

Facility:		Grand Gulf Nuclear Station										Date of Exam:						
Tier	Group	RO K/A Category Points												SRO-Only Points				
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total		
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			4	3	N/A		4	20			7		
	2	1	1	1				2	1			1	7			3		
	Tier Totals	4	4	4				6	4			5	27			10		
2. Plant Systems	1	3	2	3	2	2	2	3	3	1	2	3	26			5		
	2	1	1	2	1	1	1	1	1	1	1	1	12			3		
	Tier Totals	4	3	5	3	3	3	4	4	2	3	4	38			8		
3. Generic Knowledge and Abilities Categories				1		2		3		4		10		1	2	3	4	7
				3		3		2		2								
<p>Note:</p> <ol style="list-style-type: none"> <li>Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).</li> <li>The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by <math>\pm 1</math> from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.</li> <li>Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.</li> <li>Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.</li> <li>Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.</li> <li>Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.</li> <li>* The generic (G) 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. Refer to Section D.1.b of ES-401 for the applicable K/As.</li> <li>On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.</li> <li>For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.</li> </ol>																		

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)							Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#	
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4				X			Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION: AA1.01 Recirculation System, 55.41(7)	3.5		
295003 Partial or Complete Loss of AC / 6					X		AA2.04	3.5		
295004 Partial or Total Loss of DC Pwr / 6						X	G2.1.7	4.4		
295005 Main Turbine Generator Trip / 3			X				AK3.07	3.8		
295006 SCRAM / 1	X						AK1.01	3.7		
295016 Control Room Abandonment / 7					X		AA2.05	3.8		
295018 Partial or Total Loss of CCW / 8			X				AK3.06	3.3		
295019 Partial or Total Loss of Inst. Air / 8		X					AK2.01	3.8		
295021 Loss of Shutdown Cooling / 4				X			AA1.05	3.0		
295023 Refueling Acc / 8						X	G2.1.27	3.9		
295024 High Drywell Pressure / 5	X						EK1.01	4.1		
295025 High Reactor Pressure / 3	X						EK1.06	3.5		
295026 Suppression Pool High Water Temp. / 5			X				EK3.05	3.9		
295027 High Containment Temperature / 5						X	G2.2.38	3.6		
295028 High Drywell Temperature / 5		X					EK2.02	3.2		
295030 Low Suppression Pool Wtr Lvl / 5					X		EA2.03	3.7		
295031 Reactor Low Water Level / 2				X			EA1.07	3.7		
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1		X					EK2.07	4.0		
295038 High Off-site Release Rate / 9										
600000 Plant Fire On Site / 8						X	G2.4.49	4.6		
700000 Generator Voltage and Electric Grid Disturbances / 6				X			AA1.01	3.6		
K/A Category Totals:	3	3	3	4	3	4	Group Point Total:		20	

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)							Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#	
295002 Loss of Main Condenser Vac / 3										
295007 High Reactor Pressure / 3										
295008 High Reactor Water Level / 2		X					AK2.06	3.4		
295009 Low Reactor Water Level / 2										
295010 High Drywell Pressure / 5	X						AK1.03	3.2		
295011 High Containment Temp / 5										
295012 High Drywell Temperature / 5										
295013 High Suppression Pool Temp. / 5						X	G2.4.4	4.5		
295014 Inadvertent Reactivity Addition / 1										
295015 Incomplete SCRAM / 1										
295017 High Off-site Release Rate / 9										
295020 Inadvertent Cont. Isolation / 5 & 7										
295022 Loss of CRD Pumps / 1				X			AA1.02	3.6		
295029 High Suppression Pool Wtr Lvl / 5										
295032 High Secondary Containment Area Temperature / 5										
295033 High Secondary Containment Area Radiation Levels / 9										
295034 Secondary Containment Ventilation High Radiation / 9					X		EA2.01	3.8		
295035 Secondary Containment High Differential Pressure / 5			X				EK3.02	3.3		
295036 Secondary Containment High Sump/Area Water Level / 5				X			EA1.02	3.5		
500000 High CTMT Hydrogen Conc. / 5										
K/A Category Point Totals:	1	1	1	2	1	1	Group Point Total:		7	

ES-401		BWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)										Form ES-401-1		
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
203000 RHR/LPCI: Injection Mode						X						K6.10	3.0	
205000 Shutdown Cooling											X	G2.2.12	3.7	
206000 HPCI														
207000 Isolation (Emergency) Condenser														
209001 LPCS				X								K4.02	3.0	
						X						K6.11	3.6	
209002 HPCS			X									K3.03	3.9	
211000 SLC	X											K1.05	3.4	
212000 RPS					X							K5.02	3.3	
215003 IRM														
215004 Source Range Monitor								X				A2.03	3.0	
215005 APRM / LPRM	X											K1.09	3.6	
217000 RCIC									X			A3.05	3.9	
										X		A4.06	3.6	
218000 ADS		X										K2.01	3.1	
223002 PCIS/Nuclear Steam Supply Shutoff											X	G2.1.28	4.1	
239002 SRVs	X											K1.04	3.6	
				X								K4.04	3.4	
259002 Reactor Water Level Control							X					A1.03	3.8	
261000 SGTS							X					A1.04	3.0	
262001 AC Electrical Distribution								X				A2.04	3.8	
262002 UPS (AC/DC)			X									K3.02	2.9	
263000 DC Electrical Distribution		X										K2.01	3.1	
											X	G2.2.22	4.0	
264000 EDGs								X				A2.04	2.9	
			X									K3.03	4.1	

300000 Instrument Air					X								K5.13	2.9	
										X			A4.01	2.6	
400000 Component Cooling Water							X						A1.04	2.8	
K/A Category Point Totals:	3	2	3	2	2	2	3	3	1	2	3	Group Point Total:			26

ES-401 401-1		BWR Examination Outline											Form ES-	
Plant Systems - Tier 2/Group 2 (RO / SRO)														
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
201001 CRD Hydraulic														
201002 RMCS	X											K1.01	3.2	
201003 Control Rod and Drive Mechanism														
201004 RSCS														
201005 RCIS				X								K4.06	3.5	
201006 RWM														
202001 Recirculation								X				A2.08	3.1	
202002 Recirculation Flow Control														
204000 RWCU														
214000 RPIS														
215001 Traversing In-core Probe														
215002 RBM														
216000 Nuclear Boiler Inst.														
219000 RHR/LPCI: Torus/Pool Cooling Mode														
223001 Primary CTMT and Aux.														
226001 RHR/LPCI: CTMT Spray Mode														
230000 RHR/LPCI: Torus/Pool Spray Mode														
233000 Fuel Pool Cooling/Cleanup							X					A1.03	3.1	
234000 Fuel Handling Equipment														
239001 Main and Reheat Steam		X										K2.01	3.2	
239003 MSIV Leakage Control										X		A4.03	3.3	
241000 Reactor/Turbine Pressure Regulator					X							K5.05	2.8	
245000 Main Turbine Gen. / Aux.														
256000 Reactor Condensate														
259001 Reactor Feedwater											X	G2.1.30	4.4	
268000 Radwaste			X									K3.04	2.7	
271000 Offgas														
272000 Radiation Monitoring														
286000 Fire Protection														
288000 Plant Ventilation														
290001 Secondary CTMT									X			A3.01	3.9	
290003 Control Room HVAC						X						K6.04	2.6	

290002 Reactor Vessel Internals			X									K3.07	3.1	
K/A Category Point Totals:	1	1	2	1	1	1	1	1	1	1	1	Group Point Total:		12

**ES-401**

**Generic Knowledge and Abilities Outline (Tier 3)**

**Form ES-401-3**

Facility:		Date of Exam:				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.2	Knowledge of operator responsibilities during all modes of plant operation. 55.41(10)	4.1			
	2.1.32	Ability to explain and apply system limits and precautions. 55.41(10)	3.8			
	2.1.37	Knowledge of procedures, guidelines, or limitations associated with reactivity management. 55.41(1)	4.3			
	2.1.					
	2.1.					
	2.1.					
	Subtotal			3		
2. Equipment Control	2.2.22	Knowledge of limiting conditions for operations and safety limits. 55.41(5)	4.0			
	2.2.39	Knowledge of less than or equal to one hour Technical Specification action statements for systems. 55.41(7)	3.9			
	2.2.41	Ability to obtain and interpret station electrical and mechanical drawings. 55.41(10)	3.5			
	2.2.					
	2.2.					
	2.2.					
	Subtotal			3		
3. Radiation Control	2.3.7	Ability to comply with radiation work permit requirements during normal or abnormal conditions. 55.41(12)	3.5			
	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities. 55.41(12)	3.4			
	2.3.					
	2.3.					
	2.3.					
	2.3.					
	Subtotal			2		
4. Emergency Procedures / Plan	2.4.4	Ability to recognize abnormal indications for system operating parameters that are entry level conditions for emergency and abnormal operating procedures. 55.41(10)	4.5			
	2.4.25	Knowledge of fire protection procedures. 55.41(10)	3.3			
	2.4.					
	2.4.					
	2.4.					

	2.4.					
	Subtotal			2		
Tier 3 Point Total				10		



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Facility: Grand Gulf Nuclear Station													Date of Exam: October 19, 2012				
Tier	Group	RO K/A Category Points											SRO-Only Points				
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total	
1. Emergency & Abnormal Plant Evolutions	1												20	4	3	7	
	2												7	1	2	3	
	Tier Totals												27	5	5	10	
2. Plant Systems	1												26	3	2	5	
	2												12	1	2	3	
	Tier Totals												38	4	4	8	
3. Generic Knowledge and Abilities Categories				1		2		3		4		10	1	2	3	4	7
													2	1	1	3	
<p>Note:</p> <ol style="list-style-type: none"> <li>Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).</li> <li>The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by <math>\pm 1</math> from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.</li> <li>Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.</li> <li>Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.</li> <li>Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.</li> <li>Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.</li> <li>* The generic (G) 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. Refer to Section D.1.b of ES-401 for the applicable K/As.</li> <li>On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.</li> <li>For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.</li> </ol>																	

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)							Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#	
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4					X		AA2.05	3.4		
295003 Partial or Complete Loss of AC / 6										
295004 Partial or Total Loss of DC Pwr / 6										
295005 Main Turbine Generator Trip / 3										
295006 SCRAM / 1					X		AA2.06	3.8		
295016 Control Room Abandonment / 7										
295018 Partial or Total Loss of CCW / 8										
295019 Partial or Total Loss of Inst. Air / 8										
295021 Loss of Shutdown Cooling / 4										
295023 Refueling Acc / 8										
295024 High Drywell Pressure / 5						X	G2.1.23	4.4		
295025 High Reactor Pressure / 3										
295026 Suppression Pool High Water Temp. / 5					X		EA2.03	4.0		
295027 High Containment Temperature / 5						X	G2.4.21	4.6		
295028 High Drywell Temperature / 5										
295030 Low Suppression Pool Wtr Lvl / 5										
295031 Reactor Low Water Level / 2						X	G2.2.40	4.7		
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1										
295038 High Off-site Release Rate / 9										
600000 Plant Fire On Site / 8					X		AA2.14	3.6		
700000 Generator Voltage and Electric Grid Disturbances / 6										
K/A Category Totals:					4	3	Group Point Total:		7	

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)							Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#	
295002 Loss of Main Condenser Vac / 3										
295007 High Reactor Pressure / 3										
295008 High Reactor Water Level / 2										
295009 Low Reactor Water Level / 2										
295010 High Drywell Pressure / 5										
295011 High Containment Temp / 5						X	G2.1.28	4.1		
295012 High Drywell Temperature / 5										
295013 High Suppression Pool Temp. / 5						X	G2.2.25	4.2		
295014 Inadvertent Reactivity Addition / 1										
295015 Incomplete SCRAM / 1										
295017 High Off-site Release Rate / 9										
295020 Inadvertent Cont. Isolation / 5 & 7										
295022 Loss of CRD Pumps / 1										
295029 High Suppression Pool Wtr Lvl / 5										
295032 High Secondary Containment Area Temperature / 5										
295033 High Secondary Containment Area Radiation Levels / 9										
295034 Secondary Containment Ventilation High Radiation / 9										
295035 Secondary Containment High Differential Pressure / 5					X		EA2.01	3.9		
295036 Secondary Containment High Sump/Area Water Level / 5										
500000 High CTMT Hydrogen Conc. / 5										
K/A Category Point Totals:					1	2	Group Point Total:		3	

ES-401		BWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)											Form ES-401-1	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
203000 RHR/LPCI: Injection Mode														
205000 Shutdown Cooling														
206000 HPCI														
207000 Isolation (Emergency) Condenser														
209001 LPCS														
209002 HPCS														
211000 SLC														
212000 RPS								X				A2.14	4.0	
215003 IRM														
215004 Source Range Monitor														
215005 APRM / LPRM														
217000 RCIC								X				A2.01	3.7	
218000 ADS											X	G2.1.31	4.3	
223002 PCIS/Nuclear Steam Supply Shutoff														
239002 SRVs														
259002 Reactor Water Level Control														
261000 SGTS														
262001 AC Electrical Distribution														
262002 UPS (AC/DC)											X	G2.4.45	4.3	
263000 DC Electrical Distribution														
264000 EDGs														
300000 Instrument Air														
400000 Component Cooling Water								X				A2.02	3.0	
K/A Category Point Totals:								3			2	Group Point Total:		5

ES-401		BWR Examination Outline Plant Systems - Tier 2/Group 2 (RO / SRO)												Form ES-401-1	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#	
201001 CRD Hydraulic															
201002 RMCS															
201003 Control Rod and Drive Mechanism															
201004 RSCS															
201005 RCIS															
201006 RWM															
202001 Recirculation															
202002 Recirculation Flow Control															
204000 RWCU															
214000 RPIS											X	G2.4.4.	4.7		
215001 Traversing In-core Probe															
215002 RBM															
216000 Nuclear Boiler Inst.															
219000 RHR/LPCI: Torus/Pool Cooling Mode															
223001 Primary CTMT and Aux.															
226001 RHR/LPCI: CTMT Spray Mode															
230000 RHR/LPCI: Torus/Pool Spray Mode															
233000 Fuel Pool Cooling/Cleanup															
234000 Fuel Handling Equipment															
239001 Main and Reheat Steam															
239003 MSIV Leakage Control															
241000 Reactor/Turbine Pressure Regulator								X				A2.07	3.6		
245000 Main Turbine Gen. / Aux.															
256000 Reactor Condensate											X	G2.4.6	4.7		
259001 Reactor Feedwater															
268000 Radwaste															
271000 Offgas															
272000 Radiation Monitoring															
286000 Fire Protection															
288000 Plant Ventilation															
290001 Secondary CTMT															
290003 Control Room HVAC															
290002 Reactor Vessel Internals															
K/A Category Point Totals:								1			2	Group Point Total:		3	

Facility:		Date of Exam:				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.4	Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license status. 55.43(2)			3.8	
	2.1.13	Knowledge of facility requirements for controlling vital/controlled access. 55.43(5)			3.2	
	2.1.					
	2.1.					
	2.1.					
	2.1.					
	Subtotal					2
2. Equipment Control	2.2.14	Knowledge of the process for controlling equipment configuration or status. 55.43(3)			4.3	
	2.2.					
	2.2.					
	2.2.					
	2.2.					
	2.2.					
	Subtotal					1
3. Radiation Control	2.3.13	Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. 55.43(4)			3.8	
	2.3.					
	2.3.					
	2.3.					
	2.3.					
	2.3.					
	Subtotal					1
4. Emergency Procedures /	2.4.1	Knowledge of EOP entry conditions and immediate action steps. 55.43(5)			4.8	
	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc. 55.43(5)			4.6	

Plan	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines. 55.43(5)			4.4	
	2.4.					
	2.4.					
	2.4.					
	Subtotal					3
Tier 3 Point Total						7



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Facility: <b>GRAND GULF NUCLEAR STATION</b>		Date of Examination: 12/10/2012
Exam Level: RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: <u>LOT-2012</u>
Control Room Systems <sup>@</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. 201001 A4.01 (3.1/3.1) / Rotate Operating CRD Pumps GJPM-OPS-2012CR1	A-D-S	1
b.		
c. 239001 2.1.30 (4.4/4.0) / Close and Open a MSIV GJPM-OPS-2012CR3	D-S	3
d. 245000 700000 AA1.03 (3.8/3.7) / Adjust Generator VARs GJPM-OPS-2012CR4	A-N-S	4
e. 219000 295026 EA1.01 (4.1/4.1) / Shift RHR System to Suppression Pool Cooling GJPM-OPS-2012CR5	A-M-S-EN-L	5
f. 264000 A4.05 (3.6/3.7) / Parallel Diesel Generator with the Grid GJPM-OPS-2012CR6	D-S	6
g. 212000 A2.03 (3.3/3.5) / Reactor Manual Scram Switch Test GJPM-OPS-2012CR7	A-P-S	7
h. 272000 A4.02 (3.0/3.0) / Area Radiation Monitor Functional Test GJPM-OPS-2012CR8	D-S	9
In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. 295019 AA1.01 (3.5/3.3) / Install Nitrogen Bottle on ADS Air Supply GJPM-OPS-2012PS1	P-E-L-R	3
j. 212000 2.1.20 (4.6/4.6) / Energize RPS Alternate Feed GJPM-OPS-2012PS2	D	7
k. 286000 2.4.25 (3.3/3.7) / Manually Initiate Fire Protection GJPM-OPS-2012PS3	A-D	8
<p><sup>@</sup> All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.</p>		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	4-6 / 4-6 / 2-3  $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / $\geq 1$ (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$	

Facility: <b>GRAND GULF NUCLEAR STATION</b>		Date of Examination: 12/10/2012
Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>		Operating Test No.: <u>LOT-2012</u>
Control Room Systems <sup>@</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a.		
b.		
c.		
d. 245000 700000 AA1.03 (3.8/3.7) / Adjust Generator VARs GJPM-OPS-2012CR4	A-N-S	4
e. 219000 295026 EA1.01 (4.1/4.1) / Shift RHR System to Suppression Pool Cooling GJPM-OPS-2012CR5	A-M-S-EN-L	5
f.		
g.		
h. 272000 A4.02 (3.0/3.0) / Area Radiation Monitor Functional Test GJPM-OPS-2012CR8	D-S	9
In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. 295019 AA1.01 (3.5/3.3) / Install Nitrogen Bottle on ADS Air Supply GJPM-OPS-2012PS1	P-E-L-R	3
j.		
k. 286000 2.4.25 (3.3/3.7) / Manually Initiate Fire Protection GJPM-OPS-2012PS3	A-D	8
<p><sup>@</sup> All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.</p>		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	4-6 / 4-6 / 2-3  $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / $\geq 1$ (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$	

Facility: <b>GRAND GULF NUCLEAR STATION</b>		Date of Examination: 12/10/2012
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: <u>LOT-2012</u>
Control Room Systems <sup>@</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. 201001 A4.01 (3.1/3.1) / Rotate Operating CRD Pumps GJPM-OPS-2012CR1	A-D-S	1
b. 209001 A4.02 (3.5/3.4) / Quarterly Valve Surveillance GJPM-OPS-2012CR2	M-S	2
c. 239001 2.1.30 (4.4/4.0) / Close and Open a MSIV GJPM-OPS-2012CR3	D-S	3
d. 245000 700000 AA1.03 (3.8/3.7) / Adjust Generator VARs GJPM-OPS-2012CR4	A-N-S	4
e. 219000 295026 EA1.01 (4.1/4.1) / Shift RHR System to Suppression Pool Cooling GJPM-OPS-2012CR5	A-M-S-EN-L	5
f. 264000 A4.05 (3.6/3.7) / Parallel Diesel Generator with the Grid GJPM-OPS-2012CR6	D-S	6
g. 212000 A2.03 (3.3/3.5) / Reactor Manual Scram Switch Test GJPM-OPS-2012CR7	A-P-S	7
h. 272000 A4.02 (3.0/3.0) / Area Radiation Monitor Functional Test GJPM-OPS-2012CR8	D-S	9
In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. 295019 AA1.01 (3.5/3.3) / Install Nitrogen Bottle on ADS Air Supply GJPM-OPS-2012PS1	P-E-L-R	3
j. 212000 2.1.20 (4.6/4.6) / Energize RPS Alternate Feed GJPM-OPS-2012PS2	D	7
k. 286000 2.4.25 (3.3/3.7) / Manually Initiate Fire Protection GJPM-OPS-2012PS3	A-D	8
<p><sup>@</sup> All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.</p>		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	4-6 / 4-6 / 2-3  $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / $\geq 1$ (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$	

Facility: <b>Grand Gulf Nuclear Station</b>		Date of Examination: <b>12/10/2012</b>
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: <b>LOT-2012</b>

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations		
Conduct of Operations	P-R	Review Cooldown Record GJPM-OPS-2012AR1 2.1.23 (4.3)
Equipment Control	M-R	Determine Tagging Requirements GJPM-OPS-2012AR2 2.2.41 (3.5)
Radiation Control	N-R	Emergency Exposure Limits GJPM-OPS-2012AR3 2.3.4 (3.2)
Emergency Procedures/Plan	N-R	Reactor Water Level Determination GJPM-OPS-2012AR4 2.4.34 (4.2)

**NOTE:** All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

\* Type Codes & Criteria:

(C)ontrol room, (S)imulator, or Class(R)oom  
 (D)irect from bank ( $\leq 3$  for ROs;  $\leq 4$  for SROs & RO retakes)  
 (N)ew or (M)odified from bank ( $\geq 1$ )  
 (P)revious 2 exams ( $\leq 1$ ; randomly selected)

Facility: <b>Grand Gulf Nuclear Station</b>		Date of Examination: <b>12/10/2012</b>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: <b>LOT-2012</b>

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N-R	Reactor Water Chemistry Required Actions GJPM-OPS-2012AS1 2.1.34 (3.5)
Conduct of Operations	M-R	Manual Risk Assessment GJPM-OPS-2012AS2 K/A 2.1.20 (4.6)
Equipment Control	N-R	Tagout approval GJPM-OPS-2012AS3 2.2.41(3.9)
Radiation Control	N-R	Rad limits for Emergency GJPM-OPS-2012AS4 2.3.4 (3.7)
Emergency Procedures/Plan	N-R	Protective Action Recommendation Determination GJPM-OPS-2012AS5 2.4.44 (4.4)

**NOTE:** All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

**\* Type Codes & Criteria:**

(C)ontrol room, (S)imulator, or Class(R)oom  
 (D)irect from bank ( $\leq 3$  for ROs;  $\leq 4$  for SROs & RO retakes)  
 (N)ew or (M)odified from bank ( $\geq 1$ )  
 (P)revious 2 exams ( $\leq 1$ ; randomly selected)

Facility: GGNS			Date of Exam: 12/10/12									Operating Test No.: 12/12					
A P P L I C A N T	E V E N T  T Y P E	Scenarios												T O T A L	M I N I M U M(*)		
		1			2			3			4						
		C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P				
														R	I	U	
U1	RX	1			1									2	1	1	0
	NOR	0			1									1	1	1	1
	I/C	6			6									12	4	4	2
	MAJ	2			2									4	2	2	1
	TS	2			2									4	0	2	2
R1	RX		1				0							1	1	1	0
	NOR		0				1							1	1	1	1
	I/C		2				2							4	4	4	2
	MAJ		2				2							4	2	2	1
	TS														0	2	2
R2	RX			0		1								1	1	1	0
	NOR			1		0								1	1	1	1
	I/C			2		2								4	4	4	2
	MAJ			2		2								4	2	2	1
	TS														0	2	2
U2	RX				1			1						2	1	1	0
	NOR				1			0						1	1	1	1
	I/C				6			6						12	4	4	2
	MAJ				2			1						3	2	2	1
	TS				2			2						4	0	2	2

## Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; (\*) Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (\*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.



A P P L I C A N T	E V E N T  T Y P E	Scenarios													T O T A L	M I N I M U M (*)		
		1			2			3			4							
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION							
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P					
R3	RX					1				0				1	1	1	0	
	NOR					0				0				0	1	1	1	
	I/C					2				3				5	4	4	2	
	MAJ					2				1				3	2	2	1	
	TS														0	2	2	
R4	RX						0		1					1	1	1	0	
	NOR						1		0					1	1	1	1	
	I/C						2		2					4	4	4	2	
	MAJ						2		1					3	2	2	1	
	TS														0	2	2	
I1	RX	1				1				0				2	1	1	0	
	NOR	0				0				0				0	1	1	1	
	I/C	6				2†				3				11	4	4	2	
	MAJ	2				2				1				5	2	2	1	
	TS	2												2	0	2	2	
I2	RX		1		1			1						3	1	1	0	
	NOR		0		1			0						1	1	1	1	
	I/C		2†		6			6						14	4	4	2	
	MAJ		2		2			1						5	2	2	1	
	TS				2			2						4	0	2	2	
R5	RX			0			0		1					1	1	1	0	
	NOR			1			1		0					2	1	1	1	
	I/C			2			2		2					6	4	4	2	
	MAJ			2			2		1					5	2	2	1	
	TS														0	2	2	
I3	RX	1								0		0		1	1	1	0	
	NOR	0								0		0		0	1	1	1	
	I/C	6								3		2†		11	4	4	2	
	MAJ	2								1		2		5	2	2	1	
	TS	2													0	2	2	
I4	RX		1					1					0	2	1	1	0	
	NOR		0					0					1	1	1	1	1	
	I/C		2†					6					1	9	4	4	2	
	MAJ		2					1					2	5	2	2	1	
	TS							2						2	0	2	2	

Facility: GGNS		Date of Exam: 12/10/12									Operating Test No.: 12/12							
A P P L I C A N T	E V E N T  T Y P E	Scenarios																
		1			2			3			4			T O T A L	M I N I M U M(*)  R   I   U			
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION							
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P					
I5	RX			0					1			0			1	1	1	0
	NOR			1					0			1			2	1	1	1
	I/C			2					2 <sup>†</sup>			6			10	4	4	2
	MAJ			2					1			2			5	2	2	1
	TS											2			2	0	2	2
I6	RX	1				1					0				2	1	1	0
	NOR	0				0					0				0	1	1	1
	I/C	6				2 <sup>†</sup>					3				11	4	4	2
	MAJ	2				2					1				5	2	2	1
	TS	2													2	0	2	2
I7	RX		1		1			1							3	1	1	0
	NOR		0		1			0							1	1	1	1
	I/C		2 <sup>†</sup>		6			6							14	4	4	2
	MAJ		2		2			1							5	2	2	1
	TS				2			2							4	0	2	2
R6	RX			0			0		1						1	1	1	0
	NOR			1			1		0						2	1	1	1
	I/C			2			2		2						6	4	4	2
	MAJ			2			2		1						5	2	2	1
	TS															0	2	2
	RX															1	1	0
	NOR															1	1	1
	I/C															4	4	2
	MAJ															2	2	1
	TS															0	2	2
	RX															1	1	0
	NOR															1	1	1
	I/C															4	4	2
	MAJ															2	2	1
	TS															0	2	2
	RX															1	1	0
	NOR															1	1	1
	I/C															4	4	2
	MAJ															2	2	1
	TS															0	2	2

Facility: Grand Gulf Nuclear Station Scenario No.: 1 Op-Test No.: 12/12

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

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

1. Lower generator output to 1315 MWe.
2. Placing suppression pool cooling in service on RHR A when the E12-F064A minimum flow valve fails to automatically reposition.
3. Partial loss of CCW flow.
4. RFPT "B" Trip and FCV "A" runback does not occur.
5. FCV "A" Fails Closed.
6. Loss of 12BE2 LCC / Complete loss of CCW flow.
7. Reactor scram with limited injection capability.
8. Feedwater Line Break in the Drywell.
9. Division 1 ECCS systems fail to initiate.

