

Facility Name: Peach Bottom

Date of Exam: 12/07/2009

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	4	N/A		3	20	4		3	7	
	2	1	2	1					1	1			1	7	2	1	3		
	Tier Totals	4	5	4					5	5			4	27	6	4	10		
2. Plant Systems	1	2	2	2	3	3	2	3	2	2	2	3	26	3		2	5		
	2	1	1	1	1	1	1	1	2	1	1	1	12	0	2	1	3		
	Tier Totals	3	3	3	4	4	3	4	4	3	3	4	38	5		3	8		
3. Generic Knowledge and Abilities Categories					1	2		3		4		10	1	2	3	4	7		
					2	3		3		2			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).
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 ± 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.

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				Core flow indication	2.9	1	
295003 Partial or Complete Loss of AC / 6	0 5						Failsafe component design	2.6	1	
295004 Partial or Total Loss of DC Pwr / 6						02. 22	Knowledge of limiting conditions for operations and safety limits	4	1	
295005 Main Turbine Generator Trip / 3	0 3						Pressure effects on reactor level	3.5	1	
295006 SCRAM / 1						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	
295016 Control Room Abandonment / 7					0 2		Reactor water level	4.2	1	
295018 Partial or Total Loss of CCW / 8			0 2				Reactor power reduction	3.3	1	
295019 Partial or Total Loss of Inst. Air / 8						04. 31	Knowledge of annunciator alarms, indications, or response procedures.	4.2	1	
295021 Loss of Shutdown Cooling / 4				0 3			Component cooling water systems: Plant-Specific	3.1	1	
295023 Refueling Acc / 8					0 1		Area radiation levels	3.6	1	
295024 High Drywell Pressure / 5					0 1		Drywell pressure	4.2	1	
295025 High Reactor Pressure / 3		0 1					RPS	4.1	1	
295026 Suppression Pool High Water Temp. / 5			0 2				Suppression pool cooling	3.9	1	
295027 High Containment Temperature / 5									0	
295028 High Drywell Temperature / 5		0 2					Components internal to the drywell	3.2	1	
295030 Low Suppression Pool Wtr Lvl / 5				0 1			ECCS systems (NPSH considerations): Plant-Specific	3.6	1	
295031 Reactor Low Water Level / 2					0 3		Reactor pressure	4.2	1	
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1	0 2						Reactor water level effects on reactor power	4.1	1	
295038 High Off-site Release Rate / 9		0 3					Plant ventilation systems	3.6	1	
600000 Plant Fire On Site / 8				0 8			Fire fighting equipment used on each class of fire	2.6	1	
700000 Generator Voltage and Electric Grid Disturbances / 6				0 5			Engineered safety features	3.9	1	
K/A Category Totals:	3	3	3	4	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 2					Reactor power	3.8	1	
295008 High Reactor Water Level / 2									0	
295009 Low Reactor Water Level / 2		0 1					Reactor water level indication	3.9	1	
295010 High Drywell Pressure / 5				0 1			Drywell ventilation/cooling	3.4	1	
295011 High Containment Temp / 5									0	
295012 High Drywell Temperature / 5	0 1						Pressure/temperature relationship	3.3	1	
295013 High Suppression Pool Temp. / 5									0	
295014 Inadvertent Reactivity Addition / 1			0 2				Control rod blocks	3.7	1	
295015 Incomplete SCRAM / 1									0	
295017 High Off-site Release Rate / 9						04. 01	Knowledge of EOP entry conditions and immediate action steps.	4.6	1	
295020 Inadvertent Cont. Isolation / 5 & 7									0	
295022 Loss of CRD Pumps / 1									0	
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 3		Cause of the high water level	3.4	1	
500000 High CTMT Hydrogen Conc. / 5									0	
K/A Category Totals:	1	2	1	1	1	1	Group Point Total:		7	

