

Facility Name: Peach Bottom														Date of Exam: 01/31/2011				
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	4	4	3	N/A			3	3	N/A			3	20	4		3	7
	2	1	1	1				2	1				1	7	2	1	3	
	Tier Totals	5	5	4				5	4				4	27	6	4	10	
2. Plant Systems	1	3	2	3	3	2	2	2	2	3	2	2	26	3		2	5	
	2	1	1	1	1	2	1	1	1	1	1	1	12	0	2	1	3	
	Tier Totals	4	3	4	4	4	3	3	3	4	3	3	38	5		3	8	
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4	7
					3		2		3		2			2	2	2	1	

- 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 4						Limiting cycle oscillation: Plant-Specific	2.5	1
295003 Partial or Complete Loss of AC / 6			0 6				Containment isolation	3.7	1
295004 Partial or Total Loss of DC Pwr / 6						02. 03	Knowledge of the design, procedural, and operational differences between units.	3.8	1
295005 Main Turbine Generator Trip / 3		0 3					Recirculation system	3.2	1
295006 SCRAM / 1		0 6					Reactor power	4.2	1
295016 Control Room Abandonment / 7				0 5			D.C. electrical distribution	2.8	1
295018 Partial or Total Loss of CCW / 8	0 1						Effects on component/system operations	3.5	1
295019 Partial or Total Loss of Inst. Air / 8						04. 50	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	4.2	1
295021 Loss of Shutdown Cooling / 4	0 2						Thermal stratification	3.3	1
295023 Refueling Acc / 8		0 3					Radiation monitoring equipment	3.4	1
295024 High Drywell Pressure / 5						04. 08	Knowledge of how abnormal operating procedures are used in conjunction with EOPs.	3.8	1
295025 High Reactor Pressure / 3					0 1		Reactor pressure	4.3	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 1		Drywell temperature	4.0	1
295030 Low Suppression Pool Wtr Lvl / 5		0 8					SRV discharge submergence	3.5	1
295031 Reactor Low Water Level / 2					0 4		Adequate core cooling	4.6	1
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1				0 4			SBLC	4.5	1
295038 High Off-site Release Rate / 9				0 1			Stack-gas monitoring system: Plant-Specific	3.9	1
600000 Plant Fire On Site / 8			0 4				Actions contained in the abnormal procedure for plant fire on site	2.8	1
700000 Generator Voltage and Electric Grid Disturbances / 6	0 2						Over-excitation	3.3	1
K/A Category Totals:	4	4	3	3	3	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 3						Loss of heat sink	3.6	1
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 4					Nitrogen makeup system: Plant-Specific	2.6	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						01. 23	Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.3	1
295015 Incomplete SCRAM / 1									0
295017 High Off-site Release Rate / 9									0
295020 Inadvertent Cont. Isolation / 5 & 7				0 2			Drywell ventilation/cooling system	3.2	1
295022 Loss of CRD Pumps / 1				0 4			Reactor water cleanup system: Plant-Specific	2.5	1
295029 High Suppression Pool Wtr Lvl / 5			0 2				Lowering suppression pool water level	3.6	1
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 1		Ventilation radiation levels	3.8	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:	1	1	1	2	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 9								Surveillance for all operable components	3.1	1	
205000 Shutdown Cooling		0 2										Motor operated valves	2.5	1	
206000 HPCI	1 2							0 7				Nuclear boiler instrumentation: BWR-2, 3, 4; Low suppression pool level: BWR-2, 3, 4	3.4; 3.4	2	
207000 Isolation (Emergency) Condenser														0	
209001 LPCS						0 4						D.C. power	2.8	1	
209002 HPCS														0	
211000 SLC			0 3								04. 46	Core plate differential pressure indication ; Ability to verify that the alarms are consistent with the plant conditions.	2.6; 4.2	2	
212000 RPS		0 1										RPS motor-generator sets	3.2	1	
215003 IRM						0 2						24/48 volt D.C. power: Plant-Specific	3.6	1	
215004 Source Range Monitor														0	
215005 APRM / LPRM								0 8	0 6			Control rod block status; Verification of proper functioning/ operability	3.7; 3.6	2	
217000 RCIC							0 3					Reactor water level	4.0	1	
218000 ADS					0 1							ADS logic operation	3.8	1	
223002 PCIS/Nuclear Steam Supply Shutoff	1 4											Containment drainage system	2.8	1	
239002 SRVs									0 2	01. 32		Tail pipe temperatures; Ability to explain and apply system limits and precautions.	3.6; 3.8	2	
259002 Reactor Water Level Control					0 1							GEMAC/Foxboro/Bailey controller operation: Plant-Specific	3.1	1	
261000 SGTS									0 2			Fan start	3.2	1	
262001 AC Electrical Distribution			0 1									Major system loads	3.5	1	
