

Facility Name: Peach Bottom														Date of Exam: 3/20/17 Rev 1			
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	4	3				3	4				3	20	4	3	7
	2	1	1	1	N/A			1	1	N/A			2	7	2	1	3
	Tier Totals	4	5	4				4	5				5	27	6	4	10
2. Plant Systems	1	3	2	3	3	2	2	2	2	2	3	2	26	3	2	5	
	2	1	1	1	1	0	2	1	1	1	2	1	12	0	1	2	
	Tier Totals	4	3	4	4	2	4	3	3	3	5	3	38	4	4	8	
3. Generic Knowledge and Abilities Categories					1	2	3	4	10				1	2	3	4	7
					2	2	3	3					2	1	2	2	

Note: 1. 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). (One Tier 3 Radiation Control K/A is allowed if the K/A is replaced by a K/A from another Tier 3 Category).

2. 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  $\pm 1$  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.

3. 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 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.

4. 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.

5. 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.

6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.

7.\* 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.

8. 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.

9. 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.

G\* Generic K/As

ES-401		BWR Examination Outline							Form ES-401-1	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO)										
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			0 6				Knowledge of the reasons for the following responses as they apply to Partial or Complete Loss of Forced Core Flow Circulation: Core flow indication	2.9	1	
295003 Partial or Complete Loss of AC / 6						02 36	Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	3.1	1	
295004 Partial or Total Loss of DC Pwr / 6					0 4		Ability to determine and/or interpret the following as they apply to Partial or Total Loss of DC Pwr: System lineups	3.2	1	
295005 Main Turbine Generator Trip / 3				0 1			Ability to operate and/or monitor the following as they apply to Main Turbine Generator Trip: Recirculation system: Plant-Specific	3.1	1	
295006 SCRAM / 1				0 7			Ability to operate and/or monitor the following as they apply to SCRAM: Control rod position	4.1	1	
295016 Control Room Abandonment / 7			0 2				Knowledge of the reasons for the following responses as they apply to Control Room Abandonment: Turbine trip	3.7	1	
295018 Partial or Total Loss of CCW / 8				0 1			Ability to operate and/or monitor the following as they apply to Partial or Total Loss of CCW: Backup systems	3.3	1	
295019 Partial or Total Loss of Inst. Air / 8		1 4					Knowledge of the interrelations between Partial or Total Loss of Inst. Air and the following: Plant air systems	3.2	1	
295021 Loss of Shutdown Cooling / 4					0 1		Ability to determine and/or interpret the following as they apply to Loss of Shutdown Cooling: Reactor water heatup/cooldown rate	3.5	1	
295023 Refueling Acc / 8						02 39	Knowledge of less than or equal to one hour Technical Specification action statements for systems.	3.9	1	
295024 High Drywell Pressure / 5						04 30	Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator.	2.7	1	
295025 High Reactor Pressure / 3			0 2				Knowledge of the reasons for the following responses as they apply to High Reactor Pressure: Recirculation pump trip: Plant-Specific	3.9	1	
295026 Suppression Pool High Water Temp. / 5					0 1		Ability to determine and/or interpret the following as they apply to Suppression Pool High Water Temp.: Suppression pool water temperature	4.1	1	
295027 High Containment Temperature / 5									0	
295028 High Drywell Temperature / 5		0 2					Knowledge of the interrelations between High Drywell Temperature and the following: Components internal to the drywell	3.2	1	
295030 Low Suppression Pool Wtr Lvl / 5	0 1						Knowledge of the operational implications of the following concepts as they apply to Low Suppression Pool Wtr Lvl: Steam condensation	3.8	1	
295031 Reactor Low Water Level / 2	0 1						Knowledge of the operational implications of the following concepts as they apply to Reactor Low Water Level: Adequate core cooling.	4.6	1	
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1					0 4		Ability to determine and/or interpret the following as they apply to SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown: Suppression pool temperature	4.0	1	
295038 High Off-site Release Rate / 9	0 2						Knowledge of the operational implications of the following concepts as they apply to High Off-site Release Rate: Protection of the general public	4.2	1	
600000 Plant Fire On Site / 8		0 1					Knowledge of the interrelations between Plant Fire On Site and the following: Sensors, detectors and valves	2.6	1	
700000 Generator Voltage and Electric Grid Disturbances / 6		0 2					Knowledge of the interrelations between Generator Voltage and Electric Grid Disturbances and the following: Breakers, relays	3.1	1	
K/A Category Totals:	3	4	3	3	4	3	Group Point Total:	20		

ES-401		BWR Examination Outline							Form ES-401-1	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)										
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									0	
295007 High Reactor Pressure / 3		0 1					Knowledge of the interrelations between High Reactor Pressure and the following: Reactor/turbine pressure regulating system	3.5	1	
295008 High Reactor Water Level / 2									0	
295009 Low Reactor Water Level / 2				0 3			Ability to operate and/or monitor the following as they apply to Low Reactor Water Level: Recirculation system: Plant-Specific	3.0	1	
295010 High Drywell Pressure / 5									0	
295011 High Containment Temp / 5									0	
295012 High Drywell Temperature / 5					0 2		Ability to determine and/or interpret the following as they apply to High Drywell Temperature: Drywell pressure	3.9	1	
295013 High Suppression Pool Temp. / 5									0	
295014 Inadvertent Reactivity Addition / 1	0 5						Knowledge of the operational implications of the following concepts as they apply to Inadvertent Reactivity Addition: Fuel thermal limits	3.7	1	
295015 Incomplete SCRAM / 1									0	
295017 High Off-site Release Rate / 9									0	
295020 Inadvertent Cont. Isolation / 5 & 7									0	
295022 Loss of CRD Pumps / 1						01. 31	Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup.	4.6	1	
295029 High Suppression Pool Wtr Lvl / 5						04. 09	Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.	3.8	1	
295032 High Secondary Containment Area Temperature / 5			0 2				Knowledge of the reasons for the following responses as they apply to High Secondary Containment Area Temperature: Reactor SCRAM	3.6	1	
295033 High Secondary Containment Area Radiation Levels / 9									0	
295034 Secondary Containment Ventilation High Radiation / 9									0	
295035 Secondary Containment High Differential Pressure / 5									0	
295036 Secondary Containment High Sump/Area Water Level / 5									0	
500000 High CTMT Hydrogen Conc. / 5									0	
K/A Category Totals:	1	1	1	1	1	2	Group Point Total:			7