ES-401		BWR Examination Outline											Form ES-401-1	
Plant Systems - Tier 2/Group 1 (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	#
203000 RHR/LPCI: Injection Mode		0 3			0 2							Initiation logic ; Core cooling methods	2.7; 3.5	2
205000 Shutdown Cooling					0 3							Heat removal mechanisms	2.8	1
206000 HPCI	0 7											D.C. power: BWR-2, 3, 4	3.7	1
207000 Isolation (Emergency) Condenser														0
209001 LPCS			0 1								04. 50	Reactor water level; Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.8; 4.2	2
209002 HPCS														0
211000 SLC					0 4							Explosive valve operation	3.1	1
212000 RPS							0 1					RPS motor-generator output voltage	2.8	1
215003 IRM							0 2					Reactor power indication response to rod position changes	3.7	1
215004 Source Range Monitor														0
215005 APRM / LPRM				0 7								Flow biased trip setpoints	3.7	1
217000 RCIC							0 7			0 3		Suppression pool level; System valves	3.3; 3.4	2
218000 ADS						0 5					02. 12	A.C. power; Plant-Specific; Knowledge of surveillance procedures.	3; 3.7	2
223002 PCIS/Nuclear Steam Supply Shutoff										0 2		Valve closures	3.5	1
239002 SRVs			0 1	0 5								Reactor pressure control; Allows for SRV operation from more than one location; Plant-Specific	3.9; 3.6	2
259002 Reactor Water Level Control										0 3		All individual component controllers when transferring from manual to automatic modes	3.8	1
261000 SGTS								0 6				Valve closures	2.9	1
262001 AC Electrical Distribution								0 9				Exceeding voltage limitations	3.1	1
262002 UPS (AC/DC)						0 3						Static inverter	2.7	1
263000 DC Electrical Distribution		0 1										Major D.C. loads	3.1	1
264000 EDGs				0 1								Emergency generator trips (normal)	3.5	1
300000 Instrument Air	0 4										01. 20	Cooling water to compressor; Ability to interpret and execute procedure steps	2.8; 4.6	2
400000 Component Cooling Water									0 1			Setpoints on instrument signal levels for normal operations, warnings, and trips that are applicable to the CCWS	3	1
														0
K/A Category Totals:	2	2	2	3	3	2	3	2	2	2	3	Group Point Total:		26