262002 UPS (AC/DC)	0 8											Containment isolation system: Plant-Specific	2.9	1	
263000 DC Electrical Distribution							0 1					Battery charging/discharging rate	2.5	1	
264000 EDGs								0 1	0 3			Parallel operation of emergency generator; Indicating lights, meters, and recorders	3.5; 3.4	2	
300000 Instrument Air			0 3	0 3								Cross-tied units; Securing of IAS upon loss of cooling water	2.9; 2.8	2	
400000 Component Cooling Water				0 1								Automatic start of standby pump	3.4	1	
														0	
K/A Category Totals:	3	2	3	3	2	2	2	2	3	2	2	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 3									Shutdown margin	3.2	1
201004 RSCS														0
201005 RCIS														0
201006 RWM							0 1					Power supply loss: P-Spec(Not-BWR6)	2.5	1
202001 Recirculation											01 27	Knowledge of system purpose and/or function.	3.9	1
202002 Recirculation Flow Control														0
204000 RWCU									0 3			Response to system isolations	3.6	1
214000 RPIS														0
215001 Traversing In-core Probe														0
215002 RBM														0
216000 Nuclear Boiler Inst.										0 1		Recorders	3.3	1
219000 RHR/LPCI: Torus/Pool Cooling Mode														0
223001 Primary CTMT and Aux.		0 9										Drywell cooling fans: Plant-Specific	2.7	1
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 5							Fuel orientation	3.0	1
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	1 6											Recirculation	3.1	1
268000 Radwaste														0
271000 Offgas														0
272000 Radiation Monitoring			0 2									Automatic actions to contain the radioactive release in the event that the predetermined release rates are exceeded	3.7	1
286000 Fire Protection						0 1						A.C. electrical distribution: Plant-Specific	3.1	1
288000 Plant Ventilation					0 2							Differential pressure control	3.2	1
290001 Secondary CTMT														0
290003 Control Room HVAC						0 4						Control room pressure	2.5	1
290002 Reactor Vessel Internals														0
														0
K/A Category Totals:	1	1	1	1	2	1	1	1	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 1		Power/flow map	3.8	1
295003 Partial or Complete Loss of AC / 6						02. 25	Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.	4.2	1
295004 Partial or Total Loss of DC Pwr / 6									0
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					0 5		System pressure	2.9	1
295019 Partial or Total Loss of Inst. Air / 8									0
295021 Loss of Shutdown Cooling / 4									0
295023 Refueling Acc / 8									0
295024 High Drywell Pressure / 5					0 8		Drywell radiation levels	4.0	1
295025 High Reactor Pressure / 3									0
295026 Suppression Pool High Water Temp. / 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
295027 High Containment Temperature / 5									0
295028 High Drywell Temperature / 5						04. 20	Knowledge of the operational implications of EOP warnings, cautions, and notes.	4.3	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					0 4		Suppression pool temperature	4.1	1
295038 High Off-site Release Rate / 9									0
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						04 11	Knowledge of abnormal condition procedures.	4.2	1
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 2		Drywell pressure	4.1	1
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
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 2		Equipment operability	3.2	1
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 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	
212000 RPS								0 4				Nuclear instrument system failure	3.7	1	
215003 IRM														0	
215004 Source Range Monitor														0	
215005 APRM / LPRM														0	
217000 RCIC														0	
218000 ADS								0 5				Loss of A.C. or D.C. power to ADS valves	3.6	1	
223002 PCIS/Nuclear Steam Supply Shutoff														0	
239002 SRVs														0	
259002 Reactor Water Level Control														0	
261000 SGTS											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.	4.1	1	
262001 AC Electrical Distribution											02. 22	Knowledge of limiting conditions for operations and safety limits.	4.7	1	
262002 UPS (AC/DC)														0	
263000 DC Electrical Distribution														0	
264000 EDGs														0	
300000 Instrument Air														0	
400000 Component Cooling Water								0 3				High/low CCW temperature	3.0	1	
														0	
K/A Category Totals:	0	0	0	0	0	0	0	3	0	0	2	Group Point Total:		5	

