

**BWR RO EXAMINATION OUTLINE**Facility: **GRAND GULF NUCLEAR STATION**Date of Exam: **1 JUNE 2001**

TIER	GROUP	K/A CATEGORY POINTS											POINT TOTAL
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	
<b>1. Emergency &amp; Abnormal Plant Evolutions</b>	<b>1</b>	3	1	3				1	5			0	13
	<b>2</b>	5	4	2				2	4			2	19
	<b>3</b>	1	1	1				1	0			0	4
	<b>TIER TOTAL</b>	9	6	6				4	9			2	36
<b>2. Plant Systems</b>	<b>1</b>	4	3	2	4	1	3	3	3	1	3	1	28
	<b>2</b>	3	0	3	1	0	2	2	2	4	1	1	19
	<b>3</b>	0	0	0	0	1	0	0	0	1	1	1	4
	<b>TIER TOTAL</b>	7	3	5	5	2	5	5	5	6	5	3	51
<b>3. Generic Knowledge &amp; Abilities</b>					<b>CAT 1</b>		<b>CAT 2</b>		<b>CAT 3</b>		<b>CAT 4</b>		13
					4		2		2		5		
<p>Note:</p> <ol style="list-style-type: none"> <li>1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two)</li> <li>2. Actual point totals must match those specified in the table.</li> <li>3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant specific priorities.</li> <li>4. Systems / evolutions within each group are identified on the associated outline.</li> <li>5. The shaded areas are not applicable to the category tier.</li> <li>6.* The generic K/As in Tiers 1 and 2 shall be selected from section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.</li> <li>7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.</li> </ol>													

Scenario 1 Day 1 (Continued)

Event No.	10CFR 55.45(a)	K/A	Event Type*	Event Description
1	4	262001 A4.01; A4.05	N (BOP)	Perform AC/DC Weekly Surveillance Control Room portion. (06-OP-1R20-W-0001)
2	2, 4, 5, 6, 7, 8	202001 A4.04 202002 A4.08 2.2.2	R (RO)	Reduce Total Core Flow to 90 % Reactor Power (IOI 03-1-01-2)
3	3, 5	215005 A2.02 2.1.12; 2.1.33	I (RO)	Respond to APRM 'A' failure upscale. Complete Technical Specification determinations.
4	3, 4, 5, 6	2.4.49 295014 AA1.07; AA2.03	C(RO, BOP)	Respond to a tube failure in LP FW Heater 3B. Perform actions per ONEP 05-1-02-V-5. Lower Reactor power with Recirc flow.
5	3, 4, 5, 6	2.4.49 295002 AA1.02; AA1.05; AA2.01	C(RO, BOP)	Recognize and respond to a loss of Main Condenser vacuum. Take actions per ONEP 05-1-02-V-8.
	2, 3, 4, 7	2.4.4; 2.4.49 295006 AA1.01; AA1.05; AA1.07		When required initiate a manual Reactor Scram.
6	6, 8, 12, 13	295037 EA1.0; EA2.0 203000 A3.08 241000 A4.06	M (ALL)	Upon Reactor Scram recognize the failure of all control rods to fully insert and take actions per EOPs for ATWS.
	3, 4	218000 A4.02; A4.03; A4.04; A4.05	I (BOP)	Recognize the failure of ADS to Inhibit and take actions to prevent automatic initiation of ADS.
	3, 4, 8	295037 EA1.04; EA1.10 211000 A1.0; A2.04; A3.0	C (BOP)	Recognize the failure of Standby Liquid Control to meet the parameters to inject into the Reactor when initiated and actions taken for Alternate Boron Injection.

All evolutions test 55.45(a) 12 & 13.

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

## Scenario 1 Day 1 (Continued)

### Critical Tasks

- Inject Standby Liquid Control prior to Suppression Pool Temperature reaching 110 °F.
- Identify the need for Alternate Standby Liquid Control injection.
- Terminate and prevent injection from Feedwater and ECCS when conditions require entry into Level/Power Control.
- Commence injection into the reactor using Feedwater or RHR 'A' or 'B' through Shutdown Cooling when reactor level reaches -192".
- Insert Control Rods in response to ATWS conditions.

Facility: **GRAND GULF NUCLEAR STATION** Scenario No.: **1** Op-Test No.: **Day 1**

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Objectives:** To evaluate the candidates' ability to operate the facility in response to the following evolutions:

1. Complete the AC/DC Weekly Surveillance Control Room portion.
2. Lower Reactor Power using Recirculation Flow.
3. Respond to a failure of APRM 'A' upscale.
4. Take actions in response to a Low Pressure Feedwater Heater 3B Tube leak. Complete actions of the Loss of Feedwater Heating ONEP.
5. Analyze the affects of a reduction of Main Condenser Vacuum on plant operations and take required actions.
6. Take actions per the EOPs in response to an ATWS and mitigate the consequences of the ATWS with no Main Steam Bypass Valves.
7. Respond to a failure of a division of ADS to Inhibit to prevent initiation of ADS.
8. Take actions for a failure of Standby Liquid Control to inject to the Reactor during an ATWS.

**Initial Conditions:** Reactor Power is at 100 %.

**INOPERABLE Equipment**

APRM 'H' is INOP due to a failed power supply card  
ESF 12 Transformer is tagged out of service for maintenance  
TBCW Pump 'C' is tagged out of service for pump seal replacement  
Appropriate clearances and LCOs are written.

**Turnover:** The AC/DC Lineup Weekly surveillance is due to be performed. There are scattered thunder showers reported in the Tensas Parish area.

Scenario 1 Day 1 (Continued)

Event No.	10CFR 55.45(a)	K/A	Event Type*	Event Description
1	4	262001 A4.01; A4.05	N (BOP)	Perform AC/DC Weekly Surveillance Control Room portion. (06-OP-1R20-W-0001)
2	2, 4, 5, 6, 7, 8	202001 A4.04 202002 A4.08 2.2.2	R (RO)	Reduce Total Core Flow to 90 % Reactor Power (IOI 03-1-01-2)
3	3, 5	215005 A2.02 2.1.12; 2.1.33	I (RO)	Respond to APRM 'A' failure upscale. Complete Technical Specification determinations.
4	3, 4, 5, 6	2.4.49 295014 AA1.07; AA2.03	C(RO, BOP)	Respond to a tube failure in LP FW Heater 3B. Perform actions per ONEP 05-1-02-V-5. Lower Reactor power with Recirc flow.
5	3, 4, 5, 6	2.4.49 295002 AA1.02; AA1.05; AA2.01	C(RO, BOP)	Recognize and respond to a loss of Main Condenser vacuum. Take actions per ONEP 05-1-02-V-8.
	2, 3, 4, 7	2.4.4; 2.4.49 295006 AA1.01; AA1.05; AA1.07		When required initiate a manual Reactor Scram.
6	6, 8, 12, 13	295037 EA1.0; EA2.0 203000 A3.08 241000 A4.06	M (ALL)	Upon Reactor Scram recognize the failure of all control rods to fully insert and take actions per EOPs for ATWS.
	3, 4	218000 A4.02; A4.03; A4.04; A4.05	I (BOP)	Recognize the failure of ADS to Inhibit and take actions to prevent automatic initiation of ADS.
	3, 4, 8	295037 EA1.04; EA1.10 211000 A1.0; A2.04; A3.0	C (BOP)	Recognize the failure of Standby Liquid Control to meet the parameters to inject into the Reactor when initiated and actions taken for Alternate Boron Injection.

All evolutions test 55.45(a) 12 & 13.

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

## Scenario 1 Day 1 (Continued)

### Critical Tasks

- Inject Standby Liquid Control prior to Suppression Pool Temperature reaching 110 °F.
- Identify the need for Alternate Standby Liquid Control injection.
- Terminate and prevent injection from Feedwater and ECCS when conditions require entry into Level/Power Control.
- Commence injection into the reactor using Feedwater or RHR 'A' or 'B' through Shutdown Cooling when reactor level reaches -192".
- Insert Control Rods in response to ATWS conditions.