ES-401		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
201004 RSCS														0
201005 RCIS														0
201006 RWM							0 1					Rod position: P-Spec(Not-BWR6)	3.2	1
202001 Recirculation										0 9		Reactor water level	3.7	1
202002 Recirculation Flow Control											02. 37	Ability to determine operability and/or availability of safety related equipment.	3.6	1
204000 RWCU														0
214000 RPIS														0
215001 Traversing In-core Probe				0 1								Primary containment isolation: Mark-I&II(Not-BWR1)	3.4	1
215002 RBM														0
216000 Nuclear Boiler Inst.														0
219000 RHR/LPCI: Torus/Pool Cooling Mode									0 1			Valve operation	3.3	1
223001 Primary CTMT and Aux.														0
226001 RHR/LPCI: CTMT Spray Mode														0
230000 RHR/LPCI: Torus/Pool Spray Mode								1 2				Valve logic failure	3.2	1
233000 Fuel Pool Cooling/Cleanup		0 2										RHR pumps	2.8	1
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 2							Turbine operation and limitations	2.8	1
256000 Reactor Condensate														0
259001 Reactor Feedwater			0 5									Recirculation pump NPSH	2.9	1
268000 Radwaste	0 6											Drywell floor drains	2.9	1
271000 Offgas								0 9				Valve closures	2.6	1
272000 Radiation Monitoring														0
286000 Fire Protection														0
288000 Plant Ventilation						0 3						Plant air systems	2.7	1
290001 Secondary CTMT														0
290003 Control Room HVAC														0
290002 Reactor Vessel Internals														0
K/A Category Totals:	1	1	1	1	1	1	1	2	1	1	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						02.37	Ability to determine operability and/or availability of safety related equipment.	4.6	1	
295004 Partial or Total Loss of DC Pwr / 6						02.22	Knowledge of limiting conditions for operations and safety limits.	4.7	1	
295005 Main Turbine Generator Trip / 3									0	
295006 SCRAM / 1									0	
295016 Control Room Abandonment / 7									0	
295018 Partial or Total Loss of CCW / 8					03		Cause for partial or complete loss	3.5	1	
295019 Partial or Total Loss of Inst. Air / 8					01		Instrument air system pressure	3.6	1	
295021 Loss of Shutdown Cooling / 4									0	
295023 Refueling Acc / 8									0	
295024 High Drywell Pressure / 5									0	
295025 High Reactor Pressure / 3									0	
295026 Suppression Pool High Water Temp. / 5									0	
295027 High Containment Temperature / 5									0	
295028 High Drywell Temperature / 5						04.21	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.	4.6	1	
295030 Low Suppression Pool Wtr Lvl / 5									0	
295031 Reactor Low Water Level / 2									0	
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1					03		SBLC tank level	4.4	1	
295038 High Off-site Release Rate / 9					04		Source of off-site release	4.5	1	
600000 Plant Fire On Site / 8									0	
700000 Generator Voltage and Electric Grid Disturbances / 6									0	
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	
295009 Low Reactor Water Level / 2									0	
295010 High Drywell Pressure / 5									0	
295011 High Containment Temp / 5									0	
295012 High Drywell Temperature / 5									0	
295013 High Suppression Pool Temp. / 5					0 2		Localized heating/stratification	3.5	1	
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 3		Reactor power	3.7	1	
295022 Loss of CRD Pumps / 1									0	
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						04. 06	Knowledge of EOP mitigation strategies.	4.7	1	
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 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														0
205000 Shutdown Cooling Mode														0
206000 HPCI														0
207000 Isolation (Emergency) Condenser														0
209001 LPCS														0
209002 HPCS														0
211000 SLC								0 4				Inadequate system flow	3.4	1
212000 RPS														0
215003 IRM											02 40	Ability to apply Technical Specifications for a system.	4.7	1
215004 Source Range Monitor														0
215005 APRM / LPRM														0
217000 RCIC														0
218000 ADS														0
223002 PCIS/Nuclear Steam Supply Shutoff								1 1				Standby liquid initiation	3.9	1
239002 SRVs														0
259002 Reactor Water Level Control														0
261000 SGTS														0
262001 AC Electrical Distribution								1 0				Exceeding current limitations	3.4	1
262002 UPS (AC/DC)														0
263000 DC Electrical Distribution											04 09	Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.	4.2	1
264000 EDGs														0
300000 Instrument Air														0
400000 Component Cooling Water														0
														0
K/A Category Totals:	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														0
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											02.40	Ability to apply Technical Specifications for a system	4.7	1
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														0
286000 Fire Protection														0
288000 Plant Ventilation														0
290001 Secondary CTMT								05				High area temperature	3.3	1
290003 Control Room HVAC														0
290002 Reactor Vessel Internals								06				Exceeding safety limits	4.5	1
K/A Category Totals:	0	0	0	0	0	0	0	2	0	0	1	Group Point Total:		3