BWR Examination Outline											Form ES-401-1
Plant Systems - Tier 2/Group 1 (RO)											
System # / Name	K	K	K	K	K	K	K	K	K	K	#
203000 RHR/LPCI: Injection Mode		0									1
205000 Shutdown Cooling		2									1
206000 HPCI			0								1
207000 Isolation (Emergency) Condenser			2								0
209001 LPCS		0									1
209002 HPCS		3									0
211000 SLC					0						1
212000 RPS					3						1
215003 IRM					0						1
215004 Source Range Monitor					2						0
215005 APRM / LPRM											1
217000 RCIC			0		0						2
218000 ADS			5		3						2
223002 PCIS/Nuclear Steam Supply Shutoff	0										1
239002 SRVs	2										2
259002 Reactor Water Level Control					0						1
261000 SGTS					2						1
262001 AC Electrical Distribution					4						1
262002 UPS (AC/DC)					0						2
263000 DC Electrical Distribution					2						2
264000 EDGs	1				0						2
300000 Instrument Air	9				6						1
400000 Component Cooling Water	0				0						2
	1				3						
K/A Category Totals:	3	2	3	3	2	2	2	2	3	2	26

BWR Examination Outline											Form ES-401-1			
Plant Systems - Tier 2/Group 2 (RO)														
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														0
201002 RMCS														0
201003 Control Rod and Drive Mechanism						0 1						Knowledge of the effect that a loss or malfunction of the following will have on the Control Rod and Drive Mechanism: Control rod drive hydraulic system	3.3	1
201004 RSCS														0
201005 RCIS														0
201006 RWM									0 5			Ability to manually operate and/or monitor in the control room: Rod insert error indication: P-Spec(Not-BWR6)	3.2	1
202001 Recirculation														0
202002 Recirculation Flow Control														0
204000 RWCU			0 2									Knowledge of the effect that a loss or malfunction of the RWCU will have on following: Reactor water level	3.1	1
214000 RPIS														0
215001 Traversing In-core Probe														0
215002 RBM														0
216000 Nuclear Boiler Inst.														0
219000 RHR/LPCI: Torus/Pool Cooling Mode								0 1				Ability to monitor automatic operations of the RHR/LPCI: Torus/Pool Cooling Mode including: Valve operation	3.3	1
223001 Primary CTMT and Aux.							1 0					Ability to (a) predict the impacts of the following on the Primary CTMT and Aux., and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: High	3.6	1
226001 RHR/LPCI: CTMT Spray Mode														0
230000 RHR/LPCI: Torus/Pool Spray Mode														0
233000 Fuel Pool Cooling/Cleanup			0 3									Knowledge of Fuel Pool Cooling/Cleanup design feature(s) and/or interlocks which provide for the following: Maintenance of adequate pool temperature	2.8	1
234000 Fuel Handling Equipment									0 1			Ability to manually operate and/or monitor in the control room: Neutron monitoring system	3.7	1
239001 Main and Reheat Steam														0
239003 MSIV Leakage Control														0
241000 Reactor/Turbine Pressure Regulator									01 19			Ability to use plant computers to evaluate system or component status.	3.9	1
245000 Main Turbine Gen. / Aux.														0
256000 Reactor Condensate		0 1										Knowledge of electrical power supplies to the following: System pumps	2.7	1
259001 Reactor Feedwater														0
268000 Radwaste														0
271000 Offgas														0
272000 Radiation Monitoring						0 1						Knowledge of the effect that a loss or malfunction of the following will have on the Radiation Monitoring: Reactor protection system	3.0	1
286000 Fire Protection							0 1					Ability to predict and/or monitor changes in parameters associated with operating the Fire Protection controls including: System pressure	2.9	1
288000 Plant Ventilation	0 5											Knowledge of the physical connections and/or cause-effect relationships between Plant Ventilation and the following: Process radiation monitoring system	3.3	1
290001 Secondary CTMT														0
290003 Control Room HVAC														0
290002 Reactor Vessel Internals														0
K/A Category Totals:	1	1	1	1	0	2	1	1	1	2	1	Group Point Total:		12

ES-401		BWR Examination Outline							Form ES-401-1	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO)										
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									0	
295003 Partial or Complete Loss of AC / 6									0	
295004 Partial or Total Loss of DC Pwr / 6									0	
295005 Main Turbine Generator Trip / 3									0	
295006 SCRAM / 1						04 47	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	4.2	1	
295016 Control Room Abandonment / 7									0	
295018 Partial or Total Loss of CCW / 8					0 5		Ability to determine and/or interpret the following as they apply to Partial or Total Loss of CCW: System pressure	2.9	1	
295019 Partial or Total Loss of Inst. Air / 8					01 07		Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.7	1	
295021 Loss of Shutdown Cooling / 4					02 25		Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.	4.2	1	
295023 Refueling Acc / 8									0	
295024 High Drywell Pressure / 5									0	
295025 High Reactor Pressure / 3					0 5		Ability to determine and/or interpret the following as they apply to High Reactor Pressure: Decay heat generation	3.6	1	
295026 Suppression Pool High Water Temp. / 5									0	
295027 High Containment Temperature / 5									0	
295028 High Drywell Temperature / 5									0	
295030 Low Suppression Pool Wtr Lvl / 5					0 1		Ability to determine and/or interpret the following as they apply to Low Suppression Pool Wtr Lvl: Suppression pool level	4.2	1	
295031 Reactor Low Water Level / 2									0	
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1									0	
295038 High Off-site Release Rate / 9									0	
600000 Plant Fire On Site / 8									0	
700000 Generator Voltage and Electric Grid Disturbances / 6					0 9		Ability to determine and/or interpret the following as they apply to Generator Voltage and Electric Grid Disturbances: Operational status of emergency diesel generators	4.3	1	
K/A Category Totals:	0	0	0	0	4	3	Group Point Total:		7	