Facility: **GRAND GULF NUCLEAR STATION** Scenario No.: **1** Op-Test No.: **Day 1**

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Objectives:** To evaluate the candidates' ability to operate the facility in response to the following evolutions:

1. Lower Reactor Power using Recirculation Flow.
2. Respond to a failure of APRM 'A' upscale.
3. Take actions in response to a Low Pressure Feedwater Heater 3B Tube leak. Complete actions of the Loss of Feedwater Heating ONEP.
4. Analyze the affects of a reduction of Main Condenser Vacuum on plant operations and take required actions.
5. Take actions per the EOPs in response to an ATWS and mitigate the consequences of the ATWS with no Main Steam Bypass Valves.
6. Respond to a failure of a division of ADS to Inhibit to prevent initiation of ADS.
7. Take actions for a failure of Standby Liquid Control to inject to the Reactor during an ATWS.

**Initial Conditions:** Reactor Power is at 100 %.

**INOPERABLE Equipment**

APRM 'H' is INOP due to a failed power supply card  
 ESF 12 Transformer is tagged out of service for maintenance  
 TBCW Pump 'C' is tagged out of service for pump seal replacement  
 Appropriate clearances and LCOs are written.

**Turnover:** The plant is scheduled to lower power by 130 MWe to facilitate testing of the New Gas Turbines at Baxter Wilson SES. There are scattered thunder showers reported in the Tensas Parish area.

Event No.	Malf. No.	Event Type*	Event Description
1		N (RO)	Reduce Total Core Flow to 90 % Reactor Power (IOI 03-1-01-2)

## Scenario 1 Day 1 (Continued)

Event No.	Malf. No.	Event Type*	Event Description
2	c51009a	I (RO)	Respond to APRM 'A' failure upscale. Complete Technical Specification determinations.
3	fw232h @ 50% ramp to 80%	R/C (RO, BOP)	Respond to a tube failure in LP FW Heater 3B. Perform actions per ONEP 05-1-02-V-5. Lower Reactor power with Recirc flow.
4	fw163b @ 10% ramp to 20%	C(RO, BOP)	Recognize and respond to a loss of Main Condenser vacuum. Take actions per ONEP 05-1-02-V-8.
			When required initiate a manual Reactor Scram.
5	c11164 @ 25%	M (ALL)	Upon Reactor Scram recognize the failure of all control rods to fully insert and take actions per EOPs for ATWS.
	di_1b21m6 60a NORM	I (BOP)	Recognize the failure of ADS to Inhibit and take actions to prevent automatic initiation of ADS.
	c41263 @ 60%	C (BOP)	Recognize the failure of Standby Liquid Control to meet the parameters to inject into the Reactor when initiated and actions taken for Alternate Boron Injection.

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

**Critical Tasks**

- Inject Standby Liquid Control prior to Suppression Pool Temperature reaching 110 °F.
- Identify the need for Alternate Standby Liquid Control injection.
- Terminate and prevent injection from Feedwater and ECCS when conditions require entry into Level/Power Control.
- Commence injection into the reactor using Feedwater or RHR 'A' or 'B' through Shutdown Cooling when reactor level reaches -192".
- Insert Control Rods in response to ATWS conditions.



## Scenario 1 Day 1 (Continued)

### **Crew Turnover:**

Rx at 100% CTP.

APRM 'H' is failed due to a failed power supply card and bypassed.

ESF 12 Transformer is tagged out of service for maintenance.

TBCW Pump 'C' is tagged out of service for pump seal replacement.

Appropriate clearances and LCOs are written.

The plant is scheduled to lower power by 130 MWe to facilitate testing of the New Gas Turbines at Baxter Wilson SES.

Plant EOOS factor is 10 GREEN.

There are scattered thunderstorms reported in the Tensas Parish area.

**Simulator Setup:** (Scenarios may be setup and shot into encrypted ICs and Password protected.)

Start the process from a new simulator load.

Reset to IC-17.

Verify or perform the following:

IC: 17

OOS: ESF Transformer 12 (Place tags on 152-1903. 1904, 1905,  
1511, 1611, and 1704)  
TBCW C Pump (Place tag on start HS)

Active malfunctions: **c51010h** APRM H downscale  
**c11164 @ 25%** SDV Block  
**c41263 @ 80%** SLC injection pipe rupture

Active overrides **di\_1b21m660a** ADS Division I Inhibit Switch H13-P601 **NORM**

Pending overrides None

Pending malfunctions: **c51009a** APRM 'A' upscale (TRG 1)  
**fw232h @ 50%** LP FW Htr 3B tube failure (TRG 2) ramp to **80% over 1 min after first alarm received.**  
**fw163b @ 10%** Main Condenser Vacuum leak (TRG 3) ramp to **20% over 4 min after reactor scram.**

Pending component malfunctions: None

Trigger files:                      Trigger 1        APRM 'A' upscale  
   Trigger 2        LP FW Heater Tube Rupture  
   Trigger 3        Condenser Vacuum leak

COMPONENT	PANEL	INDICATION or CONTROL	SIMULATOR CODE	STATUS	DONE
APRM H		DOWNSCALE	c51010h		
TBCW PUMP C	P870-5C	GREEN LIGHT	lo_1p43m600c_g	OFF	
		HANDSWITCH	di_1p43m600c	STOP	
ESF 12 BREAKER 152-1903	P807-1C	GREEN LIGHT	lo_1r21m623_g	OFF	
		HANDSWITCH	di_1r21m623	TRIP	
ESF 12 BREAKER 152-1904	P807-1C	GREEN LIGHT	lo_1r21m624_g	OFF	
		HANDSWITCH	di_1r21m624	TRIP	
ESF 12 BREAKER 152-1905	P807-1C	GREEN LIGHT	lo_1r21m637_g	OFF	
		HANDSWITCH	di_1r21m637	TRIP	
ESF 12 FEEDER 152-1511	P864-1C	GREEN LIGHT	lo_1r21m601a_g	OFF	
		HANDSWITCH	di_1r21m601a	TRIP	
ESF 12 FEEDER 152-1611	P864-2C	GREEN LIGHT	lo_1r21m601b_g	OFF	
		HANDSWITCH	di_1r21m601b	TRIP	
ESF 12 FEEDER 152-1704	P601-16C	GREEN LIGHT	lo_1e22m709_g	OFF	
		HANDSWITCH	di_1e22m709	TRIP	
115 KV DISCONNECT J3885	P807-1C	GREEN LIGHT	lo_1r27r602_g	OFF	
J3885		DISCONNECT		OPEN	

Bypass Division 2 APRM Bypass Joystick to APRM H position.

Open Circuit Breakers 152-1903, 1904, 1905, 1511, 1611, and 1704

Place TBCW pump B to STOP (to clear Standby light) then to START, stop TBCW pump C.

Startup all PDS / SPDS screens. Clear any graphs and trends off of SPDS.

Setup the presently used cyclops display and verify it is functional.

Ensure the correct startup sequence is available at the P680 for the present IC.

Install turnover guide, red tag, and LCO paperwork as applicable.

Advance all chart recorders and ensure all pens are inking properly.  
(APRM chart recorders must be turned on and settings for scales on pens 0 – 125 scale)

## **SIMULATOR OPERATION SCENARIO 1**

Once simulator is reinitialized and setup complete take the simulator out of Freeze.

Once the Crew has taken control note the simulator time.

The Crew will lower reactor power using Reactor Recirc Flow Control.

Cues:

**If asked, acknowledge reports to Dispatcher, Chemistry, Radwaste, Radiation Protection, and STA of impending down power to 90%.**

**If asked, report as Reactor Engineer or STA, ramp rate for down power is at the discretion of the SRO. Should be around 390 MWth.**

Once power is reduced by 130 MWe, **activate TRIGGER 1.**

Cues:

**If asked, report that APRM 'A' appears to be failed somehow upscale. Upscale and Upscale Trip lights are illuminated.**

**If asked, when crew bypasses the APRM, report APRM 'A' indicates BYPASSED on h13-P669.**

**If asked, as I&C report the failure on APRM 'A' will require more in depth troubleshooting and that a MAI will be generated.**

The Crew will bypass APRM 'A' using the Division 1 Neutron Monitoring Bypass joystick and reset RPS 'A' using the Division 1 and 3 RPS RESET Key switches.