Facility Name: Peach Bottom Date of Exam: 12/07/2009						
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1. 25	Ability to interpret reference materials, such as graphs, curves, tables, etc.	3.9	1		
	2.1. 30	Ability to locate and operate components, including local controls.	4.4	1		
	2.1. 06	Ability to manage the control room crew during plant transients.			4.8	1
	2.1. 32	Ability to explain and apply system limits and precautions.			4	1
	2.1.					
	2.1.					
	Subtotal			2		2
2. Equipment Control	2.2. 01	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.	4.5	1		
	2.2. 07	Knowledge of the process for conducting special or infrequent tests.	2.9	1		
	2.2. 14	Knowledge of the process for controlling equipment configuration or status	3.9	1		
	2.2. 43	Knowledge of the process used to track inoperable alarms.			3.3	1
	2.2.					
	2.2.					
	Subtotal			3		1
3. Radiation Control	2.3. 04	Knowledge of radiation exposure limits under normal or emergency conditions.	3.2	1		
	2.3. 05	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	2.9	1		
	2.3. 07	Ability to comply with radiation work permit requirements during normal or abnormal conditions.	3.5	1		
	2.3. 11	Ability to control radiation releases.			4.3	1
	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.			3.8	1
	2.3.					
	Subtotal			3		2
4. Emergency Procedures / Plan	2.4. 17	Knowledge of EOP terms and definitions.	3.9	1		
	2.4. 39	Knowledge of RO responsibilities in emergency plan implementation	3.9	1		
	2.4. 46	Ability to verify that the alarms are consistent with the plant conditions.			4.2	1
	2.4. 49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.			4.4	1
	2.4.					
	2.4.					
	Subtotal			2		2
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO 1 / 1 Q #53	295023 AA2.05	Emergency Plan entry conditions are not required knowledge for ROs. (Replaced with K/A 295023 AA2.01)
RO 1 / 1 Q #54	295004 G2.2.25	Tech Spec LCO bases are not required knowledge for ROs. (Replaced with K/A 295004 G2.2.22)
RO 1 / 1 Q #58	295030 EA1.03	Peach Bottom does not have HPCS. (Replaced with K/A 295030 EA1.01)
RO 2 / 1 Q #21	218000 G2.2.38	There are no conditions and limitations in the facility license associated with ADS. (Replaced with K/A 218000 G2.2.12)
RO 2 / 1 Q #25	262002 K4.01	Unable to construct another inverter question for this K/A... too similar to K/A 262002 K6.03 for Question #12. (Replaced with K/A 239002 K4.05)
RO 2 / 2 Q #29	259001 K3.09	Unable to construct a question for this K/A – there is no significant effect on the Extraction Steam System from a Feedwater System malfunction. (Replaced with K/A 259001 K3.05)
RO 3 / 2 Q #68	G2.2.23	Tracking Tech Spec LCOs is not required knowledge for ROs. (Replaced with K/A G2.2.14)
RO 3 / 2 Q #75	G2.2.18	Managing maintenance (risk assessments, work prioritization, etc.) is not required knowledge for ROs. (Replaced with K/A G2.2.1)
RO 3 / 4 Q #73	G2.4.40	SRO responsibilities during emergency plan implementation are not required knowledge for ROs. (Replaced with K/A G2.4.39)
SRO 1 / 1 Q #79	295025 G2.4.20	Unable to construct an SRO question for this K/A that meets the requirements of NUREG-1021. (Replaced with K/A 295004 G2.2.22)
SRO 1 / 2 Q #84	295034 G2.4.49	Immediate operator actions are RO knowledge. (Replaced with K/A 295034 G2.4.6)
SRO 1 / 2 Q #89	215003 G2.2.38	There are no conditions and/or limitations in the facility license associated with the IRM (WRNM) System. (Replaced with K/A 215003 G2.2.40)
SRO 2 / 2 Q #92	226001 G2.2.4	This K/A is not tied to 10CFR55.43(b), as required by NUREG-1021. (Replaced with K/A 226001 G2.2.40)
SRO 3 / 3 Q #94	G2.1.14	Unable to construct an SRO question for this K/A that meets the requirements of NUREG-1021 (ROs make plant announcements). (Replaced with K/A G2.1.32)
SRO 3 / 3 Q #98	G2.3.5	Not SRO-only; duplicate to K/A in Tier-3 RO section. (Replaced with K/A G2.3.13)

Facility: Peach BottomDate of Examination: 12/07/2009Examination Level: RO ☒ SRO ☐Operating Test Number: NRC