ES-401		BWR Examination Outline							Form ES-401-1	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO)										
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									0	
295007 High Reactor Pressure / 3									0	
295008 High Reactor Water Level / 2					0 1		Ability to determine and/or interpret the following as they apply to High Reactor Water Level: Reactor water level	3.9	1	
295009 Low Reactor Water Level / 2									0	
295010 High Drywell Pressure / 5						04 06	Knowledge of EOP mitigation strategies.	4.7	1	
295011 High Containment Temp / 5									0	
295012 High Drywell Temperature / 5									0	
295013 High Suppression Pool Temp. / 5									0	
295014 Inadvertent Reactivity Addition / 1									0	
295015 Incomplete SCRAM / 1									0	
295017 High Off-site Release Rate / 9									0	
295020 Inadvertent Cont. Isolation / 5 & 7									0	
295022 Loss of CRD Pumps / 1					0 3		Ability to determine and/or interpret the following as they apply to Loss of CRD Pumps: CRD mechanism temperatures	3.2	1	
295029 High Suppression Pool Wtr Lvl / 5									0	
295032 High Secondary Containment Area Temperature / 5									0	
295033 High Secondary Containment Area Radiation Levels / 9									0	
295034 Secondary Containment Ventilation High Radiation / 9									0	
295035 Secondary Containment High Differential Pressure / 5									0	
295036 Secondary Containment High Sump/Area Water Level / 5									0	
500000 High CTMT Hydrogen Conc. / 5									0	
K/A Category Totals:	0	0	0	0	2	1	Group Point Total:			3

ES-401		BWR Examination Outline												Form ES-401-1		
Plant Systems - Tier 2/Group 1 (SRO)																
System # / Name	K	K	K	K	K	K	K	K	K	K	K	K	K	K/A Topic(s)	IR	#
203000 RHR/LPCI: Injection																0
205000 Shutdown Cooling Mode																0
206000 HPCI																0
207000 Isolation (Emergency) Condenser																0
209001 LPCS																0
209002 HPCS																0
211000 SLC													04.45	Ability to prioritize and interpret the significance of each annunciator or alarm.	4.3	1
212000 RPS																0
215003 IRM																0
215004 Source Range Monitor																0
215005 APRM / LPRM																0
217000 RCIC																0
218000 ADS										06				Ability to (a) predict the impacts of the following on the ADS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: ADS initiation signals present.	4.3	1
223002 PCIS/Nuclear Steam Supply Shutoff													02.22	Knowledge of limiting conditions for operations and safety limits.	4.7	1
239002 SRVs																0
259002 Reactor Water Level Control										05				Ability to (a) predict the impacts of the following on the Reactor Water Level Control; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of applicable plant air systems.	3.4	1
261000 SGTS																0
262001 AC Electrical Distribution										06				Ability to (a) predict the impacts of the following on the AC Electrical Distribution; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Depowering a plant bus.	2.9	1
262002 UPS (AC/DC)																0
263000 DC Electrical Distribution																0
264000 EDGs																0
300000 Instrument Air																0
400000 Component Cooling Water																0
K/A Category Totals:	0	0	0	0	0	0	0	0	0	3	0	0	2	Group Point Total:		5



ES-401		BWR Examination Outline												Form ES-401-1	
Plant Systems - Tier 2/Group 2 (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														0	
201002 RMCS														0	
201003 Control Rod and Drive Mechanism														0	
201004 RSCS														0	
201005 RCIS														0	
201006 RWM														0	
202001 Recirculation														0	
202002 Recirculation Flow Control														0	
204000 RWCU											04. 41	Knowledge of the emergency action level thresholds and classifications.	4.6	1	
214000 RPIS														0	
215001 Traversing In-core Probe														0	
215002 RBM														0	
216000 Nuclear Boiler Inst.														0	
219000 RHR/LPCI: Torus/Pool Cooling Mode														0	
223001 Primary CTMT and Aux.														0	
226001 RHR/LPCI: CTMT Spray Mode														0	
230000 RHR/LPCI: Torus/Pool Spray Mode														0	
233000 Fuel Pool Cooling/Cleanup														0	
234000 Fuel Handling Equipment														0	
239001 Main and Reheat Steam														0	
239003 MSIV Leakage Control														0	
241000 Reactor/Turbine Pressure Regulator														0	
245000 Main Turbine Gen. / Aux.														0	
256000 Reactor Condensate														0	
259001 Reactor Feedwater														0	
268000 Radwaste														0	
271000 Offgas														0	
272000 Radiation Monitoring											01. 27	Knowledge of system purpose and/or function.	4.0	1	
286000 Fire Protection														0	
288000 Plant Ventilation														0	
290001 Secondary CTMT														0	
290003 Control Room HVAC										0. 2		Ability to (a) predict the impacts of the following on the Control Room HVAC, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Extreme	3.4	1	
290002 Reactor Vessel Internals														0	
K/A Category Totals:	0	0	0	0	0	0	0	0	0	1	0	0	2	Group Point Total:	3

Facility Name: Peach Bottom		Date of Exam: 3/20/17 Rev 1				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1. 09	Ability to direct personnel activities inside the control room.	2.9	1	4.5	
	2.1. 43	Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc.	4.1	1	4.3	
	2.1. 43	Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc.	4.1		4.3	1
	2.1. 41	Knowledge of the refueling process.	2.8		3.7	1
	2.1.					
	2.1.					
	Subtotal			2		2
2. Equipment Control	2.2. 17	Knowledge of the process for managing maintenance activities during power operations, such as risk assessments, work prioritization, and coordination with the transmission system operator.	2.6	1	3.8	
	2.2. 02	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	4.6	1	4.1	
	2.2. 38	Knowledge of conditions and limitations in the facility license.	3.6		4.5	1
	2.2.					
	2.2.					
	2.2.					
	Subtotal			2		1
3. Radiation Control	2.3. 14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.	3.4	1	3.8	
	2.3. 15	Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	2.9	1	3.1	
	2.3. 11	Ability to control radiation releases.	3.8	1	4.3	
	2.3. 11	Ability to control radiation releases.	3.8		4.3	1
	2.3. 14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.	3.4		3.8	1
	2.3.					
	Subtotal			3		2
4. Emergency Procedures / Plan	2.4. 28	Knowledge of procedures relating to a security event.	3.2	1	4.1	
	2.4. 01	Knowledge of EOP entry conditions and immediate action steps.	4.6	1	4.8	
	2.4. 46	Ability to verify that the alarms are consistent with the plant conditions.	4.2	1	4.2	
	2.4. 32	Knowledge of operator response to loss of all annunciators.	3.6		4.0	1
	2.4. 29	Knowledge of the emergency plan.	3.1		4.4	1
	2.4.					
	Subtotal			3		2
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
The systematic and random sampling process utilized the pre-approved Peach Bottom K/A suppression list.		
The following K/As were rejected following the systematic and random sampling process:		
1 / 1	<p>Question 76</p> <p>295030 Low Suppression Pool Wtr Lvl</p> <p>A2.04 - Ability to determine and/or interpret the following as they apply to Low Suppression Pool Wtr Lvl: Drywell/ suppression chamber differential pressure: Mark-I&amp;II</p>	<p>An acceptable question could not be developed at the SRO level for with randomly sampled K/A due to lack of requirements related to Drywell / Suppression Chamber differential pressure at the facility.</p> <p>Randomly resampled K/A 295030 Low Suppression Pool Wtr Lvl A2.01 - Ability to determine and/or interpret the following as they apply to Low Suppression Pool Wtr Lvl: Suppression pool level.</p>
1 / 2	<p>Question 84</p> <p>295007 High Reactor Pressure</p> <p>2.4.50 - Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.</p>	<p>The randomly sampled K/A resulted in oversampling of concepts on the SRO exam (Question 82 also tests High Reactor Pressure, Question 89 also tests alarm response).</p> <p>Randomly resampled K/A 295010 High Drywell Pressure 2.4.6 - Knowledge of EOP mitigation strategies.</p>
2 / 1	<p>Question 86</p> <p>205000 Shutdown Cooling Mode</p> <p>A2.09 - Ability to (a) predict the impacts of the following on the Shutdown Cooling; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Reactor low water level</p>	<p>The randomly sampled K/A resulted in oversampling of Shutdown Cooling concepts on the SRO exam (Question 79) and the overall exam (Question 14 + 51).</p> <p>Randomly resampled K/A 218000 ADS A2.06 - Ability to (a) predict the impacts of the following on the ADS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: ADS initiation signals present.</p>