Initial Conditions: Operating at 95% power. HPCS is tagged out for maintenance (will be available in 6 hours).

Inoperable Equipment: HPCS

Turnover:

- SSW "A" is in service.
- Suppression pool temperatures are elevated.
- HPCS Pump was tagged out for maintenance last shift and will be returned to service in 12 hours.
- TS 3.5.1 condition B was entered at 0530 on the previous shift.

Scenario Notes:

This is a new scenario. It was developed in part from plant OE found in CR-GGN-2011-08125 (Recirc FCV fails to Runback). RHR is ranked in the top 5 important systems of the GGNS PRA analysis and is challenged by this scenario.

Validation Time (60-90 min): 80 min

Event No.	Malf. No.	Event Type <sup>†</sup>	Event Description
1		R (ATC) N (BOP)	Lower generator output to 1315 MWe (03-1-01-2 IOI Power Operations Attachment VIII temporary downpower)
2	E12275A	I (BOP) TS (CRS)	Placing suppression pool cooling in service on RHR 'A' when the E12-F064A minimum flow valve fails to automatically reposition (SOI 04-1-01-C11-1 section 5.2.2; TS 3.3.5.1 and TS 3.5.1)
3	p42f016a p42151b p42R016	C (BOP) A (CREW)	Partial Loss of CCW Flow (05-1-02-V-1 Loss of CCW)
4	RR217A fw123b	I (ATC) A (CREW)	RFPT "B" Trip and FCV "A" runback does not occur (05-1-02-V-7 Feedwater System Malfunctions; 05-1-02-III-3 Reduction in Recirculation System Flow Rate)
5	DI_1B33K 603AC	TS (CRS)	FCV "A" Fails Closed (05-1-02-III-3 Reduction in Recirculation System Flow Rate; TS 3.4.1)
6	r21142h	C (ATC)	Loss of 12BE2 LCC / Complete loss of CCW flow (05-1-02-V-1 Loss of CCW)
7	e22644 fw171b b21f065b_i	M (CREW)	Reactor Scram with limited injection capability (EP-2 RPV Control; 05-1-02-I-1 Reactor Scram) <b>* When reactor water level lowers to between -160" (TAF) and -191", the crew opens 8 SRVs and observes lowering pressure trend and valve position indications (tailpipe pressure indication lamps or solenoid valve energized) Criterion is to open at least seven SRVs before RPV level drops to -217". Rapid Depressurization with the BPVs satisfies this critical task.</b>
8	fw171b rr063b	C (CREW)	Feedwater Line Break in the Drywell (EP-3 Containment Control)
9	rr040a	I (CREW)	Division 1 ECCS systems fail to initiate <b>* When drywell pressure exceeds 1.39 psig or reactor water level is below -150.3, the crew recognizes Division 1 ECCS fails to automatically initiate and arms and depresses the LPCS/RHR A MAN INIT push button. Criterion is to align Division 1 ECCS systems for injection prior to Emergency Depressurization.</b>
<sup>†</sup> (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (A)bnormal (TS) Tech Spec <b>* Critical Task</b> (As defined in NUREG 1021 Appendix D)			
Quantitative Attributes Table			
Normal Events	1	Abnormal Events	2
Reactivity Manipulations	1	Total Malfunctions	6
Instrument/Component Failures	6	EP Entries (Requiring substantive action)	1
Major Transients	1	EP Contingencies	1
Tech Spec Calls	3	Critical Tasks	2

**Simulator Setup:****A. Initialization**

1. Log off all simulator PDS and SPDS computers (PDS and SPDS must come up after the simulator load for proper operation).
2. Startup the simulator using Simulator Instructor's Job Aid section 6.3.

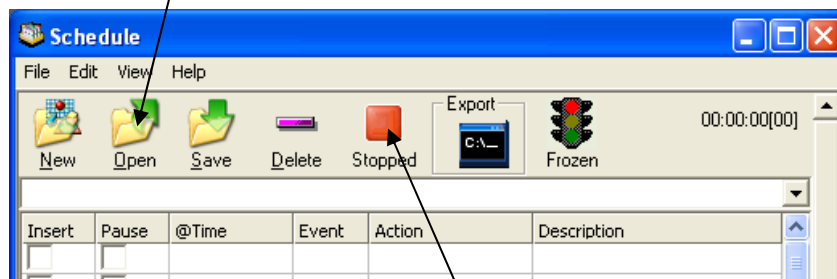
*Note:*

***Prior to running the Schedule File, ensure no Event Files are Open. If an existing Event File is Open prior to running the Schedule File, then any associated Event Files will not automatically load.***

3. Open Schedule.exe and Director.exe by clicking on the Icon in the Thunder Bar.

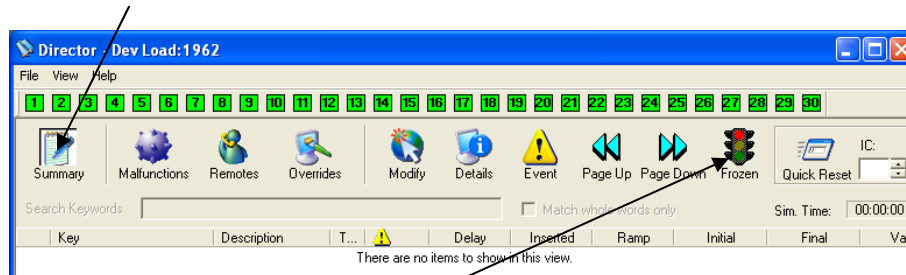


4. Set the Simulator to **IC-101** and perform switch check (Using Quick Reset in Director).
5. Click on **“Open”** in the Schedule window and Open Schedule File **“2012 NRC Scenario 1.sch”** (in the Schedule Directory)



6. In Schedule window, click on the **“Stopped”** red block. The red block will change to a green arrow and indicate the scenario is active (**“Running”**).

7. Click the Summary tab in the Director window. Verify the schedule files are loaded and opened per Section B below. (Note: Any actions in the schedule file without a specific time will not load into the director until triggered.)



8. Take the simulator out of freeze.
9. Log on to all simulator PDS and SPDS computers.
10. Verify or perform the following:
  - IC-101
  - SSW "A" is in service.
  - HPCS pump is de-energized and red tagged.
  - HPCS OOSVC to INOP.
  - Ensure the correct rod movement sequence available at the P680.
  - Advance all chart recorders and ensure all pens inking properly.
  - Clear any graphs and trends off of SPDS.
11. Run through any alarms and ensure alarms are on. (**Note: On T-Rex, to verify alarms are ON, the indicator will indicate "Alarms On"**).
12. Place the simulator in Freeze.

B. File loaded verification:

**Schedule - 2012 NRC Scenario 1.sch**

File Edit View Help

New Open Save Delete Stopped Export Frozen

00:00:00[00]

Insert	Pause	@Time	Event	Action	Description
				^NRC EXAM GGN 2012 Senario 1	
				=> E12-F064A min flow switch failed downscale	
		00:00:00		Insert malfunction E12275A	Min Flow relay failure for E12-F064A (E12N652A)
		00:00:00		create event 1 zlo4(744) == 1	E12-F064A is closing
			1	delete malfunction E12275A	Min Flow relay failure for E12-F064A (E12N652A)
			1	Insert malfunction E12275A after 5	Min Flow relay failure for E12-F064A (E12N652A)
				=> Loss of CCW ONEP	
		00:00:00		Insert remote p42f016a from 25.00000 to 0 in 500 on event 2	VALVE P42F016A CCW
		00:00:00		Insert remote p44f002a to 0.04000 in 120 on event 2	PSW A Discharge valve
		00:00:00		Insert remote p42R016 to 124.50000 in 150 on event 2	CCW Temperature Controller Setpoint
		00:00:00		create event 3 p42nccwp(2) > 0.99	CCW B is running
		00:00:00		Insert malfunction p42151b after 30 on event 3	Component Cooling Water Pump B Trip
		00:00:00		create event 4 zlo3(688) == 1 & zlo3(694) == 1	Fuel Pool Cooling was isolated
			4	Modify remote p42R016 to 99.75000 in 60 on event 4	
			4	Modify remote p44f002a to 0.08000 in 45 on event 4	
				=> RFPT "B" trip & Recirc FCV A fails to automatically runback	CR-GGN-2011-08125
		00:00:00		Insert malfunction RR217A	"A" Recirc FCV fails to runback
		00:00:00		Insert malfunction p680_2a_c_10 to ON on event 5 delete in 1	RFPT B GOV VLV CONTR TROUBLE
		00:00:00		Insert malfunction p680_2a_c_10 after 25 to ON on event 5 delete in 1	RFPT B GOV VLV CONTR TROUBLE
		00:00:00		Insert malfunction fw123b after 35 on event 5	Feedwater Pump Turbine B Overspeed Trip
				=> Recirc FCV A fails closed when manually operated	
		00:00:00		create event 6 rrvpb33f060a < 0.5	FCV A is being closed
		00:00:00		Insert override DI_1B33K603AC to FAST_CLOSE on event 6	P680/03D RECIRC LOOP A FLO CONT
				=> Complete loss of CCW (loss of lcc 12BE2)	
		00:00:00		Insert malfunction r21142h on event 7	480 V Bus 12BE2 Overcurrent Trip
			7	modify remote p42f016a from 25.00000 to 0.50000 on event 7	VALVE P42F016A CCW
			7	modify remote p42R016 on event 7	CCW Temperature Controller Setpoint
				=> Post SCRAM activities	
		00:00:00		create event 8 xcr4c34na011 < 800	scram has occurred (MW < 800)
		00:00:00		Insert malfunction fw171b after 240 on event 8	Feedwater Line B ruptures inside Drywell.
		00:00:00		Insert malfunction rr063b after 240 to 2.00000 on event 8	Recirc Loop B Non-Isolable Suction Rupture
		00:00:00		Insert malfunction b21f065b_i	override (loss of power when stroke)
		00:00:00		Insert malfunction rr040a to 0 on event 8	DW Press Xmtr B21-N094A Fails (VAR)
				=> SETUP	
		0		Insert remote ct101 to ON	SUPP POOL TEMP ADJUST (FOR IC SETUP ONLY)
		0		Insert remote ct100 to 84.80000 delete in 3	SUPP POOL TEMP DESIRED/ACTUAL IC SETUP ONLY
		2		modify remote ct101 after 2 to OFF delete in 3	
		0		Insert remote e22644 to OUT	HPCS PUMP BREAKER
		0		Insert malfunction p870_5a_d_1 to OFF	CCW HX OUTL TEMP HI

Ready NUM

Director - Dev Load:1962

File View Help

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Summary Malfunctions Remotes Overrides Modify Details Event Page Up Page Down Frozen Quick Reset IC: 101

Search Keywords  ☐ Match whole words only Sim. Time: 00:00:00

Key	Description	T...	Delay	Inserted	Ramp	Initial	Final	Value
E12275A	Min Flow relay failure for E12-F064A (E12N652A)		00:00:00		00:00:00		Active	InActive
p42151b	Component Cooling Water Pump B Trip		3 00:00:30		00:00:00		Active	InActive
RR217A	"A" Recirc FCV fails to runback		00:00:00		00:00:00		Active	InActive
p680_2a_c_10	RFPT B GOV VLV CONTR TROUBLE		5 00:00:00		00:00:00		ON	NORMAL
p680_2a_c_10	RFPT B GOV VLV CONTR TROUBLE		5 00:00:25		00:00:00		ON	NORMAL
fw123b	Feedwater Pump Turbine B Overspeed Trip		5 00:00:35		00:00:00		Active	InActive
r21142h	480 V Bus 12BE2 Overcurrent Trip		7 00:00:00		00:00:00		Active	InActive
fw171b	Feedwater Line B ruptures inside Drywell.		8 00:04:00		00:00:00		100	0
rr063b	Recirc Loop B Non-Isolable Suction Rupture		8 00:04:00		00:00:00		2	0
b21f065b_i	override [loss of power when stroke]		00:00:00		00:00:00		Active	InActive
rr040a	DW Press Xmt B21-N094A Fails (VAR)		8 00:00:00		00:00:00		0	0
p42f016a	VALVE P42F016A CCW		2 00:00:00		00:08:20	25	0	100
p44f002a	PSW A Discharge valve		2 00:00:00		00:02:00		0.04	0.125
p42R016	CCW Temperature Controller Setpoint		2 00:00:00		00:02:30		124.5	90
DI_1B33K603AC	P680/03D RECIRC LOOP A FLO CONT		6 00:00:00		00:00:00		FAST_CL...	NORMAL

Ready NUM



**Crew Turnover:**

B. Assign the candidates crew positions.

C. Turnover the following conditions:

Power	95%
Pressure	1020 psig
EOC	
EOOS	YELLOW
Work Week	Division 2

- SSW “A” is in service.
- Suppression pool temperatures are elevated.
- HPCS Pump was tagged out for maintenance last shift and will be returned to service in 12 hours.
- TS 3.5.1 condition B was entered at 0530 on the previous shift.

Planned Evolutions this shift:

- Lower generator output to 1315 MWe using IOI-2 Attachment VIII Temporary Downpower (notifications have been made).
- Place RHR “A” in suppression pool cooling mode for maximum cooling (EOOS will remain YELLOW).
- Note that an independent Reactivity Management SRO per Operations Philosophy 6.8.1 will not be provided for this scenario.

D. Allow the crew to perform pre-shift brief and review procedures for planned evolutions.

E. Bring the crew into the Simulator, place the simulator is in RUN.

F. Allow the crew to walk down panels.

G. When the crew assumes the shift begin Scenario Activities.

**SCENARIO ACTIVITIES:**

- A. Start SBT report and any other required recording devices (Video recording not allowed for NRC exams).

**Lower Generator Output to 1315 MWe:**

- B. The crew will lower generator output. No actions require outside the Control Room. The Crew should move from this evolution to placing RHR in SP Cooling without prompting. If required, contact the control room as the Shift Manager to move the scenario along.
- C. At the Lead Evaluator's discretion, Call the Control Room as SM (2374) and tell the CRS that the Load Dispatcher wants us to hold our generator output at the current level and that the crew should proceed with placing Suppression Pool Cooling in service.

**Place RHR "A" in Suppression Pool Cooling Mode:**

- D. The crew will start RHR "A" in suppression pool cooling using 04-1-01-E12-1, Residual Heat Removal System SOL.
1. If directed by the Control Room to perform pre-start pump checks:
    - a. Report that pre-start pump check is complete.
  2. When the RHR "A" pump is running and E12-F024A (Test Return to Suppression Pool) is open, E12-F064A (Min Flow Valve) should automatically close; however, it has failed to reposition. The valve will close when the handswitch is repositioned (Auto Event 1).
    - a. If an operator (or the Control Room directs you as I&C / Control Building Operator) looks at E12-FIS-N652A, report that it is reading erratically between 550 – 3,500 gpm.
    - b. Also, if acting as the I&C technician, report that you will need to develop a work order to troubleshoot. If the transmitter is failing, it could fail high or low. This instrument is unreliable until we fix it.
    - c. The CRS should consult TS and enter TS 3.3.5.1 condition E2.
    - d. When the TS is entered and any transient brief is complete (or lead evaluator directs) begin the next event.

**Partial Loss of CCW:**

- E. Trigger **EVENT 2** to simulate a degrading CCW pump as indicated by lowering common pump discharge pressure. When discharge pressure lowers to 100 psig, CCW "B" pump will automatically start; however, it will trip after 30 seconds (Auto Trigger 3).



1. When the Control Room directs you as the local operator or maintenance to investigate the CCW pumps:
  - a. If sent to CCW “B” pump breaker, report that breaker 52-16302 is tripped and that Electrical Maintenance will need to inspect the breaker before it can be reclosed.
  - b. If sent to the CCW pumps, report that CCW pumps “A” and “C” are running and that the “A” CCW pump is running warmer than normal and sounds unusual.
2. The crew should take the actions for partial loss of CCW and isolate CCW to the Fuel Pool Cooling HXs by closing P42-F105 and P42-205. This will cause CCW component temperatures to stabilize (Recirc Pump temps on P614 B33-TJR-R601; Auto Trigger 4).
3. The crew may isolate CCW to RWCU and/or lower core flow to 70 mlbm/hr although not required to stabilize CCW component temperatures.
4. When the crew stabilizes CCW component temperatures and any transient brief is complete (or lead evaluator directs) begin the next event.

**RFPT “B” Trip and FCV “A” runback does not occur (CR-GGN-2011-08125):**



F. Trigger **EVENT 5** to Trip RFPT “B”.

1. The crew will enter the FW Malfunctions ONEP and Reduction in Recirc ONEP.
2. There are no actions require outside the Control room.
3. When the ATC operator attempts to reposition FCV “A”, the valve will fail closed (Auto Trigger 6).

**FCV “A” Fails Closed:**

G. No actions are required for this event; however, the CRS will enter TS 3.4.1 condition A requiring the crew to shutdown one Recirc loop within 2 hrs.

1. When the TS is entered or the crew begins to insert control rods (or lead evaluator directs) begin the next event.

**Loss of 12BE2 LCC / Complete loss of CCW:**



H. Trigger **EVENT 7** to trip 12BE2 on overcurrent.

1. The crew will determine that there is a complete loss of CCW and manually scram the reactor and trip both Recirc pumps.

**Reactor SCRAM with a FW line break inside the Drywell:**

- I. Four minutes after the crew scrams the reactor, a feedwater line break (“B” side) inside the drywell concurrent with a loss of power on B21-F065B will occur (Auto Trigger 8). (**Install EP Attachments as directed**).

**Termination:**


- J. Once emergency depressurization has been conducted and reactor water level is stabilized above TAF or as directed by Lead Evaluator:
- Take the simulator to Freeze and turn horns off.
  - Stop and save the SBT report and any other recording devices.
  - Instruct the crew to not erase any markings or talk about the scenario until after follow-up questions are asked.


**Critical Tasks:**

- When drywell pressure exceeds 1.39 psig or reactor water level is below -150.3, the crew recognizes Division 1 ECCS fails to automatically initiate and arms and depresses the LPCS/RHR A MAN INIT push button. Criterion is to align Division 1 ECCS systems for injection prior to Emergency Depressurization.
- When reactor water level lowers to between -160” (TAF) and -191”, the crew opens 8 SRVs and observes lowering pressure trend and valve position indications (tailpipe pressure indication lamps or solenoid valve energized) Criterion is to open at least seven SRVs before RPV level drops to -217”. Rapid Depressurization with the BPVs satisfies this critical task.


Op-Test No: <u>12/12</u>		Scenario No: <u>1</u>	Event No: <u>1</u>
Event Description: <b><u>Lower generator output to 1315 MWe</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	Conducts reactivity brief for the planned power change. (May be performed prior to taking the shift)  Directs the ATC to lower generator output to 1315 MWe using Recirc FCV's.  <i>Note: If desired, cue the both operator at any point before 1315 MWe to move on to the next event.</i>	
	ATC	Lowers power by closing the Recirc FCVs A & B using loop flow controllers B33K603A & B in slow detent on P680-3B (IOI-2 attachment VIII step 12.3).	
	BOP	Lowers Load Demand as power is lowered by depressing EHC LOAD REF DEMAND LOWER pushbutton (P680-9C) to maintain generator actual load within +/- 25 MW of the load demand limited value during power change (IOI-2 attachment VIII step 12.2).	

Op-Test No: <u>12/12</u>		Scenario No: <u>1</u>	Event No: <u>2</u>
Event Description: <b><u>Place suppression pool cooling in service on RHR A</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	<p>Directs the BOP to place suppression pool cooling in service on RHR "A" in accordance with SOI 04-1-01-E12-1.</p> <p>Enter TS 3.5.1 condition C when E12-F024A is opened.</p> <p>When notified that E12-F064A (RHR A MIN FLOW VLV) did not close, the CRS should direct the BOP to manually attempt to close E12-F064A.</p> <p>Direct the Control Building Operator / I&amp;C to determine cause for E12-F064A failed automatic operation.</p> <p>When determined that E12-F064A is INOP, enter TS 3.3.5.1 condition E.</p> <ul style="list-style-type: none"> <li>❖ Indication of the E12-F064A being INOP is that the valve failed to close followed by the valve being able to manually close and indications reported from the operators outside the Control Room (if asked) the Trip Unit is responding erratically.</li> </ul> <p><i>Note: There are two (2) Tech Spec entries for this event.</i></p>	
	BOP	<p>Places suppression pool cooling "A" in service using SOI 04-1-01-E12-1 section 5.2.2a:</p> <ul style="list-style-type: none"> <li>• Step (1) is NA – placing SSW "A" in Service.</li> <li>• Start RHR RM A FAN COIL UNIT on 1H13-P870</li> <li>• OPEN OR CHECK OPEN F003A, HX A OUTL VLV. (Normally Open, Valve Position Indication is located on a P601-20B meter)</li> <li>• Start RHR A PMP</li> <li>• OPEN F024A, RHR A TEST RTN TO SUPP POOL. (Opening this valve will cause RHR A to become INOP. The operator should inform the CRS prior to opening)</li> <li>• CLOSE (procedure says throttle, but close for max cooling) F048A, HX A BYP VLV</li> <li>• CHECK F064A (RHR A MIN FLOW VLV) is CLOSED (This valve has failed to close and is in the open position)</li> <li>• NOTIFY the CRS that E12-F064A did not automatically close as expected.</li> <li>• The BOP should attempt to close the E12-F064A. (The crew may opt to not close this valve.)</li> <li>• Send the Control Building Operator to the Upper Control Room to look at E12-FIS-N652A Flow indicating switch (Trip Unit for the E12-F064A).</li> </ul>	


Op-Test No: <u>12/12</u>		Scenario No: <u>1</u>	Event No: <u>3</u>
Event Description: <b><u>Partial Loss of CCW flow</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	BOP	<p>Recognizes and reports a Partial Loss of CCW (CCW pumps A and C are running but discharge pressure is low)</p> <ul style="list-style-type: none"> <li>❖ As indicated by annunciator P670-5A-C2, CCW PMP A/C DISCH PRESS LO and P6870-8A-E1, CCW PMP B DISCH PRESS LO and P870-8A-A1, CCW PMP B TRIP. Discharge pressure is below 100 psig. (NOTE: initially, CCW pump B starts, but then trips 30 seconds after it starts.)</li> </ul>	
	CRS	<p>Enters the Loss of Component Cooling Water ONEP (may also enter Inadequate Decay Heat Removal ONEP, but this is not an immediate priority).</p> <p>The CRS will direct actions of the Loss of CCW ONEP starting at step 3.2 and:</p> <ul style="list-style-type: none"> <li>• Direct an operator to monitor Recirc temperatures on Recorder B33-R601 at the P614 panel.</li> <li>• 3.2.2 – Direct the BOP operator to Close P42-F105 and P42-F205. (<b>When the operator takes this action or lowers core flow to 70 mlbm/hr, CCW temperatures will stabilize and further action is not necessary</b>)</li> <li>• The CRS may direct the ATC to lower core flow to 70 mlbm/hr and/or isolate CCW flow to RWCU heat exchangers.</li> <li>• Direct an operator to monitor Upper Containment and Spent Fuel Pool Temperatures.</li> <li>• Direct a local operator to monitor CRD pump oil temperature.</li> </ul> <p>When core flow is lowered to 70 mlbm/hr, Enter the Reduction in Recirculation Flow ONEP.</p> <p>Direct the ATC to establish THI watch without concurrent duties (concurrent duties are allowed when feedwater temperatures have stabilized).</p>	
	ATC	<p>When directed:</p> <ul style="list-style-type: none"> <li>• Lower core flow to 70 mlbm/hr using Recirc Loop A and B flow controllers in fast detent.</li> </ul> <p>Plot power and flow on the power-to-flow map and report entry into the OPRM Trip Enabled Region.</p> <p>Monitor APRMs, LPRMs, SRM period meters, and OPRM computer trends for indication of THI.</p>	