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, R/S	G2.1.32 - Complete Attachment 1 of AO 3.8 "Evaluation of High CRD Temperature on Control Rod Scram Time" (PLOR-266C)
Conduct of Operations	D, R/S	G2.1.7 - Compliance with Asymmetric Feedwater Heating Operation (AFTO) (PLOR-251C)
Equipment Control	D, P, R/S	G2.2.41 - Isolate the 2A Turbine Building Closed Cooling Water Pump Due to a System Leak (P&ID M-316) (PLOR-257C) (2008 NRC Exam)
Radiation Control	N/A	N/A
Emergency Plan	N, R/S	G2.4.39 - Identify Errors on State and Local Notification Form - Return Form to SED for Correction (PLOR-341CA)

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 (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
- (N)ew or (M)odified from bank (≥ 1)
- (P)revious 2 exams (≤ 1 ; randomly selected)

Facility: <u>Peach Bottom</u>		Date of Examination: <u>12/07/2009</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: <u>NRC</u>

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, R/S	G2.1.32 Review Attachment 1 of AO 3.8 "Evaluation of High CRD Temperature on Control Rod Scram Time" and Identify and declare SLOW Control Rod (PLOR-340CA - SRO)
Conduct of Operations	D, R/S	G2.1.7 - Compliance with Asymmetric Feedwater Heating Operation (AFTO) (PLOR-252C)
Equipment Control	D, P, R/S	G2.2.21 - Determination of Required Post-Maintenance Testing (PLOR-242C) (2007 NRC Exam)
Radiation Control	M, R/S	G2.3.14 - Review and Authorize Issuance of Thyroid Blocking Agent (KI) (PLOR-215C)
Emergency Plan	D, R/S	G2.4.41 - EAL Classification with State and Local Notifications - Alert due to RPS Failure (PLOR-233C)

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 (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)

(N)ew or (M)odified from bank (≥ 1)

(P)revious 2 exams (≤ 1 ; randomly selected)

Facility: Peach BottomDate of Examination: 12/07/2009Exam Level: RO ☒ SRO-I ☐ SRO-U ☐Operating Test Number: NRCControl Room Systems[@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. 295037 EA1.04 - Standby Liquid Control System / Inject SBLC (Alternate Path - Low SBLC Discharge Pressure) (PLOR-331CA) [Set 1]	A, D, EN, L, S	1
b. 217000 A4.03 - Reactor Core Isolation Cooling System / Manually Initiate RCIC (Alternate Path - RCIC fails to isolate) (PLOR-332CA) [Set 2]	A, D, EN, L, S	2
c. 239001 A4.01 - Reopen Main Steam Isolation Valves after a Group I Isolation (PLOR-083C) (2008 NRC Exam) [Set 3]	D, L, P, S	3
d. 206000 A2.09 - High Pressure Coolant Injection System / Manual System Start (Alternate Path - Suction Valves Fail to Auto Swap on Low CST Level) (PLOR-343CA) [Set 1]	A, L, N, S	4
e. 223001 A4.10 - Primary Containment System and Auxiliaries / CAD System Nitrogen Addition To Containment During Normal Operations (PLOR-034C) [Set 2]	D, S	5
f. 264000 A4.04 - Emergency Generators / Diesel Generator Load Test (Alternate Path - Load Control Difficulty) (PLOR-322CA) [Set 4]	A, D, S	6
g. 400000 A4.01 - Component Cooling Water System / ECW System Makeup to Tower Using ESW System (PLOR-270C) [Set 3]	N, S	8
h. 261000 A4.03 - Standby Gas Treatment (SBGT) System / Manually Start SBGT System on Equipment Cell Exhaust (PLOR-018C) [Set 4]	D, S	9

