event Description: 1A and 1B # 3 Heater Drain Tank Pumps Trip, Rods fail to move on demand, Failure of Auto Reactor Trip, Failure of 1A MDAFW Pump to start from MCR, & Failure of the Stby MFWP to start			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>CRO</b>	Recognizes trip of 1A # 3 Heater Drain Tank Pump and informs crew.  Alarms: <ul style="list-style-type: none"> <li>• # 3 HD TANK BYP TO CONDENSER OPEN [30-E]</li> <li>• # 3 HD TANK LEVEL HI/LO [29E]</li> </ul>	
	<b>US</b>	May direct turbine load reduction per AOI-39 in anticipation of turbine runback: <ul style="list-style-type: none"> <li>• Push REFERENCE control lower button to set desired load in SETTER display</li> <li>• Set LOAD RATE as required.</li> <li>• Push GO button.</li> </ul>	
	<b>CRO</b>	Recognizes trip of 1B # 3 Heater Drain Tank Pump and reduces turbine load to 900 MW (75%) with Valve Position Limiter.	5 minutes after trip of the 1A Pump.  May have run back to 900 MW automatically.
	<b>US</b>	Implements AOI-37, Section 3.2 and directs crew actions.	
	<b>OAC</b>	Ensures Tavg and Tref within 3°F.	
	<b>OAC</b>	Inform US that ROD URGENT FAILURE alarm is in and rods are not inserting.	<b>EVENT 8</b> - Occurs after rods insert ~ 10 steps.
	<b>US</b>	Directs boration to compensate for failure of rods to move.	Approx. 37 gals per per % power drop w/o rod motion per reactivity mgmt brief.
	<b>OAC</b>	Establishes boration of RCS.	

OP Test No: _____ Scenario No.: <u>2</u> Event No.: <u>7, 8, 9, MT</u> Page <u>2</u> of <u>6</u>			
Event 1A and 1B # 3 Heater Drain Tank Pumps Trip, Rods fail to move on Description: demand, Failure of Auto Reactor Trip, Failure of 1A MDAFW Pump to start from MCR, & Failure of the Stby MFWP to start			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	CRO	Monitors the following to determine if main turbine free of water induction: <ul style="list-style-type: none"> <li>• Htr level alarms.</li> <li>• Turbine Vibration.</li> <li>• Turbine Metal Temperature (1-TR-47-2).</li> </ul>	
	CRO	Ensure S/G levels returning to program	
	CRO	Dispatches personnel to determine cause of # 3 HDT Pump trips.	
	US/CRO	Trips 1A MFW Pump upon direction from AUO and Maintenance personnel monitoring vibration.	<b>Cue Console Operator for elevated vibration and removal of pump.</b>
	US/CRO	Determines that feedwater flow can not keep up with steam flow with existing conditions resulting in lowering S/G levels.	
	US	Directs manual reactor trip in anticipation of lo-lo S/G levels or trips the reactor upon First-Out Reactor Trip Annuciation and failure of reactor to trip and enters E-0.	<b>EVENT 9 Auto Reactor Trip Failure. Critical Task</b>
	CRO/OAC	Performs immediate actions of E-0.	
	OAC	Ensures reactor trip.	
	CRO	Ensures turbine trip.	
	CRO	Ensures 6.9KV Shutdown boards energized.	

OP Test No: \_\_\_\_\_ Scenario No.: 2 Event No.: 7, 8, 9, MT Page 3 of 6

Event 1A and 1B # 3 Heater Drain Tank Pumps Trip, Rods fail to move on  
Description: demand, Failure of Auto Reactor Trip, Failure of 1A MDAFW Pump to start from MCR, & Failure of the Stby MFWP to start

Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	OAC	Checks SI not actuated and not required.	
	US	Transitions to ES-0.1.	
	CREW	Implements Status Tree monitoring.	
	OAC	Monitors RCS temperature stable or trending to 557°F.	
	CRO	Ensures AFW Pump operation. Identifies failure of AFW Pump 1A-A to start and informs crew: <ul style="list-style-type: none"> <li>Manually attempts start and reports pump failure to start.</li> <li>Checks AFW LCVs in Auto.</li> </ul>	Dispatches AUO to check pump breaker compartment.
	CRO	Ensures MFW isolation: <ul style="list-style-type: none"> <li>MFW isolation valves closed</li> <li>MFW bypass isolations closed</li> <li>MFW reg and bypass reg valves closed</li> <li>MFWPT A and B tripped</li> <li>Standby MFWP stopped</li> <li>Cond demin pumps tripped</li> <li>Cond booster pumps tripped</li> </ul>	
	OAC	Verifies all control rods fully inserted	
	US	Announces reactor trip over PA system	
	US	Transitions to FR-H.1 on red path due to all S/G levels < 10% NR.	