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											01.20	Ability to interpret and execute procedure steps.	4.6	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								1.7				Turbine trip: Plant-Specific	3.8	1
245000 Main Turbine Gen. / Aux.														0
256000 Reactor Condensate								1.7				Feedwater heater string trip: Plant-Specific	2.9	1
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														0
290003 Control Room HVAC														0
290002 Reactor Vessel Internals														0
														0
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: 01/31/2011				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1. 30	Ability to locate and operate components, including local controls.	4.4	1		
	2.1. 38	Knowledge of the station's requirements for verbal communications when implementing procedures.	3.7	1		
	2.1. 44	Knowledge of RO duties in the control room during fuel handling such as responding to alarms from the fuel handling area, communication with the fuel storage facility, systems operated from the control room in support of fueling operations, and supporting	3.9	1		
	2.1. 25	Ability to interpret reference materials, such as graphs, curves, tables, etc.			4.2	1
	2.1. 45	Ability to identify and interpret diverse indications to validate the response of another indicator.			4.3	1
	2.1.					
	Subtotal			3		2
2. Equipment Control	2.2. 38	Knowledge of conditions and limitations in the facility license.	3.6	1		
	2.2. 44	Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.	4.2	1		
	2.2. 01	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.			4.4	1
	2.2. 15	Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups, tag-outs, etc.			4.3	1
	2.2.					
	2.2.					
	Subtotal			2		2
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. 11	Ability to control radiation releases.	3.8	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. 14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.			3.8	1
	2.3.					
	Subtotal			3		2
4. Emergency Procedures / Plan	2.4. 27	Knowledge of "fire in the plant" procedures.	3.4	1		
	2.4. 31	Knowledge of annunciator alarms, indications, or response procedures.	4.2	1		
	2.4. 04	Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.			4.7	1
	2.4.					
	2.4.					
	2.4.					
	Subtotal			2		1
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO 1 / 1 Q #51	295028 EA2.04	This K/A is essentially the same as the one for Q #83 (295012 AA2.02). Replaced with K/A 295028 EA2.01.
RO 1 / 1 Q #55	295019 G2.4.50	Unable to construct a question for this K/A that meets the requirements of NUREG-1021 (there are no EOP warnings, cautions or notes relative to the Instrument Air System). Replaced with K/A 295019 G2.4.50.
RO 1 / 1 Q #56	295024 G2.2.36	This generic K/A is not a good fit for the High Drywell Pressure EPE. Replaced with K/A 295024 G2.4.8.
RO 1 / 1 Q #57	295005 AK2.09	This K/A is for BWR-2 plants and does not apply to Peach Bottom, which is a BWR-4. Replaced with K/A 295005 AK2.03.
RO 1 / 2 Q #64	295020 G2.1.7	Unable to construct a question for this K/A that meets the requirements of NUREG-1021 (cannot link this K/A to Inadvertent Containment Isolation). Replaced with K/A 295020 AA1.02 (Generic K/A's were over-sampled).
RO 1 / 2 Q #65	295012 G2.1.23	The High Drywell Temperature APE/EPE was over-sampled. Replaced with K/A 295014 G2.1.23.
RO 2 / 1 Q #15	400000 A2.01	This K/A is essentially the same as the one for Q #26 (400000 K4.01). Replaced with K/A 264000 A2.01 (400000 was over-sampled).
SRO 1 / 1 Q #78	295031 EA2.01	This K/A is very similar to the one for Q #52 (295031 EA2.04). Replaced with K/A 295037 EA2.04 (295031 was over-sampled).
SRO 1 / 1 Q #79	295001 G2.2.42	Unable to construct an SRO-only question for this K/A that meets the requirements of NUREG-1021 (system parameters that are entry level for Tech Specs is RO knowledge). Replaced with K/A 295001 AA2.01.
SRO 1 / 2 Q #84	295008 G2.1.30	Unable to construct an SRO-only question for this K/A that meets the requirements of NUREG-1021 and K/A is not tied to 10CFR55.43(b). Replaced with K/A 295008 G2.4.11.
SRO 1 / 2 Q #85	295033 G2.4.34	There are no RO tasks performed outside the Main Control Room associated with High Secondary Containment Radiation Levels. Replaced with K/A 295033 EA2.02 (Generic K/A's were over-sampled).
SRO 2 / 1 Q #86	300000 A2.01	Unable to construct an SRO-only question for this K/A that meets the requirements of NUREG-1021. In addition, System 300000 was already sampled on the RO section. Replaced with K/A 218000 A2.05.
SRO 2 / 1 Q #89	400000 G2.4.45	Unable to construct an SRO-only question for this K/A that meets the requirements of NUREG-1021. Replaced with K/A 400000 A2.03 (Generic K/A's were over-sampled).
SRO 2 / 2 Q #92	268000 G2.4.31	Unable to construct an SRO-only question for this K/A that meets the requirements of NUREG-1021 and K/A is not tied to 10CFR55.43(b). Replaced with K/A 241000 A2.17 (Generic K/A's were over-sampled).
SRO 2 / 2 Q #93	226001 G2.1.19	Unable to construct an SRO-only question for this K/A that meets the requirements of NUREG-1021 (SPDS is not used for "decision-making"). Replaced with K/A 226001 G2.1.20.