In-Plant Systems[@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

i. 239001 A2.12 - Main and Reheat Steam System / Close A Stuck Open MSIV (Alternate Path - Removing Fuse Fails To Close MSIV - Unit 3) (PLOR-313PA)	A, D, L, R	4
j. 295037 EA1.01 - Reactor Protection System / Scram Solenoid De-energization - Unit 2 (T-213-2) (PLOR-075P)	C, D, E, L, R	7
k. 2180000 A2.03 - Backup Instrument Nitrogen to ADS System Startup and Operation (Unit 3) (PLOR-271P)	D, E, R	3

[@] 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	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: Peach BottomDate of Examination: 12/07/2009Exam Level: RO ☐ SRO-I ☒ SRO-U ☐Operating Test Number: NRC

Control Room Systems® (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. 295037 EA1.04 - Standby Liquid Control System / Inject SBLC (Alternate Path - Low SBLC Discharge Pressure) (PLOR-331CA) [Set 1]	A, D, EN, L, S	1
b. 217000 A4.03 - Reactor Core Isolation Cooling System / Manually Initiate RCIC (Alternate Path - RCIC fails to isolate) (PLOR-332CA) [Set 2]	A, D, EN, L, S	2
c. 239001 A4.01 - Reopen Main Steam Isolation Valves after a Group I Isolation (PLOR-083C) (2008 NRC Exam) [Set 3]	D, L, P, S	3
d. 206000 A2.09 - High Pressure Coolant Injection System / Manual System Start (Alternate Path - Suction Valves Fail to Auto Swap on Low CST Level) (PLOR-343CA) [Set 1]	A, L, N, S	4
e.		
f. 264000 A4.04 - Emergency Generators / Diesel Generator Load Test (Alternate Path - Load Control Difficulty) (PLOR-322CA) [Set 4]	A, D, S	6
g. 400000 A4.01 - Component Cooling Water System / ECW System Makeup to Tower Using ESW System (PLOR-270C) [Set 3]	N, S	8
h. 261000 A4.03 - Standby Gas Treatment (SBGT) System / Manually Start SBGT System on Equipment Cell Exhaust (PLOR-018C) [Set 4]	D, S	9

In-Plant Systems® (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

i. 239001 A2.12 - Main and Reheat Steam System / Close A Stuck Open MSIV (Alternate Path - Removing Fuse Fails To Close MSIV - Unit 3) (PLOR-313PA)	A, D, L, R	4
j. 295037 EA1.01 - Reactor Protection System / Scram Solenoid De-energization - Unit 2 (T-213-2) (PLOR-075P)	C, D, E, L, R	7
k. 2180000 A2.03 - Backup Instrument Nitrogen to ADS System Startup and Operation (Unit 3) (PLOR-271P)	D, E, R	3

@ 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	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: Peach BottomDate of Examination: 12/07/2009Exam Level: RO ☐ SRO-I ☐ SRO-U ☒Operating Test Number: NRCControl Room Systems[@] (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. 217000 A4.03 - Reactor Core Isolation Cooling System / Manually Initiate RCIC (Alternate Path - RCIC fails to isolate) (PLOR-332CA) [Set 2]	A, D, EN, L, S	2
c.		
d. 206000 A2.09 - High Pressure Coolant Injection System / Manual System Start (Alternate Path - Suction Valves Fail to Auto Swap on Low CST Level) (PLOR-343CA) [Set 1]	A, L, N, S	4
e.		
f.		
g.		
h. 261000 A4.03 - Standby Gas Treatment (SBGT) System / Manually Start SBGT System on Equipment Cell Exhaust (PLOR-018C) [Set 4]	D, S	9

In-Plant Systems[@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

i.		
j. 295037 EA1.01 - Reactor Protection System / Scram Solenoid De-energization - Unit 2 (T-213-2) (PLOR-075P)	C, D, E, L, R	7
k. 2180000 A2.03 - Backup Instrument Nitrogen to ADS System Startup and Operation (Unit 3) (PLOR-271P)	D, E, R	3

[@] 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	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Scenario Outline

ES-D-1

Simulation Facility Peach Bottom

Scenario No. #1 (new)

Op Test No. 2009 NRC

Examiners _____

Operators _____ 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 crew is directed to secure drywell purge in preparation for inerting the drywell. Once drywell purge is secured, the crew should continue with the reactor startup by pulling control rods in accordance with the approved startup sequence. During this evolution a control rod will drift out, requiring the crew to execute ON-121 "Drifting Control Rod" and declare the affected control rod inoperable in accordance with Tech Specs.