The SRO will review Tech Specs 3.3.1.1 and 3.3.2.1. (A tracking LCO may be initiated on 3.3.1.3 PBDS.) Tracking LCOs will be written.

Six (6) minutes after APRM upscale, **activate TRIGGER 2.**

The Crew will lower power per Loss of Feedwater Heating ONEP to 60% core flow.

Cues:

**If asked, report at Turbine Building Operator the controllers on H22-P172 for LP FW Heater 3B are calling for dumps and drains to be full open and valves are responding.**

**Simulator Operator ramp fw232h from 50% to 80% over one (1) minute following first FW Heater alarm.**

**If asked, report other Main Steam Line Radiation Monitors are reading approximately 1930 mR/hr.**

When plant is stabilized and four (4) minutes after isolation of LP FW Heater String 'B', **activate TRIGGER 3.**

Main Condenser Vacuum leak

Cues:

**If asked, report as Turbine Building Operator that you hear a high pitched whistling sound in the Condenser Bay.**

The Crew will manually scram the reactor at which time the ATWS will appear.

**Simulator Operator after Reactor Scram modify fw163b to ramp from 10% to 20% over four (4) minutes.**

The Main Turbine will trip.

RFPTs will require a vacuum reset.

Main Steam Bypass Valves will close.

EP Attachments which may be requested:

Attachment 12 Defeat RHR Shutdown Cooling interlocks	6 minutes to DONE
Attachment 18 Defeat ATWS ARI	3 minutes to DONE
Attachment 19 Defeat RPS	4 minutes to DONE
Attachment 20 Defeat RCIS	5 minutes to DONE
Attachment 8 Defeat MSIV isolations	9 minutes to DONE
Attachment 1 Defeat RCIC High SP Transfer	8 minutes to DONE
Attachment 2 Defeat RCIC Trips	8 minutes to DONE

Attachment 28 (Alternate Boron) can not be done by any remote functions, just acknowledge the request.

## **TERMINATION**

Once Control Rods are being inserted and the Lead Evaluator concurs the scenario may be terminated.

### **Critical Tasks**

- Inject Standby Liquid Control prior to Suppression Pool Temperature reaching 110 °F.
- Identify the need for Alternate Standby Liquid Control injection.
- Terminate and prevent injection from Feedwater and ECCS when conditions require entry into Level/Power Control.
- Commence injection into the reactor using Feedwater or RHR 'A' or 'B' through Shutdown Cooling when reactor level reaches -192".
- Insert Control Rods in response to ATWS conditions.

Op-Test No.: \_\_\_\_\_ Scenario No.: **1** Event No.: **1**

Event Description: **Reduce Reactor power using Recirculation Flow Control**

Time	Position	Applicant's Actions or Behavior
	SS	Conduct reactivity manipulation brief.
	RO	Reduces Total Core Flow by throttling closed on the Recirc Flow Control Valves.
	BOP	Monitors Pressure, Level, Power, and Turbine Loading.

Op-Test No.: \_\_\_\_\_ Scenario No.:   1   Event No.:   2  Event Description: **Respond to a failure of APRM 'A' Upscale.**

Time	Position	Applicant's Actions or Behavior
	RO	Determines APRM 'A' is Upscale and reviews Alarm Response Instructions.
	SS	Reviews applicable Technical Specifications 3.3.1 Reactor Protection System 3.3.2 Control Rod Block Instrumentation
	BOP	Observe and report indications on APRM 'A'.
	SS	Contact I&C to investigate APRM failure.
	RO	Shift Neutron Monitoring APRM Division 1 to A bypassed.
	RO	Reset ½ scram.

Op-Test No.: _____ Scenario No.: <u>  1  </u> Event No.: <u>  3  </u>		
Event Description: <b>Respond to a tube failure on LP FW Heater 3B.</b> <b>Perform actions per ONEP 05-1-02-V-5.</b>		
Time	Position	Applicant's Actions or Behavior
	RO	Recognizes annunciator concerning High level in 3B LP FW heater. Calls up display on PDS computer of N23 to determine heater level and operation of drains and dumps.
	SS	Dispatch an operator to H22-P172 panel to investigate Heater Drains Controllers.
	RO	Lowers Reactor Power using Reactor Recirc Flow control to 60 % Core flow or lower power by 20% per ONEP 05-1-02-V-5 Loss of Feedwater Heating. Monitor operation on the Power to Flow Map.
	BOP	Verify isolation of LP FW heater string N19-F042B and N19-F040B on H13-P870 section 6C.
	BOP	Verify Main Steam Line Rad Monitor High due to Hydrogen Water Chemistry operation.
	RO or BOP	Monitors Reactor for Thermal Hydraulic Instability per ONEP 05-1-02-III-3, Reduction in Recirc Flow.
	RO or BOP	Monitors Feedwater temperature vs Reactor Power per ONEP 05-1-02-V-5 Loss of Feedwater Heating.



Op-Test No.: _____ Scenario No.: <u>  1  </u> Event No.: <u>  4  </u>		
Event Description: <b>Loss of Main Condenser Vacuum (ONEP 05-1-02-V-8) and subsequent Manual Scram</b>		
Time	Position	Applicant's Actions or Behavior
	BOP	Investigates Offgas trouble and reports rising Offgas flow.
	SS	Directs lowering of power by control rod insertion using insertion sequence.
	SS	Dispatches local operators to monitor condenser area for leaks.
	SS	Determines minimum vacuum for insertion of manual scram and communicates this to crew.
	RO	Verifies control rods and positions per Pull Sheet and selects control rods per next gang of control rods. (May select Individual or Gang movement and may select any Control Rod in the Gang.)
	BOP	Act as Verifier for Control Rod movements and monitors Main Condenser Vacuum.
	RO	Inserts Control Rods per Control Rod Movement Sequence Sheet to reduce turbine load.
	SS	Based on lowering Main Condenser Vacuum, orders manual scram of the Reactor
	RO	Places the Reactor Mode Switch to Shutdown or arms and depresses at least one Manual Scram Pushbutton per RPS
	RO	Verifies All Control Rods have fully inserted to position 00 and determines ALL Control Rods NOT fully inserted and reports to the SS.
	RO	If the Manual Scram Pushbuttons utilized confirms stable reactor pressure and places the Reactor Mode Switch in Shutdown.

Op-Test No.: _____ Scenario No.: <u>  1  </u> Event No.: <u>  5  </u>		
Event Description: <b>ATWS with no Main Steam Bypass Valves</b>		
Time	Position	Applicant's Actions or Behavior
	SS	Enters EP-2A.
	RO	Reports downshift of Recirc Pumps to Slow Speed.
	RO	On orders initiates ARI/RPT.
	BOP	On orders inhibits ADS, reports failure of Division 1 to inhibit, depresses manual reset pushbutton for Division 1 periodically.
	BOP	On orders initiates and overrides HPCS.
	RO	Realigns Condensate and Feedwater on Startup Level Control and maintains reactor level within level band specified by the SS. RFPTs will require the Vacuum Trip to be overridden with permission of the SS.
	RO	Reports closure of Main Steam Bypasses due to Condenser vacuum.
	BOP	On orders maintains RPV pressure in band specified by SS.
	BOP	When ordered by SS, restores Auxiliary Building, Containment, and Drywell isolation (Instrument Air, Plant Service Water, and Drywell Chilled Water).
	SS **	Orders Standby Liquid Control initiated prior to Suppression Pool Temperature reaching 110 0F.
	BOP **	When ordered, initiates Standby Liquid Control and identifies the failure of SLC to inject.
	SS **	Orders implementation of Attachment 28 Alternate Boron Injection.