Facility: <u>Peach Bottom</u>		Date of Examination: <u>01/31/2011</u>
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: <u>2011 NRC</u>

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, R	2.1.45 - Manually Calculate Drywell Bulk Average Temperature (Alternate Path - Failed Temperature Points) [PLOR241C]
Conduct of Operations	D, R	2.1.25 - Perform RCS Leakage Test IAW ST-O-020-560 [PLOR244C]
Equipment Control		
Radiation Control	D, P, S (2008 NRC)	2.3.11 - PRO Duties for Liquid RadWaste Discharge [PLOR258C]
Emergency Plan	M, S	2.4.28 - Perform Personnel Notifications During a Security Threat [PLOR350C]

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: 01/31/2011Examination Level: RO ☐ SRO ☒Operating Test Number: 2011 NRC

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, R	2.1.18 - Identify and Specify Required Notifications per OP-AA-106-102 "Accidents Involving the Transportation of Rad Materials" Based on Completed Attachment 1 - Transportation Accident / Incident Form [PLOR351C]
Conduct of Operations	D, R	2.1.26 - Determine Electrical Safety Personal Protective Equipment For Racking Out A 4 KV Circuit Breaker [PLOR263C]
Equipment Control	D, R	2.2.23 - Tech Spec Action Log Entry [PLOR221C]
Radiation Control	D, R	2.3.4 - Review and Authorize an Emergency Exposure [PLOR249C]
Emergency Plan	D, R	2.4.41 - EAL Classification with State and Local Notification [PLOR232C]