After the actions for the drifting control rod are complete, the 'B' drywell chiller will trip. The crew should place a standby drywell chiller in service in accordance with the system operating procedure. Next, a blown fuse will cause an ARI power supply failure, requiring the crew to initiate repairs and evaluate ARI-RPT operability per Tech Specs. This will be followed by an APRM trip with an auto scram failure, requiring the crew to initiate a manual scram. A SULCV failure will complicate RPV level control post-scram.

Following the scram, a leak will develop in the torus, requiring the crew to enter T-103 "Secondary Containment Control" and T-102 "Primary Containment Control". A failure of the turbine bypass jack will require the crew to use alternate methods to depressurize the reactor in accordance with T-101 "RPV Control". Torus level will continue to lower to the point where the crew will be required to perform T-112 "Emergency Blowdown".

Initial Conditions Turnover

IC-91, 5% power

See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*	Event Description
1		N PRO CRS	Secure drywell purge
2		R URO CRS	Power ascension with control rods
3		C TS URO PRO CRS	Drifting control rod (Tech Spec)
4		C PRO CRS	Drywell chiller trip / place standby chiller in service
5		TS CRS	ARI power supply failure (Tech Spec)
6		I URO CRS	APRM trip with auto scram failure / manual reactor scram
7		M ALL	Torus leak into secondary containment / emergency blowdown
8		I URO CRS	Startup level control valve (LCV-8091) failure
9		C PRO CRS	Turbine bypass jack fails (prevents rapid depressurization to the main condenser)

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

Scenario Outline

ES-D-1

Simulation Facility	<u>Peach Bottom</u>	Scenario No.	<u>#2 (new)</u>	Op Test No.	<u>2009 NRC</u>
Examiners	_____	Operators	_____	CRS (SRO)	
	_____		_____	URO (ATC)	
	_____		_____	PRO (BOP)	
Scenario Summary	<p>The scenario begins with the reactor at 100% power. After taking the shift the crew is required to verify operability of the Startup Source load tap changer due to an earlier thunderstorm. Shortly after this, the running CRD pump will trip, requiring the crew to execute ON-107 "Loss of CRD Regulating Function" and place the standby CRD pump in service. Additional thunderstorms in the area will result in a loss of the SBO line, which will require the CRS to enter and evaluate the TRM.</p> <p>Following this, the 'D' SRV will inadvertently open, requiring the crew to take actions to close the valve in accordance with OT-114 "Inadvertent Opening of a Relief Valve". Power will be reduced in accordance with GP-9-2 "Fast Power Reduction", and the crew will be successful in closing the SRV by lowering reactor pressure in accordance with OT-114.</p> <p>Next, a sustained loss of Stator Cooling will occur, requiring the crew to scram the reactor. An ATWS (electrical) will require the crew to execute T-101 "RPV Control" and T-117 "Level/Power Control". The main turbine will trip several minutes into this event as a result of the loss of Stator Cooling, complicating the crew's efforts to respond to the ATWS and challenging Primary Containment due to SRV actuation. When SBLC is initiated, RWCU will fail to automatically isolate, requiring the crew to manually isolate RWCU. In addition, the crew will not be able to restore normal instrument nitrogen, which will require aligning a backup source of nitrogen to the SRVs to ensure they are available for reactor pressure control. After RPV level has been lowered to control power, the ATWS will be terminated using T-214 "Venting the Scram Air Header".</p>				
Initial Conditions	IC-92, 100% power				
Turnover	See Attached "Shift Turnover" Sheet				