OP Test No: \_\_\_\_\_ Scenario No.: 2 Event No 7, 8, 9, MT Page 4 of 6

Event 1A and 1B # 3 Heater Drain Tank Pumps Trip, Rods fail to move on  
Description: demand, Failure of Auto Reactor Trip, Failure of 1A MDAFW Pump  
to start from MCR, & Failure of the Stby MFWP to start

Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>OAC</b>	Checks secondary heat sink required. <ul style="list-style-type: none"> <li>• RCS pressure greater than any intact S/G pressure.</li> <li>• RCS temperature greater than 375°F.</li> </ul>	
	<b>OAC</b>	Ensures at least one charging pump running.	
	<b>CREW</b>	Determines that RCS bleed and feed required: <ul style="list-style-type: none"> <li>• Any three S/G WR levels less than or equal to 34% OR</li> <li>• RCS pressure greater than or equal to 2335 psig.</li> </ul>	Goes to caution prior to step 18.
	<b>OAC</b>	Actuates SI.	
	<b>OAC</b>	Establishes at least one of the following RCS feed paths: <ul style="list-style-type: none"> <li>• At least one charging pump injecting thru BIT, <b>OR</b></li> <li>• At least one SI Pump running with its injection valves open.</li> </ul>	<b>Critical Step</b>
	<b>OAC</b>	Resets SI after 90 seconds, and checks the following: <ul style="list-style-type: none"> <li>• SI ACTUATED permissive DARK.</li> <li>• AUTO SI BLOCKED permissive LIT.</li> </ul>	
	<b>OAC</b>	Resets Containment Isolation Phase A.	

OP Test No: \_\_\_\_\_ Scenario No.: 2 Event No 7, 8, 9, MT Page 5 of 6

Event 1A and 1B # 3 Heater Drain Tank Pumps Trip, Rods fail to move on  
Description: demand, Failure of Auto Reactor Trip, Failure of 1A MDAFW Pump  
to start from MCR, & Failure of the Stby MFWP to start

Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>OAC</b>	Ensures containment air in service: <ul style="list-style-type: none"> <li>Aux air pressure greater than 75 psig.</li> <li>Containment air supply valves open: <ul style="list-style-type: none"> <li>1-FCV-32-80.</li> <li>1-FCV-32-102.</li> <li>1-FCV-32-110.</li> </ul> </li> </ul>	
	<b>OAC</b>	Ensures adequate RCS bleed path: <ul style="list-style-type: none"> <li>Both pzs PORVs open.</li> <li>Both pzs PORV block valves open.</li> </ul>	<b>Critical Step'</b>
	<b>CRO</b>	Performs Steps 1 thru 11 of E-0, Reactor Trip or Safety Injection, while continuing with this instruction.	
	<b>OAC</b>	Maintains RCS bleed and feed paths: <ul style="list-style-type: none"> <li>Maintains charging pump injection thru BIT.</li> <li>Maintains SI Pump flow.</li> <li>Maintains both pzs PORVs and block valves open.</li> </ul>	
	<b>OAC</b>	Determines Cntmt Spray never started.	
	<b>CRO</b>	Ensures CCS alignment for RHR operation: <ul style="list-style-type: none"> <li>RHR heat exchanger B outlet 1-FCV-70-153 open.</li> <li>RHR heat exchanger A outlet 1-FCV-70-156 open.</li> <li>SFP heat exchanger A supply 0-FCV-70-197 closed.</li> </ul>	

OP Test No: _____ Scenario No.: <u>  2  </u> Event No <u>  7, 8, 9, MT  </u> Page <u>  6  </u> of <u>  6  </u>			
Event            1A and 1B # 3 Heater Drain Tank Pumps Trip, Rods fail to move on Description:    demand, Failure of Auto Reactor Trip, Failure of 1A MDAFW Pump to start from MCR, & Failure of the Stby MFWP to start			
Time	Position	Expected Actions/Behavior	Comment (SAT/UNSAT)
	<b>CREW</b>	Evaluates the following to restore level in at least one S/G: <ul style="list-style-type: none"> <li>• AFW pumps.</li> <li>• MFW pumps.</li> <li>• Condensate pumps.</li> <li>• ERCW valves to AFW suction.</li> <li>• HPFP spool piece (AOI-7.06).</li> </ul>	
	<b>CRO</b>	Starts 1A MD AFW Pump <b>OR</b> starts the TD AFW Pump after personnel in field indicate pump availability.	Request for assistance at the pump breaker or transfer switch will provide success path.
		<b>TERMINATE SCENARIO AFTER BLEED AND FEED PATH ESTABLISHED AND AFW REESTABLISHED TO S/Gs</b>	