2 / 1	<p>Question 87</p> <p>300000 Instrument Air</p> <p>A2.01 - Ability to (a) predict the impacts of the following on the Instrument Air; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Air dryer and filter malfunctions</p>	<p>The randomly sampled K/A resulted in oversampling of Instrument Air concepts on the SRO exam (Question 81) and the overall exam (Questions 8 + 44).</p> <p>Randomly resampled K/A 262001 AC Electrical Distribution A2.06 - Ability to (a) predict the impacts of the following on the A.C. ELECTRICAL DISTRIBUTION; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: De-energizing a plant bus.</p>
2 / 2	<p>Question 91</p> <p>259001 Reactor Feedwater</p> <p>A2.05 - Ability to (a) predict the impacts of the following on the Reactor Feedwater; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of applicable plant air systems</p>	<p>The randomly sampled K/A resulted in oversampling of Feedwater concepts on the SRO exam (Questions 83 + 90).</p> <p>Randomly resampled K/A 290003 Control Room HVAC A2.02 - Ability to (a) predict the impacts of the following on the CONTROL ROOM HVAC; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Extreme environmental conditions.</p>
2 / 2	<p>Question 93</p> <p>204000 RWCU</p> <p>2.4.31 - Knowledge of annunciator alarms, indications, or response procedures.</p>	<p>An acceptable question could not be developed at the SRO level for the combination of system and generic K/A. The K/A also resulted in oversampling of alarm response concepts on the SRO exam (Question 89 also tests alarm response).</p> <p>Randomly resampled K/A 204000 RWCU 2.4.41 - Knowledge of the emergency action level thresholds and classifications.</p>
2 / 1	<p>Question 9</p> <p>212000 RPS</p> <p>K5.01 - Knowledge of the operational implications of the following concepts as they apply to RPS: Fuel thermal time constant</p>	<p>An acceptable question could not be written without testing primarily GFES knowledge.</p> <p>Randomly resampled K/A 212000 RPS K5.02 - Knowledge of the operational implications of the following concepts as they apply to RPS: Specific logic arrangements.</p>

2 / 1	<p>Question 18</p> <p>262001 AC Electrical Distribution</p> <p>A3.04 - Ability to monitor automatic operations of the AC Electrical Distribution including: Load sequencing</p>	<p>An acceptable question could not be written without overlap with Question 10.</p> <p>Randomly resampled K/A 262001 AC Electrical Distribution A3.02 - Ability to monitor automatic operations of the AC Electrical Distribution including: Automatic bus transfer.</p>
2 / 2	<p>Question 33</p> <p>286000 Fire Protection</p> <p>A1.03 - Ability to predict and/or monitor changes in parameters associated with operating the Fire Protection controls including: Fire doors</p>	<p>An acceptable question could not be written at the license level due to limited association between operating Fire Protection control and Fire doors.</p> <p>Randomly resampled K/A 286000 Fire Protection A1.01 - Ability to predict and/or monitor changes in parameters associated with operating the Fire Protection controls including: System pressure.</p>
3	<p>Question 72</p> <p>2.4.32 - Knowledge of operator response to loss of all annunciators.</p>	<p>An acceptable question could not be written without overlap with Question 97 (same generic K/A with limited scope).</p> <p>Randomly resampled K/A 2.4.28 - Knowledge of procedures relating to a security event (non-safeguards information).</p>
3	<p>Question 73</p> <p>2.4.47 - Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.</p>	<p>The randomly sampled generic K/A is oversampled because it is also used in Questions 22 and 80.</p> <p>Randomly resampled K/A 2.4.1 - Knowledge of EOP entry conditions and immediate action steps.</p>
2 / 2	<p>Question 29</p> <p>204000 RWCU</p> <p>K3.01 - Knowledge of the effect that a loss or malfunction of the RWCU will have on following: Reactor water quality</p>	<p>An acceptable question could not be written at the license level for the randomly sampled K/A.</p> <p>Randomly resampled K/A 204000 RWCU K3.02 - Knowledge of the effect that a loss or malfunction of the RWCU will have on following: Reactor water level.</p>

2 / 2	<p>Question 31</p> <p>272000 Radiation Monitoring</p> <p>K5.01 - Knowledge of the operational implications of the following concepts as they apply to RADIATION MONITORING SYSTEM: Hydrogen injection operation's effect on process radiation indications: Plant-Specific</p>	<p>An acceptable question could not be written for the randomly sampled K/A without overlapping a scenario event on the operating exam.</p> <p>Randomly resampled K/A 272000 Radiation Monitoring K6.01 - Knowledge of the effect that a loss or malfunction of the following will have on the RADIATION MONITORING SYSTEM: Reactor protection system.</p>
1 / 2	<p>Question 83</p> <p>295008 High Reactor Water Level</p> <p>A2.02 - Ability to determine and/or interpret the following as they apply to High Reactor Water Level: Steam flow/feed flow mismatch</p>	<p>An acceptable question could not be written for the randomly sampled K/A at the SRO level.</p> <p>Randomly resampled K/A 295008 High Reactor Water Level A2.01 - Ability to determine and/or interpret the following as they apply to High Reactor Water Level: Reactor water level.</p>
2 / 1	<p>Question 90</p> <p>259002 Reactor Water Level Control</p> <p>A2.06 - Ability to (a) predict the impacts of the following on the Reactor Water Level Control; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of controller signal output</p>	<p>An acceptable question could not be written for the randomly sampled K/A at the SRO level.</p> <p>Randomly resampled K/A 259002 Reactor Water Level Control A2.05 - Ability to (a) predict the impacts of the following on the Reactor Water Level Control; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of applicable plant air systems.</p>