Op-Test No: <u>12/12</u>		Scenario No: <u>1</u>	Event No: <u>3 cont.</u>
Event Description: <b><u>Partial Loss of CCW flow</u></b>			
	BOP	<p>When directed:</p> <ul style="list-style-type: none"><li>• Close P42-105 and P42-205 from the P870 panel.</li><li>• Monitor Recirc temperatures on Recorder B33-R601 at the P614 panel.</li><li>• Report that Recirc temperatures are stable once P42-105 and P42-205 are closed.</li></ul>	
	ATC	<p>When directed:</p> <ul style="list-style-type: none"><li>• Isolate CCW flow to RCWU heat exchangers as follows:<ul style="list-style-type: none"><li>○ If time permits, then place RWCU filters in hold and Trip RWCU pumps.</li><li>○ If RWCU FLTR DMIN INL TEMP HI 130F (P680-11A-D6) annunciator alarms, then trip RWCU pumps.</li><li>○ Close P42-103 (Local valve, send building operator)</li><li>○ Notify Chemistry.</li></ul></li></ul>	



Op-Test No: <u>12/12</u>	Scenario No: <u>1</u>	Event No: <u>4</u>
Event Description: <b><u>RFPT 'B' Trip and FCV 'A' runback does not occur</u></b>		
TIME	Position	Applicant's Actions or Behavior
	ATC	<p>Report annunciator P680-2A-C10, RFPT B GOV VLV CONTR TROUBLE (Note: This annunciator will come in twice before the feed pump trips).</p> <p>Report RFPT "B" is tripped as indicated by annunciator P680-2A-A12, RFPT B TRIP.</p> <p>Observe and report that a runback occurs on Recirc FCV 'B' but does not occur on Recirc FCV 'A' as indicated by annunciators P680-4A1-C4, RECIRC FCV B PARTIAL CLOSE/RFP TRIP combined with the Recirc FCV 'B' closing to about 20% open. Conversely, these indications are expected on the Recirc FCV 'A' but do not occur.</p> <p>Manually close Recirc FCV 'A'.</p>
	CRS	<p>Enters the Feedwater System Malfunction ONEP and Reduction in Recirculation System Flow Rate ONEP.</p> <p>Direct the ATC to verify Reactor Recirculation System FCV runback occurs</p> <p>Direct the ATC to close the 'A' Recirc FCV to balance loop flows to within 4460 gpm.</p>

Op-Test No: <u>12/12</u>		Scenario No: <u>1</u>	Event No: <u>5</u>
Event Description: <b><u>FCV “A” Fails Closed</u></b>			
TIME	Position	Applicant’s Actions or Behavior	
	ATC	Recognize and report that the “A” Recirc FCV has failed closed. (NOTE: when the ATC takes the “A” FCV to close in order to balance loop flows, the “A” FCV will fail closed resulting in a loop flow mismatch)  Recognize and report entry into the Controlled Entry Region of the Power to Flow map as indicated by plotting reactor power and flow on the map posted on the P680.	
	CRS	Enter TS 3.4.1 Condition A requiring the crew to shutdown one Recirc loop within 2 hours.  Direct the ATC and BOP to insert control rods to exit the Controlled Entry Region  <i>Note: The next event will be triggered before the crew can actually insert control rods. This event is for CRS benefit of calling a TS and the Lead Evaluator may cue the booth operator to start next event at anytime.</i>	

Op-Test No: <u>12/12</u>		Scenario No: <u>1</u>	Event No: <u>6</u>
Event Description: <b><u>Loss of 12BE2 LCC / Complete loss of CCW</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	BOP	Recognizes and reports a loss of 12BE2 LCC. ❖ As indicated by annunciators P807-2A-E4, 480V LCC 12BE2 UNDERVOLT and P807-2A-C4, 480V LCC 12BE2 INCM FDR-MCC FDR TRIP.	
	CRS	The CRS will enter the Loss of AC ONEP; however, there are no direct actions to take from this ONEP Direct the BOP and ATC to walk down panels and determine all out of service equipment. Refer to 04-1-01-R21-12 BOP BUS 12HE for a complete load list and plant impact.	
	BOP	Recognize and report the loss of CCW pump "C" and complete loss of CCW cooling as indicated by P870-5A-B2, rising CCW cooled component temperatures, and P870-5A-C1 CCW DISCH HDR PRESS LO-LO.	
	ATC	Manually inserts a reactor scram by placing the reactor mode switch to SHUTDOWN.	

Op-Test No: <u>12/12</u>		Scenario No: <u>1</u>	Event No: <u>7</u>
Event Description: <b><u>Reactor Scram with Limited Injection Capability</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	Direct the ATC to insert a manual reactor scram. Enter the SCRAM ONEP and the Turbine and Generator Trips ONEP. Enter EP-2	
	ATC	Provides a scram report to the CRS: <ul style="list-style-type: none"> <li>• Reactor Mode SW in SHUTDOWN.</li> <li>• All Rods are IN.</li> <li>• Reactor power is 0%.</li> <li>• Reactor water level and trend.</li> <li>• Reactor pressure and trend.</li> <li>• Feedwater is available.</li> <li>• Bypass valves are available.</li> </ul>	
	CRS	Establish a level band of 11.4 – 53.5" and a pressure band of 800 – 1060 psig. Direct the ATC to place Startup Level Control in Automatic.	
	CREW	<i>NOTE: 4 minutes after the scram, a FW line break will occur in the drywell.</i> Recognize and announce a FW line break "B" side in the drywell. <ul style="list-style-type: none"> <li>❖ Indicated by rising Drywell pressure above 1.23 psig, rising Drywell temperatures, FW line "B" indicating high flow and no indicated flow in FW line "A", and multiple Drywell Floor and Equipment drain sump temperature annunciators.</li> </ul>	

Op-Test No: <u>12/12</u>		Scenario No: <u>1</u>	Event No: <u>8</u>
Event Description: <b><u>Feedwater Line B break in the Drywell</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	ATC	Report the Feed water leak to the CRS. Trip all condensate pumps. Attempt to close B21-F065B (this valve will lose power on stroke and remain open) Inform the CRS the Feedwater line break is unisolable and all Condensate Pumps have been tripped.	
	CRS	Ensure all condensate pumps are tripped and the B21-F065B is closed. The CRS will enter EP-3 (NOTE: there are no significant actions expected for this EP during this scenario)	
	CREW	Send an electrician to the B21-F065B breaker to inspect and restore power to this valve. Secure RCIC flow (RCIC is feeding the leak and not assisting to maintain reactor water level)	

Op-Test No: <u>12/12</u>		Scenario No: <u>1</u>	Event No: <u>9</u>
Event Description: <b><u>Division 1 ECCS systems fail to initiate</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	BOP	<p>Recognize the failure of Division 1 ECCS systems to automatically initiate when Drywell pressure exceeds 1.39 psig.</p> <ul style="list-style-type: none"><li>❖ Indicated by P601-21A-E7, DRWL PRESS HI annunciator in and the white light above the LPCS/RHR A INIT RESET pushbutton is out.</li></ul> <p>Arm and depress the LPCS/RHR A MAN INIT pushbutton.</p> <ul style="list-style-type: none"><li>* <b>When drywell pressure exceeds 1.39 psig or reactor water level is below -150.3, the crew recognizes Division 1 ECCS fails to automatically initiate and arms and depresses the LPCS/RHR A MAN INIT push button. Criterion is to align Division 1 ECCS systems for injection prior to Emergency Depressurization.</b></li></ul> <p>Inform the CRS that DW Pressure Transmitter for Div 1 ADS logic has failed as indicated by the "A" white light on ADS A HI DRWL PRESS REST being out (located on P601-19B; NOTE: This pressure transmitter failing is the cause for the Division 1 ECCS to not initiate).</p>	

Op-Test No: <u>12/12</u>		Scenario No: <u>1</u>	Event No: <u>7 cont.</u>
Event Description: <b><u>Reactor Scram with Limited Injection Capability</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	Enter the alternate level control leg of EP-2 Establish a new reactor level band of -30 to +30" Direct the ATC to monitor reactor level and provide periodic updates (20" updates is standard) Direct the ATC to INHIBIT ADS Direct the BOP to initiate SLC. Direct the BOP to maximize CRD for flow.	
	BOP	When directed, maximize CRD for flow <ul style="list-style-type: none"> <li>• Re-energize 15B42 and 16B42 on P864</li> <li>• Start the CRD A &amp; B Aux Oil Pump</li> <li>• Start the CRD A &amp; B Pump             <ul style="list-style-type: none"> <li>○ Start the first pump by placing the CRD SYS FLO CONT C11-R600 in manual and reducing output to 0 zero (with no CRD pumps initially running).</li> </ul> </li> <li>• Place CRD SYS FLO CONT C11-R600 in MANUAL.</li> <li>• Using CRS SYS FLO CONT C11-R600, fully open C11-F002A, CRD FLO CONT VLV</li> <li>• Fully open C11-F003, CRD DRIVE WTR PRESS CONT VLV.</li> </ul> When directed, initiate SLC <ul style="list-style-type: none"> <li>• Insert keys and turn SBL Pmp A and B pump key switches to START.</li> </ul>	
	ATC	When directed, Inhibit ADS by placing both ADS inhibit switches to INHIBIT. Update the CRS with reactor water level as it continues to lower.	
	CRS	When reactor water level reaches -160" and before -191", enter Emergency Depressurization leg of EP-2 Verify Suppression Pool level is above 10.5' Direct the BOP to open 8 ADS/SRVs <ul style="list-style-type: none"> <li>* <b>When reactor water level lowers to between -160" (TAF) and -191", the crew opens 8 SRVs and observes lowering pressure trend and valve position indications (tailpipe pressure indication lamps or solenoid valve energized) Criterion is to open at least seven SRVs before RPV level drops to -217". Rapid Depressurization with the BPVs satisfies this critical task.</b></li> </ul>	
	BOP	When directed, Opens at least 7 ADS valves.	

Op-Test No: <u>12/12</u>		Scenario No: <u>1</u>	Event No: <u>7 cont.</u>
Event Description: <b><u>Reactor Scram with Limited Injection Capability</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	ATC	Monitors for ECCS injection and ensure level is re-established above TAF. Restores reactor water level to -30" to +30"	



Give this page to the CRS

Turnover the following conditions:

Power	95%
Pressure	1020 psig
EOC	
EOOS	YELLOW
Work Week	Division 2

- SSW “A” is in service.
- Suppression pool temperatures are elevated.
- HPCS Pump was tagged out for maintenance last shift and will be returned to service in 12 hours.
- TS 3.5.1 condition B was entered at 0530 on the previous shift.

Planned Evolutions this shift:

- Lower generator output to 1315 MWe using IOI-2 Attachment VIII Temporary Downpower (notifications have been made).
- Place RHR “A” in suppression pool cooling mode for maximum cooling (EOOS will remain YELLOW).
- Note that an independent Reactivity Management SRO per Operations Philosophy 6.8.1 will not be provided for this scenario.

Facility: Grand Gulf Nuclear Station Scenario No.: 2 Op-Test No.: 12/12

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

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

1. Start a Condensate Pump.
2. Withdraw Control Rods to Establish Main Turbine BCV's 10% open.
3. RPS "A" MG failure.
4. Electric Power Monitoring Assembly INOPERABLE.
5. Two IRM channel failures.
6. Loss of TBCW
7. CST Rupture to CST/RWST Dike.
8. Scram with an unisolable recirc line break.
9. Major Electrical transient that limits injection sources.
10. Failure of automatic HPCS suction swap.

Initial Conditions: Reactor startup in progress.

- Reactor pressure is 400 psig
- Reactor power is 5%
- IRM 'G' is Bypassed

Inoperable Equipment: IRM G

Turnover:

- Crane operations are in progress on the south side of the Unit 1 Auxiliary Building.
- A reactor startup is in progress.
  - Step 135 of Control Rod Movement Sequence is complete
  - SJAE 'B' is in warm up 04-01-N62-1 step 4.2.2r
  - Step 6.2.13 of 03-1-01-1
- IRM 'G' is bypassed.
- The Condensate system is lined up as follows:
  - CFFF is in service
  - Precoat Filters are not in service
  - 4 Deepbed demins are in service

Scenario Notes:

This is a new scenario. It was developed in part from plant OE found in CR-GGN-1996-00517 (Low CST Level).

Validation Time (60-90 min): 70 min

Event No.	Malf. No.	Event Type <sup>†</sup>	Event Description
1		N (BOP)	Start a Condensate Pump (04-1-01-N19-1 Condensate System)
2		R (ATC)	Withdraw Control Rods to Establish Main Turbine BCV's 10% open (04-1-01-C11-2 Rod Control and Information System)
3	c71077a	I (BOP, ATC) A (CREW)	RPS "A" MG failure (05-1-02-III-2 Loss of One or Both RPS Buses)
4		TS (CRS)	Electric Power Monitoring Assembly INOPERABLE (TS 3.3.8.2)
5	c51005g c51005a	I (ATC) TS (CRS)	Two IRM channel failures (TS 3.3.1.1)
6	p43152b	I (BOP)	Loss of TBCW (05-1-02-V-2 Loss of Turbine Building Cooling Water)
7	fw273	C(ATC)	CST Rupture to CST/RWST Dike (05-1-02-IV-1 Control Rod/Drive Malfunctions) <b>* With no CRD pumps operating and reactor pressure less than 600 psig, when one scram accumulator associated with a withdrawn Control Rod is declared INOP, place the reactor mode switch to SHUTDOWN. Criterion is to give the highest priority to place the mode switch to SHUTDOWN when any HCU Accumulator Fault associated with a withdrawn control rod is verified to be due to low accumulator pressure.</b>
8	rr063a	M (Crew)	Scram with an unisolable recirc line break (EP-2, EP-3)
9	fw226a fw115a r21139b r21139e e12188e	C (Crew)	Major Electrical transient that limits injection sources
10	e22f015_j	I (Crew)	Failure of automatic HPCS suction swap <b>* When CST level is less than 5ft, OPEN E22-F015 (HPCS Suction from Suppression Pool). Criterion is to OPEN E22-F015 before reactor water level lowers to -191".</b>
<sup>†</sup> (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (A)bnormal (TS) Tech Spec <b>* Critical Task</b> (As defined in NUREG 1021 Appendix D)			
Quantitative Attributes Table			
Normal Events	1	Abnormal Events	1
Reactivity Manipulations	1	Total Malfunctions	6
Instrument/Component Failures	6	EP Entries (Requiring substantive action)	1
Major Transients	1	EP Contingencies	0
Tech Spec Calls	2	Critical Tasks	2

**Simulator Setup:****A. Initialization**

1. Log off all simulator PDS and SPDS computers (PDS and SPDS must come up after the simulator load for proper operation).
2. Startup the simulator using Simulator Instructor's Job Aid section 6.3.

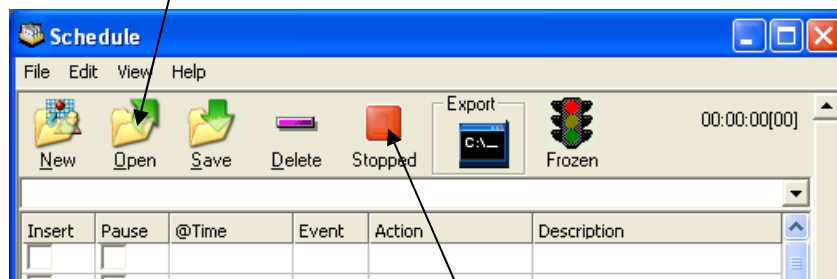
*Note:*

***Prior to running the Schedule File, ensure no Event Files are Open. If an existing Event File is Open prior to running the Schedule File, then any associated Event Files will not automatically load.***

3. Open Schedule.exe and Director.exe by clicking on the Icon in the Thunder Bar.

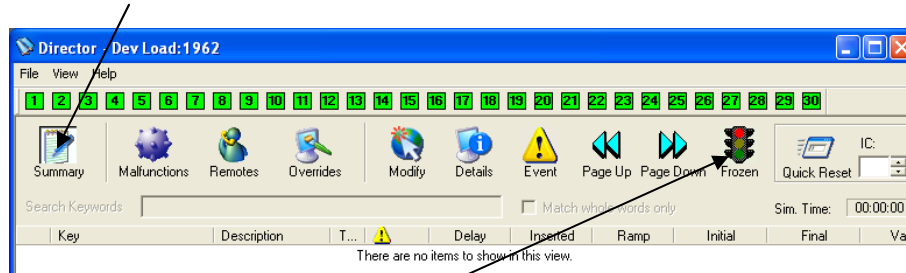


4. Set the Simulator to **IC-102** and perform switch check (Using Quick Reset in Director).
5. Click on **“Open”** in the Schedule window and Open Schedule File **“2012 NRC Scenario 2.sch”** (in the Schedule Directory)



6. In Schedule window, click on the **“Stopped”** red block. The red block will change to a green arrow and indicate the scenario is active (**“Running”**).

7. Click the Summary tab in the Director window. Verify the schedule files are loaded and opened per Section B below. (Note: Any actions in the schedule file without a specific time will not load into the director until triggered.)



8. Take the simulator out of freeze.
9. Log on to all simulator PDS and SPDS computers.
10. Verify or perform the following:
  - IC-102
  - IRM "G" Bypassed and Caution Tagged.
  - Ensure the correct rod movement sequence available at the P680 and marked up to step 135 complete.
  - Advance all chart recorders and ensure all pens inking properly.
  - Clear any graphs and trends off of SPDS.
11. Run through any alarms and ensure alarms are on. (**Note: On T-Rex, to verify alarms are ON, the indicator will indicate "Alarms On"**).
12. Place the simulator in Freeze.

B. File loaded verification:

**Schedule - 2012 NRC Scenario 2.sch**

File Edit View Help

New Open Save Delete Stopped Export Frozen 00:00:00[00]

Insert	Pause	@Time	Event	Action	Description
<input type="checkbox"/>	<input type="checkbox"/>			^NRC EXAM GGN 2012 Senario 2	
<input type="checkbox"/>	<input type="checkbox"/>			=> RPS A MG EPA breaker S003A Trip	
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction c71077a on event 1	RPS MG Set A Failure
<input type="checkbox"/>	<input type="checkbox"/>			=> IRM A fails downscale	
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction c51005a on event 2	IRM Channel A Downscale
<input type="checkbox"/>	<input type="checkbox"/>			=> CST Rupture	
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction fw273 to 75 on event 3	CST Leak to the CST/RWST Dike
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		create event 4 XAL1P601_22A_A_3 == 1	
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction z024024_24_33 after 280 on event 4	Control Rod 24-33 Accumulator Trouble
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction z024024_40_37 after 310 on event 4	Control Rod 40-37 Accumulator Trouble
<input type="checkbox"/>	<input type="checkbox"/>			=> Post SCRAM activities	
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		create event 5 xcr4c34na011 < 100	MW < 100
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		create event 6 zlo4(829) == 1	RHR PUMP B START
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		create event 7 xcr4e21n003_c88 > 10   xcr4e12n015a_c88 > 10	Div 1 ECCS is injecting
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		create event 8 xml1rr063a == 1 & E22VFM(6) == 1 & E22VFM(7) == 1	Recirc line is broken
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction e12050b after 2 on event 6	RHR PUMP B TRIP
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction r21139b after 50 on event 5	4160 V Bus 14AE Overcurrent Trip
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction r21139e after 1 on event 7	4160 V Bus 15AA Overcurrent Trip
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction rr063a after 240 to 10 on event 5	Recirc Loop A Non-Isolable Suction Rupture
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction fw115a on event 5	Condensate Pump A Trip
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction fw226a on event 5	Condensate Booster Pump A Shaft Shear
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert remote fw206 to 0.75000 in 120 on event 8	CST LEVEL DESIRED/ACTUAL
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert remote fw207 to ON on event 8	CST LEVEL ADJUST
<input type="checkbox"/>	<input type="checkbox"/>			=> SETUP	
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction c51005g	IRM Channel G Downscale
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction e22f015_j	HPCS suction auto swap failure
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction p601_16a_c_4 to OFF	CST LVL LO
<input type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction e12188e after 10	Loss of power on Stroke (E12-F042C)

Ready NUM

Director - Dev Load:1962

File View Help

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Summary Malfunctions Remotes Overrides Modify Details Event Page Up Page Down Frozen Quick Reset IC: 102

Search Keywords  ☐ Match whole words only Sim. Time: 00:00:00

Key	Description	T...	Delay	Inserted	Ramp	Initial	Final	Value
c71077a	RPS MG Set ...	1	00:00:00		00:00:00		Active	InActive
c51005a	IRM Channel...	2	00:00:00		00:00:00		Active	InActive
fw273	CST Leak to ...	3	00:00:00		00:00:00		75	0
z024024_24_33	Control Rod ...	4	00:04:40		00:00:00		Active	InActive
z024024_40_37	Control Rod ...	4	00:05:10		00:00:00		Active	InActive
e12050b	RHR PUMP ...	6	00:00:02		00:00:00		Active	InActive
r21139b	4160 V Bus ...	5	00:00:50		00:00:00		Active	InActive
r21139e	4160 V Bus ...	7	00:00:01		00:00:00		Active	InActive
rr063a	Recirc Loop ...	5	00:04:00		00:00:00		10	0
fw115a	Condensate ...	5	00:00:00		00:00:00		Active	InActive
fw226a	Condensate ...	5	00:00:00		00:00:00		Active	InActive
c51005g	IRM Channel...		00:00:00		00:00:00		Active	InActive
e22f015_j	HPCS suction...		00:00:00		00:00:00		Active	InActive
p601_16a_c_4	CST LVL LO		00:00:00		00:00:00		OFF	NORMAL
e12188e	Loss of powe...		00:00:10		00:00:00		Active	InActive
fw206	CST LEVEL ...	8	00:00:00		00:02:00		0.75	26.1728
fw207	CST LEVEL ...	8	00:00:00		00:00:00		ON	OFF

Ready NUM

**Crew Turnover:**

B. Assign the candidates crew positions.

C. Turnover the following conditions:

Power	4%
Pressure	400 psig
EOC	
EOOS	GREEN
Work Week	Division 2

- Crane operations are in progress on the south side of the Unit 1 Auxiliary Building.
- A reactor startup is in progress.
  - Step 135 of Control Rod Movement Sequence is complete
  - SJAE 'B' is in warm up 04-01-N62-1 step 4.2.2r
  - Step 6.2.13 of 03-1-01-1
- IRM 'G' is bypassed.
- The Condensate system is lined up as follows:
  - CFFF is in service
  - Precoat Filters are not in service
  - 4 Deepbed demins are in service

Planned Evolutions this shift:

- Continue with startup IOI-1 step 6.2.13
  - Start Condensate Pump "C" (Pre-start Pump Checks are complete and all prerequisites are met).
  - Withdraw control rods to establish main turbine BCV's 10% open.
- Note that an independent Reactivity Management SRO per Operations Philosophy 6.8.1 will not be provided for this scenario.

D. Allow the crew to perform pre-shift brief and review procedures for planned evolutions.

E. Bring the crew into the Simulator, place the simulator is in RUN.

F. Allow the crew to walk down panels.

G. When the crew assumes the shift begin Scenario Activities.



**SCENARIO ACTIVITIES:**

- A. Start SBT report and any other required recording devices (Video recording not allowed for NRC exams).

**Start a Condensate Pump:**


- B. The crew will start Condensate Pump “C” using 04-1-01-N19-1, Condensate System SOI.
1. If asked as the local operator, report that FK-R001 and FK-R003 are in “cascade.”
  2. When directed to isolate PI-R002C, report that N19-FX019 was closed to isolate PI-R002C.
  3. When directed to un-isolate PI-R002C, report that N19-FX019 is open.

**Withdraw Control Rods to Establish Main Turbine BCV’s 10% OPEN:**


- C. The crew will withdraw control rods per 04-1-01-C11-2, Rod Control and Information System SOI (Information Use Procedure), to establish 10% Bypass Valve opening.
1. There are no actions for this outside the Control Room.
  2. When the crew has completed step 137 of the sequence sheet or at the Lead Evaluator’s discretion, Trigger **Event 1** to trip RPS ‘A’ MG.

**RPS “A” MG failure:**


- D. The crew will enter the Loss of One or Both RPS Buses ONEP and:
1. Re-energize RPS ‘A’ by placing the MG Set ‘A’ transfer switch to Alternate “A”.
  2. Reset the Half-Scram
  3. Ensure MSIVs are open.
    - a. When the BOP comes to the booth and asks the status of the pilot solenoids amperage on the back panels, reply that all MSIVs indicate normally.
- E. When asked to investigate the cause of the bus trip, and after the half-scram is reset, inform the control room that (if not asked, report as Control Building Operator while taking rounds):
1. the RPS “A” MG EPA breaker C71S003A and C71S003C (located on the Control Building, 189’ el.) are tripped and the undervoltage flags are tripped. The motor-generator is operating normally.

2. you have also noted that the alternate feeder EPA breaker C71S003G underfrequency flag is tripped, but the breaker is still closed (**ensure that the CRS understands that this is the breaker currently powering the RPS “A” Bus**).
  3. If sent as Electrical, report that underfrequency flag is a valid trip and the breaker should have opened.
- F. When the CRS enters LCO 3.3.8.2 Condition “A,” insert malfunction c51009d by triggering **Event 2** to cause IRM “A” to fail downscale. 

**Two IRM channel failures:**

- G. Since IRM “G” is already in bypass, no operator action is required for this situation; however.
1. When the CRS enters LCO 3.3.1.1 Condition “A,” Trigger **Event 10** to insert a loss of TBCW. 

**Loss of TBCW:**

- H. The crew will respond per Loss of TBCW ONEP.
1. When the crew has stabilized TBCW by starting the ‘C’ TBCW pump Trigger **Event 3** to insert a leak in the CST. 