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: 01/31/2011Exam Level: RO ☒ SRO-I ☐ SRO-U ☐Operating Test Number: 2011 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. 201003 A2.03 - Control Rod and Drive Mechanism - Respond to a Rod Drift (Alternate Path - Second Rod Drifts) [PLOR307CA] [Set 1]	A, D, EN, S	1
b. 259001 A4.02 - Reactor Feedwater System - Shutdown the "A" RFP Turbine (Alternate Path - Min Flow Valve Fails Closed) [PLOR303CA] [Set 2]	A, D, S	2
c. 218000 A4.03 - Automatic Depressurization System - ADS Reset Following Blowdown [PLOR023C] [Set 3]	D, EN, L, S	3
d. 206000 A3.07 - High Pressure Coolant Injection - Startup HPCI in CST-to-CST Mode (Alternate Path - Exhaust Diaphragm Rupture) [PLOR353CA] [Set 4]	A, EN, M, S	4
e. 219000 A4.13 - RHR/LPCI: Torus Cooling Mode - HPSW Injection into the Torus [PLOR081C] [Set 1]	D, EN, L, S	5
f. 262001 A4.01 - A.C. Electrical Distribution - Restoration of 4KV Buses from 2SUE (Alternate Path - 2SU-A Breaker Closes) [PLOR344CA] [Set 4]	A, D, S	6
g. 400000 A4.01 - Component Cooling Water System - ECW System Makeup to Tower Using a HPSW Pump [PLOR-270C] [Set 3]	M, S	8
h. 261000 A4.03 - Standby Gas Treatment System - Manually Start SGBT System [PLOR044C] [Set 2]	D, EN, S	9

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

i. 202001 A4.08 - Recirculation Flow Control System - Manual Operation of Scoop Tube Positioner (Alternate Path - Clutch Fails to Engage) [PLOR346PA]	A, E, M, R	1
j. 241000 A2.01 - Reactor/Turbine Pressure Regulating System - Swapping EHC System Pressure Regulators - Unit 3 (Alternate Path - Backup Pressure Regulator Instabilities) [PLOR334PA]	A, D, E, R	3
k. 295018 AA1.01 - Component Cooling Water System - Loss of RBCCW (Plant Actions for the Instrument Nitrogen System) [PLOR096P]	D, E, R	8

[@] 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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Facility: Peach BottomDate of Examination: 01/31/2011Exam Level: RO ☐ SRO-I ☒ SRO-U ☐Operating Test Number: 2011 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. 201003 A2.03 - Control Rod and Drive Mechanism - Respond to a Rod Drift (Alternate Path - Second Rod Drifts) [PLOR307CA] [Set 1]	A, D, EN, S	1
b. 259001 A4.02 - Reactor Feedwater System - Shutdown the "A" RFP Turbine (Alternate Path - Min Flow Valve Fails Closed) [PLOR303CA] [Set 2]	A, D, S	2
c. 218000 A4.03 - Automatic Depressurization System - ADS Reset Following Blowdown [PLOR023C] [Set 3]	D, EN, L, S	3
d. 206000 A3.07 - High Pressure Coolant Injection - Startup HPCI in CST-to-CST Mode (Alternate Path - Exhaust Diaphragm Rupture) [PLOR353CA] [Set 4]	A, EN, M, S	4
e. 219000 A4.13 - RHR/LPCI: Torus Cooling Mode - HPSW Injection into the Torus [PLOR081C] [Set 1]	D, EN, L, S	5
f. 262001 A4.01 - A.C. Electrical Distribution - Restoration of 4KV Buses from 2SUE (Alternate Path - 2SU-A Breaker Closes) [PLOR344CA] [Set 4]	A, D, S	6
g.		
h. 261000 A4.03 - Standby Gas Treatment System - Manually Start SBT System [PLOR044C] [Set 2]	D, EN, S	9

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

i. 202001 A4.08 - Recirculation Flow Control System - Manual Operation of Scoop Tube Positioner (Alternate Path - Clutch Fails to Engage) [PLOR346PA]	A, E, M, R	1
j. 241000 A2.01 - Reactor/Turbine Pressure Regulating System - Swapping EHC System Pressure Regulators - Unit 3 (Alternate Path - Backup Pressure Regulator Instabilities) [PLOR334PA]	A, D, E, R	3
k. 295018 AA1.01 - Component Cooling Water System - Loss of RBCCW (Plant Actions for the Instrument Nitrogen System) [PLOR096P]	D, E, R	8