Facility: Peach BottomDate of Examination: 3/20/17Examination Level: RO ☒ SRO ☐Operating Test Number: 2017 NRC

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, S	G2.1.23 (4.3) - Monitor Reactor Vessel Temperatures During Cooldown (PLOR 154C)
Conduct of Operations	N, R	G2.1.25 (3.9) – Manually Calculate Drywell Bulk Average Temperature (PLOR 061C)
Equipment Control	D, R	G2.2.13 (3.6) - Knowledge of Tagging and Clearance Procedures (PLOR 204C)
Radiation Control	N/A	Not Required
Emergency Plan	D, S, P	G2.4.29 (3.1) - Emergency Response Organization Response Augmentation Using the Everbridge Web-based Call Out System (PLOR-92C)
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 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: Peach BottomDate of Examination: 3/20/17Examination Level: RO ☐ SRO ☒Operating Test Number: 2017 NRC

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, R, P	G2.1.7 (4.7) - Resolution of Thermal Limit Violation (PLOR-218C)
Conduct of Operations	D,R	G2.1.25 (4.2) Perform Reactor Coolant Leakage Test – SRO Version (PLOR-354C)
Equipment Control	M, R	G2.2.22 (4.7) -Asymmetric Feedwater Temperature Operation (AFTO) (PLOR-252C)
Radiation Control	D, R	G2.3.14 (3.8) – Review and Authorize Issuance of Thyroid Blocking Agent (KI) (PLOR-215C)
Emergency Plan	N, R	G2.4.41 (3.6) - Classification of Emergencies and PARs

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 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: <u>Peach Bottom</u>		Date of Examination: <u>3/20/17</u>	
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: <u>2017 NRC</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. 259001A4.02 ( 3.9/3.7) Shutdown The "A" RFP Turbine (Alternate Path - Min Flow Valve Fails Closed) (PLOR-303CA)	A, D, S	2	
b. 239001A4.01( 4.2/ 4.0) Recover a Single Main Steam Line (PLOR-379C)	D, S	3	
c. 295031EA1.05 (4.3/4.3) Manually Initiate RCIC (Alternate Path – Controller Fails Low) (PLOR-302CA)	A, D, S	4	
d. 295024EA1.19 (3.3/3.4) Vent the Primary Containment via the Torus Hardened Vent for Gas or Pressure Control per T-200J (PLOR-135C)	M, S, EN	5	
e. 264000A4.04 (3.7/3.7) Diesel Generator Load Test (Alternate Path - (D/G will not load) (PLOR-322CA)	A, M, S	6	
f. 212000 A4.03 (3.9/3.9) Perform Actions For An Unexpected/Unexplained Change In Core Flow Per OT-112 (Alternate Path Control Rods Will Not Insert) (PLOR 355CA)	A, E, N, S	7	
g. 400000 A4.01 (3.1/3.0) ECW System Makeup to Tower using a HPSW Pump (PLOR-270C) 2015 NRC Exam	D, EN, P, S	8	
h. 295002 AK2.07 – Steam Jet Air Ejector Operations During a Condenser Low Vacuum Transient (OT-106) (PLOR-136C)	D, E, S	9	
In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
i. 295037EA1.05 (3.9/4.0) Rod Insertion By Withdraw Line Venting (T-215) - Unit 2 (PLOR-64P)	D, E, L, R	1	
j. 295029EA1.01 (3.4/3.5) Defeating HPCI High Torus Level Suction Transfer (PLOR-198P)	D, E, L, EN, R	4	
k. 264000A2.10 (3.9/4.2) Diesel Generator Air Start Solenoid Override	D, E, L	6	
<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.			
* Type Codes	Criteria for RO / SRO-I / SRO-U		

(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	$\leq 9$ / $\leq 8$ / $\leq 4$
(E)mergency or abnormal in-plant	$\geq 1$ / $\geq 1$ / $\geq 1$
(EN)gineered safety feature	- / - / $\geq 1$ (control room system
(L)ow-Power / Shutdown	$\geq 1$ / $\geq 1$ / $\geq 1$
(N)ew or (M)odified from bank including 1(A)	$\geq 2$ / $\geq 2$ / $\geq 1$
(P)revious 2 exams	$\leq 3$ / $\leq 3$ / $\leq 2$ (randomly selected)
(R)CA	$\geq 1$ / $\geq 1$ / $\geq 1$
(S)imulator	

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ES-301-2 Rev 1

Facility: Peach BottomDate of Examination: 3/20/17Exam Level: RO ☐ SRO-I ☒ SRO-U ☐Operating Test No.: 2017 NRCControl 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. 259001A4.02 ( 3.9/3.7) Shutdown The "A" RFP Turbine (Alternate Path - Min Flow Valve Fails Closed) (PLOR-303CA)	A, D, S	2
b. 239001A4.01( 4.2/ 4.0) Recover a Single Main Steam Line (PLOR-379C)	D, S	3
c. 295031EA1.05 (4.3/4.3) Manually Initiate RCIC (Alternate Path – Controller Fails Low) (PLOR-302CA)	A, D, S	4
d. 295024EA1.19 (3.3/3.4) Vent the Primary Containment via the Torus Hardened Vent for Gas or Pressure Control per T-200J (PLOR-135C)	M, S, EN	5
e. 264000A4.04 (3.7/3.7) Diesel Generator Load Test (Alternate Path - Load Control Difficulty) (PLOR-322CA)	A, M, S	6
f. 212000 A4.03 (3.9/3.9) Perform Actions For An Unexpected/Unexplained Change In Core Flow Per OT-112 (Alternate Path Control Rods Will Not Insert) (PLOR 355CA)	A, E, N, S	7
g. 400000 A4.01 (3.1/3.0) ECW System Makeup to Tower using a HPSW Pump (PLOR-270C) 2015 NRC Exam	D, EN, P, S	8
h.		