**CST Rupture to CST/RWST Dike (CR-GGN-1996-00517):**

- I. The crew will respond to a CST Dike Sump Level alarm and dispatch an operator to check the CST dike.
1. When dispatched as the local operator to the CST Dike, wait 3 min then report to the control room that a crane has tipped over onto the CST and there is a large hole in the side of the CST.
    - a. If ask about the location of the hole, say you can’t tell.
  2. When the CRD pump trips on low suction pressure, The CRS will enter 05-1-02-IV-1, CRD Malfunctions.
  3. Since reactor pressure is below 600 psig, the first accumulator associated with a withdrawn control rod being declared INOP will require placing the Mode Switch to shutdown.

**Reactor SCRAM with an Unisolable line break:**

- J. When the crew scrams the reactor, Condensate Pump ‘A’ will trip and Condensate Booster Pump ‘A’ will have a shaft shear (prevents feeding with condensate until loss of 14AE). One minute later the 14AE bus will trip. This prevents using condensate to feed the reactor (Auto Triggers 5,6,7). All low pressure ECCS systems will fail so that only HPCS, RCIC, and SLC will be available for injection.

K. Four minutes after the crew scrams the reactor, a recirc line break ("A" side) will occur (Auto Trigger 5). **(Install EP Attachments as directed)**.

**Termination:**

L. Once the HPCS suction has been aligned to the Suppression Pool and reactor level has stabilized in band (-30" to 30") or as directed by Lead Evaluator:


- Take the simulator to Freeze and turn horns off.
- Stop and save the SBT report and any other recording devices.
- Instruct the crew to not erase any markings or talk about the scenario until after follow-up questions are asked.

**Critical Tasks:**


- \* With no CRD pumps operating and reactor pressure less than 600 psig, when one scram accumulator associated with a withdrawn Control Rod is declared INOP, place the reactor mode switch to SHUTDOWN. Criterion is to give the highest priority to place the mode switch to SHUTDOWN when any HCU Accumulator Fault associated with a withdrawn control rod is verified to be due to low accumulator pressure.
- \* When CST level is less than 5ft, OPEN E22-F015 (HPCS Suction from Suppression Pool). Criterion is to OPEN E22-F015 before reactor water level lowers to -191".


Op-Test No: <u>12/12</u>		Scenario No: <u>2</u>	Event No: <u>1</u>
Event Description: <b><u>Start a Condensate Pump</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	Directs the BOP to start Condensate Pump 'C' using 04-1-01-N19-1.	
	BOP	<p>Start Condensate Pump 'C' by:</p> <ul style="list-style-type: none"><li>• Direct a local operator to ENSURE FK-R001 AND FK-R003 on 1H22-P171 are in cascade.</li><li>• Direct a local operator to CLOSE the Instrument Isolation valve for the pressure indicator associated with Condensate Pump 'C'.</li><li>• DEPRESS CNDS PMP 'C' START pushbutton. (Condensate Pump 'C' discharge valve will automatically open after 5 seconds)</li><li>• CHECK discharge pressure is approximately 250 psig on PI-R607.</li><li>• CHECK total condensate flow by observing CNDS PMPS MIN FLO indicator FI-R621 for minimum pump flow indication of &gt; 5.0 mlbm/hr.</li><li>• Direct a local operator to un-isolate the pressure indicator for Condensate Pump 'C'.</li></ul>	

Op-Test No: <u>12/12</u>		Scenario No: <u>2</u>	Event No: <u>2</u>
Event Description: <b><u>Withdraw Control Rods to Establish Main Turbine BCV's 10% open</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	<p>Conduct a reactivity brief (this was performed prior to the crew entering the simulator)</p> <p>Directs the BOP and ATC to coordinate and withdraw control rods IAW the approved Control Rod Movement Sequence and 04-1-01-C11-2, Rod Control and Information System.</p> <p><i>NOTE: Event 3 will begin when step 137 of the Control Rod Movement Sequence is complete or when directed by the Lead Evaluator (CRS Evaluator).</i></p>	
	ATC	Peer Check Control Rod Selection while monitoring reactor parameters.	
	BOP	<p>Select Control Rods per step 136 of the Control Rod Movement Sequence sheets (Should be in Gang mode and may use either continuous or notch withdraw, Rods selected should be 28-05, 36-61, 60-29, 04-37).</p> <p>For continuous withdraw, simultaneously DEPRESS and HOLD WITHDRAW and CONT WITHDRAW pushbuttons.</p> <p>For notch withdraw MOMENTARILY DEPRESS WITHDRAW pushbutton and observe proper response.</p>	


Op-Test No: <u>12/12</u>		Scenario No: <u>2</u>	Event No: <u>3</u>
Event Description: <b><u>RPS "A" MG failure</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	ATC	<p>Recognizes and reports a half-scam with no additional annunciators and a trip of the RPS bus has occurred.</p> <ul style="list-style-type: none"> <li>❖ As indicated by annunciator P680-7A-A-2, RX SCRAM TRIP coupled with a ½ scam and no other indications for why the ½ scam occurred.</li> <li>❖ The GENERATOR 'A' NORMAL FEED AVAILABLE light is out on the P610 back panel.</li> </ul>	
	CRS	<p>Enters the Loss of One or Both RPS Buses ONEP.</p> <p>Direct the BOP to re-energize the A RPS bus using the alternate power source.</p> <p>Direct the ATC to reset the half-scam.</p> <p>Send a local operator to investigate the cause of the RPS A MG failure.</p>	
	BOP	<p>When directed, Re-energize the A RPS Bus using the Alternate power source.</p> <ul style="list-style-type: none"> <li>• Place the MG SET A TRANSFER switch on the CONTROL ROD TEST INSTRUMENT PANEL (P610) to ALT 'A'</li> </ul>	
	ATC	<p>When directed, reset the half-scam.</p> <ul style="list-style-type: none"> <li>• Place the division 1 &amp; 3 scam RESET switches to RESET on the P680.</li> </ul>	
	CRS	<p>Direct the BOP to ensure all MSIVs are energized.</p>	
	BOP	<p>When directed, ensure all MSIV solenoid lights are on and all MSIV pilot solenoids indicate amperage on the P622 and P623 panels.</p> <p>(This is not modeled in the simulator. The operator should go to the instructor booth behind the P807 and simulate performance by stating to the instructor his intentions to perform the step. The instructor will provide the operator with a verbal cue concerning indications the operator observes).</p>	

Op-Test No: <u>12/12</u>		Scenario No: <u>2</u>	Event No: <u>4</u>
Event Description: <b><u>Electric Power Monitoring Assembly INOPERABLE</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	<p>Recognizes entry conditions and enters TS 3.3.8.2 Condition A.</p> <p>❖ There are no indications in the control room for the EPMA breaker failure; however, the following report will be made to the control room:</p> <p><i>When asked to investigate the cause of the bus trip, when the half-scram is reset, inform the control room that:</i></p> <ol style="list-style-type: none"><li><i>the RPS "A" MG EPA breakers C71S003A &amp; C71S003C (located on the Control Building, 189' el.) is tripped and the undervoltage flag is tripped.</i></li><li><i>you have also noted that the <u>alternate feeder</u> EPA breaker C71S003G underfrequency flag is tripped, but the breaker is still closed (ensure that the CRS understands that this is the breaker currently powering the RPS "A" Bus).</i></li></ol>	

Op-Test No: <u>12/12</u>	Scenario No: <u>2</u>	Event No: <u>5</u>
Event Description: <b><u>Two IRM channel failures</u></b>		
TIME	Position	Applicant's Actions or Behavior
	ATC	<p>Recognizes and reports IRM A has failed upscale.</p> <ul style="list-style-type: none"> <li>❖ As indicated by annunciators P680-4A2-C5, CONT ROD WITHDRAW BLOCK, and P680-7A-B9, IRM DNSC</li> <li>❖ IRM Ch-A will be "pegged" low.</li> </ul>
	CRS	Recognizes entry conditions and enters TS 3.3.1.1 Condition A.

Op-Test No: <u>12/12</u>	Scenario No: <u>2</u>	Event No: <u>6</u>
Event Description: <b><u>Loss of TBCW</u></b>		
TIME	Position	Applicant's Actions or Behavior
	BOP	<p>Recognizes and reports TBCW 'B' pump tripped and the standby TBCW 'C' pump failed to auto start.</p> <ul style="list-style-type: none"> <li>❖ As indicated by annunciators P870-5A-B4, TBCW PMP B TRIP</li> <li>❖ TBCW PMP C STBY white light is on but the pump is not running.</li> </ul>
	CRS	<p>Enter the Loss of TBCW ONEP and direct the BOP to start the standby TBCW pump.</p> <p><i>Note: No other actions of the ONEP are required.</i></p>
	BOP	When directed, start TBCW 'C' Pump.



Op-Test No: <u>12/12</u>		Scenario No: <u>2</u>	Event No: <u>7</u>
Event Description: <b><u>CST Rupture to CST/RWST Dike</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	BOP	<p>Recognizes and reports the following when they occur:</p> <ul style="list-style-type: none"> <li>❖ P870-5A-D5, CST DIKE SMP LVL HI</li> <li>❖ P870-5A-D4, CST LVL HI-LO</li> </ul> <p>In addition, the BOP should evaluate CST level as indicated by P11-LI-R601 on P870 and report lowering CST level.</p>	
	CRS	<p>Send an operator to the CST Dike to determine if there is a leak to the CST Dike. Recognize the imminent loss of CRD and subsequent required reactor scram.</p> <p>Perform a transient brief to prepare the crew for the loss of CRD.</p> <p>When CRD pumps are tripped, enter the CRD Malfunctions ONEP, 05-1-02-IV-1.</p> <p>When the first HCU accumulator fault associated with a withdrawn control rod is determined to be due to low pressure, direct the ATC to manually scram the reactor.</p> <p><i>NOTE: The CRS may opt to scram the reactor sooner based on conservative decision making these action are based on the limits of Tech Specs and procedures.</i></p>	
	BOP	<p>Keep the crew updated with CST level and the status of the CRD system.</p>	
	ATC	<p>With no CRD pumps running and reactor pressure &lt;600 psig, when one scram accumulator associated with a withdrawn control rod is declared INOP, manually inserts a reactor scram by placing the reactor mode switch to SHUTDOWN.</p> <p><b>* With no CRD pumps operating and reactor pressure less than 600 psig, when one scram accumulator associated with a withdrawn Control Rod is declared INOP, place the reactor mode switch to SHUTDOWN. Criterion is to give the highest priority to place the mode switch to SHUTDOWN when any HCU Accumulator Fault associated with a withdrawn control rod is verified to be due to low accumulator pressure.</b></p> <p>Provides a scram report to the CRS:</p> <ul style="list-style-type: none"> <li>• Reactor Mode SW in SHUTDOWN.</li> <li>• All Rods are IN.</li> <li>• Reactor power is 0%.</li> <li>• Reactor water level and trend.</li> <li>• Reactor pressure and trend.</li> <li>• Feedwater is recoverable.</li> <li>• Bypass valves are available.</li> </ul>	

Op-Test No: <u>12/12</u>		Scenario No: <u>2</u>	Event No: <u>8</u>
Event Description: <b><u>Scram with an unisolable recirc line break</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	<p>Following the reactor scram the CRS will:</p> <p>Enter the SCRAM ONEP, 05-1-02-I-1.</p> <p>Enter EP-2</p> <p>Evacuate Containment</p> <p>Establish a level band of 11.4 – 53.5”.</p> <p>When Drywell pressure exceeds 1.23 psig, the CRS will enter EP-3</p>	
	ATC	<p>May attempt to restore Condensate Pumps; however, 50 seconds following the scram the 14AE bus will lockout preventing the restoration of feedwater.</p> <p>Manually initiate RCIC by arming and depressing the RCIC MAN INIT pushbutton.</p> <p>May also manually initiate HPCS by arming and depressing the HPCS MAN INIT pushbutton.</p> <p>Maintain the reactor within the established level band.</p>	
	CRS	<p>After entering EP-3, direct the BOP to energize H2 igniters.</p>	
	BOP	<p>When directed to energize H2 igniters, Place the H2 IGNITER SYS A &amp; B switches to the ON position.</p>	

Op-Test No: <u>12/12</u>		Scenario No: <u>2</u>	Event No: <u>9</u>
Event Description: <b><u>Major Electrical transient that limits injection sources</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CREW	<p><b>Recognize and report loss of the 14AE bus.</b></p> <p>As indicated by:</p> <ul style="list-style-type: none"> <li>❖ Loss of Recirc Pump 'B'</li> <li>❖ P807-2A-B3, 4.16KV BUSS 14AE INCM FDR TRIP</li> </ul> <p><b>Recognize and report loss of the 15AA bus.</b></p> <p>As indicated by:</p> <ul style="list-style-type: none"> <li>❖ P864-1A-A3, 4.16KV BUS 15AA UNDERVOLTAGE</li> <li>❖ P864-1A-A4, 4.16KV BUSS 15AA INCM FDRS TRIP</li> </ul> <p><b>Recognize and report loss of RHR Pump 'B'</b></p> <p>As indicated by:</p> <ul style="list-style-type: none"> <li>❖ P601-17A-H2, RHR B SYS OOSVC</li> <li>❖ P601-17A-A1, RHR PMP B OVERLD</li> <li>❖ RHR PMP B OVERLD/PWR LOSS status light</li> </ul> <p><b>Recognize and report loss of power to E12-F042C, RHR 'C' INJ VLV (vlv closed)</b></p> <p>A indicated by:</p> <ul style="list-style-type: none"> <li>❖ P601-17A-H3, RHR C SYS OOSVC</li> <li>❖ Red and Green indicating lights for E12-F042C are out</li> <li>❖ RHR C MOV OVERLD/PWR LOSS status light</li> </ul>	
	CRS	<p>Enter the Loss of AC Power ONEP, 05-1-02-I-4 (The only actions in this ONEP the crew can take are to send personnel to restore the affected components and busses)</p> <p>Direct the BOP to perform an ECCS Status Report.</p>	
	BOP	<p>When directed, report to the CRS that only HPCS, RCIC, SSW, and SLC are available for injection.</p>	

Op-Test No: <u>12/12</u>		Scenario No: <u>2</u>	Event No: <u>10</u>
Event Description: <b><u>Failure of automatic HPCS suction swap</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	BOP	<p>Recognize the failure of the automatic HPCS suction swap.</p> <ul style="list-style-type: none"><li>❖ CST level below 5' and HPCS flow to reactor at 0 gpm combined with E22-F001 OPEN and E22-F015 CLOSED. The (HPCS) CST LVL LO annunciator P601-16A-C4 will not come in but the (RCIC) CST LVL LO annunciator P601-21A-B5 will come in.</li></ul> <p>Manually align HPCS suction to the Suppression Pool by placing the handswitch for E22-F015 to OPEN.</p> <ul style="list-style-type: none"><li>* <b>When CST level is less than 5ft, OPEN E22-F015 (HPCS Suction from Suppression Pool). Criterion is to OPEN E22-F015 before reactor water level lowers to -191".</b></li></ul>	

Give this page to the CRS

Turnover the following conditions:

Power	4%
Pressure	400 psig
EOC	
EOOS	GREEN
Work Week	Division 2

- A reactor startup is in progress.
- IRM 'G' is bypassed.
- The Condensate system is lined up as follows:
  - CFFF is in service
  - Precoat Filters are not in service
  - 4 Deepbed demins are in service

Planned Evolutions this shift:

- Continue with startup IOI-1 step 6.2.13
  - Start Condensate Pump "C" (Pre-start Pump Checks are complete and all prerequisites are met).
  - Withdraw control rods to establish main turbine BCV's 10% open.
- Note that an independent Reactivity Management SRO per Operations Philosophy 6.8.1 will not be provided for this scenario.

Facility: Grand Gulf Nuclear Station Scenario No.: 3 Op-Test No.: 12/12

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

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

1. Secure the Division 1 Diesel Generator
2. Raise reactor power to 100%
3. HPCS spurious initiation (DW Press)
4. RFPT 'B' Manual/Auto Controller Failure
5. Suppression Pool Leak
6. Loss of ESF 11 Transformer
7. ADS Valve fails to open

Initial Conditions: 95% power

Inoperable Equipment: B21-PIS-N667C , Drywell press hi, is failed high (TS 3.3.5.1 Condition B entered)

Turnover: Division 1 DG is running tied to the grid. 06-OP-1P75-M-0001, Standby Diesel Generator (SDG) 11 Functional Test is in progress ready for step 5.2.25.

Scenario Notes:

This is a new scenario. HPCS and Division 1 Diesel Generator are ranked in the top 10 important systems of the GGNS PRA analysis.

Validation Time (60-90 min): 60 min

Event No.	Malf. No.	Event Type <sup>†</sup>	Event Description
1	DL_1R21M608A DL_1P75M601A p864_1a_b_2	I (BOP) TS (CRS)	Secure the Division 1 Diesel Generator (04-1-01-P75-1, Standby Diesel Generator System section 4.4; TS 3.8.1 condition B)
2		R (ATC)	Raise reactor power to 100% (03-1-01-2 attachment VIII, Power Operations – Temporary Downpower)
3	e22055 e22159a	I (BOP) TS (CRS)	HPCS spurious initiation (02-S-01-27, Operation's Philosophy section 6.6.3 – Spurious HPCS Initiation; TS 3.5.1 condition B)
4	fw121b p680_2a_e_12	A (Crew) I (ATC)	RFPT 'B' Manual/Auto Controller Failure (05-1-02-V-7, Feedwater System Malfunctions)
5	ct218d ct219a	M (Crew) C (BOP, ATC)	<p>Suppression Pool Leak (EP-4 Aux Building Control; EP-3 Containment Control; EP-2 RPV Control)</p> <p><b>* Crew manually scrams the reactor before SP level drops below 14.5'</b></p> <p><b>* When it is determined that Suppression Pool level cannot be maintained above 14.5', the crew opens 8 SRVs and observes lowering pressure trend and valve position indications (tailpipe pressure indication lamps or solenoid valve energized). Criterion is to open at least seven SRVs prior to Suppression Pool level reaching 14.5' (In cases where Emergency Depressurization is anticipated, Rapid Depressurization with the BPVs satisfies this critical task).</b></p>
6	r21134g	C (Crew)	Loss of ESF 11 Transformer (05-1-02-I-4, Loss of AC Power)
7	DL_1B21M605D	I (Crew)	ADS Valve fails to open (EP-2, RPV Control Emergency Depressurization)
<sup>†</sup> (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (A)bnormal (TS) Tech Spec * <b>Critical Task</b> (As defined in NUREG 1021 Appendix D)			
Quantitative Attributes Table			
Normal Events	0	Abnormal Events	1
Reactivity Manipulations	1	Total Malfunctions	6
Instrument/Component Failures	6	EP Entries (Requiring substantive action)	2
Major Transients	1	EP Contingencies	1
Tech Spec Calls	2	Critical Tasks	2

**Simulator Setup:****A. Initialization**

1. Log off all simulator PDS and SPDS computers (PDS and SPDS must come up after the simulator load for proper operation).
2. Startup the simulator using Simulator Instructor's Job Aid section 6.3.

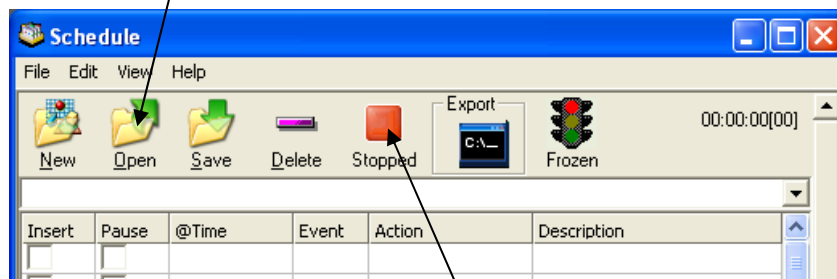
*Note:*

***Prior to running the Schedule File, ensure no Event Files are Open. If an existing Event File is Open prior to running the Schedule File, then any associated Event Files will not automatically load.***

3. Open Schedule.exe and Director.exe by clicking on the Icon in the Thunder Bar.



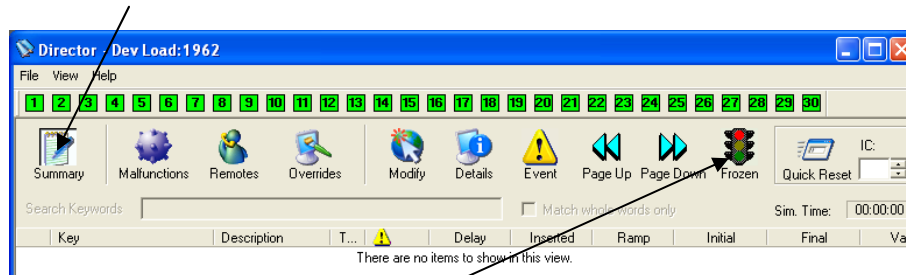
4. Set the Simulator to **IC-103** and perform switch check (Using Quick Reset in Director).
5. Click on **“Open”** in the Schedule window and Open Schedule File **“2012 NRC Scenario 3.sch”** (in the Schedule Directory)



6. In Schedule window, click on the **“Stopped”** red block. The red block will change to a green arrow and indicate the scenario is active (**“Running”**).



7. Click the Summary tab in the Director window. Verify the schedule files are loaded and opened per Section B below. (Note: Any actions in the schedule file without a specific time will not load into the director until triggered.)



8. Take the simulator out of freeze.
9. Log on to all simulator PDS and SPDS computers.
10. Verify or perform the following:
- IC-103
  - Division 1 DG is running and tied to the grid near full load.
  - Provide a copy of 06-OP-1P75-M0001 marked up to step 5.2.25.
  - Ensure the correct rod movement sequence available at the P680.
  - Advance all chart recorders and ensure all pens inking properly.
  - Clear any graphs and trends off of SPDS.
11. Run through any alarms and ensure alarms are on. (**Note: On T-Rex, to verify alarms are ON, the indicator will indicate “Alarms On”**).
12. Place the simulator in Freeze.

B. File loaded verification:

**Schedule - 2012 NRC Scenario 3.sch**

File Edit View Help

New Open Save Delete Running Export Frozen 00:00:00[00]

Insert	Pause	@Time	Event	Action	Description
				^NRC EXAM GGN 2012 Senario 3	
				=> DG11 Trip	Gen Trip w/ failure of sv-f541a
<input checked="" type="checkbox"/>		00:00:00		create event 1 ioao2_eu(123) < 4.5	
<input checked="" type="checkbox"/>		00:00:00		Insert override DI_1R21M608A to TRIP on event 1	P864/01C BUS 15AA FDR FM DG 11:152-1508
<input checked="" type="checkbox"/>		00:00:00		Insert override DI_1P75M601A to NORM on event 1	P864/01C DIV 1 DSL ENG RMT STOP
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction p864_1a_b_2 to ON on event 1	4.16kV BUS 15AA INCM FDR 152-1508 TR
<input checked="" type="checkbox"/>		00:00:00		Insert remote p75057 to MAINT on event 2	DG DIV 1 MAINTENANCE MODE
				=> HPCS event	
<input checked="" type="checkbox"/>		00:00:00		create event 3 xcr4b33k612 > 101	
<input checked="" type="checkbox"/>		00:00:00		create event 4 e22vfm(7) > 0.25	
<input checked="" type="checkbox"/>		00:00:00		create event 5 et_array(4) == 1 & e22vfm(7) < 0.25	
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction e22055 on event 3	B21-PI5-N667G fails upscale
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction e22159a to 0.18 on event 5	MOV E22-F004 HPCS Injection Failure
				=> RFPT B Controller Fails Increasing	
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction fw121b to 100 in 75 on event 6	RFPT B M/A Station C34R613 Output Failure
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction p680_2a_e_12 after 15 to ON on event 6	RFP B VIBR HI
			7	Delete malfunction p680_2a_e_12	RFP B VIBR HI
<input checked="" type="checkbox"/>		00:00:00		create event 7 et_array(30) == 1 & fw1rfpr6rad == 0	
<input checked="" type="checkbox"/>		00:00:00		create event 30 fw1rfpr6rad == 1	
				=> Suppression Pool Leak	
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction ct218d in 600 on event 8	Suppression Pool Leak LPCS Suction line
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction ct219a	Watertight Door Failure LPCS Room
				=> Post Scram Activities	
<input checked="" type="checkbox"/>		00:00:00		create event 9 xcr4n41r789_c88 < 100	ESF Transformer 11 Lockout
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction r21134g on event 9 after 45	ESF Transformer 11 Lockout
<input checked="" type="checkbox"/>		00:00:00		Insert override DI_1B21M605D to AUTO	P601/19C MSL D SRV (ADS):B21-F041D
				=> Setup	
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction e22054	B21-PI5-N667C fails upscale
<input checked="" type="checkbox"/>		00:00:00		Insert override DI_1N32M624 to NORM	P680/09C BYPASS RAISE

Execute: Insert override DI\_1N32M624 to NORM  
Execute: Insert malfunction e22054  
Execute: Insert override DI\_1B21M605D to AUTO  
Execute: Insert malfunction r21134g on event 9 after 45  
Execute: create event 9 xcr4n41r789 c88 < 100

Ready NUM

Director - Dev Load:1962

File View Help

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Summary Malfunctions Remotes Overrides Modify Details Event Page Up Page Down Frozen Quick Reset IC: 103

Search Keywords  ☐ Match whole words only Sim. Time: 00:00:00

Key	Description	T...		Delay	Inserted	Ramp	Initial	Final	Value
p864_1a_b_2	4.16KV BU...		1	00:00:00		00:00:00		ON	NORMAL
e22055	B21-PIS-N6...		3	00:00:00		00:00:00		Active	InActive
e22159a	MOV E22-F...		5	00:00:00		00:00:00		0.18	0
fw121b	RFPT B M/...		6	00:00:00		00:01:15		100	71.4025
p680_2a_e_12	RFP B VIBR...		6	00:00:15		00:00:00		ON	NORMAL
ct218d	Suppression...		8	00:00:00		00:10:00		100	0
ct219a	Watertight ...			00:00:00		00:00:00		Active	InActive
r21134g	ESF Transf...		9	00:00:45		00:00:00		Active	InActive
e22054	B21-PIS-N6...			00:00:00		00:00:00		Active	InActive
p75057	DG DIV 1 M...		2	00:00:00		00:00:00		MAINT	OPER
DI_1R21M608A	P864/01C B...		1	00:00:00		00:00:00		TRIP	NORM
DI_1P75M601A	P864/01C ...		1	00:00:00		00:00:00		NORM	NORM
DI_1B21M605D	P601/19C ...			00:00:00		00:00:00		AUTO	AUTO
DI_1N32M624	P680/09C B...			00:00:00		00:00:00		NORM	NORM

Ready NUM

**Crew Turnover:**

A. Assign the candidates crew positions.

B. Turnover the following conditions:

Power	95%
Pressure	1020 psig
BOC	
EOOS	GREEN
Work Week	Division 1

- B21-PIS-N667C is failed upscale (DW pressure sensor for HPCS). TS 3.3.5.1 Condition B was entered.
- The Division 1 DG is running tied to the grid.
- 06-OP-1P75-M-0001, Standby Diesel Generator (SDG) 11 Functional Test is in progress ready for step 5.2.25 (DG has run for 1.5hrs at full load and vibration data is complete)

Planned Evolutions this shift:

- Continue with the 06-OP-1P75-M-001 Surveillance at step 5.2.25 (Chemistry has requested that SSW 'A' remain in service until next shift).
- Raise reactor power to 100% using IOI-2 attachment VIII, Temporary Downpower (all preconditioning requirements are met).
- Note that an independent Reactivity Management SRO per Operations Philosophy 6.8.1 will not be provided for this scenario.