	SS **	Orders installation of Attachments 18, 19, and 20 of EP-2.
	SS **	Based on conditions orders Terminate and Prevent step to lower RPV level to reduce reactor power.
	BOP/RO **	Terminates and prevents systems ordered by SS.
	RO **	On orders of SS, initiates flow to the RPV from Condensate / Feedwater.
	BOP/RO **	Insert Control Rods by scrambling rods and inserting rods using CRD/RCIS. CRD Drive Pressure, Instrument Air to Containment and Auxiliary Building, and RPS reset.
	SS	If level drops below –192 inches Fuel Zone, may elect to Emergency Depressurize. (Optional)
	SS	Orders Terminate and Prevent step for Emergency Depressurization. (Optional)
	BOP/RO	Terminates and prevents systems ordered by SS. (Optional)
	BOP/RO	If ordered opens 8 ADS SRVs. (Optional)
	SS	Upon Reactor pressure drop < 177 psig with 8 SRVs open, orders slow injection with Condensate and Feedwater. (Optional)
	BOP/RO	Injects with Condensate at prescribed rates by SS. (Optional)

Optionals for Emergency Depressurization leg of EP-2A are only if SS elects to use this based on RPV Water Level < -192 inches.

Facility: **GRAND GULF NUCLEAR STATION** Scenario No.: **2** Op-Test No.: **Day 2**

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Objectives:** To evaluate the candidates' ability to operate the facility in response to the following evolutions:

1. Start SSW 'B' in support of chemical addition.
2. Lower Reactor Power by inserting control rods. Respond to single immovable control rod per ONEP 05-1-02-IV-1.
3. Downshift Reactor Recirculation Pumps per IOI 03-1-01-2 & SOI 04-1-01-B33-1. Respond to trip to OFF of Recirculation Pump 'A' per ONEP 05-1-02-III-3.
4. Respond to Service Transformer 11 trouble and subsequent trip.
5. Take actions to mitigate a small break failure of Feedwater piping in the Drywell per EOPs.
6. Take actions to manually initiate Division 2 ECCS upon failure to automatically initiate.

**Initial Conditions:** Reactor Power is at 45 %. Plant shutdown is in progress for an outage. Reactor Recirculation pumps in Fast Speed; a single Reactor Feed Pump in single element Master Level Control;

**INOPERABLE Equipment**

APRM 'H' is INOP due to a failed power supply card

ESF 12 Transformer is tagged out of service for maintenance

TBCW Pump 'C' is tagged out of service for pump seal replacement

Appropriate clearances and LCOs are written.

**Turnover:** Chemistry requires SSW 'B' in operation to support a chemical addition. Continue plant shutdown per IOI-2. There are scattered thunder showers reported in the Tensas Parish area.

Scenario 2 Day 2 (Continued)

Event No.	10CFR 55.45(a)	K/A	Event Type*	Event Description
1	4, 5, 6	2.1.30	N (BOP)	Place Standby Service Water 'B' in service for chemical addition. (EPI 04-1-03-P41-1)
2	1, 2, 5, 6, 8	201005 A3.01; A3.02; A3.03; A4.01 2.2.2	R (RO)	Lower Reactor power using control rods to between 40 and 45%. (Control Rod Pull Sheet)
3	1, 2, 3, 5, 6, 8	201001 A4.04 2.4.4; 2.4.11; 2.4.48	C (RO, BOP)	Identify immovable control rod, take actions to move the control rod. (ONEP 05-1-02-IV-1)
4	2, 3, 4, 5, 6, 8	202001 A1.07; A3.02; A4.01 202002 A1.01; A4.01	N (RO)	Downshift Reactor Recirculation Pumps. (IOI 03-1-01-2 & SOI 04-1-01-B33-1)
	3, 4, 5, 6	202001 A2.03	C (RO)	Respond to trip to OFF of Recirculation Pump 'A'. (ONEP 05-1-01-III-3)
5	3, 5, 6, 8	295003 AA1.01; AA2.01 262001 A2.03; A2.07; A4.01	C (ALL)	Respond to Service Transformer 11 Trouble and subsequent trip of ST-11. (ONEP 05-1-02-I-4 & 05-1-02-I-1)
6	3, 4, 5, 6, 7, 13	295031 EA1.0 203000 A3.08 241000 A4.06	M (ALL)	Respond to indications of small break LOCA on Feedwater Line 'B' per EOPs.
	3, 4, 7, 10	2.4.4 295024 EA1.0	I (BOP)	Respond to a failure of Division 2 ECCS to automatically initiate on High Drywell Pressure.
	3	295031 EA1.04 209002 A2.02	C (BOP)	Respond to a trip of the High Pressure Core Spray Pump.

All evolutions test 55.45(a) 12 & 13.

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

### Critical Tasks

- Recognize failure of Division 1 to initiate and manually initiate Division 1.
- Lower reactor pressure to allow injection from Low Pressure systems.

REVISION 1 03/29/2001

Facility: **GRAND GULF NUCLEAR STATION** Scenario No.: **2** Op-Test No.: **Day 2**

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Objectives:** To evaluate the candidates' ability to operate the facility in response to the following evolutions:

1. Start SSW 'B' in support of chemical addition.
2. Lower Reactor Power by inserting control rods. Respond to single immovable control rod per ONEP 05-1-02-IV-1.
3. Downshift Reactor Recirculation Pumps per IOI 03-1-01-2 & SOI 04-1-01-B33-1. Respond to trip to OFF of Recirculation Pump 'A' per ONEP 05-1-02-III-3.
4. Respond to Service Transformer 11 trouble and subsequent trip.
5. Take actions to mitigate a small break failure of Feedwater piping in the Drywell per EOPs.
6. Take actions to manually initiate Division 2 ECCS upon failure to automatically initiate.

**Initial Conditions:** Reactor Power is at 45 %. Plant shutdown is in progress for an outage. Reactor Recirculation pumps in Fast Speed; a single Reactor Feed Pump in single element Master Level Control;

**INOPERABLE Equipment**

APRM 'H' is INOP due to a failed power supply card  
 ESF 12 Transformer is tagged out of service for maintenance  
 TBCW Pump 'C' is tagged out of service for pump seal replacement  
 Appropriate clearances and LCOs are written.

**Turnover:** Chemistry requires SSW 'B' in operation to support a chemical addition. Continue plant shutdown per IOI-2. There are scattered thunder showers reported in the Tensas Parish area.

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP)	Place Standby Service Water 'B' in service for chemical addition. (EPI 04-1-03-P41-1)
2		R (RO)	Lower Reactor power using control rods to between 40 and 45%. (Control Rod Pull Sheet)
3	z022022_32_33	C (RO, BOP)	Identify immovable control rod, take actions to move the control rod. (ONEP 05-1-02-IV-1)

## Scenario 2 Day 2 (Continued)

Event No.	Malf. No.	Event Type*	Event Description
4		N (RO)	Downshift Reactor Recirculation Pumps. (IOI 03-1-01-2 & SOI 04-1-01-B33-1)
	rr016a	C (RO)	Respond to trip to OFF of Recirculation Pump 'A'. (ONEP 05-1-01-III-3)
5	xal2p807_2a _f_5 ON r21133a	C (ALL)	Respond to Service Transformer 11 Trouble and subsequent trip of ST-11. (ONEP 05-1-02-I-4 & 05-1-02-I-1)
6	fw0171b @ 70% rr063b @ 5% b21f065b_i	M (ALL)	Respond to indications of small break LOCA on Feedwater Line 'B' per EOPs.
	rr040f @ 0 rr041f @ 83%	I (BOP)	Respond to a failure of Division 2 ECCS to automatically initiate on High Drywell Pressure.
	e22052	C (BOP)	Respond to a trip of the High Pressure Core Spray Pump.

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

**Critical Tasks**

- Recognize failure of Division 2 to initiate and manually initiate Division 2.
- Lower reactor pressure to allow injection from Low Pressure systems.

## Scenario 2 Day 2 (Continued)

### **Crew Turnover:**

Rx at 45% CTP.

The plant is lowering power in preparation for an outage. Reactor Recirculation Pumps are operating in Fast Speed. The 'A' Reactor Feed Pump is operating in Single Element Master Level Control. Heater Drain Pumps are secured. Circ Water is in Single Pump Dual Train 'A' Pump in service. APRM 'H' is failed due to a failed power supply card and bypassed.