In-Plant Systems<sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

i. 295037EA1.05 (3.9/4.0) Rod Insertion By Withdraw Line Venting (T-215) - Unit 2 (PLOR-64P)	D, E, L, R	1
j. 295029EA1.01 (3.4/3.5) Defeating HPCI High Torus Level Suction Transfer (PLOR-198P)	D, E, L, EN, R	4
k. 264000A2.10 (3.9/4.2) Diesel Generator Air Start Solenoid Override	D,E,L	6

<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.

* Type Codes	Criteria for RO / SRO-I / SRO-U
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(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	$\leq 9$ / $\leq 8$ / $\leq 4$
(E)mergency or abnormal in-plant	$\geq 1$ / $\geq 1$ / $\geq 1$
(EN)gineered safety feature	- / - / $\geq 1$ (control room system
(L)ow-Power / Shutdown	$\geq 1$ / $\geq 1$ / $\geq 1$
(N)ew or (M)odified from bank including 1(A)	$\geq 2$ / $\geq 2$ / $\geq 1$
(P)revious 2 exams	$\leq 3$ / $\leq 3$ / $\leq 2$ (randomly selected)
(R)CA	$\geq 1$ / $\geq 1$ / $\geq 1$
(S)imulator	

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Facility: <u>Peach Bottom</u>		Date of Examination: <u>3/20/17</u>	
Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>		Operating Test No.: <u>2017 NRC</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. 295024EA1.19 (3.3/3.4) Vent the Primary Containment via the Torus Hardened Vent for Gas or Pressure Control per T-200J (PLOR-135C)	M, S, EN	5	
e. 264000A4.04 (3.7/3.7) Diesel Generator Load Test (Alternate Path - Load Control Difficulty) (PLOR-322CA)	A, M, S	6	
f. 212000 A4.03 (3.9/3.9) Perform Actions For An Unexpected/Unexplained Change In Core Flow Per OT-112 (Alternate Path Control Rods Will Not Insert) (PLOR 355CA)	A, E, N, S	7	
g.			
h.			
In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
i. 295037EA1.05 (3.9/4.0) Rod Insertion By Withdraw Line Venting (T-215) - Unit 2 (PLOR-64P)	D, E, L, R	1	
j. 295029EA1.01 (3.4/3.5) Defeating HPCI High Torus Level Suction Transfer (PLOR-198P)	D, E, L, EN, R	4	
k.			
<b>@</b> 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.			
* Type Codes	Criteria for RO / SRO-I / SRO-U		

(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	$\leq 9$ / $\leq 8$ / $\leq 4$
(E)mergency or abnormal in-plant	$\geq 1$ / $\geq 1$ / $\geq 1$
(EN)gineered safety feature	- / - / $\geq 1$ (control room system
(L)ow-Power / Shutdown	$\geq 1$ / $\geq 1$ / $\geq 1$
(N)ew or (M)odified from bank including 1(A)	$\geq 2$ / $\geq 2$ / $\geq 1$
(P)revious 2 exams	$\leq 3$ / $\leq 3$ / $\leq 2$ (randomly selected)
(R)CA	$\geq 1$ / $\geq 1$ / $\geq 1$
(S)imulator	

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Simulation Facility Peach Bottom      Scenario No. #1      Op Test No. 2017 NRC

Examiners \_\_\_\_\_ Operator \_\_\_\_\_ CRS (SRO)

\_\_\_\_\_ URO (ATC)

\_\_\_\_\_ PRO (BOP)

**Scenario  
Summary**

The scenario begins with the reactor at approximately 100% power.

Following shift turnover, the PRO will cross tie 1PS4 with 3PS4 using SO 55.6.A-0, "480 V Auxiliary Load Center Cross-Tie".

When the PRO has completed the cross-tie, the CRD suction strainer will clog. The URO should recognize and report the trip of the "A" CRD pump due to low suction pressure. The Crew should have the suction filter bypassed. The URO should start the "B" CRD pump after the suction filter is bypassed. When the CRD Accumulator trouble alarms are received, the CRS should recognize the condition requiring entry into a Tech Spec required action. The CRS should enter and execute Tech Spec 3.1.5. Based on the time it takes to start the "B" CRD pump, the Crew may also receive a CRD Hydraulic Hi Temperature alarm. The PRO should monitor CRD temperatures until CRD is returned to service.

While CRD is being recovered, HPCI will spuriously start. The PRO should determine that an initiation signal for HPCI does not exist. The URO should report the rise in Reactor Power and RPV level. The Crew should enter and execute OT-104, "Positivity Reactivity insertion and OT-110, "Reactor High Level". The CRS should direct the PRO to place HPCI in "short term shutdown" using SO 23.2.A-2, "HPCI System Shutdown" or RRC 23.1-2, "HPCI System Operation during a Plant Event". (If RRC 23.1-2 is used then the CRS should direct follow-up with SO 23.2.A-2) The CRS should recognize a condition requiring entry into a Tech Spec required action. The CRS should enter and execute required actions 3.5.1.C.

When CRD has been returned to service, the #3 stop valve will fail closed. The Crew should recognize and report the rise in RPV pressure and Reactor power and determine that the #3 stop valve has failed closed. The Crew should enter and execute OT-102, "Reactor High Pressure and OT-104, "Positive Reactivity insertion" to lower power to 84.5%. **(Critical Task: Following a positive reactivity addition, restore Reactor power below 100%)** The CRS should reference Tech Specs sections 3.2, "Power Distribution Limits" and 3.4.10, "Reactor Steam Dome Pressure" and determine that no actions are required.

After the power reduction is complete, a report of a large spill of radioactive liquid will be reported to the control room. The Crew should enter SE-9, "Radioactive Liquid Spill" but not immediately be able to take any actions because the area has been evacuated. The PRO should recognize and report the rise in Vent Stack and Reactor Zone radiation levels. The Crew should enter and execute ON-104, "Vent Stack High Radiation" when alarms 218 B-5 and 218 C-5 are received. The CRS should evacuate the Reactor Building. The PRO should place Reactor Building Ventilation on SBT. The PRO should recognize and report the drop in Vent stack radiation levels when Reactor Building Ventilation is placed on SBT.