C. Allow the crew to perform pre-shift brief and review procedures for planned evolutions.

D. Bring the crew into the Simulator, place the simulator is in RUN.

E. Allow the crew to walk down panels.

F. When the crew assumes the shift begin Scenario Activities.

**SCENARIO ACTIVITIES:**

- A. Start SBT report and any other required recording devices (Video recording not allowed for NRC exams).

**Secure the Division 1 Diesel Generator:**

- B. The crew will unload and shutdown the Div 1 diesel generator using 06-OP-1P75-M-0001, Standby Diesel Generator 11 Functional Test step 5.2.25.
1. The crew will establish phone communications with the local operator (Control Building Operator).
  2. The crew will lower Div 1 DG's output to below 350KW.
    - a. When Div 1 DG's output is below 450KW (4.5MW) the reverse power relay will pickup (Auto Event 1).
    - b. Div 1 DG output breaker 152-1508 will trip open; however, the DG will not trip due to a failure of SV-F541A. This will also prevent the Remote Stop PB in the control room from operating (This is due to failure of SV-F541A, see E-1042).
  3. When asked or 1 minute after breaker trip, report the following indications:
    - a. Annunciator P400-1A-E4, TRIP GENERATOR FAULT
    - b. Annunciator P400-1A-D10, LOSS OF EXCITATION OR REVERSE POWER
    - c. Div 1 Diesel Generator is running
  4. If asked to depress the LOCAL (EMERGENCY) STOP PB, modify the override DI\_1P75M601A to "PB" (This will trip the DG).
  5. If asked to place the Div 1 DG in Maintenance Mode, coordinate with the Control Room and when directed Trigger **Event 2** (Insert remote Fxn p75057 to "MAINT").
    - a. Report that the diesel generator stopped when placed in MAINT.
  6. When the CRS has entered LCO 3.8.1 Condition "B" and any transient briefs are complete, at the Lead Evaluator's discretion, call the Control Room phone (2374) as the Shift Manager and prompt the crew to raise reactor power to 100%.

**Raise reactor power to 100%:**

- C. The crew will raise reactor power to 100% using FCVs.
1. No operations outside the control room are required.
  2. When Total Core Flow is above 101 mlbm/hr, HPCS will initiate due to a second DW Pressure Transmitter failing upscale, B21-PIS-N667G (Auto Event 3).

**HPCS Spurious Initiation:**

D. When the crew shuts E22-F004, it will experience a loss of power (Auto Events 4 & 5).

E. If asked:

1. Indications on the HPCS back panel P625 are:
  - a. B21-PIS-N667G and B21-PIS-N667C are tripped/pegged hi.
2. Indication for E22-F004 are:
  - a. Breaker 52-170101 is tripped. Need a work order to investigate further.
  - b. Valve is stuck and cannot be repositioned manually.
3. All other indications are normal.

F. When the CRS enters LCO 3.5.1 Condition “B,” and any transient briefs are complete, at the Lead Evaluator’s discretion, insert malfunction fw121b by triggering **Event 6** to cause RFPT ‘B’ M/A Controller to fail max demand.

**RFPT ‘B’ Manual/Auto Controller Failure:**

G. The crew will respond by placing the RFPT ‘B’ controller in MANUAL. The crew may, in the course of executing the FW Malf ONEP, trip RPFT ‘B’. This is not required, but acceptable.

H. If sent to investigate/reset RFPT ‘B’ vibrations at P846:

1. Use Draw.exe Index Drawing C86-8 to view vibrations.
2. Pump vibration alarm occurs at 8 mils.
3. If feed pump flows have been matched or the RFPT ‘B’ was tripped, reset annunciators if asked, by inserting remote c86014 to RESET (click on C86 014 button on soft panel).

I. When the plant is stabilized and any transient briefs are complete, at the Lead Evaluator’s discretion, insert malfunction ct218d by triggering **Event 8** to cause an unisolable suppression pool leak in the LPCS room.

**Suppression Pool Leak and Reactor Scram:**

J. When the crew scrams the reactor, ESF Transformer 11 will lockout 45 seconds later. This is not recoverable. The crew will have to manually realign power to the 15AA bus (Auto Trigger 9).

K. The crew will send an operator to investigate the status of the leak and LPCS room door. The first operator sent will not respond (He becomes injured and does not report back). In any

case, wait until the crew has initiated SPMU before reporting any status back to the Control Room.

- L. When the crew blows down the reactor, ADS valve B21-F041D will not respond to P601 switch manipulations.

- M. **(Install EP Attachments as directed).**

**Termination:**


- N. Once the crew has emergency depressurized and established reactor level in band,
- Take the simulator to Freeze and turn horns off.
  - Stop and save the SBT report and any other recording devices.
  - Instruct the crew to not erase any markings or talk about the scenario until after follow-up questions are asked.

**Critical Tasks:**


- \* Crew manually scrams the reactor before SP level drops below 14.5'.
- \* When it is determined that Suppression Pool level cannot be maintained above 14.5', the crew opens 8 SRVs and observes lowering pressure trend and valve position indications (tailpipe pressure indication lamps or solenoid valve energized). Criterion is to open at least seven SRVs prior to Suppression Pool level reaching 14.5' (In cases where Emergency Depressurization is anticipated, Rapid Depressurization with the BPVs satisfies this critical task).


Op-Test No: <u>12/12</u>		Scenario No: <u>3</u>	Event No: <u>1</u>
Event Description: <b><u>Secure the Division 1 Diesel Generator</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	Directs the BOP to continue surveillance 06-OP-1P75-M-0001 (Standby Diesel Generator 11 Functional Test) step 5.2.25. Note: Brief was performed prior to the crew assuming the watch.	
	BOP	Stop the Division 1 DG as follows: <ul style="list-style-type: none"> <li>Adjust DG 11 GOV NAN CONT AND DG 11 VR AUTO SET PT CONT to lower SDG 11 load to less than 350 kW and reactive load to less than 0.25 mVAR.</li> </ul> When the Division 1 DG output breaker trips (indicated by annunciator P864-1A-B2, 4.16KV BUS 15AA INCM FDR 152-1508): <ul style="list-style-type: none"> <li>Notify the CRS of the breaker trip/generator fault.</li> <li>Determine that the Div 1 DG should have tripped but did not.             <ul style="list-style-type: none"> <li>This is indicated by the ARIs for P400-1A-E4, P400-1A-D10 and the diesel generator still running. Also, the Diesel Ready to Load status light indicates the DG is &gt;200 rpm.</li> </ul> </li> <li>Attempt to trip Div 1 DG by depressing the DIV 1 DSL ENG RMT MAN STOP (this action will not trip the Div 1 DG)</li> <li>Coordinate with the Control Building Operator to place the Div 1 DG in Maintenance Mode (ARI's 04-1-02-1H22-P400-1A-D10/E4).             <ul style="list-style-type: none"> <li>BOP depresses the DG 11 MAINT PERM pushbutton.</li> <li>Direct the Control Building Operator to depress and release the Maintenance Mode pushbutton locally at P400.</li> <li>BOP releases the DG 11 MAINT PERM pushbutton.</li> </ul> </li> </ul> Note: The Control Building Operator will report the following <ol style="list-style-type: none"> <li>Annunciator P400-1A-E4, TRIP GENERATOR FAULT</li> <li>Annunciator P400-1A-D10, LOSS OF EXCITATION OR REVERSE POWER</li> <li>Div 1 Diesel Generator is running</li> </ol>	
	CRS	Direct the BOP to place the Division 1 DG in Maintenance Mode. Recognizes entry conditions and enters LCO 3.8.1 Condition B.	



Op-Test No: <u>12/12</u>		Scenario No: <u>3</u>	Event No: <u>2</u>
Event Description: <b><u>Raise reactor power to 100%</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	Conducts reactivity brief for the planned power change. (May be performed prior to taking the shift) Directs the ATC to raise reactor power to 100% using Recirc FCV's. <i>Note: When core flow exceeds 101 mlbm/hr the next event will be inserted.</i>	
	ATC	Raises power by opening the Recirc FCVs A & B using loop flow controllers B33K603A & B in slow detent on P680-3B (IOI-2 attachment VIII step 12.3).	
	BOP	Raises Load Demand as power is raised by depressing EHC LOAD REF DEMAND RAISE pushbutton (P680-9C) to maintain generator actual load within +/- 25 MW of the load demand limited value during power ascension (IOI-2 attachment VIII step 12.2).	

Op-Test No: <u>12/12</u>		Scenario No: <u>3</u>	Event No: <u>3</u>
Event Description: <b><u>HPCS spurious</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	BOP	<p>Recognizes and reports spurious HPCS initiation as indicated by:</p> <ul style="list-style-type: none"> <li>❖ Annunciator P601-16A-C3, HPCS INIT coupled with the Division 3 diesel generator starting and the HPCS pump starting and the HPCS INJ VLV (E22-F004) opening.</li> <li>❖ Spurious initiation is identified in accordance with Operations Philosophy, 02-S-01-27 step 6.6.3a by “at least two independent means”</li> </ul>	
	CRS	Directs the BOP to verify the initiation was spurious and secure HPCS.	
	BOP	<p>Takes actions in accordance with Operations Philosophy step 6.6.3</p> <ul style="list-style-type: none"> <li>• Trip HPCS pump.</li> <li>• Close E22-F004</li> </ul> <p><i>Note: When the E22-F004 is stroking closed, it will experience a loss of power.</i></p> <p>Recognize and report that E22-F004 has failed as indicated by:</p> <ul style="list-style-type: none"> <li>❖ Annunciator P601-16A-H5, HPCS SYS OOSVC with Status Light HPCS MOV OOFFILE/PWR LOSS and E22-F004 indicating lights out.</li> </ul> <p>Dispatch an operator to breaker 52-170101 to determine the cause of the trip.</p> <p>Determines the cause of the initiation to be due to Drywell Pressure Trip Units.</p> <p><i>Note: The operator has indication via annunciator P601-16A-B4, DRWL PRESS HI; however, the HPCS panel is not modeled in the simulator. The expectation is that the operator will come to the instructor booth side entrance and ask for indications on this panel.</i></p>	
	CRS	<p>Recognizes entry conditions and enters LCO 3.5.1 condition B (LCO 3.6.1.3 condition A is also applicable but less limiting).</p> <p>Direct the BOP operator to reset the HPCS initiation (not required).</p>	
	BOP	When directed to reset the HPCS initiation, depresses and releases the HPCS INIT RESET pushbutton.	

Op-Test No: <u>12/12</u>		Scenario No: <u>3</u>	Event No: <u>4</u>
Event Description: <b><u>RFPT 'B' Manual/Auto Controller Failure</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	ATC	<p>Recognizes and reports the failure of RFPT 'B' M/A Controller</p> <ul style="list-style-type: none"> <li>❖ Indicated by annunciator P680-2A-E12, RFP B VIBR HI and comparing the operation of the RFPT 'A' / 'B' SP CONT compared to the demand signal from the FW LVL MASTER CONT.</li> </ul> <p>Places the RFPT 'B' SP CONT in MANUAL per EN-OP-115, Conduct of Operations step 5.5[2] and Feedwater Systems Malfunctions ONEP.</p>	
	CRS	<p>Enter the Feedwater Systems Malfunctions ONEP, 05-1-02-V-7</p> <p>Direct the ATC to place the RFPT 'B' SP CONT in MANUAL</p> <p>Direct the ATC to balance Feed Pump discharge pressures by lowering the output of RFPT 'B' to match the output of RFPT 'A'.</p> <p>Note: the CRS may choose to trip RFPT 'B' per step 3.2 of the Feedwater Systems Malfunctions ONEP. This is unnecessary as the controller is still operational in manual. If this action is taken, then the CRS will enter the Reduction in Recirc Flow ONEP, 05-1-02-III-3; however, no actions are required.</p>	
	ATC	<p>When directed, balance Feed Pump discharge pressures by lowering the output of RFPT 'B' to match the output of RFPT 'A'.</p> <p>If directed to trip RFPT 'B' then depress and release the red TRIP pushbutton for RFPT 'B' and observe that a recirc valve runback occurs.</p>	

Op-Test No: <u>12/12</u>		Scenario No: <u>3</u>	Event No: <u>5</u>
Event Description: <b><u>Suppression Pool Leak</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CREW	<p>Recognizes and reports a suppression pool leak in the LPCS pump room as indicated by:</p> <ul style="list-style-type: none"> <li>❖ Annunciator P680-8A1-A4, LPCS RM SMP LVL HI-HI</li> <li>❖ Annunciator P870-4A(10A)-C3, SUPP POOL LVL HI-LO</li> <li>❖ Annunciator P870-2A-F1, LPCS PMP RM FLOODED</li> <li>❖ Lowering SP water level.</li> </ul>	
	CRS	<p>Enter EP-4 when the LPCS RM SMP LVL HI-HI is announced.</p> <p>Direct the BOP to attempt to isolate the suppression pool leak by closing E21-F001, LPCS Suction from SP valve.</p> <p>Send an operator to look for the location of the suppression pool leak.</p> <p>Establish suppression pool level as a critical parameter and have the BOP give periodic updates.</p> <p>Enter EP-3 when SP level is below 18.34 ft.</p> <p>Direct the BOP to manually initiate suppression pool makeup.</p> <p>When it is determined that suppression pool level cannot be maintained above 14.5':</p> <ul style="list-style-type: none"> <li>• Direct the ATC to place the MODE SW in SHUTDOWN.</li> <li>• Enter EP-2, Scram and Turbine Trip ONEP's.</li> <li>• Establish reactor level band of 11.4 – 53.5".</li> <li>• Establish reactor pressure band of 800 – 1060 psig.</li> <li>• Direct the ATC or BOP to Emergency Depressurize the reactor.</li> </ul> <p><b>* Crew manually scrams the reactor before SP level drops below 14.5'.</b></p> <p><b>* When it is determined that Suppression Pool level cannot be maintained above 14.5', the crew opens 8 SRVs and observes lowering pressure trend and valve position indications (tailpipe pressure indication lamps or solenoid valve energized). Criterion is to open at least seven SRVs prior to Suppression Pool level reaching 14.5' (In cases where Emergency Depressurization is anticipated, Rapid Depressurization with the BPVs satisfies this critical task).</b></p>	

Op-Test No: <u>12/12</u>		Scenario No: <u>3</u>	Event No: <u>5 cont.</u>
Event Description: <b><u>Suppression Pool Leak</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	BOP	<p>Attempt to isolate the suppression pool leak by closing E21-F001, LPCS Suction from SP valve.</p> <p>Report updates to the CRS as directed (CRS specifies frequency).</p> <p>Manually initiate suppression pool makeup by:</p> <ul style="list-style-type: none"><li>• Place the SPMU MODE SEL handswitch to AUTO</li><li>• Place the SPMU DUMP TEST switch to TEST</li><li>• Depress both SPMU MAN INIT pushbuttons (simultaneously)</li><li>• Verify suppression pool level rising.</li></ul>	
	ATC	<p>Place the MODE SW to SHUTDOWN when directed</p> <p>Provides a scram report:</p> <ul style="list-style-type: none"><li>• Reactor Mode SW in SHUTDOWN.</li><li>• All Rods are IN.</li><li>• Reactor power is 0%.</li><li>• Reactor water level and trend.</li><li>• Reactor pressure and trend.</li><li>• Feedwater is AVAILABLE.</li><li>• Bypass valves are AVAILABLE</li></ul>	

Op-Test No: <u>12/12</u>		Scenario No: <u>3</u>	Event No: <u>5 cont.</u>
Event Description: <b><u>Suppression Pool Leak</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	ATC	<p>Transfer to startup level control:</p> <ul style="list-style-type: none"> <li>• If two RFPTs are in operation, then trip one by depressing the red TRIP pushbutton.</li> <li>• For the running RFPT, select SPEED AUTO or SPEED MANUAL and adjust RFPT speed as required to control reactor level.</li> <li>• CLOSE <ul style="list-style-type: none"> <li>○ N21-F009A, FW HTR 6A OUTL VLV</li> <li>○ N21-F009B, FW HTR 6B OUTL VLV</li> </ul> </li> <li>• OPEN <ul style="list-style-type: none"> <li>○ N21-F001, SU FCV OUTL ISOL VLV</li> <li>○ N21-F010A, HP FW HTR STRNG A SU OUTL VLV</li> <li>○ N21-F010B, HP FW HTR STRNG B SU OUTL VLV</li> </ul> </li> <li>• VERIFY CLOSED <ul style="list-style-type: none"> <li>○ N21-F513, X WTR LVL SU CONTR Valve (1C34-LK-R602)</li> <li>○ N21-F510, FW CU RECIRC VLV</li> <li>○ N21-F040, FW SU BYP VLV</li> </ul> </li> <li>• Ensure the running RFPT is running in SPEED AUTO with a discharge pressure approximately 250 psig above reactor pressure.</li> <li>• Verify OPEN N21-F014A(B), RFP DISCH VLV, for at least one pump.</li> <li>• Adjust N21-F513, RX WTR LVL SU CONT valve, as necessary in MANUAL or AUTO to maintain desired reactor level. N21-040 and/or N21-F009A(B) may also be used as necessary to maintain level.</li> </ul> <p>Maintain the reactor water level within the band of 11.4 – 53.5”.</p>	

Op-Test No: <u>12/12</u>		Scenario No: <u>3</u>	Event No: <u>6</u>
Event Description: <b><u>Loss of ESF 11 Transformer</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CREW	<p>Recognize and Report a loss of ESF 11 Transformer as indicated by:</p> <ul style="list-style-type: none"> <li>❖ Annunciator P864-1A-A3, 4.16KV BUS 15AA UNDERVOLTAGE</li> <li>❖ Annunciator P864-1A-H1, DIV 1 LSS SYS FAIL</li> <li>❖ Multiple 15 Bus LCC Under Voltage annunciators</li> <li>❖ Control Room lighting loss (partial)</li> <li>❖ Multiple annunciators resulting from loss of power</li> </ul> <p>Reenergize the 15AA Bus by closing an alternate feeder breaker</p>	
	CRS	<p>Enter Loss of AC Power ONEP, 05-1-02-I-4</p> <p>Direct an operator to reenergize the 15AA bus from an alternate feeder breaker</p> <p>Direct an operator to RESTORE THE AUX BUILDING</p>	
	CREW	<p>Reenergize 15AA using alternate feeder breaker.</p> <p>When directed to RESTORE THE AUX BUILDING:</p> <ul style="list-style-type: none"> <li>• OPEN <ul style="list-style-type: none"> <li>○ P53-F001 (After 30 sec TD)</li> <li>○ P53-F007 (After 30 sec TD)</li> </ul> </li> <li>• If all drywell temperatures are &lt; 200 F, and Drywell Chillers are available <ul style="list-style-type: none"> <li>○ If required, reenergize 15B42 and 16B42 on P864</li> </ul> </li> <li>• OPEN <ul style="list-style-type: none"> <li>○ P72-F121, P72-F122, P72-125, P72-123, P72-126, P72-124 (After 30 sec TD)</li> </ul> </li> <li>• Ensure at least one Drywell Chiller Water pump is running</li> <li>• Ensure Drywell Coolers are in operation.</li> </ul>	

Op-Test No: <u>12/12</u>			Scenario No: <u>3</u>			Event No: <u>5 cont.</u>		
Event Description: <b><u>Suppression Pool Leak</u></b>								
TIME	Position	Applicant's Actions or Behavior						
	CRS	<p>When the CRS determines that suppression pool level cannot be maintained above 14.5':</p> <ul style="list-style-type: none"><li>• Enter EMERGENCY DEPRESSURIZATION in EP-2</li><li>• Verify suppression pool level is above 10.5'</li><li>• Direct an operator to OPEN 8 ADS/SRV's</li></ul> <p><i>Note: the CRS may have an operator open the Manual Bypass Valve Jack prior to Emergency Depressurizing the reactor. A malfunction has been inserted to prevent this operator action to ensure that the crew enters the Emergency Depressurization in a timely manner. For the same reason, Turb Stm Press Demand has been disabled.</i></p>						
	CREW	<p>When directed to OPEN 8 ADS/SRV's:</p> <ul style="list-style-type: none"><li>• OPEN 8 ADS/SRV's</li></ul> <p>Restore reactor water level to within band (Startup Level Control should still be in AUTO).</p>						



Op-Test No: <u>12/12</u>			Scenario No: <u>3</u>			Event No: <u>7</u>		
Event Description: <b><u>ADS Valve Fails to Open</u></b>								
TIME		Position		Applicant's Actions or Behavior				
		CREW		Recognize and report that ADS valve B21-F041D failed to OPEN as indicated by the valve status lights remaining green ON and red OFF. OPEN an alternate SRV.				
		CRS		Ensure that an operator opens a total of 8 ADS/SRV's.				

Give this page to the CRS

Turnover the following conditions:

Power	95%
Pressure	1020 psig
BOC	
EOOS	GREEN
Work Week	Division 1

- B21-PIS-N667C is failed upscale (DW pressure sensor for HPCS). TS 3.3.5.1 Condition B was entered.
- The Division 1 DG is running tied to the grid.
- 06-OP-1P75-M-0001, Standby Diesel Generator (SDG) 11 Functional Test is in progress ready for step 5.2.25 (DG has run for 1.5hrs at full load and vibration data is complete)

Planned Evolutions this shift:

- Continue with the 06-OP-1P75-M-001 Surveillance at step 5.2.25 (Chemistry has requested that SSW 'A' remain in service until next shift).
- Raise reactor power to 100% using IOI-2 attachment VIII, Temporary Downpower (all preconditioning requirements are met).
- Note that an independent Reactivity Management SRO per Operations Philosophy 6.8.1 will not be provided for this scenario.

## Scenario 4

Page 1 of 3

Facility: Grand Gulf Nuclear Station Scenario No.: 4 Op-Test No.: 12/12Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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

1. Place RHR 'A' in Standby Mode
2. Reactor Water Level Narrow Range 'C' fails downscale
3. High Pressure Heater 6A tube leak
4. Spurious Division 1 ECCS initiation
5. Multiple Control Rod Drifts
6. ATWS
7. Failure of RCIC to initiate
8. Failure of EHC Pressure Control Systems

Initial Conditions: 100% power

Inoperable Equipment: B21-PT-N094E , Drywell Pressure, is failed high (TS 3.3.5.1 Conditions B and F, 3.3.6.1 Condition A, 3.3.6.3 Condition B, and 3.3.6.4 Condition B were entered)

Turnover:

- B21-PT-N094E has failed last shift.
  - Annunciators P601-21A-E7 (DRWL PRESS HI) and P601-18A-B2 (ADS A HI DRWL PRESS SEALED IN)
  - TS 3.3.5.1 Conditions B and F, 3.3.6.1 Condition A, 3.3.6.3 Condition B, and 3.3.6.4 Condition B were entered (no other actions are required at this time).
- RHR 'A' is lined up for Suppression Pool Cooling.
  - TS 3.5.1 Condition A was entered.

Scenario Notes:

This is a new scenario. The Condenser is a power conversion system (PCS) important to events leading to core damage of the GGNS PRA analysis. This scenario takes the Condenser away as a heat sink early in a high power ATWS. This event will challenge the crew to maintain the containment within the limits of HCTL.