ESF 12 Transformer is tagged out of service for maintenance.

TBCW Pump 'C' is tagged out of service for pump seal replacement.

Appropriate clearances and LCOs are written.

Standby Service Water 'B' requires a Chemical Addition run. Section 7.4 of EPI 04-1-03-P41-2 is not required to be performed.

Continue to shutdown the plant. At step 8.5 of IOI-2 Attachment IV.

Startup Pull Sheet Step 005 (IC 15 S/D) 32-33 @ 48.

Plant EOOS is 10 GREEN.

There are scattered thunderstorms reported in the Tensas Parish area.

**Simulator Setup:** (Scenarios may be setup and shot into encrypted ICs and Password protected.)

Start the process from a new simulator load.

Reset to IC-13.

Verify or perform the following:

IC: 13

OOS: APRM H  
ESF Transformer 12 (Place tags on 152-1903, 1904, 1905, 1511, 1611, and 1704)  
TBCW C Pump (Place tag on start HS)

Active malfunctions: **z022022\_32\_33** Control Rod 32-33 stuck  
**rr040f @ 0** Failure of Division 2 Drywell Pressure B21-N094F  
**e22052** HPCS Pump trip on start  
**rr016a** Recirc pump A incorrect slow speed start (TRG1) tied to opening of CB-5A. (iodib33m607a(1))

Active overrides **b21f065b\_i** Failure of B21-F065B to close



Pending overrides

**xal2p807\_2a\_f\_5 ON** Service Transformer 11 Trouble Alarm (TRG 2)

Pending malfunctions:

**r21133a** Service Transformer 11 trip (TRG 3)  
**fw0171b @ 70%** Feedwater B Line Rupture in Drywell (TRG 4)  
**rr063b @ 5%** Feedwater check valve leakage (Recirc Line Rupture) (TRG 4)  
**rr041f @ 83%** Reactor Level Transmitter B21-N091F (TRG 4)

Pending component malfunctions: None

Trigger files:

Trigger 1 Recirc Pump 'A' trip on downshift  
Trigger 2 Service Transformer 11 Trouble alarm  
Trigger 3 Service Transformer 11 Trip  
Trigger 4 Feedwater rupture in Drywell

COMPONENT	PANEL	INDICATION or CONTROL	SIMULATOR CODE	STATUS	DONE
APRM H		DOWNSCALE	c51010h		
TBCW PUMP C	P870-5C	GREEN LIGHT	lo_1p43m600c_g	OFF	
		HANDSWITCH	di_1p43m600c	STOP	
ESF 12 BREAKER 152-1903	P807-1C	GREEN LIGHT	lo_1r21m623_g	OFF	
		HANDSWITCH	di_1r21m623	TRIP	
ESF 12 BREAKER 152-1904	P807-1C	GREEN LIGHT	lo_1r21m624_g	OFF	
		HANDSWITCH	di_1r21m624	TRIP	
ESF 12 BREAKER 152-1905	P807-1C	GREEN LIGHT	lo_1r21m637_g	OFF	
		HANDSWITCH	di_1r21m637	TRIP	
ESF 12 FEEDER 152-1511	P864-1C	GREEN LIGHT	lo_1r21m601a_g	OFF	
		HANDSWITCH	di_1r21m601a	TRIP	
ESF 12 FEEDER 152-1611	P864-2C	GREEN LIGHT	lo_1r21m601b_g	OFF	
		HANDSWITCH	di_1r21m601b	TRIP	
ESF 12 FEEDER 152-1704	P601-16C	GREEN LIGHT	lo_1e22m709_g	OFF	
		HANDSWITCH	di_1e22m709	TRIP	
115 KV DISCONNECT J3885	P807-1C	GREEN LIGHT	lo_1r27r602_g	OFF	
J3885		DISCONNECT		OPEN	

Bypass Division 2 APRM Bypass Joystick to APRM H position.

Open Circuit Breakers 152-1903, 1904, 1905, 1511, 1611, and 1704

Place TBCW pump B to STOP (to clear Standby light) then to START, stop TBCW pump C.

Startup all PDS / SPDS screens. Clear any graphs and trends off of SPDS.

Setup the presently used cyclops display and verify it is functional.

Ensure the correct startup sequence is available at the P680 for the present IC.

Install turnover guide, red tag, and LCO paperwork as applicable.

Advance all chart recorders and ensure all pens are inking properly.

(APRM chart recorders must be turned on and settings for scales on pens 0 – 125 scale)

## **SIMULATOR OPERATION SCENARIO 2**

Once simulator is reinitialized and setup complete take the simulator out of Freeze.

Once the Crew has taken control note the simulator time.

Crew will start SSW 'B' per EPI 04-1-03-P41-2.

Crew will review procedures for shutting down the plant and down shifting Recirc Pumps.

Cues:

**If asked, report as Reactor Engineer – you would prefer to insert control rods further before down shifting Recirc Pumps to Slow Speed.**

**If asked, report as Reactor Engineer – insert control rods per the Control Rod Pull Sheet beginning at step 005. Insertion of rods may be in gang or individual mode.**

Crew will insert control rods to lower power and note Control Rod 32-33 will not move.

**If asked, report as Local Operator, CRD Drive Filter DP and Suction Filter DP are normal.**

**If asked, report as Local Operator, CRD Flow Control Valves are operating normally and the HCU for 32-33 appears normal.**

Respond to stuck control rod per ONEP 05-1-02-IV-1, CRD Malfunctions.

### **REMOVE Malfunction z022022 for control rod 32-33.**

Once power is lowered to less than 45%, **Cue the crew at the Reactor Engineer that power to flow is sufficient to support downshifting Recirc Pumps to slow speed.**

During downshift Recirc Pump A will trip to OFF. Trigger 1 will activate when CB-5A opens on downshift.

Cues:

**If asked, as Turbine Building Operator inform the Control Room that there are no apparent reasons for the failure of Recirc Pump 'A' to shift to slow speed.**

**If asked, respond as Electrical or I&C as required and request a MAI be generated to troubleshoot Recirc Pump 'A'.**

Seven (7) minutes after the Recirc Pump trip, **activate TRIGGER 2.**

Service Transformer 11 Trouble.

Cues:

**If asked, as Outside Operator respond to Switchyard and report “Service Xfmr ST11 General Alarm” 2R-D1 is in alarm in the Switchgear house.**

**Dispatcher contacts the control room to request personnel be dispatched to determine the alarm.**

**If asked, at the Transformer “Oil Level Low” 1A-A1 is in alarm. The sight glass on the transformer has NO oil present.**

**If asked, respond as the Jackson Dispatcher that the UC & M crew has been dispatched and that the transformer should be unloaded.**

Five (5) minutes after ST 11 Trouble alarm, **activate TRIGGER 3.**

Service Transformer 11 trip.

Cues:

**If asked, respond as the Turbine Building operator to reset bus undervoltages, as necessary.**

Four (4) minutes after Scram, **activate TRIGGER 4.**

The reactor will scram on Drywell pressure will rise from the Feedwater Line Break, this action will most likely occur before operators have a chance to manually scram the reactor.

Division 2 will not automatically initiate on the LOCA.

HPCS Pump will trip on initiation.

Crew will implement actions of EP-2 and EP-3.

After the LOCA is detected, perform the following attachments when requested.

Attachment 12 Defeat SDC interlocks	4 minutes to DONE
-------------------------------------	-------------------

Attachment 12 for RHR ‘A’ can be of use. RHR ‘B’ through shutdown cooling injection is of no use.

Cues:

**If asked, as the Auxiliary Building Operator report 52-153118 is trip free and will not reset.**

RCIC, Feedwater, and Condensate are not available due to the location of the break.

Attachment s 25 (Condensate Transfer) and 26 (Fire Water) can not be installed by any remote functions just acknowledge the request.

## **TERMINATION**

Once Reactor level is being restored with Low Pressure ECCS and the Lead Evaluator concurs the scenario may be terminated.