When Reactor Building ventilation has been placed on SBT, a steam leak will develop on HPCI. The Crew will receive smoke detector alarms and area high temperature alarms for the HPCI room. The Crew should attempt to isolate the HPCI steam supply and determine that the HPCI steam supply valves will not go closed. As HPCI area temperature continues to rise, the CRS should direct a GP-4, Manual Reactor Scram". **(Critical Task: When a Primary System is discharging into Secondary Containment through an unisolable leak, scram the Reactor when any parameter (temperature) exceeds a T-103, "Secondary Containment Control" Action Level)** The Reactor Operators will take their scram actions per RRC 94.2-2, "Plant Reactor Operator Scram Actions" and RRC 94.1-2, "Reactor Operator Scram Actions". The CRS will enter and execute T-101, "RPV Control".

During the performance of the PRO Scram actions, the PRO should recognize that the Main Generator did not lockout following the Main Turbine trip. The PRO should manually open the generator output breakers and the field breaker. During the performance of the URO Scram actions, the URO should recognize that the "C" RFP discharge valve bypass isolation valve MO-8090 would not open. The URO should use the RFP discharge valve position and speed to control RPV level.

The CRS should direct an RPV depressurization to minimize the input into the Reactor building.

Conditions will continue to deteriorate, Torus room temperature will begin to rise, the CRS should direct a rapid depressurization be conducted with bypass valves as conditions approach a blowdown limit. When a second area exceeds the action level in two areas the Crew should perform an Emergency Blowdown using OT-112, "Emergency Blowdown" **(Critical Task: Perform T-112, "Emergency Blowdown" when the same parameter (temperature) exceeds a T-103, "Secondary Containment Control" Action Level in More than one area and the system breach has not been isolated OR Perform a rapid depressurization using RC/P-12 when the blowdown limit in T-103 is approached.)**

The scenario may be terminated when the Reactor is depressurized and Reactor level is being controlled above -172 inches.

**Initial  
Conditions  
Turnover**

IC-14 Approximately 100% power

Unit 2 is at 100% power.

Following shift turnover perform SO 55.6.A-0, "480V Auxiliary Load Center Cross-tie".



Event No.	Malfunction No.	Event Type*		Event Description
1	See Scenario Guide	N	PRO CRS	Cross-tie 1PS4 with 3PS4
2	See Scenario Guide	C TS	URO CRS	"A" CRD pump trips on low suction pressure. Swap to the "B" CRD pump after suction filter is bypassed.
3	See Scenario Guide	C TS	PRO CRS	Inadvertent HPCI start. Secure HPCI.
4	See Scenario Guide	R	URO CRS	#3 stop valve fails closed. Lower Reactor power to 84.5%.
5	See Scenario Guide	C	PRO CRS	Vent Stack high radiation caused by a spill. Place Reactor Building ventilation on SBTG.
6	See Scenario Guide	M	ALL	HPCI steam leak into the Reactor Building. Scram the Reactor as Reactor Building Temperatures rise.
7	See Scenario Guide	C	PRO	Main Generator fails to lock out on the turbine trip. Manually trip the generator output breakers and field breaker.
8	See Scenario Guide	C	URO	MO 8090 fails to open. Control RPV level using RFP discharge valve and RFP speed.
9	See Scenario Guide	M	ALL	Second Reactor Building exceeds and action level requiring an emergency depressurization.

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

Simulation Facility Peach BottomScenario No. #2Op Test No. 2017 NRC

Examiners \_\_\_\_\_ Operator \_\_\_\_\_ CRS (SRO)  
\_\_\_\_\_ URO (ATC)  
\_\_\_\_\_ PRO (BOP)

**Scenario Summary** The scenario begins with the reactor at approximately 95% power.  
The PRO will lower Torus level to 14.55 feet.

When the Torus lineup is complete, the E-2 Diesel Generator will spuriously start. The Crew will be given feedback that there is a diesel fuel oil leak that will require the PRO to secure the E-2 Diesel Generator. The CRS should recognize the condition requiring entry into a Tech Spec required action. The CRS should enter and execute Tech Spec 3.8.1, "AC Sources Operating".

Following the Tech Spec determination, Control Rod 30-35 will drift into the core. The Crew will enter and execute ON-121, "Rod Drift" to insert and disarm the control rod. The CRS should recognize the condition requiring entry into a Tech Spec required action. The CRS should enter and execute Tech Spec 3.1.3, "Control Rod Operability".

When the Control Rod is inserted and the Tech Spec determination has been made, the Hydrogen Water Chemistry system hydrogen controller will fail full open. This will cause a rise in Main Steam Line radiation levels and an entry into ON-103, "Main Steam Line High Radiation". The HWC will fail to automatically isolate on the high hydrogen flow condition and the PRO must manually isolate the HWC system.

When the HWC system is isolated, the 13 KV breaker for the 2A Recirc pump Adjustable Speed Drive will trip. The Crew should enter and execute OT-112, "Unexpected/Unexplained Change in Core Flow". The URO should immediately begin to drive GP-9-2 Control Rods. The Crew should monitor for THI and plot position on the power to flow map.

After the first control rod is inserted, a loss of Stator Cooling will occur. The Crew should enter and execute OT-113, "Loss of Stator Cooling". The loss of stator cooling will require the Crew to perform a manual scram or an automatic scram will occur.

When the URO attempts a manual scram, control rods will not insert due to an electric ATWS. The Crew will enter and execute T-101, "RPV Control" and T-117, "Level/Power Control". The Reactor Operators will take their ATWS Rapid Response Card actions. When the second Recirc pump is tripped, THI will occur. This will require the Crew to lower level to halt the THI. **(Critical Task: Perform T-240, "Termination and Prevention of Injection into the RPV" to minimize thermal hydraulic instabilities (THI) until RPV level is below -60 inches.)**

When the URO injects SLC, RWCU will not automatically isolate and must be

manually isolated for SLC to shut down the Reactor. The Crew will perform T-214, "Isolating and Vent Scram Air Header" and T-220, "Driving Control Rods During Failure to Scram" to shut down the Reactor. **(Critical Task: Attempt to shut down the Reactor by performing one or more of the following: a. T-214, "Isolating and Venting the Scram Air Header", b. T-220, "Driving Control Rods During a Failure to Scram" and/or c. Injecting Standby Liquid Control before Torus temperature exceeds 110 degrees F)**

When the PRO attempts to bypass and restore Drywell Instrument Nitrogen, the bypass logic will fail and the Crew will need to use the back Instrument Nitrogen bottles and/or perform T-261, "Placing the Backup Instrument Nitrogen Supply from the CAD Tank In Service". This will supply nitrogen to the SRVs and keep the MSIVs open for long term RPV pressure control.

When the PRO is controlling RPV level below -60 inches, T-214, "Isolating and Venting the Scram Air Header" will be successful and the Control Rods will insert.