Validation Time (60-90 min): 75 min

Event No.	Malf. No.	Event Type <sup>†</sup>	Event Description
1		N (BOP)	Place RHR 'A' in Standby Mode (04-1-01-E12-1, Residual Heat Removal System section 5.2.2)
2	fw126c	TS (CRS)	Reactor Water Level NR "C" fails downscale (TS 6.3.7 Condition A)
3	fw129c	C (ATC) A (Crew)	High Pressure Heater 6A tube leak (05-1-02-V-5, Loss of Feedwater Heating)
4	ptb21n094e_a ltb21n091a_b	I (BOP) TS (CRS)	Spurious Division 1 ECCS initiation (04-1-01-E12-1, Attachment IX; TS 3.5.1 Condition C)  * When Division 1 ECCS spuriously initiates, the crew secures the Division 1 Drywell Purge Compressor prior to the Drywell reaching 1.23 psig (causing a reactor scram).
5	z021021_20_21 z021021_40_53	I (ATC)	Multiple Control Rod Drifts (05-1-02-IV-1, Control Rod/Drive Malfunctions)
6	c11164 c11027 c41263	C (Crew) M (Crew)	ATWS (EP-2A, ATWS RPV Control)  * Entry into EP2A step L8. Crew terminates and prevents all injection except boron, CRD, and RCIC per 02-S-01-27 Operations Philosophy. Feedwater and ECCS system alignments prevent injection into the RPV as evidenced by available instrumentation. Criterion is to give the highest priority to terminate and prevent all injection except boron, CRD, and RCIC until reaching criteria specified in EP2A step L8.  * Criteria specified in EP2A step L-9 are satisfied. Crew restores injection using Condensate/Feedwater as evidenced by feedwater flow to RPV or RPV level trend. Criterion is to give the highest priority to reinitiate injection flow and establish the appropriate level band.  IF Emergency Depressurization is Entered:  * When EP-2A requires Emergency Depressurization, Crew terminates and prevents all injection except boron, CRD, and RCIC per 02-S-01-27 Operations Philosophy. Feedwater and ECCS system alignments prevent injection into the RPV as evidenced by available instrumentation. Criterion is to give the highest priority to prevent all injection except boron, CRD, and RCIC until reaching MSCP.  * Reactor pressure decreases to MSCP. Crew commences and slowly raises injection utilizing available EP-2A Table 4 and/or Table 5 systems with RPV level restored and maintained to greater than -191". Criterion is to give the highest priority to restore RPV level greater than -191".

Event No.	Malf. No.	Event Type <sup>†</sup>	Event Description
7	e51043 DI_1E51M625	C (CREW)	Failure of RCIC to initiate (04-1-01-E51-1, Reactor Core Isolation Cooling System Attachment VI)
8	tc079 DI_1N32M624	C (CREW)	<p>Failure of EHC Pressure Control Systems (EP-3, Containment Control)</p> <p><b>* When it is determined that Suppression Pool temperature and RPV pressure cannot be maintained below HTCL, the crew opens 8 SRVs and observes lowering pressure trend and valve position indications (tailpipe pressure indication lamps or solenoid valve energized). Criterion is to open a sufficient number of SRV's to active lower reactor pressure to prevent exceeding HCTL and opens at least 8 SRV's prior to exceeding HCTL.</b></p>
<sup>†</sup> (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (A)bnormal (TS) Tech Spec * <b>Critical Task</b> (As defined in NUREG 1021 Appendix D)			
Quantitative Attributes Table			
Normal Events	1	Abnormal Events	1
Reactivity Manipulations	0	Total Malfunctions	7
Instrument/Component Failures	6	EP Entries (Requiring substantive action)	2
Major Transients	1	EP Contingencies	1 - 2
Tech Spec Calls	2	Critical Tasks	4 - 6

**Simulator Setup:****A. Initialization**

1. Log off all simulator PDS and SPDS computers (PDS and SPDS must come up after the simulator load for proper operation).
2. Startup the simulator using Simulator Instructor's Job Aid section 6.3.

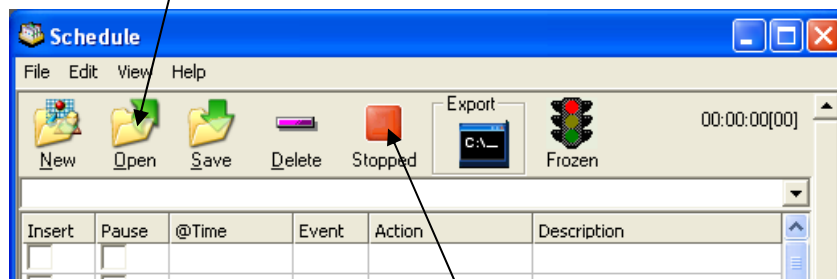
*Note:*

***Prior to running the Schedule File, ensure no Event Files are Open. If an existing Event File is Open prior to running the Schedule File, then any associated Event Files will not automatically load.***

3. Open Schedule.exe and Director.exe by clicking on the Icon in the Thunder Bar.

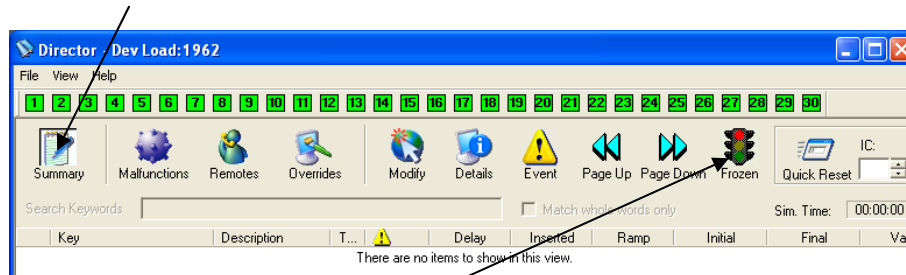


4. Set the Simulator to **IC-104** and perform switch check (Using Quick Reset in Director).
5. Click on **“Open”** in the Schedule window and Open Schedule File **“2012 NRC Scenario 4.sch”** (in the Schedule Directory)



6. In Schedule window, click on the **“Stopped”** red block. The red block will change to a green arrow and indicate the scenario is active (**“Running”**).

7. Click the Summary tab in the Director window. Verify the schedule files are loaded and opened per Section B below. (Note: Any actions in the schedule file without a specific time will not load into the director until triggered.)



8. Take the simulator out of freeze.
9. Log on to all simulator PDS and SPDS computers.
10. Verify or perform the following:
  - IC-104
  - RHR 'A' is lined up for Suppression Pool Cooling.
  - Ensure the correct rod movement sequence available at the P680.
  - Advance all chart recorders and ensure all pens inking properly.
  - Clear any graphs and trends off of SPDS.
11. Run through any alarms and ensure alarms are on. (**Note: On T-Rex, to verify alarms are ON, the indicator will indicate "Alarms On"**).
12. Place the simulator in Freeze.

B. File loaded verification:

**Schedule - 2012 NRC Scenario 4.sch**

File Edit View Help

New Open Save Delete Running Export Frozen

00:00:00[00]

Insert	Pause	@Time	Event	Action	Description
<input type="checkbox"/>	<input type="checkbox"/>			^NRC EXAM GGN 2012 Senario 3	
<input type="checkbox"/>	<input type="checkbox"/>			=>Reactor NR C level fails down scale	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		create event 1 zlo4(750) ==1	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction fw126c to 0 in 60 on event 1	Reactor Level Transmitter C34-LT-N004C Failure
<input type="checkbox"/>	<input type="checkbox"/>			=>Spurious ECCS init	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction ltb21n091a_b on event 2	override (fails low)
<input type="checkbox"/>	<input type="checkbox"/>			=>Loss of FW Heating	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction fw129c to 20.00099 on event 3	High Pressure Heater 6A Tube Leak (VAR)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		create event 4 et_array(3) == 1 & xmmvfw129c < 0.201 & zlo3(1164) == 1	
<input type="checkbox"/>	<input type="checkbox"/>		4	modify malfunction fw129c after 210 from 30 to 20 in 30 on event 4	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		create event 5 et_array(4) == 1 & xmmvfw129c < 0.200001 & zlo3(1164) == 1	
<input type="checkbox"/>	<input type="checkbox"/>		5	modify malfunction fw129c after 60 from 30 to 18 in 45 on event 5	
<input type="checkbox"/>	<input type="checkbox"/>			=>Control Rod Drift	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction z021021_20_21 on event 6	Control Rod 20-21 Drift In
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction z021021_40_53 after 90 on event 6	Control Rod 40-53 Drift In
<input type="checkbox"/>	<input type="checkbox"/>			=>Post Scram activities	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		create event 7 zdl1(645) == 1	Pressure Controller Fails
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction tc079 after 210 to 0 on event 7	Pressure Controller Fails
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction c11027 after 450 to 0 on event 7	CRD Flow Control Valve A Failure (VAR)
<input type="checkbox"/>	<input type="checkbox"/>		7	Modify malfunction c11164 after 20 on event 7	
<input type="checkbox"/>	<input type="checkbox"/>			=>Setup	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction c11164 to 27	CRD HYDRAULIC BLOCK
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert override DI_1E51M625 to NORM	P601/21B RCIC MAN INIT ARM
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction e51043	RCIC Auto Start Failure
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert override DI_1N32M624 to NORM	P680/09C BYPASS RAISE
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction ptb21n094e_a	override (fails high)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction c41263	SLC Piping Rupture (VAR)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		set xmmvfw129c = 1	MSL RAD HI
<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:00:00		Insert malfunction p601_19a_d_4 to OFF	MSL RAD HI
<input type="checkbox"/>	<input type="checkbox"/>	00:00:01		Set xallismbutton = 5	

Execute: Insert malfunction p601\_19a\_d\_4 to OFF  
Execute: set xmmvfw129c = 1  
Execute: Insert malfunction c41263  
Execute: Insert malfunction ptb21n094e\_a  
Execute: Insert override DI\_1N32M624 to NORM

Ready NUM



Director - Dev Load:1962

File View Help

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Summary Malfunctions Remotes Overrides Modify Details Event Page Up Page Down Frozen

Quick Reset IC: 104

Search Keywords  ☐ Match whole words only Sim. Time: 00:00:00

Key	Description	T...	Delay	Inserted	Ramp	Final	Value
fw126c	Reactor Lev...	1	00:00:00		00:01:00	0	60.7285
ltb21n091a_b	override (fail...	2	00:00:00		00:00:00	Active	InActive
fw129c	High Pressur...	3	00:00:00		00:00:00	20.001	100
z021021_20_21	Control Rod ...	6	00:00:00		00:00:00	Active	InActive
z021021_40_53	Control Rod ...	6	00:01:30		00:00:00	Active	InActive
tc079	Pressure Con...	7	00:03:30		00:00:00	0	79.8314
c11027	CRD Flow Co...	7	00:07:30		00:00:00	0	80.7847
c11164	CRD HYDRA...		00:00:00		00:00:00	27	0
e51043	RCIC Auto St...		00:00:00		00:00:00	Active	InActive
ptb21n094e_a	override (fail...		00:00:00		00:00:00	Active	InActive
c41263	SLC Piping R...		00:00:00		00:00:00	100	0
p601_19a_d_4	MSL RAD HI		00:00:00		00:00:00	OFF	NORMAL
DI_1E51M625	P601/21B R...		00:00:00		00:00:00	NORM	NORM
DI_1N32M624	P680/09C B...		00:00:00		00:00:00	NORM	NORM

Ready NUM

**Crew Turnover:**

B. Assign the candidates crew positions.

C. Turnover the following conditions:

Power	100%
Pressure	1030 psig
BOC	
EOOS	GREEN
Work Week	Division 1

- B21-PT-N094E has failed last shift.
  - Annunciators P601-21A-E7 (DRWL PRESS HI) and P601-18A-B2 (ADS A HI DRWL PRESS SEALED IN)
  - TS 3.3.5.1 Conditions B and F, 3.3.6.1 Condition A, 3.3.6.3 Condition B, and 3.3.6.4 Condition B were entered (no other actions are required at this time).
- RHR 'A' is lined up for Suppression Pool Cooling.
  - TS 3.5.1 Condition A was entered.

Planned Evolutions this shift:

- Place RHR 'A' in standby mode.
- Note that an independent Reactivity Management SRO per Operations Philosophy 6.8.1 will not be provided for this scenario.

D. Allow the crew to perform pre-shift brief and review procedures for planned evolutions.

E. Bring the crew into the Simulator, place the simulator is in RUN.

F. Allow the crew to walk down panels.

G. When the crew assumes the shift begin Scenario Activities.

**SCENARIO ACTIVITIES:**

- A. Start SBT report and any other required recording devices (Video recording not allowed for NRC exams).

**Place RHR 'A' in Standby Mode:**

- B. The crew will place RHR 'A' in standby using 04-1-01-E12-1 section 5.2.2.c (Shutdown of Suppression Pool Cooling 'A').
1. When the RHR 'A' pump is secured, reactor NR 'C' level instrument (C34-LT-004C) will begin to slowly fail downscale (Auto Event 1).

**Narrow Range 'C' Failed Downscale**

- A. This event will require no actions. It is given only for the LCO entry.
- B. When the CRS enters LCO 6.3.7 Condition A, and any transient briefs are complete, at the Lead Evaluator's discretion, insert malfunction fw129c by triggering **Event 3** to a Feedwater Tube Leak in HP Heater 6A.

**High Pressure Heater 6A Tube Leak:**

- C. The crew will respond using the ARI for FW HTR 6A LVL HI.
1. If sent as the building operator to P171 to check N23-LK-R051A, open Drawing P171-3 (the dump valve controller is the bottom middle controller R051A)
  2. After 3 ½ minutes, the leak will get worse (Auto Events 4 & 5). This will cause the FW HTR 6A LVL HI-HI annunciator. This will cause extraction steam to the heater to isolate. The crew will enter the Loss of FW Heating ONEP.
  3. The crew will reduce core flow to 70 mlbm/hr.
  4. The crew will determine that Rod Line is above 105% and insert cram rods to reduce reactor power below 105% Rod Line.
  5. The crew will take action per 04-1-01-N23-1 section 6.1 to isolate HP Heater 6A.
    - a. If directed as a local operator to close N35-F008A, use Remote fxn ms020 to close valve.
- D. When the crew has lowered core flow to 70 mlbm/hr and lowered power to < 105% Rod Line and the crew has determined a course of action to isolate the affected heater string, at the Lead Evaluator's discretion, insert malfunctions ltb21n091a\_b and ltb21n091e\_b by triggering **Event 2** to cause reactor WR 'A' and 'E' level instruments (B21-LT-N091A/E) to experience a current transient (common power source) causing Division 1 ECCS to initiate.



**Division 1 ECCS Spurious Initiation:**

- E. The Crew will use 04-1-01-E12-1 attachment IX (Recovery form a Division 1ECCS Initiation Signal) to recover from the initiation.
- F. If contacted by the control room to investigate a cause, say that it sounds like someone may have keyed a radio in the area where the transmitters are and that you will ask the Aux Building Operator if he was in the area. Wait 3 minutes and call the control room to confirm that the Aux Building Operator did bump his radio on something while taking rounds in a “no radio transmission” area.
- G. The LPCS pump will trip upon initiation. If asked, wait 2 minutes and report that the breaker is tripped on overcurrent.
- H. If sent to verify that ESF PWR light and BOP PWR light is on at LSS panel, wait 2 minutes and report that the lights are on.
- I. The When the CRS enters LCO 3.5.1 Condition A, and any transient briefs are complete, at the Lead Evaluator’s discretion, insert malfunction z021021\_20\_21 by triggering **Event 6** to cause a control rod 20-21EE to drift in.

**Multiple Control Rod Drifts:**

- J. The crew will enter the CRD Malfunctions ONEP and fully insert the drifting control rod. After 90 seconds, control rod 40-53KN will drift in.
- K. The crew will manually scram the reactor.

**ATWS:**

- L. The crew will respond to a high power ATWS and loss of EHC pressure controls (Auto Event 7).
  - 1. The crew will have to take actions to avoid exceeding HCTL.
  - 2. RCIC will not auto start. It must be manually lined up using the hard card.
  - 3. C11-F002 (Flow Control Valve) will fail closed preventing the crew from inserting control rods. Also, the ATWS will increase in severity. This is to ensure the crew is required to take actions to avoid HCTL.
- M. **(Install EP Attachments as directed).**

**Termination:**

- N. Once the crew has emergency depressurized or is actively taking action to avoid exceeding HCTL and maintaining the reactor within established level and pressure bands,
- Take the simulator to Freeze and turn horns off.
  - Stop and save the SBT report and any other recording devices.
  - Instruct the crew to not erase any markings or talk about the scenario until after follow-up questions are asked.

**Critical Tasks:**


- \* When Division 1 ECCS spuriously initiates, the crew secures the Division 1 Drywell Purge Compressor prior to the Drywell reaching 1.23 psig (causing a reactor scram).
- \* Entry into EP2A step L8. Crew terminates and prevents all injection except boron, CRD, and RCIC per 02-S-01-27 Operations Philosophy. Feedwater and ECCS system alignments prevent injection into the RPV as evidenced by available instrumentation. Criterion is to give the highest priority to terminate and prevent all injection except boron, CRD, and RCIC until reaching criteria specified in EP2A step L8.
- \* Criteria specified in EP2A step L-9 are satisfied. Crew restores injection using Condensate/Feedwater as evidenced by feedwater flow to RPV or RPV level trend. Criterion is to give the highest priority to reinitiate injection flow and establish the appropriate level band.
- \* When it is determined that HCTL will be exceeded, the crew opens 8 SRVs and observes lowering pressure trend and valve position indications (tailpipe pressure indication lamps or solenoid valve energized). Criterion is to open a sufficient number of SRV's to actively lower reactor pressure to prevent exceeding HCTL and to open at least 8 SRV's prior to exceeding HCTL.

If the crew enters Emergency Depressurization

- \* When EP-2A requires Emergency Depressurization, Crew terminates and prevents all injection except boron, CRD, and RCIC per 02-S-01-27 Operations Philosophy. Feedwater and ECCS system alignments prevent injection into the RPV as evidenced by available instrumentation. Criterion is to give the highest priority to prevent all injection except boron, CRD, and RCIC until reaching MSCP.
- \* Reactor pressure decreases to MSCP. Crew commences and slowly raises injection utilizing available EP-2A Table 4 and/or Table 5 systems with RPV level restored and maintained to greater than -191". Criterion is to give the highest priority to restore RPV level greater than -191".


Op-Test No: <u>12/12</u>		Scenario No: <u>4</u>	Event No: <u>1</u>
Event Description: <b><u>Place RHR 'A' in Standby Mode</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	Directs the BOP to place RHR 'A' in Standby Mode using 04-1-01-E12-1 section 5.2.2.c (Shutdown of Suppression Pool Cooling A) Note: Brief was performed prior to the crew assuming the watch.	
	BOP	Place RHR 'A' in standby as follows: <ul style="list-style-type: none"><li>• Close E12-F024A, RHR A TEST RTN TO SUPP POOL</li><li>• When flow decreases below 1154 gpm, Verify that E12-F064A, RHR A MIN FLO VLV opens (8 second delay)</li><li>• Stop RHR PMP 'A'</li></ul> <i>Note: When RHR PMP 'A' is stopped, the next event will automatically begin. The remaining steps of the procedure would be performed outside the control room.</i>	

Op-Test No: <u>12/12</u>		Scenario No: <u>4</u>	Event No: <u>2</u>
Event Description: <b><u>Reactor Water Level Narrow Range 'C' fails downscale</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	ATC	Recognize and report that RX WTR LVL NARROW RANGE 'C' has failed downscale as indicated by: <ul style="list-style-type: none"><li>❖ Annunciator P680-2A-C9, DFCS TROUBLE</li><li>❖ Annunciator P680-4A2-A2, RX WTR LVL SIG FAIL HI-LO</li><li>❖ C34-R606C, RX WTR LVL NARROW RANGE 'C', lowers to 0"</li></ul>	
	ATC	Verify that the feedwater control system is maintaining the desired reactor water level.	
	CRS	Recognizes entry conditions and enters TRM 6.3.7 Condition A.	


Op-Test No: <u>12/12</u>		Scenario No: <u>4</u>	Event No: <u>3</u>
Event Description: <b><u>High Pressure Heater 6A Tube Leak</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	ATC	<p>Recognizes and reports a High Pressure Heater 6A Tube Leak as indicated by:</p> <ul style="list-style-type: none"> <li>❖ Annunciator P680-2A-A9, FW HTR 6A LVL HI</li> <li>❖ The leak is verified by               <ol style="list-style-type: none"> <li>(1) Observing on the N23 (Heaters and Drain) PDS process diagram that the HP FW HTR 6A DRN valve is open and the HP FW HTR 6A DUMP valve is controlling level. <i>(This is also part of the ARI response)</i></li> <li>(2) Calculating the difference in RFPT suction flow and Feedwater flow to the vessel.</li> </ol> </li> </ul> <p>Refer to the ARI for annunciator P680-2A-A9 and verify that heater 6A dump valve N23-LV-F515A is controlling level using a listed computer point or process diagram.</p>	
	BOP	<p>Report when annunciator P870-6A-A4, FW HTR 6A LVL HI-HI comes in.</p> <p>Verify that:</p> <ul style="list-style-type: none"> <li>• N36-BTV-F012A closes</li> <li>• N36-F011A closes</li> <li>• N36-F008A opens</li> <li>• N35-LV-F505A closes</li> <li>• N23-F053A opens (PDS process diagram or local operator at P171)</li> </ul>	
	CRS	<p>Direct operators actions per the appropriate ARI's.</p> <p>Enter Loss of Feedwater Heating, 05-1-02-V-5</p> <p>Direct the ATC to lower core flow to 70 mlbm/hr and enter Reduction in Recirculation System Flow Rate, 05-1-02-III-3.</p>	
	ATC	<p>When Loss of Feedwater Heating is entered lower core flow to 70 mlbm/hr in fast detent.</p>	



Op-Test No: <u>12/12</u>		Scenario No: <u>4</u>	Event No: <u>3 cont.</u>
Event Description: <b><u>High Pressure Heater 6A Tube Leak</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	ATC	<p>Recognize and report when Rod Line is determined to be above 105%. This is determined by plotting power and flow on the power-to-flow map or when indicated on the CYCLOPS computer.</p> <p>Plot power and flow on the power-to-flow map and report entry into the OPRM Trip Enabled Region.</p>	
	CRS	<p>Direct the ATC to establish THI watch without concurrent duties (concurrent duties are allowed when feedwater temperatures have stabilized).</p> <p>Direct the ATC and BOP to insert Control Rods to lower power to below the 105% Rod Line per the approved Rod Sequence Sheets (CRAM RODS).</p> <p><i>Note: The CRS may direct power be lowered to 50% per 04-1-01-N23-1 section 6.1 (Isolation/Restoration of 1 HP Heater String).</i></p>	
	ATC	<p>Monitor APRMs, LPRMs, SRM period meters, and OPRM computer trends for indication of THI.</p> <p>Act as peer checker for Control Rod movements.</p>	
	BOP	<p>Sequentially insert Control Rods using the approved Rod Sequence Sheets (CRAM RODS) to lower reactor power as directed by the CRS.</p>	
	CRS	<p>Direct the ATC and BOP to insert Control Rods to lower reactor power to 50% (If not previously directed).</p> <p>Direct the BOP to isolate FW Heater 6A using 04-1-01-N23-1 section 6.1 (Isolation/Restoration of 1 HP Heater String)</p> <p><i>Note: If it is not desired to observe the isolation of FW Heater 6A, the lead examiner may cue the next event anytime after the first Control Rod movement.</i></p>	
	BOP	<p>When directed to isolate FW Heater 6A,</p> <ul style="list-style-type: none"> <li>• Close N21-F012A on P870</li> <li>• Check Closed N21-F010A on P870</li> <li>• Close N21-F009A on P680</li> <li>• Close N36-F010A and N36-F011A on P870</li> <li>• Direct the local operator to Close N35-F008A on P177</li> </ul>	

Op-Test No: 12/12		Scenario No: 4	Event No: 4
Event Description: <b><u>Spurious Division 1 ECCS initiation</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	BOP	<p>Recognizes and reports spurious Division 1 ECCS initiation as indicated by:</p> <ul style="list-style-type: none"> <li>❖ Annunciator P601-21A-E8, RX LVL 1 (-150) LO</li> <li>❖ Spurious initiation is identified in accordance with Operations Philosophy, 02-S-01-27 step 6.6.3a by "at least two independent means." In this case, only the Division 1 ECCS system indicates low level. All level indications are still indicating normal water level.</li> </ul>	
	CRS	<p>Directs the BOP to verify the initiation was spurious.</p> <p>Direct the BOP to recover from Division 1 ECCS initiation using SOI 04-1-01-E12-1 Attachment IX (Hard Card).</p> <p><u>OR</u></p> <p>Direct the BOP to secure the A DW purge compressor using SOI 04-1-01-E61-1 section 5.2.2 step a. (Note that if this path is taken, the CRS should enter TS 3.6.3.3)</p> <p><b>* When Division 1 ECCS spuriously initiates, the crew secures the Division 1 Drywell Purge Compressor prior to the Drywell reaching 1.23 psig causing a reactor scram.</b></p>	
	BOP	<p>Complete actions of SOI 04-1-01-E12-1 Attachment IX (hard card).</p> <ul style="list-style-type: none"> <li>• Press the LPCS/RHR 'A' INIT RESET pushbutton (on P601-21B).</li> <li>• Press the DIV 1 LSS PNL RESET pushbutton (on P864-1C).</li> <li>• Reset the Division 1 CGCS logic using the keylock switch (on P870-4B).</li> <li>• Stop the Drywell Purge Compressor "A" (on P870-4C).</li> <li>• Close E61-F003A (on P870-4C).</li> </ul> <p><u>OR</u></p> <p>Complete actions of SOI 04-1-01-E61-1 section 5.2</p> <ul style="list-style-type: none"> <li>• Direct the local plant operator to manually trip the 52-15105 A DW purge compressor breaker and pull the lockout tab.</li> </ul>	

Op-Test No: <u>12/12</u>		Scenario No: <u>4</u>	Event No: <u>4 cont.</u>
Event Description: <b><u>Spurious Division 1 ECCS initiation</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	<p>Develops a plan of action to restore affected systems to standby lineup.</p> <ul style="list-style-type: none"> <li>• Refers to SSW SOI (04-1-01-P41-1) to place SSW A in standby.</li> <li>• Refers to RHR SOI (04-1-01-E12-1) to place RHR A in standby.</li> </ul> <p><i>Note: The CRS will not have time to implement these actions prior to the next event, but the CRS should pursue these actions.</i></p>	
	BOP	<p>Recognizes and reports that the LPCS pump tripped when Division 1 ECCS initiated.</p> <ul style="list-style-type: none"> <li>❖ As indicated by the amber pump trouble light above the LPCS hand switch being illuminated (indicates pump trip when an auto start signal is present).</li> <li>❖ LPCS PMP AUTO TRIP status light is lit.</li> <li>❖ Annunciators P601-21A-A-7, LPCS PMP OVERLD, and P601-21A-H-8, LPCS SYS OOSVC will be in also.</li> </ul> <p>If directed to place RHR A in standby: Stop RHR A pump. (all other actions should be verification with no actual manipulations)</p>	
	CRS	Recognizes entry conditions and enters TS 3.5.1 Condition A.	