### **Critical Tasks**

- Recognize failure of Division 2 to initiate and manually initiate Division 2.
- Lower reactor pressure to allow injection from Low Pressure systems.

Op-Test No.: _____ Scenario No.: <b>2</b> Event No.: <b>1</b>		
Event Description: <b>Place Standby Service Water 'B' in service for chemical addition. (EPI 04-1-03-P41-2 &amp; SOI 04-1-01-P41-1)</b>		
Time	Position	Applicant's Actions or Behavior
	BOP	Starts SSW 'B' per EPI and SOI and aligns through components.

Op-Test No.: _____ Scenario No.: <b>2</b> Event No.: <b>2</b>		
Event Description: <b>Lower Reactor power using Control Rods from 45 % to 44 % (Control Rod Pull Sheet)</b>		
Time	Position	Applicant's Actions or Behavior
	SS	Conduct reactivity manipulation brief.
	RO	Inserts control rods in individual or gang per control rod pull sheet to lower power to 44 %.
	BOP	Assists RO in Control Rod selection verification, monitors Pressure, Level, Power, and Turbine Loading.

Op-Test No.: _____ Scenario No.: <u>  2  </u> Event No.: <u>  3  </u>		
Event Description: <b>Insert control rods to lower power. (Control Rod Pull Sheet)</b>		
<b>Control Rod 32-33 is stuck, un-stick control rod per ONEP. (ONEP 05-1-02-IV-1)</b>		
Time	Position	Applicant's Actions or Behavior
	RO	Moves Control Rods from Position 42 to position 00. Once Control Rod 32-33 is attempted to be moved will recognize control rod is immovable.
	SS	Dispatches operators to verify HCV, FCV, Drive Filter DP and Suction Filter DP.
	SS	Obtains CRD Malfunctions ONEP 05-1-02-IV-1 and verifies action per section 3.5, orders CRD Drive pressure raised ~25 psid.
	BOP	Raises CRD Drive pressure ~ 25 psid using C11-F003 Pressure Control Valve on H13-P601.
	RO	Attempts to move the Control Rod and reports no movement.
	BOP	Raises CRD Drive pressure ~25 psid using C11-F003 Pressure Control Valve on H13-P601.
	RO	Attempts to move the Control Rod and reports movement and positions Control Rod 32-33 at position 00.

Op-Test No.: \_\_\_\_\_ Scenario No.: **2** Event No.: **4**

Event Description: **Down shift Recirculation Pumps to slow speed.**  
**(IOI 03-1-01-1 and SOI 04-1-01-B33-1)**  
**Recirculation Pump A trip to OFF on downshift (ONEP 05-1-02-III-3)**

Time	Position	Applicant's Actions or Behavior
	RO	Transfers Recirc Pumps to slow speed
	RO	Respond to annunciators concerning Recirc Pump 'A' trip, and performs immediate actions of "Reduction in Recirculation System Flow Rate" ONEP 05-1-02-III-3.  Closes B33-F067A Monitors for Thermal Hydraulic Instability Monitors position on Power to Flow Map and region of operation
	RO	Verifies Recirc Loop 'B' flow is < 44,600 gpm.
	BOP	Monitors Thermal Hydraulic Instability and reaction of Reactor Power.
	SS	Verifies actions per ONEP are completed, dispatches personnel to investigate the trip.



Op-Test No.: _____ Scenario No.: <b>2</b> Event No.: <b>5</b>		
Event Description: <b>Respond to Service Transformer 11 Trouble alarm and subsequent trip of ST-11.</b>		
Time	Position	Applicant's Actions or Behavior
	BOP	Responds to Service Transformer 11 Trouble alarm per Alarm Response Instructions.
	SS	Dispatches operator to monitor local panel and Service Transformer.
	BOP	On orders of SS, transfers loads from Service Transformer 11 to Service Transformer 21.
	BOP	Reports trip of Service Transformer 11 and recovers any buses lost.
	RO/BOP	Determines and recovers equipment lost.
	SS/BOP	Dispatches operator to reset any Bus Undervoltage devices.
	SS	Dispatches operator to monitor diesel generator operation as necessary.

Op-Test No.: _____ Scenario No.: <b>2</b> Event No.: <b>6</b>		
Event Description: <b>Feedwater Rupture in the Drywell with leakage past check valves from the Reactor</b>		
Time	Position	Applicant's Actions or Behavior
	RO	Recognizes scram on High Drywell Pressure/Low Reactor Water level and performs the immediate actions for Reactor Scram. Reports all rods fully inserted and places the Reactor Mode Switch to SHUTDOWN.
	RO	Recognizes loss of ability to feed the reactor with Condensate and Feedwater. Communicates the loss to the SS. May depending on conditions recognize which feed line has rupture.
	SS	Enters EP-2 and EP-3, orders the BOP Operator to initiate HPCS, RCIC and inhibit ADS (if HPCS auto initiated the pump is tripped).
	BOP	Recognizes the failure of Division 2 to initiate and manually initiates Division 2 ECCS.
	BOP	Verifies/initiates HPCS (recognizes trip of HPCS pump)
	BOP or RO	Verifies/initiates RCIC (If RO/SS determine which Feedwater Line is ruptured prevents operation of RCIC – pumps into line with break.)
	SS	Orders CRD maximized and possible initiation of SLC.
	SS	Dispatches EP Attachments to be installed Attachment 12 RHR through Shutdown Cooling Attachment 25 Condensate Transfer injection Attachment 26 Fire Water injection
	SS	Dispatches Operators, electricians to investigate problems with HPCS.

	SS **	Orders alignment of Low Pressure ECCS for injection to the Reactor.
	BOP or RO **	Align Low Pressure ECCS for injection.
	SS	Orders depressurization of the Reactor with either SRVs or Main Steam Bypass Valves to a pressure which will allow injection from Low Pressure ECCS.
	SS **	If Reactor Level drops below – 192 inches, orders Emergency Depressurization with 8 SRVs (at least 5 SRVs should be open)
	BOP or RO **	On orders, opens 8 SRVs using handswitches (initiation pushbuttons may be used initially, however should be followed with handswitches.)
	SS **	If conditions require RPV Flooding order injection to attain RPV pressure 57 psig above Containment pressure
	BOP or RO	Verifies injection to the RPV with Low Pressure ECCS.

Facility: **GRAND GULF NUCLEAR STATION** Scenario No.: **3** Op-Test No.: **Day 1**

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Objectives:** To evaluate the candidates' ability to operate the facility in response to the following evolutions:

1. Raise Reactor Power using Recirculation Flow.
2. Start 3<sup>rd</sup> Condensate and Condensate Booster Pumps.
3. Respond to a trip of RPS Motor Generator 'B'.
4. Determine the source and respond to a leak on the suction valve of RHR Pump 'C', EOP entry.
5. Respond to a steam leak in the Auxiliary Building Steam Tunnel and a failure of Group 1 to isolate.
6. Take actions per the EOPs in response to two stuck control rods following a Reactor Scram.
7. Take actions per EOPs to control RPV parameters with a failure the MSIVs to isolate the steam leak.

**Initial Conditions:** Reactor Power is at 83 % continuing power ascension to rated conditions.

**INOPERABLE Equipment**

APRM 'H' is INOP due to a failed power supply card

ESF 12 Transformer is tagged out of service for maintenance

TBCW Pump 'C' is tagged out of service for pump seal replacement

Appropriate clearances and LCOs are written.

**Turnover:** Continue power ascension. Radwaste is prepared for full Condensate and Feedwater operation. There are scattered thunder showers reported in the Tensas Parish area.