Event No.	Malfunction No.	Event Type*	Event Description
1		N PRO CRS	Verify operability of Startup Source load tap changer
2		C URO CRS	CRD pump trip / place standby CRD pump in service
3		TS CRS	SBO line failure (TRM)
4		C PRO TS CRS	SRV inadvertently opens (Tech Spec) / maximize torus cooling
5		R URO CRS	Fast power reduction / pressure reduction due to SRV failure
6		M ALL	Loss of stator cooling water / scram (electric ATWS)
7		I URO CRS	RWCU fails to isolate on SBLC initiation / manually isolate RWCU
8		C PRO CRS	Unable to restore drywell instrument nitrogen / place alternate instrument nitrogen system(s) in service

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

Scenario Outline

ES-D-1

Simulation Facility Peach Bottom

Scenario No. #3 (modified)

Op Test No. 2009 NRC

Examiners _____

Operators _____ CRS (SRO)
_____ URO (ATC)
_____ PRO (BOP)

Scenario Summary

The scenario begins with the reactor at approximately 88% power. Following shift turnover, the crew will perform ST-O-001-200-2 "Turbine Stop Valve Closure and EOC-RPT Functional Test". An RPS failure during the test will require the crew to make a Tech Spec declaration. Next, the running Service Water pump will trip on overcurrent, requiring the crew to place the standby pump in service using the system operating procedure. Following this, a drywell pressure instrument will fail upscale without causing the expected half scram. The crew will apply Tech Specs and (with time-compression) insert a half scram IAW GP-25 "Installation of Trips/Isolations to Satisfy Tech Spec/TRM Requirements". When this is complete, the 'A' Condensate pump will trip without the expected Recirc System runback. Power must be manually reduced using recirc flow to prevent a low-level scram.

When conditions have stabilized, #2 Auxiliary Bus will trip on overcurrent, causing a loss of the remaining Condensate pumps. An RPS failure will prevent the automatic and manual scrams, requiring entry into T-101 "RPV Control" and the use of Alternate Rod Insertion (ARI) to shutdown the reactor. HPCI will trip shortly after it starts and will not be recoverable. A small reactor coolant leak inside the drywell will be greater than the capacity of RCIC (the only remaining high-pressure feed source) and require the use of containment sprays. The crew should enter T-111 "Level Restoration" and T-102 "Primary Containment Control". A failure of the RCIC flow controller will complicate efforts to feed with RCIC and require the operator to transfer RCIC control to manual. A containment spray logic failure will complicate the crew's efforts to spray containment; the other loop of RHR will be available and should be used to spray containment. As level deteriorates, the crew should start available low pressure ECCS pumps and when it is determined that level cannot be restored and maintained above -172 inches, the reactor should be depressurized in accordance with T-112 "Emergency Blowdown". Low pressure ECCS will be available to recover reactor level.

Initial Conditions Turnover

IC-93, 88% power

See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*	Event Description
1		N TS PRO CRS	Main Turbine stop valve functional test / RPS failure (Tech Spec)
2		C URO CRS	Service Water pump trip / manual start of the standby pump
3		I TS PRO CRS	Drywell pressure instrument fails upscale without the expected half scram (Tech Spec) / insert half scram IAW GP-25
4		R URO CRS	Condensate pump trip with recirc runback failure / power reduction
5		M ALL	Loss of #2 auxiliary bus / loss of condensate & feedwater / reactor coolant leak inside the drywell
6		C URO CRS	RPS failure requires ARI to scram the reactor
7		I URO CRS	HPCI trip / RCIC flow controller fails in automatic (transfer to manual control)
8		I PRO CRS	Containment spray logic failure hampers effort to spray the containment, requiring crew to use alternate RHR loop

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