Op-Test No: <u>12/12</u>	Scenario No: <u>4</u>	Event No: <u>5</u>
Event Description: <b><u>Multiple Control Rod Drifts</u></b>		

TIME	Position	Applicant's Actions or Behavior
	ATC	<p>Recognizes and report Control Rod 20-21EE is drifting in as indicated by:</p> <ul style="list-style-type: none"> <li>❖ Annunciator P680-4A2-E4, CONT ROD DRIFT</li> <li>❖ Determine Control Rod(s) that have drifted by depressing the ROD DRIFT pushbutton and observe the red LEDs of the drifted Control Rod(s) on the Control Rod Display Module. (from annunciator ARI)</li> </ul> <p>Apply continuous insert signal until Control Rod reaches zero.</p> <p>Reset drift alarms using the RESET DRIFT pushbutton on P680 RC&amp;IS (from annunciator ARI)</p>
	CRS	<p>Enter Control Rod/Drive Malfunctions, 05-1-02-IV-1</p> <p>Direct the ATC to apply continuous insert signal until Control Rod reaches zero.</p> <p>Direct the ATC to reset the ROD DRIFT in accordance with the ARI (P680-4A2-E4)</p> <p>When the second Control Rod begins to drift in, direct the ATC to place the Mode Switch in SHUTDOWN</p> <p><i>Note: The CRS may use conservative bias and direct the crew to place the Mode Switch in SHUTDOWN when the first Control Rod drift begins.</i></p>
	ATC	<p>When directed or the second Control Rod (40-53KN) begins to drift in, report the rod drift and place the Mode Switch in SHUTDOWN. (Indication is the same as before).</p> <p>Provides a scram report:</p> <ul style="list-style-type: none"> <li>• Reactor Mode SW in SHUTDOWN.</li> <li>• All Rods are NOT Inserted (Hyd Block ATWS).</li> <li>• Reactor power is above 4% (<i>Value depends when data taken</i>).</li> <li>• Reactor water level and trend.</li> <li>• Reactor pressure and trend.</li> <li>• Feedwater is available</li> </ul> <p>Bypass valves are available.</p>

Op-Test No: <u>12/12</u>		Scenario No: <u>4</u>	Event No: <u>6</u>
Event Description: <u>ATWS</u>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	Enter SCRAM ONEP and EP-2A, ATWS RPV CONTROL  Direct actions of EP-2A steps 1 - 4: <ul style="list-style-type: none"> <li>• Directs ATC to Verify Recirc Pumps transferred to LFMG.</li> <li>• Directs ATC to Verify ARI/RPT initiation.</li> <li>• Directs BOP to inhibit ADS.</li> <li>• Directs BOP to Override HPCS injection.</li> </ul>	
	ATC	Verify Recirc Pumps transferred to LFMG. Verify/Initiate ARI/RPT.	
	BOP	Inhibits ADS. <ul style="list-style-type: none"> <li>• Place ADS "A" and ADS "B" keylock switches to "INHIBIT"</li> </ul> Override HPCS injection. <ul style="list-style-type: none"> <li>• Place the HPCS pump handswitch to the "STOP" position.</li> <li>• Place the E22-F004, HPCS injection valve, handswitch to the "CLOSE" position.</li> </ul>	
	CRS	Enter EP-2A step L-7 and direct the ATC to establish level band -70 to -130" on Startup Level Control. Enter EP-2A step Q-4. ( <i>SLC will not inject, Attachment 28 is required</i> ) Enter EP-2A step P-4 and direct the BOP to establish a pressure band 800 – 1060 psig using IPC and BCV Manual Jack. Call for EP Attachments 8, 12, 18, 19, 20, and 28.	

Op-Test No: <u>12/12</u>		Scenario No: <u>4</u>	Event No: <u>6 Cont.</u>
Event Description: <u>ATWS</u>			
TIME	Position	Applicant's Actions or Behavior	
	ATC	<p>Line up Feed and Condensate systems for Startup Level Control using hard card.</p> <ul style="list-style-type: none"> <li>• If two Feed pumps are running, trip one.</li> <li>• Close N21-F009A and N21-F009B.</li> <li>• Open N21-F001, N21-F010A and N21-F010B.</li> <li>• Verify Closed N21-F513, N21-F510, N21-F040.</li> <li>• If no Feed pumps are in operation, start one. <ul style="list-style-type: none"> <li>○ Ensure RFPT A(B) controls "Manual" pushbutton is backlit.</li> <li>○ Verify AC lube oil pump is running</li> <li>○ Open N21-F014A(B)</li> <li>○ Depress the TRIP RESET pushbutton</li> <li>○ Depress the RAISE pushbutton to establish Feed pump discharge pressure above reactor pressure by approx. 250 psig.</li> </ul> </li> <li>• Open/Verify Open N21-F014A or N21-F014B</li> <li>• Maintain reactor level in Auto or Manual using the Startup level controller or Manually using N21-F040 or N21-F009A(B).</li> </ul> <p>Feed the reactor using the Startup Level Controller to maintain reactor level within the set level band (-70 to -130").</p>	

Op-Test No: <u>12/12</u>		Scenario No: <u>4</u>	Event No: <u>8</u>
Event Description: <b><u>Failure of EHC Pressure Control Systems</u></b>			
<i>Note: ATWS actions are continued in this event since it becomes the main driver of crew actions.</i>			
TIME	Position	Applicant's Actions or Behavior	
	CREW	<p>Recognize and report that EHC Pressure Control has failed as indicated by:</p> <ul style="list-style-type: none"> <li>❖ Annunciator P680-9A-D2, TURB IPC CAB FAIL</li> <li>❖ Annunciator P601-19A(18A)-B6, LO-LO SET PT SEALED IN</li> <li>❖ Rising reactor pressure</li> <li>❖ Open SRVs</li> </ul> <p><i>Note: The ability to open the manual jack has also been removed.</i></p>	
	CRS	<p>Direct the BOP to manually control reactor pressure in the band of 800 to 1060 psig using SRVs.</p> <p>Direct the BOP to lineup RHR 'A' and 'B' for Suppression Pool Cooling using 04-1-01-E12-1 Attachment VI, Maximizing Suppression Pool Cooling.</p>	
	BOP	<p>Open and Close SRVs as required to maintain reactor pressure within the established band. <i>(This will be a continuing action for the remainder of the scenario)</i></p> <p>When directed to lineup RHR 'A' and 'B' for Suppression Pool Cooling:</p> <ul style="list-style-type: none"> <li>• Ensure SSW is in service by observing the following: <ul style="list-style-type: none"> <li>○ SSW A(B) Pump running</li> <li>○ P41-F001A(B), SSW PMP A(B) DISCH VLV is Open</li> <li>○ P41-F005A(B), SSW LOOP A(B) RTN TO CLG TWR is Open</li> <li>○ P41-F014A(B), SSW INL TO RHR HX A(B) OUTL VLV is Open</li> <li>○ P41-F006A(B), SSW PMP RECIRC VLV is closed</li> </ul> </li> <li>• Verify Open E12-F003A(B), RHR HX OUTL VLV</li> <li>• Start RHR PMP A(B)</li> <li>• Open E12-F024A(B), RHR TEST RTN TO SUPP POOL</li> </ul>	

Op-Test No: <u>12/12</u>		Scenario No: <u>4</u>	Event No: <u>8 Cont.</u>
Event Description: <b><u>Failure of EHC Pressure Control Systems</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	<p>When Suppression Pool Temperature reaches 110F</p> <p>Enter EP-2A step L-8 and direct the following:</p> <p>ATC: Terminate and prevent Feedwater by Closing the Startup Level Control valve, N21-F040, N21-F009A, and N21-F009B.</p> <p>BOP: Terminate and prevent high pressure and low pressure ECCS injection by ensuring ECCS is initiated and overriding LPCS, RHR A/B/C, HPCS pump off and injection valve shut.</p> <p>Allow level to lower until:</p> <ul style="list-style-type: none"> <li>• Power is below 4% OR</li> <li>• Level drops to -167" (Compensated Fuel Zone) OR</li> <li>• All SRVs stay closed and DW pressure stays below 1.23 psig</li> </ul> <p>Establish a new level band of -191" to level lowered from above</p> <p><b>* Entry into EP2A step L8. Crew terminates and prevents all injection except boron, CRD, and RCIC per 02-S-01-27 Operations Philosophy. Feedwater and ECCS system alignments prevent injection into the RPV as evidenced by available instrumentation. Criterion is to give the highest priority to terminate and prevent all injection except boron, CRD, and RCIC until reaching criteria specified in EP2A step L8.</b></p> <p><b>* Criteria specified in EP2A step L-9 are satisfied. Crew restores injection using Condensate/Feedwater as evidenced by feedwater flow to RPV or RPV level trend. Criterion is to give the highest priority to reinitiate injection flow and establish the appropriate level band.</b></p>	
	ATC	Reestablish Feedwater to maintain level within the new level band.	



	CRS	<p>Take action to avoid exceeding HCTL (EP-1, EP/SAP Figure 1) by one or both of the following methods:</p> <ol style="list-style-type: none"> <li>1. Per EP-2A step P1: <ol style="list-style-type: none"> <li>a. SP temperature cannot be maintained in the Safe zone of the HCTL, maintain RPV pressure in the Safe zone of HCTL (OK to exceed 100F/hr)</li> <li>b. This is accomplished by establishing progressively lower pressure bands for the BOP to maintain; however, there is no specific procedural guidance on what pressure bands to use in this case.</li> </ol> </li> <li>2. Per EP-3 step SPT-5: <ol style="list-style-type: none"> <li>a. SP temperature and RPV pressure cannot be maintained within the Safe zone of the HCTL, Enter Emergency Depressurization.</li> <li>b. Direct the ATC and BOP to Terminate and Prevent Feedwater, High Pressure and Low Pressure ECCS injection systems.</li> <li>c. Direct BOP to Open 8 ADS/SRVs</li> <li>d. Direct ATC to reestablish Feedwater in accordance with 02-S-01-27, Operations Philosophy step 6.2.11 when RPV pressure is below MSCP (206 psig). <ol style="list-style-type: none"> <li>o Feedwater is reestablished by raising flow initially to ~ 2 mlbm/hr and then in ~ 0.5 mlbm/hr increments until RPV level begins to turn. This is controlled by the CRS.</li> <li>o The level band should be the same as prior to ED.</li> </ol> </li> </ol> </li> </ol> <p><b>* When it is determined that HCTL will be exceeded, the crew opens 8 SRVs and observes lowering pressure trend and valve position indications (tailpipe pressure indication lamps or solenoid valve energized). Criterion is to open a sufficient number of SRV's to actively lower reactor pressure to prevent exceeding HCTL and to open at least 8 SRV's prior to exceeding HCTL.</b></p> <p><i>Note: HCTL is defined by EP Figure 1 and is a function of SP Temperature, RPV Pressure, and SP Level. The graph will automatically display on the SPDS computer prior to exceeding. This screen may also be placed on a computer screen visible only to the evaluator prior to the scenario if desired.</i></p> <p>If Emergency Depressurization</p> <p><b>* When EP-2A requires Emergency Depressurization, Crew terminates and prevents all injection except boron, CRD, and RCIC per 02-S-01-27 Operations Philosophy. Feedwater and ECCS system alignments prevent injection into the RPV as evidenced by available instrumentation. Criterion is to give the highest priority to prevent all injection except boron, CRD, and RCIC until reaching MSCP.</b></p> <p><b>* Reactor pressure decreases to MSCP. Crew commences and slowly raises injection utilizing available EP-2A Table 4 and/or Table 5 systems with RPV level restored and maintained to greater than -191". Criterion is to give the highest priority to restore RPV level greater than -191".</b></p>
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Op-Test No: <u>12/12</u>		Scenario No: <u>4</u>	Event No: <u>8 Cont.</u>
Event Description: <b><u>Failure of EHC Pressure Control Systems</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	BOP	<p>Control RPV pressure to avoid exceeding HCTL as directed by the CRS by:</p> <ul style="list-style-type: none"> <li>• Open SRVs as required to maintain the given pressure band</li> <li style="text-align: center;">OR</li> <li>• When directed, verify high pressure and low pressure ECCS systems are overridden.</li> <li>• When directed, Open 8 ADS/SRVs</li> </ul>	
	ATC	<p>If Emergency Depressurization is entered,</p> <ul style="list-style-type: none"> <li>• When directed, Terminate and Prevent Feedwater injection</li> <li>• When directed, reestablish feed <ul style="list-style-type: none"> <li>○ Feedwater is reestablished by raising flow initially to ~ 2 mlbm/hr and then in ~ 0.5 mlbm/hr increments until RPV level begins to turn. This is controlled by the CRS.</li> <li>○ Maintain level within the established level band</li> </ul> </li> </ul>	
	BOP	<p>When RCIC does not automatically initiate at -41.6" reactor water level or when directed, Manually align RCIC as follows:</p> <ul style="list-style-type: none"> <li>• Shift RCIC Flo controller to manual and reduce output to minimum</li> <li>• Open E51-F046</li> <li>• Start the Gland Seal Compressor</li> <li>• Open E51-F095</li> <li>• After ~ 6 seconds, Open E51-F045</li> <li>• Raise turbine speed using flow controller in manual to develop pressure greater than reactor pressure</li> <li>• Open E51-F013</li> <li>• Adjust flow as necessary</li> </ul> <p><i>Note: The normal method of "arming" and "depressing" the RCIC MAN INIT pushbutton has also failed for this event.</i></p>	

Op-Test No: <u>12/12</u>		Scenario No: <u>4</u>	Event No: <u>7</u>
Event Description: <b><u>Failure of RCIC to initiate</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	BOP	<p>When RCIC does not automatically initiate at -41.6" reactor water level or when directed, Manually align RCIC as follows:</p> <ul style="list-style-type: none"><li>• Shift RCIC Flo controller to manual and reduce output to minimum</li><li>• Open E51-F046</li><li>• Start the Gland Seal Compressor</li><li>• Open E51-F095</li><li>• After ~ 6 seconds, Open E51-F045</li><li>• Raise turbine speed using flow controller in manual to develop pressure greater than reactor pressure</li><li>• Open E51-F013</li><li>• Adjust flow as necessary</li></ul> <p><i>Note: The normal method of "arming" and "depressing" the RCIC MAN INIT pushbutton has also failed for this event.</i></p>	

Give this page to the CRS

Turnover the following conditions:

Power	100%
Pressure	1030 psig
BOC	
EOOS	GREEN
Work Week	Division 1

- B21-PT-N094E has failed last shift.
  - Annunciators P601-21A-E7 (DRWL PRESS HI) and P601-18A-B2 (ADS A HI DRWL PRESS SEALED IN)
  - TS 3.3.5.1 Conditions B and F, 3.3.6.1 Condition A, 3.3.6.3 Condition B, and 3.3.6.4 Condition B were entered (no other actions are required at this time).
- RHR 'A' is lined up for Suppression Pool Cooling.
  - TS 3.5.1 Condition A was entered.

Planned Evolutions this shift:

- Place RHR 'A' in standby mode.
- Note that an independent Reactivity Management SRO per Operations Philosophy 6.8.1 will not be provided for this scenario.

Facility: Grand Gulf Nuclear Station Scenario No.: 5 Op-Test No.: 12/12

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

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

1. Place SSW 'A' in STANDBY.
2. Raise reactor power using Recirc Flow Control.
3. Two APRM channel failures.
4. Loss of ESF Transformer 21.
5. Division 2 LSS failure.
6. Fuel cladding leak.
7. RCIC fails to start on initiation.
8. RCIC room unisolable steam leak.

Initial Conditions: Operating at 85% power.

Inoperable Equipment: APRM Ch 1 is failed downscale and bypassed.

Turnover:

A plant startup is in progress with all steps complete up to step 6.8 of Attachment II in 03-1-01-2 (Power Ascension From 60% to Full Power). The crew will place SSW "A" in STANDBY upon assuming the shift. When SSW "A" is in STANDBY, raise reactor power to 100% of rated.

Scenario Notes:

This scenario was developed for the GGNS 2011 NRC License Operating Test. It has been modified to meet the requirements of NUREG-1021ES-301, but is not considered significantly modified.

Validation Time (60-90 min): 50 minutes

Event No.	Malf. No.	Event Type <sup>†</sup>	Event Description
1	p41f005a_i	C (BOP)	Place SSW 'A' in Standby (SOI 04-1-01-P41-1 section 4.6)
2		N (BOP) R (ATC)	Raise Reactor power using FCV's (IOI 03-1-01-2 Att. 2 step 6.8)
3	c51010_1 c51009_4	I (ATC) TS (CRS)	Two APRM channel failures (ARI/TS 3.3.1.1)
4	r21180	C (BOP) A(CREW)	Loss of EST Transformer 21 (05-1-02-I-4, Loss of AC Power)
5	r21218	TS (CRS)	Division 2 LSS Failure (TS 3.8.1)
6	rr071 rm157a rrd21k648a_d rrd21k648b_d rrd21k648c_d rrd21k648d_d	M (CREW)	Fuel cladding leak (Off-Gas Activity High (05-1-02-II-2) and SCRAM (05-1-02-I-1) ONEP)  * Fuel failure is occurring and main steam line radiation is greater than 3 times normal full power background as indicated by MSL B / MSL C RAD HI-HI or MSL A / MSL D RAD HI-Hi alarms, the crew closes MSIVs and MSL drains per EP-4. The crew closes the MSIVs and MSL drains and observes valve position indications and lowering pressure trend downstream of the MSIVs. Criterion is to give the highest priority to close the four inboard MSIVs or the four outboard MSIVs and MSL drains when MSL radiation is greater than 3 times normal full power background.
7	e51043 DI_1E51M625D	I (ATC / BOP)	RCIC fails to start on initiation (SOI 04-1-01-E51-1)
8	e51187a e51187b rrd21k603 rrd21k613	I/C (ATC / BOP)	RCIC room unisolable steam leak (EP-4)  * A primary system is discharging outside primary containment and area temperatures, radiation levels, or water levels are above their max safe values in two or more areas. The crew opens 8 ADS/SRVs and observes lowering pressure trend and valve position indications (tailpipe pressure indication lamps or solenoid valve energized). Criterion is to give the highest priority to open at least seven SRVs when area temperatures, radiation levels, or water levels are above their maximum safe values in two or more areas.
<sup>†</sup> (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (A)bnormal (TS) Tech Spec * Critical Task (As defined in NUREG 1021 Appendix D)			
Quantitative Attributes Table			
Normal Events	1	Abnormal Events	1
Reactivity Manipulations	1	Total Malfunctions	7
Instrument/Component Failures	5	EP Entries (Requiring substantive action)	2
Major Transients	1	EP Contingencies	1
Tech Spec Calls	2	Critical Tasks	2

**Simulator Setup:**

## A. Initialization

1. Log off all simulator PDS and SPDS computers (PDS and SPDS must come up after the simulator load for proper operation).
2. Startup the simulator using Simulator Instructor's Job Aid section 6.3.

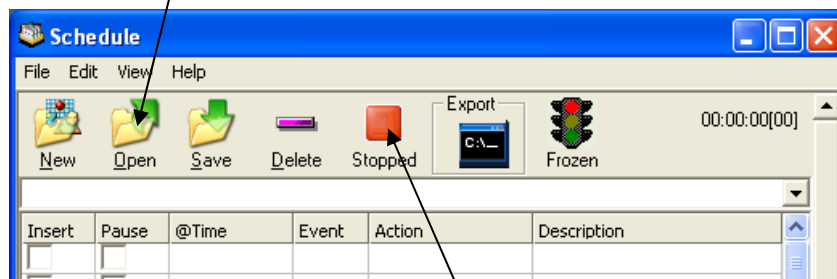
*Note:*

***Prior to running the Schedule File, ensure no Event Files are Open. If an existing Event File is Open prior to running the Schedule File, then any associated Event Files will not automatically load.***

3. Open Schedule.exe and Director.exe by clicking on the Icon in the Thunder Bar.

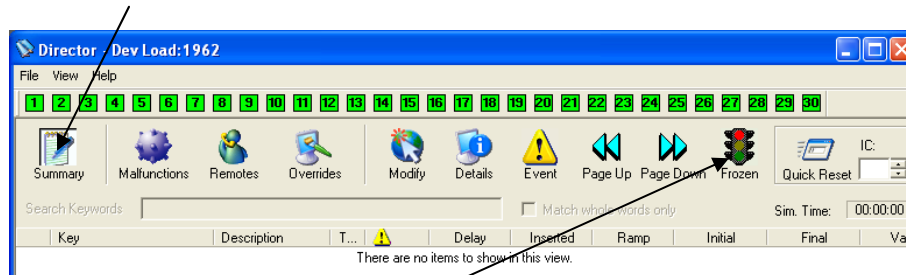


4. Set the Simulator to **IC-105** and perform switch check (Using Quick Reset in Director).
5. Click on “**Open**” in the Schedule window and Open Schedule File “**2011 NRC Scenario 5.sch**” (in the Schedule Directory)



6. In Schedule window, click on the “**Stopped**” red block. The red block will change to a green arrow and indicate the scenario is active (“**Running**”).

7. Click the Summary tab in the Director window. Verify the schedule files are loaded and opened per Section B below. (Note: Any actions in the schedule file without a specific time will not load into the director until triggered.)



8. Take the simulator out of freeze.
9. Log on to all simulator PDS and SPDS computers.
10. Verify or perform the following:
  - IC-105
  - SSW “A” started normally.
  - After SSW “A” is running, trigger event 30 to setup malfunction p41f005a\_c (thermal ol/49 device)
  - APRM 1 is bypassed and caution tagged
  - Ensure the correct rod movement sequence available at the P680.
  - Advance all chart recorders and ensure all pens inking properly.
  - Clear any graphs and trends off of SPDS.
11. Run through any alarms and ensure alarms are on. (**Note: On T-Rex, to verify alarms are ON, the indicator will indicate “Alarms On”**).
12. Place the simulator in Freeze.