Scenario 3 Day 1 (Continued)

Event No.	10CFR 55.45(a)	K/A	Event Type*	Event Description
1	1, 2, 4, 5, 6, 8	202001 A4.04 202002 A4.08 2.2.2	R (RO)	Raise Total Core Flow to >12.5 Mlbm/hr Feedwater Flow. (IOI 03-1-01-2)
2	2, 4, 5, 6	256000 A3.02; A4.01	N (RO)	Start 3 <sup>rd</sup> Condensate and Condensate Booster Pump. (SOI 04-1-01-N19-1)
3	3, 5, 6	212000 A1.11; A2.01; A4.07	C (RO, BOP)	Respond to trip of RPS Motor Generator 'B'. (ONEP 05-1-02-III-2)
4	3, 4, 5, 6	295036 EA1.02	C (BOP)	Determine the source and respond to a packing leak on E12-F004C RHR 'C' Suction Valve, with the valve failure determine unisolable and take actions per EOP – 3 & 4.
5	3, 4, 6, 13	2.4.46; 2.4.47; 2.4.48; 2.4.49	M (ALL)	Recognize and respond to a steam leak in the Auxiliary Building Steam Tunnel.
	3, 4, 6, 13	2.4.46; 2.4.47; 2.4.48; 2.4.49 290001 A2.06; A4.04	I (BOP)	Recognize the failure of Group 1 to automatically isolate and take actions to isolate the Main Steam Lines (ONEP 05-1-01-III-5)
	3, 4, 6, 13	2.4.46; 2.4.47; 2.4.48; 2.4.49 290001 A2.06; A4.04		Recognize the failure of a single Main Steam line to isolate and take actions for mitigation of the leak.
	4, 6, 12, 13	295037 EA1.0; EA2.0 212000 A4.17	C (RO)	Recognize the failure of two control rods to fully insert on the Reactor Scram and take actions as necessary per procedures to insert the control rods.

All evolutions test 55.45(a) 12 & 13.

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

**Critical Tasks**

- Manually scram the reactor.
- Isolate the main steam lines.

Facility: **GRAND GULF NUCLEAR STATION** Scenario No.: **3** Op-Test No.: **Day 1**

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Objectives:** To evaluate the candidates' ability to operate the facility in response to the following evolutions:

1. Raise Reactor Power using Recirculation Flow.
2. Start 3<sup>rd</sup> Condensate and Condensate Booster Pumps.
3. Respond to a trip of RPS Motor Generator 'B'.
4. Determine the source and respond to a leak on the suction valve of RHR Pump 'C', EOP entry.
5. Respond to a steam leak in the Auxiliary Building Steam Tunnel and a failure of Group 1 to isolate.
6. Take actions per the EOPs in response to two stuck control rods following a Reactor Scram.
7. Take actions per EOPs to control RPV parameters with a failure the MSIVs to isolate the steam leak.

**Initial Conditions:** Reactor Power is at 85 % continuing power ascension to rated conditions.

**INOPERABLE Equipment**

APRM 'H' is INOP due to a failed power supply card  
 ESF 12 Transformer is tagged out of service for maintenance  
 TBCW Pump 'C' is tagged out of service for pump seal replacement  
 Appropriate clearances and LCOs are written.

**Turnover:** Continue power ascension. Radwaste is prepared for full Condensate and Feedwater operation. There are scattered thunder showers reported in the Tensas Parish area.

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO)	Raise Total Core Flow to >12.5 Mlbm/hr Feedwater Flow. (IOI 03-1-01-2)
2		N (RO)	Start 3 <sup>rd</sup> Condensate and Condensate Booster Pump. (SOI 04-1-01-N19-1)

## Scenario 3 Day 1 (Continued)

Event No.	Malf. No.	Event Type*	Event Description
3	c71077b	C (RO, BOP)	Respond to trip of RPS Motor Generator 'B'. (ONEP 05-1-02-III-2)
4	ct218c @ 2% see list for E12F004C	C (BOP)	Determine the source and respond to a packing leak on E12-F004C RHR 'C' Suction Valve, with the valve failure determine unisolable and take actions per EOP – 3 & 4.
5	ms066b @ 0.2% c71076	M (ALL)	Recognize and respond to a steam leak in the Auxiliary Building Steam Tunnel.
	epatt09 ms067b @ 20%	I (BOP)	Recognize the failure of Group 1 to automatically isolate and take actions to isolate the Main Steam Lines (ONEP 05-1-01-III-5)
	ms183b ms184b		Recognize the failure of a single Main Steam line to isolate and take actions for mitigation of the leak.
	z022022 _08-29 _12_09	C (RO)	Recognize the failure of two control rods to fully insert on the Reactor Scram and take actions as necessary per procedures to insert the control rods.

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

**Critical Tasks**

- Manually scram the reactor.
- Isolate the main steam lines.

### Scenario 3 Day 1 (Continued)

#### Crew Turnover:

Rx at 83% CTP.

The plant is raising power following an outage.

APRM 'H' is failed due to a failed power supply card and bypassed.

ESF 12 Transformer is tagged out of service for maintenance.

TBCW Pump 'C' is tagged out of service for pump seal replacement.

Appropriate clearances and LCOs are written.

The reactor is at the target rod line.

Continue to bring the plant to full power per IOI-2 step 6.6.

Plant EOOS factor is 10 GREEN.

There are scattered thunderstorms reported in the Tensas Parish area.

#### **Simulator Setup:** (Scenarios may be setup and shot into encrypted ICs and Password protected.)

Start the process from a new simulator load.

Reset to IC-14.

Verify or perform the following:

IC: 14

OOS: ESF Transformer 12 (Place tags on 152-1903. 1904, 1905,  
1511, 1611, and 1704)  
TBCW C Pump (Place tag on start HS)

Active malfunctions: **c51010h** APRM H downscale  
**z022022\_08\_29** Control Rod 08-29 stuck  
**z022022\_12\_09** Control Rod 12-09 stuck  
**ms183b** MSIV B21-F022B failed open (**as-is**)  
**ms 184b** MSIV B21-F028B failed open (**as-is**)

Active overrides **epatt09** EP Attachment 9 Defeat MSIV/Group 1 isolation **INSTALL**

Pending overrides None



Pending malfunctions: **c71077b** RPS Motor Generator 'B' trip (TRG 1)  
**ct218c @ 2%** Leak in RHR C room from Suppression Pool (TRG 2)  
**ms066b @ 0.2%** Main Steam Line B steam leak in Auxiliary Building  
Steam Tunnel (TRG 4) ramp to 20% over 6 minutes.  
**c71076** Failure to scram (manual available)  
**ms067b @ 20%** Main Steam Line B Rupture ramp to 40% over 7  
minutes (TRG 5).

Pending component malfunctions: **lo\_1e12m602c\_g** E12-F004C green light **OFF** (TRG 3)  
**lo\_1e12m602c\_r** E12-F004C red light **OFF** (TRG 3)  
**di\_1e12m602c(2)** E12-F004C handswitch to **OPEN** (TRG 3)  
**lo\_1e12ads23** RHR C MOV overload / power loss Status light  
**ON** (TRG 3)  
**P601\_17a\_h\_3** RHR C SYS OOSVC annunciator **ON** (TRG 3)

Trigger files:

Trigger 1	RPS Motor Generator 'B' trip
Trigger 2	Leak in RHR 'C' Pump Room
Trigger 3	E12-F004C failure
Trigger 4	Steam leak in Aux Bldg Steam Tunnel; Automatic Scram Failure
Trigger 5	Steam Rupture in Aux Bldg Steam Tunnel

COMPONENT	PANEL	INDICATION or CONTROL	SIMULATOR CODE	STATUS	DONE
APRM H		DOWNSCALE	c51010h		
TBCW PUMP C	P870-5C	GREEN LIGHT	lo_1p43m600c_g	OFF	
		HANDSWITCH	di_1p43m600c	STOP	
ESF 12 BREAKER 152-1903	P807-1C	GREEN LIGHT	lo_1r21m623_g	OFF	
		HANDSWITCH	di_1r21m623	TRIP	
ESF 12 BREAKER 152-1904	P807-1C	GREEN LIGHT	lo_1r21m624_g	OFF	
		HANDSWITCH	di_1r21m624	TRIP	
ESF 12 BREAKER 152-1905	P807-1C	GREEN LIGHT	lo_1r21m637_g	OFF	
		HANDSWITCH	di_1r21m637	TRIP	
ESF 12 FEEDER 152-1511	P864-1C	GREEN LIGHT	lo_1r21m601a_g	OFF	
		HANDSWITCH	di_1r21m601a	TRIP	
ESF 12 FEEDER 152-1611	P864-2C	GREEN LIGHT	lo_1r21m601b_g	OFF	
		HANDSWITCH	di_1r21m601b	TRIP	
ESF 12 FEEDER 152-1704	P601-16C	GREEN LIGHT	lo_1e22m709_g	OFF	
		HANDSWITCH	di_1e22m709	TRIP	
115 KV DISCONNECT J3885	P807-1C	GREEN LIGHT	lo_1r27r602_g	OFF	
J3885		DISCONNECT		OPEN	

Bypass Division 2 APRM Bypass Joystick to APRM H position.