**APPENDIX B**  
**SHIFT TURNOVER CHECKLIST**  
**Page 1 of 3**

Instructions: Do not alter form format! Use TAB keys instead of

<b>SHIFT TURNOVER CHECKLIST</b>																				
		Page ____ of ____																		
<input type="checkbox"/> SM <input checked="" type="checkbox"/> US/MCR <input type="checkbox"/> UO <input type="checkbox"/> AUO <input type="checkbox"/> STA (STA Function)	Unit _____ Unit _____ Station _____		Off-going - Name _____ On-coming - Name _____																	
<b>Part 1 - Completed by off-going shift/Reviewed by on-coming shift:</b> <span style="float: right;">C<sub>b</sub> = 947 ppm</span>																				
<ul style="list-style-type: none"> <li>• <u>Abnormal equipment lineup/conditions:</u> <table border="0" style="width: 100%; margin-top: 5px;"> <tr><td colspan="2">1B-B MDAFWP OOS for maintenance to replace outboard motor bearing. ETR 25 hours.</td></tr> <tr><td colspan="2">LCO 3.7.5 condition B - For 30 hours.</td></tr> <tr><td colspan="2">Maintenance has completed work on # 2 main turbine governor valve after leak repair.</td></tr> <tr><td colspan="2">Medium risk associated with out of service equipment.</td></tr> </table> </li> <li>• <u>SI/Test in progress/planned: (including need for new brief)</u> <table border="0" style="width: 100%; margin-top: 5px;"> <tr><td>See schedule</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table> </li> <li>• <u>Major Activities/Procedures in progress/planned:</u> <table border="0" style="width: 100%; margin-top: 5px;"> <tr><td>Power was lowered on previous shift to 98% to lower # 4 governor valve in prep for PMT on # 2 governor valve.</td></tr> <tr><td>Maintain 98% RTP until governor valve PMT completed, then raise power back to 100% RTP.</td></tr> <tr><td> </td></tr> </table> </li> <li>• <u>Radiological changes in plant during shift:</u> <table border="0" style="width: 100%; margin-top: 5px;"> <tr><td>None</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table> </li> </ul>				1B-B MDAFWP OOS for maintenance to replace outboard motor bearing. ETR 25 hours.		LCO 3.7.5 condition B - For 30 hours.		Maintenance has completed work on # 2 main turbine governor valve after leak repair.		Medium risk associated with out of service equipment.		See schedule			Power was lowered on previous shift to 98% to lower # 4 governor valve in prep for PMT on # 2 governor valve.	Maintain 98% RTP until governor valve PMT completed, then raise power back to 100% RTP.		None		
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None																				
<b>Part 2 - Performed by on-coming shift</b>																				
<div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less (N/A for AUOs)         </div> <div style="width: 50%;"> <input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only)         </div> </div> <p>Review the following programs for changes since last shift turnover:</p> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <input type="checkbox"/> Standing Orders         </div> <div style="width: 50%;"> <input type="checkbox"/> LCO(s) in actions (N/A for AUOs)         </div> <div style="width: 50%;"> <input type="checkbox"/> Immediate required reading         </div> <div style="width: 50%;"> <input type="checkbox"/> TACF (N/A for AUOs)         </div> </div>																				
<b>Part 3 - Performed by both off-going and on-coming shift</b>																				
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs)																				
Relief Time: _____		Relief Date: _____																		