B. File loaded verification:



**Schedule - 2012 NRC Scenario 5.sch**

File Edit View Help

New Open Save Delete Running Export Frozen 00:00:00[00]

Insert	Pause	@Time	Event	Action	Description
				^NRC EXAM GGN 2011 Senario 5	
				=>APRM D fails upscale	
<input checked="" type="checkbox"/>		00:00:00		Create event 1 xcr4b33na001 > 88.0	
<input checked="" type="checkbox"/>		00:00:00	1	Insert malfunction c51010_4 on event 1	APRM Channel 4 Downscale
				=>LSS Failure	
<input checked="" type="checkbox"/>		00:00:00		Insert remote r21218 to INOP on event 2	DIV 2 LOAD SHED AND SEQUENCING STATUS
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction r21180 on event 2	ESF 21 Transformer Lockout
				=>Fuel cladding leak	
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction rr071 to 0.1000 on event 3	Fuel Cladding Leak
<input checked="" type="checkbox"/>		00:00:00		create event 4 xcr4b33k612 < 73	
			4	modify malfunction rr071 to 2.00000 in 430 on event 4	Fuel Cladding Leak
				^Scram Actions	
<input checked="" type="checkbox"/>		00:00:00		create event 5 zdi1(645) = 1	
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction p680_2a_e_9 after 15 to ON on event 5	CNDSR HTWL LVL LO
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction fw115a after 15 on event 5	Condensate Pump A Trip
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction fw115b after 15 on event 5	Condensate Pump B Trip
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction fw115c after 15 on event 5	Condensate Pump C Trip
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction rrd21k648a_d to 55.00000 in 330 on event 5	override (variable failure) drywell hi-range
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction rrd21k648b_d to 5.30000 in 300 on event 5	override (variable failure) cntmt hi-range
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction rrd21k648c_d to 5.20000 in 300 on event 5	override (variable failure) cntmt hi-range
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction rrd21k648d_d to 55.00000 in 330 on event 5	override (variable failure) drywell hi-range
				=>EP4 Max Safe Driver/Steam Leak	
<input checked="" type="checkbox"/>		00:00:00		create event 6 e51vf045 > 0.75	
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction rrd21k603_d in 240 on event 6	override (variable failure) rcic room acty
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction rrd21k613_d after 30 in 500 on event 6	override (variable failure) sgts filter train
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction e51050 to 40.00000 on event 6	RCIC Steam Leak (VAR) Upstream of ES1-F045
				^E51F064 Failure to look like motor pinion key failure	
<input checked="" type="checkbox"/>		00:00:00		create event 7 e51vfm(2) < 1	
<input checked="" type="checkbox"/>		00:00:00		Insert override LO_1E51M610_G to TRUE on event 7	P601/21C STM SPLY OUTBD ISOLATION:ES1-F064 - DF
<input checked="" type="checkbox"/>		00:00:00		Insert override LO_1E51M610_R to TRUE on event 7	P601/21C RCIC STM SPLY OUTBD ISOLATION:ES1-F064 - DF
<input checked="" type="checkbox"/>		00:00:00		Insert override LO_1E51F064_G to TRUE on event 7	P858 SE) F064 - GREEN
<input checked="" type="checkbox"/>		00:00:00		Insert override LO_1E51F064_R to TRUE on event 7	P858 N) F064 - RED
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction e51187b on event 7	E51F064 POWER LOSS ON STROKE SIGNAL
			7	Set e51vf064 = 0.5 on event 7	
				^MSL Rad Monitor Alarms	
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction rm157a to 40.00000 in 300 on event 5	PRM Main Steam Line D17K610A-D High Radiation
				^Clear MSL Rad Monitors after MSL Isolation	
<input checked="" type="checkbox"/>		00:00:00		create event 8 zlo4(836) == 0	
			8	modify malfunction rm157a after 30 to 15.00000 in 120 on event 8	PRM Main Steam Line D17K610A-D High Radiation
				^Begining Scenario Malfunctions	
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction e51187a	E51F063 POWER LOSS ON STROKE SIGNAL
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction c51010_1	APRM Channel 1 Downscale
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction e51043	RCIC Auto Start Failure
<input checked="" type="checkbox"/>		00:00:00		create event 9 zdi3(333) == 1	
<input checked="" type="checkbox"/>		00:00:00		Insert malfunction p41f005a_i after 15 on event 9	override (loss of power when stroke)

Execute: Insert malfunction p41f005a\_i after 15 on event 9  
Execute: create event 9 zdi3(333) == 1  
Execute: Insert malfunction e51043  
Execute: Insert malfunction c51010\_1  
Execute: Insert malfunction e51187a

Ready NUM

Director - Dev Load:1962

File View Help

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Summary Malfunctions Remotes Overrides Modify Details Event Page Up Page Down Frozen Quick Reset IC: 105

Search Keywords  Match whole words only Sim. Time: 00:00:00

Key	Description	T...	Delay	Inserted	Ramp	Initial	Final	Value
c51010_4	APRM Channel 4 Downscale	1	00:00:00		00:00:00		Active	InActive
r21180	ESF 21 Transformer Lockout	2	00:00:00		00:00:00		Active	InActive
rr071	Fuel Cladding Leak	3	00:00:00		00:00:00		0.1	0
p680_2a_e_9	CNDSR HTWL LVL LO	5	00:00:15		00:00:00		ON	NORMAL
fw115a	Condensate Pump A Trip	5	00:00:15		00:00:00		Active	InActive
fw115b	Condensate Pump B Trip	5	00:00:15		00:00:00		Active	InActive
fw115c	Condensate Pump C Trip	5	00:00:15		00:00:00		Active	InActive
rrd21k648a_d	override (variable failure) drywell hi-range	5	00:00:00		00:05:30		55	1
rrd21k648b_d	override (variable failure) cntmt hi-range	5	00:00:00		00:05:00		5.3	1
rrd21k648c_d	override (variable failure) cntmt hi-range	5	00:00:00		00:05:00		5.2	1
rrd21k648d_d	override (variable failure) drywell hi-range	5	00:00:00		00:05:30		55	1
rrd21k603_d	override (variable failure) rcic room acty	6	00:00:00		00:04:00		100000	3.00289
rrd21k613_d	override (variable failure) sgts filter train	6	00:00:30		00:08:20		1000	0.02
e51050	RCIC Steam Leak (VAR) Upstream of E51-F045	6	00:00:00		00:00:00		40	0
e51187b	E51F064 POWER LOSS ON STROKE SIGNAL	7	00:00:00		00:00:00		Active	InActive
rm157a	PRM Main Steam Line D17K610A-D High Radiati...	5	00:00:00		00:05:00		40	0
e51187a	E51F063 POWER LOSS ON STROKE SIGNAL		00:00:00		00:00:00		Active	InActive
c51010_1	APRM Channel 1 Downscale		00:00:00		00:00:00		Active	InActive
e51043	RCIC Auto Start Failure		00:00:00		00:00:00		Active	InActive
p41f005a_i	override (loss of power when stroke)	9	00:00:15		00:00:00		Active	InActive
r21218	DIV 2 LOAD SHED AND SEQUENCING STATUS	2	00:00:00		00:00:00		INOP	OPER
LO_1E51M610_G	P601/21C STM SPLY OUTBD ISOLATION:E51-F...	7	00:00:00		00:00:00		TRUE	FALSE
LO_1E51M610_R	P601/21C RCIC STM SPLY OUTBD ISOLATION:...	7	00:00:00		00:00:00		TRUE	TRUE
LO_1E51F064_G	P858 SE) F064 - GREEN	7	00:00:00		00:00:00		TRUE	FALSE
LO_1E51F064_R	P858 N) F064 - RED	7	00:00:00		00:00:00		TRUE	TRUE

Ready NUM

**Crew Turnover:**

A. Assign the candidates crew positions.

B. Turnover the following conditions:

Power	85%
Pressure	1010 psig
BOC	
EOOS	GREEN

- A reactor startup is in progress with all steps complete up to step 6.8, Attachment II of 03-1-01-2 (Power Ascension from 60% to full power)
- SSW “A” is in service.
- APRM Channel 1 has failed downscale and is in BYPASS (a tracking LCO was written).
- Note that an independent Reactivity Management SRO per Operations Philosophy 6.8.1.b will not be provided for this scenario.

Planned Evolutions this shift:

- Place SSW “A” in STANDBY using 04-1-01-P41-1 SSW SOI.
- Once SSW “A” is in STANDBY, continue with plant startup and raise reactor power to 100%. Ramp rates are not required until reactor power reaches 95%.

C. Allow the crew to perform pre-shift brief and review procedures for planned evolutions.

D. Bring the crew into the Simulator, place the simulator is in RUN.

E. Allow the crew to walk down panels.

F. When the crew assumes the shift begin Scenario Activities.

**SCENARIO ACTIVITIES:**

- A. Start SBT report and any other required recording devices (Video recording not allowed for NRC exams).

**Place SSW 'A' in STANDBY**

- B. The crew will place SSW 'A' in STANDBY.
1. When the operator attempts to close P41-F005A, it will not shut due to tripped thermal device.
  2. If directed by the control room to manually shut P41-F005A, wait 3 minutes and report that the valve is stuck and the motor is hot to the touch.
  3. If asked to check the breaker, report that the breaker is tripped and you will submit a work request to further determine the cause.
  4. When the CRS enters TS 3.5.1 condition D and/or the lead evaluator is satisfied with the crew response, call the CRS (2374) and prompt the crew to go ahead and raise power.

**Raise reactor power to 100%:**

- C. The crew will raise reactor power to 100% using FCVs.
1. No operations outside the control room are required.
  2. When Core Flow reaches 88 Mlbm/hr, a second APRM, Channel 4, will fail downscale (Auto Event 1).

**APRM Channel 4 fails downscale**

- D. Since APRM channel 1 is already in bypass, no operator action is required for this situation; however, the CRS may choose to insert a ½ scram as required by TS 3.3.1.1 Condition A (This action is not required for 12 hours).
1. If the BOP operator comes to the booth for indications on APRM 4, report that it is in alarm and the trip status is for flux downscale.
  2. When the CRS enters LCO 3.3.1.1 Condition 'B,' trigger **Event 2** to Lockout ESF Transformer 21 and loss of Division 2 LSS.

**ESF Transformer 21 Lockout/Div 2 LSS Failure**

- E. The crew will enter Loss of AC ONEP and reenergize 16AB via an alternate feeder.

- F. If requested to reset RC&IS, use remote c11647 to reset RC&IS.
- G. When the CRS enters LCO 3.8.1 Condition 'F' and any transient briefs are complete, at the Lead Evaluator's discretion, insert a fuel cladding leak by triggering **Event 3**.



### **Fuel Cladding Leak**

- H. When the OG PRE-TREAT RAD HI annunciator alarms, the crew will enter the Off-Gas Activity High ONEP.
1. If asked as RP to report local Pre-treat rad levels, report them as above normal and trending up.
  2. Prior to Pre-treat radiation levels reaching 700 mR/hr, the CRS will direct the ATC to lower core flow to 70 mlbm/hr.
  3. When core flow is below 73 mlbm/hr, Auto Event 4 will trigger causing the Fuel Cladding Leak to worsen.
    - a. The crew will enter the Reduction in Recirc Flow ONEP and the ATC will become the THI watch with concurrent duties.
  4. When the crew determines that Pre-treat radiation levels cannot be maintained below 14,000 mR/hr, the crew will manually scram the reactor and enter the Reactor Scram and Turbine Trip ONEPs and EP-2. **Insert EP Attachments as directed** by the Control Room.
  5. 15 seconds after the scram Auto Event 5 will trigger causing Condensate Pumps to trip on low condenser level (due to failed trip unit, this is unrecoverable)
  6. 2 minutes after the scram, MSL RAD HI annunciator will alarm and the CRS will enter EP-4.
  7. 4 ½ minutes after the scram, MSL A-D HI-HI annunciators will alarm. The CRS will direct the BOP operator to close all MSIVs per EP-4 step 1.

### **Unisolable steam leak RCIC room/RCIC fail to start on initiation**

- I. After all MSIVs are closed the CRS will direct the ATC/BOP operator to control reactor level using RCIC and HPCS.
1. The CRS should establish a reactor pressure band of 800-1060 psig using ADS/SRV valves and a reactor level band of +30" to -30".
  2. Once the operating feed pump trips, RCIC will fail to initiate (when started by the operator or on low level). The operator must manually line up RCIC.
- J. When E51-F045 opens, an unisolable steam leak will occur in the RCIC room.

1. The crew will receive RCIC room high temperature and radiation alarms. The E51-F063 and E51-F064 will fail to close (loss of power, motor pinion key failed respectively).
2. The crew should enter the reduced pressure band 450-600 psig to reduce driving head of the steam leak.
3. Five minutes after RCIC is started, report to the control room as Security that there is a plume of steam coming from the Auxiliary Building Roof.
4. When 2 max safe values (Rad levels) from EP-4 Table 10 are reached, the crew will enter the emergency depressurization procedure of EP-2.

**Termination:**

- K. Once emergency depressurization has been conducted and reactor water level is stabilized above TAF, or as directed by Lead Evaluator:
- Take the simulator to Freeze and turn horns off.
  - Stop and save the SBT report and any other recording devices.
  - Instruct the crew to not erase any markings or talk about the scenario until after follow-up questions are asked.

**Critical Tasks:**

- Fuel failure is occurring and main steam line radiation is greater than 3 times normal full power background as indicated by MSL B / MSL C RAD HI-HI or MSL A / MSL D RAD HI-HI alarms, the crew closes MSIVs and MSL drains per EP-4. The crew closes the MSIVs and MSL drains and observes valve position indications and lowering pressure trend downstream of the MSIVs. Criterion is to give the highest priority to close the four inboard MSIVs or the four outboard MSIVs and MSL drains when MSL radiation is greater than 3 times normal full power background.
- A primary system is discharging outside primary containment and area temperatures, radiation levels, or water levels are above their max safe values in two or more areas. The crew opens 8 ADS/SRVs and observes lowering pressure trend and valve position indications (tailpipe pressure indication lamps or solenoid valve energized). Criterion is to give the highest priority to open at least seven SRVs when area temperatures, radiation levels, or water levels are above their maximum safe values in two or more areas.

Op-Test No: <u>12/11</u>		Scenario No: <u>5</u>	Event No: <u>1</u>
Event Description: <b><u>Place SSW "A" in Standby</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	Directs the BOP operator to place SSW "A" in standby.	
	BOP	<p>Places SSW "A" in Standby using SOI 04-1-01-P41-1 section 4.6:</p> <ul style="list-style-type: none"> <li>• Verifies all prerequisites are met</li> <li>• N/A's steps 4.6.2a – 4.6.2h.</li> <li>• Places the SSW "A" MOV test switch to TEST</li> <li>• Open/check open P41-F006A.</li> <li>• Close P41-F005A – <b>P41-F005A will fail to close</b> <ul style="list-style-type: none"> <li>❖ As indicated by annunciator P870-1A-C2, SSW DIV 1 OOSVC</li> <li>❖ SSW D1 MOV OVERLD PWR LOSS status light turns on</li> </ul> </li> </ul> <p>The operator refers to ARI for P870-1A-C2 and:</p> <p>Does not proceed with securing SSW and report that P41-F005 lost power and is still open. At this point, if the crew chooses to stop the SSW pump they will cause the SSW head tank to drain.</p> <p>Look in Attachment IIIA of 04-1-01-P41-1 and determine breaker number for P41-F005A (52-155112).</p> <p>Direct the local operator to the breaker for P41-F005A on 15B51 to determine the cause of loss of power.</p> <p>Using ARI and control room indications, determine that the valve's breaker has tripped on overload.</p> <ul style="list-style-type: none"> <li>❖ As indicated by the SSW D1 MOV OVERLD PWR LOSS status light lit and the valve positions indicating lights for P41-F005A on the P870 are still lit.</li> </ul> <p>Reports diagnosis to the CRS.</p>	
	CRS	<p>Ensure an operator and/or electrical maintenance is dispatched to investigate the problem.</p> <p>The CRS should opt to leave SSW A running. In order to secure SSW A, P41-F005A would have to be manually closed. Without power to the valve, SSW A would have to be declared INOPERABLE.</p> <p>Declare SSW 'A' INOPERABLE, enters TS 3.7.1 Condition D.</p>	



Op-Test No: <u>12/11</u>		Scenario No: <u>5</u>	Event No: <u>2</u>
Event Description: <b><u>Raise reactor power using Recirc Flow Control</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	CRS	Conducts reactivity brief for the planned power change. (May be performed prior to taking the shift) Directs the ATC to raise reactor power to 100% using Recirc FCV's.	
	ATC	Raises power by opening the Recirc FCVs A & B using loop flow controllers B33K603A & B in slow detent on P680-3B (IOI-2 attachment VIII step 12.3).	
	BOP	Raises Load Demand as power is raised by depressing EHC LOAD REF DEMAND RAISE pushbutton (P680-9C) to maintain generator actual load within +/- 25 MW of the load demand limited value during power ascension (IOI-2 attachment VIII step 12.2).	

Op-Test No: <u>12/11</u>		Scenario No: <u>5</u>	Event No: <u>3</u>
Event Description: <b><u>Two APRM channel failures</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	ATC	<p>Recognizes and reports APRM Channel 4 has failed downscale.</p> <ul style="list-style-type: none"> <li>❖ As indicated by annunciators P680-4A2-C-5, CONT ROD WITHDRAWAL BLOCK, and P680-5A-C-10, APRM DNSC/TRBL</li> <li>❖ APRM Ch-4 will read 0% and will have the DNSC light on.</li> </ul>	
	CRS	<p>Recognizes entry conditions and enters LCO 3.3.1.1 Condition A.</p> <p>The CRS may direct the ATC to insert a ½ scram in order to comply with the LCO (No action required for 12 hours). If so, the CRS will:</p> <p style="padding-left: 40px;">-Direct the ATC to insert a ½ scram.</p> <p><i>Note: The ARI directs the crew to bypass the APRM channel if possible. In this case it is not possible since one other channel is already bypassed.</i></p>	
	BOP	<p><i>Note: The BOP operator may go to the back panels to read the APRM channel locally. This is not modeled in the simulator. The operator should go to the booth operator to obtain indications if desired.</i></p>	
	ATC	<p>If directed,</p> <p>Insert a ½ scram by arming and depressing one of four MAN SCRAM push buttons on the P680 panel.</p> <p>Report completed actions to the CRS.</p>	

Op-Test No: <u>12/11</u>		Scenario No: <u>5</u>	Event No: <u>4/5</u>
Event Description: <b>Loss of ESF Transformer 21/Division 2 LSS failure</b>			
TIME	Position	Applicant's Actions or Behavior	
	CREW	<p>Recognize and report ESF Transformer Lockout as indicated by:</p> <ul style="list-style-type: none"> <li>❖ Annunciator P807-4A-B5, ESF XFMR 21 LOCKOUT TRIP</li> <li>❖ Annunciator P807-4A-F2, ESF XFMR 21 TROUBLE</li> <li>❖ There are also other alarms associated with the loss of power.</li> </ul>	
	CRS	<p>Enter Loss of AC Power ONEP.</p> <p>Direct the BOP to Reenergize 16AB using an alternate feeder breaker and Reenergize 16B42.</p>	
	BOP	<p>Reenergize 16AB with an alternate feeder breaker using one of the following sources:</p> <ul style="list-style-type: none"> <li>• ESF 12 via 152-1611</li> <li>• ESF 21 via 152-1614</li> <li>• Div 2 DG via 152-1608</li> </ul> <p>Reenergize 16B42 via 52-16405</p> <p>Perform a "board walk down" and determine and report the cause for 16AB not automatically reenergizing was due to a failure of Division 2 LSS as indicated by annunciator P864-2A-H1, DIV 2 LSS SYS FAIL and the DIV 2 LSS PNL FAIL status light being lit.</p>	
	CRS	<p>Recognize and Enter LCO 3.8.1 Condition 'F'</p> <p><i>Note: The CRS will begin to develop a plan to restore plant systems to normal; however, due to time restraints the next event should be initiated when satisfied with the crew's response.</i></p>	

Op-Test No: <u>12/11</u>		Scenario No: <u>5</u>	Event No: <u>6</u>
Event Description: <b><u>Fuel Cladding Leak</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	BOP	Recognizes and reports to the CRS when the OG PRE-TREAT RAD HI annunciator alarms. Directs the CRS to the Off-Gas Activity High ONEP per the OG PRE-TREAT RAD HI ARI.	
	CRS	Enters the Off-Gas Activity High ONEP. Establish Off-Gas Pre-Treat Radiation Level as a critical parameter.	
	ATC / BOP	Monitor Off-Gas Pre-Treat Radiation Level. Report Off-Gas Pre-Treat Radiation Levels as directed by the CRS.	
	CRS	When the CRS anticipates exceeding the limits of step 3.1 Pre-Treatment Monitor Limit (700mR/hr), directs the ATC to lower core flow to 70 mlbm/hr in fast detent.	
	ATC	Lower core flow to 70 mlbm/hr using Recirc "A" and "B" FCV flow controllers in fast detent when directed by the CRS.	
	CRS	Enters the Reduction in Recirculation Flow Rate ONEP. Ensures THI watch with concurrent duties is established.	
	ATC	Plot the power to flow map. Recognize and report to the CRS entry into the OPRM Trip Enabled Region as determined by the power to flow map plot. Establish THI watch with concurrent duties.	
	CRS	Perform subsequent actions of the Off-Gas Activity High ONEP. <ul style="list-style-type: none"> <li>Consult with the Reactor Engineer or Duty Manager for further power reductions.</li> <li>Activate the Emergency Plan when limits of step 3.3 are exceeded (pre-treat rad monitor limit of 700 MR/HR).</li> <li>Notify Chemistry to monitor ventilation release points.</li> </ul>	
	CRS	When the CRS determines that Off-Gas Pre-Treat Radiation Levels cannot be maintained below 14,000 mR/hr, direct the ATC to scram the reactor. Enter the Scram ONEP, Turbine/Generator Trip ONEP, EP-2	

Op-Test No: <u>12/11</u>		Scenario No: <u>2</u>	Event No: <u>6 cont.</u>
Event Description: <b><u>Fuel Cladding Leak</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	ATC	<p>Places the Reactor Mode Switch to SHUTDOWN when directed by the CRS.</p> <p>Provides a scram report:</p> <ul style="list-style-type: none"><li>• Reactor Mode SW in SHUTDOWN.</li><li>• Reactor power is 0%.</li><li>• Reactor water level and trend.</li><li>• Reactor pressure and trend.</li><li>• Feedwater is NOT available.</li><li>• Bypass valves are available.</li></ul>	
	ATC / BOP	Start RCIC by arming and depressing the RCIC initiation push button (RCIC will fail to start; see event 7 on page 17).	
	BOP	Recognizes and reports EP-4 entry condition when MSL RAD HI annunciator alarms on P601-19A-D4.	
	CRS	Enters EP-4 when any entry condition is met.	

Op-Test No: <u>12/11</u>		Scenario No: <u>2</u>	Event No: <u>6 cont.</u>
Event Description: <b><u>Fuel Cladding Leak</u></b>			
	ATC / BOP	Recognize and report when MSL A-D HI-HI radiation annunciators alarm. Close all MSIVs (per EP-4 step 1).	
	CRS	<p>When MSL A-D HI-HI radiation annunciators alarm, direct the ATC/BOP to close all MSIVs.</p> <p><b>*Fuel failure is occurring and main steam line radiation is greater than 3 times normal full power background as indicated by MSL B / MSL C RAD HI-HI or MSL A / MSL D RAD HI-HI alarms, the crew closes MSIVs and MSL drains per EP-4. The crew closes the MSIVs and MSL drains and observes valve position indications and lowering pressure trend downstream of the MSIVs. Criterion is to give the highest priority to close the four inboard MSIVs or the four outboard MSIVs and MSL drains when MSL radiation is greater than 3 times normal full power background.</b></p> <p>Establish reactor pressure band of 800 – 1060 psig using ADS/SRV valves.</p> <p>Establish reactor level band of +30" to -30" using Feed and Condensate system (this band is established per Ops Philosophy Level Band Strategies since reactor pressure is now being controlled with ADS/SRV's).</p>	
	BOP	Maintain pressure band of 800 – 1060 psig using ADS/SRV valves (cycle open and closed as required to stay within band).	
	ATC	Maintain level band of +30" to -30" using HPCS (May use the Startup Level Controller in Auto or Manual).	

Op-Test No: <u>12/11</u>		Scenario No: <u>2</u>	Event No: <u>7</u>
Event Description: <b><u>RCIC fails to start on initiation</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	ATC / BOP	<p>Recognizes that RCIC does not start when manually initiated using Initiate push button.</p> <p>❖ As indicated when nothing happens after the Initiate PB is depressed.</p> <p>Manually starts RCIC using SOI 04-1-01-E51-1 Attachment VI.</p> <ul style="list-style-type: none"><li>• Shift RCIC Flo controller to manual and reduce output to minimum.</li><li>• Open E51-F046.</li><li>• Start Gland Seal Compressor.</li><li>• Open E51-F095.</li><li>• After 6 seconds, Open E51-F045.</li><li>• Raise turbine speed using flow controller in manual to develop pressure greater than reactor pressure.</li><li>• Open E51-F013.</li><li>• Adjust flow as necessary with Flo controller.</li><li>• Verify SSW A is running with adequate flow path.</li></ul> <p>Establish and maintain reactor water level in the established band (11.4" to 53.5")</p>	

Op-Test No: <u>12/11</u>		Scenario No: <u>2</u>	Event No: <u>8</u>
Event Description: <b><u>RCIC room unisolable steam leak</u></b>			
TIME	Position	Applicant's Actions or Behavior	
	ATC / BOP	Recognize and report unisolable steam leak in the RCIC room after RCIC is initiated. <ul style="list-style-type: none"> <li>❖ As indicated by annunciators P601-21A-G-3, RCIC EQUIP AREA TEMP HI, P601-21A-H-2, RCIC PIPE/EQUIP AMBIENT TEMP HI, and P601-21A-H-3, RCIC EQUIP AREA dT HI.</li> <li>❖ E51-F063 loss of power and E51-F064 will not close.</li> <li>❖ RCIC room temperature remains high.</li> </ul>	
	CRS	Go to EP-4 at 22 (will be on step 10 until 2 max safe values are reached). Direct the BOP to monitor EP-4 parameters.	
	BOP	Monitor EP-4 parameters using EP-4 table 3. <ul style="list-style-type: none"> <li>• Monitor for 2 Max Safe values</li> </ul>	
	CRS	Establish a reduced pressure band of 450 – 600 psig to reduce the driving head of the steam leak in accordance with the Ops Philosophy Pressure Control Strategy. Establish a level band of +30" to -30" in accordance with Ops Philosophy Level Control Strategy.	
	BOP	Control reactor pressure in the 450 – 600 psig band using ADS/SRV valves when directed.	
	ATC	Manually initiate HPCS to maintain reactor water level within the established band by arming and depressing the HPCS initiation pushbutton.	



Op-Test No: <u>12/11</u>		Scenario No: <u>2</u>	Event No: <u>8 cont</u>
Event Description: <b><u>RCIC room unisolable steam leak</u></b>			
	BOP / ATC	Recognize and report to the CRS when 2 max safe values of EP-4 Table 10 are exceeded.	
	CRS	<p>When 2 max safe values of EP-4 Table 10 are exceeded, enters the Emergency Depressurization procedure of EP-2.</p> <p><b>*A primary system is discharging outside primary containment and area temperatures, radiation levels, or water levels are above their max safe values in two or more areas. The crew opens 8 ADS/SRVs and observes lowering pressure trend and valve position indications (tailpipe pressure indication lamps or solenoid valve energized). Criterion is to give the highest priority to open at least seven SRVs when area temperatures, radiation levels, or water levels are above their maximum safe values in two or more areas.</b></p> <ul style="list-style-type: none"> <li>❖ The Two Max Safe values for this scenario are: <ul style="list-style-type: none"> <li>- SGTS Rad levels of 800 mr/hr (<math>\geq 8 \times 10^2</math> mr/hr)</li> <li>- RCIC Room Rad levels of 80,000 mr/hr (<math>\geq 8 \times 10^4</math> mr/hr)</li> </ul> </li> <li>• Verify SP level is above 10.5 ft.</li> <li>• Direct the BOP operator to open 8 ADS valves.</li> </ul>	
	BOP	Opens at least 7 ADS valves when directed by the CRS.	
	ATC	Maintain reactor level band of +30" to -30" following Emergency Depressurization. (The CRS may establish a level band of 11.4" to 53.5")	

Give this page to the CRS

Turnover the following conditions:

Power	85%
Pressure	1010 psig
BOC	
EOOS	GREEN

- A reactor startup is in progress with all steps complete up to step 6.8, Attachment II of 03-1-01-2 (Power Ascension from 60% to full power)
- SSW “A” is in service.
- APRM Channel 1 has failed downscale and is in BYPASS (a tracking LCO was written).
- Note that an independent Reactivity Management SRO per Operations Philosophy 6.8.1.b will not be provided for this scenario.

Planned Evolutions this shift:

- Place SSW “A” in STANDBY using 04-1-01-P41-1 SSW SOL.
- Once SSW “A” is in STANDBY, continue with plant startup and raise reactor power to 100%. Ramp rates are not required until reactor power reaches 95%.