Open Circuit Breakers 152-1903, 1904, 1905, 1511, 1611, and 1704

Place TBCW pump B to STOP (to clear Standby light) then to START, stop TBCW pump C.

Ensure only two Condensate and Condensate Booster Pumps are operating.

Startup all PDS / SPDS screens. Clear any graphs and trends off of SPDS.

Setup the presently used cyclops display and verify it is functional.

Ensure the correct startup sequence is available at the P680 for the present IC.

Install turnover guide, red tag, and LCO paperwork as applicable.

Advance all chart recorders and ensure all pens are inking properly.

(APRM chart recorders must be turned on and settings for scales on pens 0 – 125 scale)

### **SIMULATOR OPERATION SCENARIO 3**

Once simulator is reinitialized and setup complete take the simulator out of Freeze.

Once the Crew has taken control note the simulator time.

The Crew will raise reactor power using Recirculation Flow to just above 14 mlbm/hr Feedwater Flow.

Above 14 mlbm/hr, they will place the third Condensate and Condensate Booster Pump in service. They may contact Radwaste about Condensate Demins.

Two (2) minutes after the Condensate Pump evolution is complete, **activate TRIGGER 1.**

Loss of RPS MG 'B'

Cues:

**If asked, report as Control Building Operator, RPS MG 'B' has tripped. The Alternate supply EPA breakers are closed.**

Six (6) minutes after the loss of RPS MG 'B', **activate TRIGGER 2.**

Call up display of H13-P601 section 17C in the area of E12-F004C.

Upon alarms in RHR 'C' Pump room on high water level, the crew will attempt to close E12-F004C, **when dual indication occurs on RHR 'C' suction valve activate TRIGGER 3.**

Cues:

**If asked, respond as the Auxiliary Building Operator that water is seeping from below the RHR 'C' Pump Room door. From viewing from 119' Piping Penetration Room water is covering the floor.**

**If asked, respond as the Auxiliary Building Operator that water is coming from around the E12-F004C. Could be a packing leak.**

**If asked to check the circuit breaker for E12-F004C (52-161114 MCC 16B11), respond as the operator the breaker is in the trip free position and will not reset.**

**If asked, respond as electricians the breaker will NOT reset and stay closed.**

Five (5) minutes after the RHR 'C' Pump Room alarms are received, **activate TRIGGER 4.**

When Crew initiates Manual scram, **activate TRIGGER 5.**

**Two (2) Minutes after Reactor Scram, report as Security white smoke or steam is coming out of the top of the Auxiliary Building.**

**If contacted, report as Health Physics there are NO abnormal radiation surveys of the Auxiliary Building.**

**If contacted, report as Chemistry there are NO verified leaking fuel bundles in the reactor.**

If SS decides to install attachments to attempt to insert the two stuck control rods.

Attachment 18 Defeat ATWS ARI	4 minutes to DONE
Attachment 19 Defeat RPS	5 minutes to DONE
Attachment 20 Defeat RCIS	6 minutes to DONE
Attachment 2 Defeat RCIC Trips	8 minutes to DONE
Attachment 1 Defeat RCIC Suction Xfer	8 minutes to DONE
Attachment 12 Defeat RHR SDC Interlocks	6 minutes to DONE

## **TERMINATION**

Once reactor pressure has lowered to < 600 psig and a system is aligned for RPV level control and the Lead Evaluator concurs the scenario may be terminated.

## **Critical Tasks**

- Manually scram the reactor.

- Isolate the main steam lines.

Op-Test No.: _____ Scenario No.: <u>  3  </u> Event No.: <u>  1  </u>		
Event Description: <b>Raise Reactor Power by raising Total Recirc Flow.</b>		
Time	Position	Applicant's Actions or Behavior
	SS	Provides Reactivity brief to crew.
	RO	Verifies position on Power to Flow Map.
	RO	Opens Recirc Flow Control Valves to raise Reactor Power.
	BOP	Monitor Power, Level, Pressure, and Turbine Loading during the evolution.

Op-Test No.: _____ Scenario No.: <u>  3  </u> Event No.: <u>  2  </u>		
Event Description: <b>Start 3<sup>rd</sup> Condensate and Condensate Booster Pump (SOI 04-1-01-N19-1)</b>		
Time	Position	Applicant's Actions or Behavior
	RO	Starts up 3 <sup>rd</sup> Condensate Pump.
	RO	Starts up 3 <sup>rd</sup> Condensate Booster Pump.

Op-Test No.: _____ Scenario No.: <u>  3  </u> Event No.: <u>  3  </u>		
Event Description: <b>Respond to a trip of RPS Motor Generator 'B' (ONEP 05-1-02-III-2)</b>		
Time	Position	Applicant's Actions or Behavior
	RO	Identify the loss of RPS Motor Generator 'B'
	SS	Dispatch operators to investigate loss of RPS MG.
	BOP	Check H13-P610 for availability of Alternate Power for RPS 'B'. On orders from SS transfer RPS 'B' to alternate source.
	RO	Resets RPS 'B' scram signals.
	SS	Dispatches electricians to investigate loss of RPS MG.

Op-Test No.: _____ Scenario No.: <b>3</b> Event No.: <b>4</b>		
Event Description: <b>Respond to a leak from the Suppression Pool into RHR 'C' Pump Room via failed E12-F004C packing. (EP 3 &amp; 4)</b>		
Time	Position	Applicant's Actions or Behavior
	RO	Reports RHR 'C' Room Sump High-High level alarm.
	SS	Enters EP-4 and dispatches operator to investigate.
	BOP	Reports RHR 'C' Room Flooded alarm and lowering Suppression Pool level.
	SS	Upon Suppression Pool Low level alarm, enters EP-3.
	RO	On orders of SS attempts to isolate RHR 'C' by closing E12-F004C, reports failure of valve to stroke and loss of power.
	SS	Orders makeup to Suppression Pool. May use HPCS, RCIC, Refueling Water Transfer or SPMU.
	SS	May elect to Manually scram the reactor.

Op-Test No.: \_\_\_\_\_ Scenario No.:   3   Event No.:   5  

Event Description: **Respond to a steam leak in Auxiliary Building Steam Tunnel with a failure to isolate. (EP-4) w/ Automatic Scram failure**

Scenario is geared toward EP-4 actions, stuck control rods is for operator board awareness.

Time	Position	Applicant's Actions or Behavior
	BOP	Announces Steam Tunnel temperature alarms and EP-4 entry and failure of Group 1 to isolate.
	BOP**	Manually isolates MSIVs and reports failure of 'B' Main Steam Line to isolate and closes B21-F098B Main Steam Shutoff Valve.
	RO**	Inserts a manual Scram (recognition of failure to automatic scram is not critical if reactor manually scrammed.)
	RO	Recognizes failure of two control rods to fully insert. (Control Rods 08-29 & 12-09)
	SS	Enters EP-2A for two Control Rods and EP-4 for Steam leak in Auxiliary Building. (SS should recognize no conditions exist warranting lowering of reactor level for ATWS.)
	CREW	Maintains reactor water level using RCIC or HPCS. Condensate and Feedwater may be used when reactor pressure drops below Condensate Booster Pump shutoff head.
	SS	As conditions dictate may elect to lower reactor pressure using SRVs to reduce energy release to Secondary Containment.
	BOP or RO	On orders of SS lowers reactor pressure using SRVs.