# **APPENDIX B** **SHIFT TURNOVER CHECKLIST**

**Page 2 of 3**

Instructions: Do not alter form format! Use TAB keys instead of

<b>SHIFT TURNOVER CHECKLIST</b>			
		Page ____ of ____	
<input type="checkbox"/> SM <input type="checkbox"/> US/MCR <input checked="" type="checkbox"/> UO <input type="checkbox"/> AUO <input type="checkbox"/> STA (STA Function)	Unit _____ Unit _____ Station _____		Off-going - Name _____ On-coming - Name _____
<b>Part 1 - Completed by off-going shift/Reviewed by on-coming shift:</b>		<b>C<sub>b</sub> = 947 ppm</b>	
<ul style="list-style-type: none"> <li>• <u>Abnormal equipment lineup/conditions:</u>  <div style="border-bottom: 1px solid black; margin-bottom: 5px;">1B-B MDAFWP OOS for maintenance to replace outboard motor bearing. ETR 25 hours.</div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;">Maintenance has completed work on # 2 main turbine governor valve after leak repair.</div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> </li> <li>• <u>SI/Test in progress/planned: (including need for new brief)</u>  <div style="border-bottom: 1px solid black; margin-bottom: 5px;">1-SI-0-2</div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;">1-TRI-47-3 needs priority attention to perform PMT for # 2 Governor Valve only.</div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> </li> <li>• <u>Major Activities/Procedures in progress/planned:</u>  <div style="border-bottom: 1px solid black; margin-bottom: 5px;">Power was lowered on previous shift to 98% to lower # 4 governor valve in prep for PMT on # 2 governor valve.</div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;">1-TRI-47-3 for governor valve # 2, then raise power to 100% RTP.</div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> </li> <li>• <u>Radiological changes in plant during shift:</u>  <div style="border-bottom: 1px solid black; margin-bottom: 5px;">None</div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> </li> </ul>			
<b>Part 2 - Performed by on-coming shift</b>			
<div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less (N/A for AUOs)           </div> <div style="width: 50%;"> <input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only)           </div> </div> <p>Review the following programs for changes since last shift turnover:</p> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <input type="checkbox"/> Standing Orders           </div> <div style="width: 50%;"> <input type="checkbox"/> LCO(s) in actions (N/A for AUOs)           </div> <div style="width: 50%;"> <input type="checkbox"/> Immediate required reading           </div> <div style="width: 50%;"> <input type="checkbox"/> TACF (N/A for AUOs)           </div> </div>			
<b>Part 3 - Performed by both off-going and on-coming shift</b>			
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs)			
Relief Time: _____		Relief Date: _____	

**REACTIVITY MANAGEMENT BRIEF**

Last Updated For 100% MOL Simulator

**1. Our method of maintaining the 8 hour average reactor power at or below 3459 MWt will be:**

- ⇒ Maintain the 1 hour average reactor power at or below 3459 MWt.
- ⇒ Adjustments to the main turbine governor valve position by utilizing the governor valve position limiter (VPL).
- ⇒ RCS Dilution expected is **120 to 220 gallons per shift**.  
From TI-59/REACT (-1 PPM = 72 gallons Water) or (+1 PPM = 10 gallons Boric Acid).
- ⇒ Maintain reactor coolant temperature 587.5°F - 588.5°F via RCS boron adjustments in appropriate size batches of water or acid, as needed.  
The Boron Worth will remain at ~ 5.7 - 6.0 pcm/ppm until ~8000 MWD/MTU  
Reference NuPOP Figure 6-21. Use TI-59 or REACTINW as required. (Preferred Method)

**2. Our method of maintaining Delta I within the target band will be:**

- Moving control rods in or out in  $\frac{1}{2}$  or 1 step increments.  
Nominal rod step @ 220 is worth: ~ 1.5 - 2.5 pcm.  
Nominal rod step @ 212 is worth: ~ 3.0 - 6.5 pcm.  
(Reference NuPOP Figures 6-24 and 25)
- The Boron Worth will remain at ~ 5.7 - 6.0 pcm/ppm until ~8000 MWD/MTU  
reference
- Our current full power Delta I target band is (-8.1%) - (+1.9%).
- Our present Delta I value is -4. (Fill in the blank)
- Control rods are in AUTO / MANUAL. (Circle one)

**3. Peer checking by another licensed person prior to performing reactivity manipulations is required.****4. In the event of a runback initiation without rod motion the boration requirement is approximately**  
37.0 gallons/% power runback.**5. Projected reactivity effect is negative / positive / none (circle one) if the idle CCP is placed in service.**(Based on RCS  $C_B$  being 947 ppm when the pump was last run.)**6. Additional reactivity management issues:**

Task Description	Date Complete
1. Facility written exam comments or graded exams received and verified complete	11/26/02
2. Facility written exam comments reviewed and incorporated and NRC grading completed, if necessary	12/16/02
3. Operating tests graded by NRC examiners	12/16/02
4. NRC Chief examiner review of written exam and operating test grading completed	12/16/02
5. Responsible supervisor review completed	12/18/02
6. Management (licensing official) review completed	12/18/02
7. License and denial letters mailed	
8. Facility notified of results	12/18/02
9. Examination report issued (refer to NRC MC 0612)	
10. Reference material returned after final resolution of any appeals	