**Initial  
Conditions  
Turnover**

IC-14 Approximately 100% power

Unit 2 is at 95% power.

Reduce Torus level to 14.55 feet in preparations for a HPCI ST the following shift

Event No.	Malfunction No.	Event Type*	Event Description
1	See Scenario Guide	N PRO CRS	Lower Torus level to 14.55 feet
2	See Scenario Guide	C PRO CRS TS	Spurious E-2 Diesel Generator Start. Must secure the D/G due to a fuel oil leak.
3	See Scenario Guide	C URO CRS TS	Control rod 30-35 drifts into the Core. Must insert and disarm the control rod.
4	See Scenario Guide	C PRO CRS	HWC controller fails open resulting in high Main Steam Line Radiation levels. The automatic isolation will not occur and the PRO must trip the HWC system.
5	See Scenario Guide	R URO CRS	"A" Recirc pump trips requiring the URO to insert control rods.
6	See Scenario Guide	C URO CRS	A loss of Stator cooling occurs requiring the URO to attempt to scram the Reactor.
7	See Scenario Guide	M ALL	ATWS
8	See Scenario Guide	C URO	RWCU fails to isolate on SLC injection requiring the URO to manually isolate RWCU.
9	See Scenario Guide	C PRO CRS	Drywell Instrument Nitrogen bypass will fail, the PRO will need to use the backup nitrogen bottles and/or the CAD tank.

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

Simulation Facility Peach BottomScenario No. #3Op Test No. 2017 NRC

Examiners \_\_\_\_\_

Operator \_\_\_\_\_

CRS (SRO)

URO (ATC)

PRO (BOP)

**Scenario  
Summary**

The scenario begins with the reactor at approximately 5% power during a reactor startup.

Following shift turnover, the PRO cycles HPCI MO-2-23-14 as part of GP-2-2, "Normal Plant Startup".

After MO-2-23-14 is cycled, the URO will continue to withdraw control rods with a goal of 3 bypass valves fully open.

As the URO withdraws control rods he will determine that control rod 34-19 is stuck. The Crew should enter and execute SO 62.1.A-2, "Withdrawing/Inserting a Control Rod". The URO will raise drive water pressure in 50 psid increments until the control rod is no longer stuck (the rod will un-stick at 50 psid). When the control rod is no longer stuck the URO will return drive water pressure to normal.

Following the stuck control rod, the Main Stack radiation monitor will fail upscale. The Crew should recognize the failure and also the failure of AO-2506, "Drywell 18" Vent Valve" to close on the isolation signal. The CRS should enter and execute Tech Specs sections 3.6.1.3, "Primary Containment Isolation Valves" and 3.3.6.1, "Primary Containment Isolation Instrumentation" and ODCM 3.8.C, "Gaseous Effluents" and determine that a trip must be inserted within 24 hours and that the vent path must be isolated within 4 hours.

When the vent line is isolated, a loss of power to the "C" SRV will occur due to a blown fuse. The Crew will enter and execute the Alarm Response Card "Blowdown Valves Power Monitor" (227 C-5). The CRS should enter and execute Tech Specs sections 3.5.1, "ECCS Operating" and 3.4.3, "Safety Relief Valve and Safety Valve". The CRS should determine that the ADS valve must be returned to operable status within 14 days and that a potential TSA exists for the INOP SRV.

Following the loss of power to the "C" SRV, an unisolable steam leak will occur in the Drywell. The crew should enter and execute OT-101, "High Drywell Pressure". Drywell pressure will continue to rise. When Drywell pressure cannot be restored and maintained below 1.2 psig the CRS should direct a GP-4, "Manual Reactor Scram". The CRS should enter and execute T-101, "RPV Control". When the URO takes the mode switch to the shutdown position, control rods will not insert. Control rods will insert when the Manual Scram pushbuttons are depressed.  
**(Critical Task: Shutdown the Reactor by depressing the manual Scram pushbuttons.)**

The Steam leak will continue to get worse. The CRS will enter and execute T-102, "Primary Containment Control" and require the Crew to spray containment. When

containment sprays are attempted, failures in the valve logic will not allow the Crew to spray containment.

As the Drywell leak progresses, a Torus to Drywell vacuum breaker will fail open. This will cause a rapid rise in containment pressure and a violation of the PSP curve. This will require the Crew to perform an emergency blowdown. **(Critical Task: Perform an emergency blowdown in accordance with T-112 "Emergency Blowdown" when the PSP Curve of T-102 is violated.)** Because of the loss of power to the "C" ADS/SRV the PRO will be required to open a non-ADS SRV to get a total of 5 ADS/SRVs open.

**Initial  
Conditions  
Turnover**

IC-8 Approximately 5% power

Unit 2 startup is in progress.

GP-2-2, "Normal Plant Startup" is complete through step 6.2.34

Continue rod withdraw with Group 8 rod 26-43

Cycle MO-2-23-14 HPCI steam valve per GP2-2, "Normal Plant Startup".

Event No.	Malfunction No.	Event Type*	Event Description
1	See Scenario Guide	N PRO CRS	Cycle HPCI MO-2-23-14
2	See Scenario Guide	R URO CRS	Raise Reactor power using control rods until 3 main turbine bypass valves are open with reactor pressure at 450 psig
3	See Scenario Guide	C URO CRS	Control rod 34-19 is stuck requiring the use of SO 62.1.A-2, "Withdrawing Inserting a Control Rod" to free the rod.
4	See Scenario Guide	C PRO CRS TS	Main Stack radiation monitor fails upscale but does not cause all the isolations. The PRO must isolate the vent path.
5	See Scenario Guide	TS CRS	Loss of power to the "C" ADS/SRV
6	See Scenario Guide	C URO CRS	Steam leak in the Drywell. The URO will maximize Drywell cooling to attempt to lower Drywell pressure.
7	See Scenario Guide	M ALL	Steam leak worsens requiring a Reactor Scram and containment sprays
8	See Scenario Guide	C URO CRS	Automatic scram and mode switch fails to shutdown the Reactor. URO used the Manual scram pushbuttons.
9	See Scenario Guide	M ALL	Containment Spray valves fail to operate. Will not allow the Crew to reduce containment pressure. Torus to Drywell vacuum breaker fails open causing a violation of PSP and requiring an emergency blowdown.
10	See Scenario Guide	C PRO CRS	"C" SRV has no power open an additional SRV to complete the Emergency Blowdown

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