[@] 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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Facility: Peach BottomDate of Examination: 01/31/2011Exam Level: RO ☐ SRO-I ☐ SRO-U ☒Operating Test Number: 2011 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. 259001 A4.02 - Reactor Feedwater System - Shutdown the "A" RFP Turbine (Alternate Path - Min Flow Valve Fails Closed) [PLOR303CA] [Set 2]	A, D, S	2
c.		
d. 206000 A3.07 - High Pressure Coolant Injection - Startup HPCI in CST-to-CST Mode (Alternate Path - Exhaust Diaphragm Rupture) [PLOR353CA] [Set 4]	A, EN, M, S	4
e. 219000 A4.13 - RHR/LPCI: Torus Cooling Mode - HPSW Injection into the Torus [PLOR081C] [Set 1]	D, EN, L, S	5
f.		
g.		
h.		

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

i. 202001 A4.08 - Recirculation Flow Control System - Manual Operation of Scoop Tube Positioner (Alternate Path - Clutch Fails to Engage) [PLOR346PA]	A, E, M, R	1
j.		
k. 295018 AA1.01 - Component Cooling Water System - Loss of RBCCW (Plant Actions for the Instrument Nitrogen System) [PLOR096P]	D, E, R	8

[@] 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	≤ 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	

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Scenario Outline

ES-D-1

Simulation Facility Peach Bottom

Scenario No. #1 (new)

Op Test No. 2011 NRC

Examiners _____

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

Scenario Summary

The scenario begins with the reactor at 100% power. After taking the shift, the crew will cross-tie 480V auxiliary load center 1PS4 with 3PS4 to allow for scheduled preventative maintenance on the 1PS4 breaker. Shortly after this, the running CRD pump will trip due to a clogged pump suction filter, requiring the crew to bypass the filter and restore a CRD pump to service in accordance with ON-107 "Loss of CRD Regulating Function". After CRD has been restored, a turbine stop valve will fail closed, requiring the crew to execute OT-102 "Reactor High Pressure", which will require reducing reactor power to less than or equal to 95% in accordance with GP-5 "Power Operations".

Next, a spurious HPCI initiation will occur due to a logic system failure. The crew should enter OT-104 "Positive Reactivity Insertion" and shutdown HPCI. This event will cause a steam leak from the HPCI system piping in the HPCI pump room, requiring the crew to enter and execute T-103 "Secondary Containment Control". All attempts to isolate HPCI will be unsuccessful due to logic system and control switch failures. The leak will gradually worsen, requiring a reactor scram and entry into T-101 "RPV Control". While performing scram actions, the PRO should recognize the generator lockout failure following the main turbine trip and manually open the generator output breakers and exciter field breaker. The URO should respond to the 'C' reactor feedpump discharge bypass valve failure by batch feeding through the 'C' reactor feedpump discharge valve.

Conditions will continue to deteriorate in the Reactor Building due to the HPCI steam leak. When the second Reactor Building area (Torus Room) exceeds its T-103 Action Level, the crew should perform a T-112 "Emergency Blowdown". The scenario will end when the RPV is depressurized and RPV level is being maintained between +5 to +35 inches with Condensate.

Initial Conditions Turnover

IC-81, 100% power

See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*	Event Description
1	See Scenario Guide	N PRO CRS	Cross-tie 480V auxiliary load center 1PS4 with 3PS4
2	See Scenario Guide	C URO TS CRS	Loss of CRD pump due to clogged pump suction filter / bypass filter and restore CRD pump to service (Tech Spec)
3	See Scenario Guide	R URO CRS	Turbine stop valve fails closed / power reduction
4	See Scenario Guide	C PRO TS CRS	Inadvertent HPCI initiation / shutdown HPCI (Tech Spec)
5	See Scenario Guide	M ALL	HPCI steam leak into secondary containment
6	See Scenario Guide	I PRO CRS	Generator lockout fails to occur following main turbine trip
7	See Scenario Guide	C URO CRS	'C' reactor feedpump discharge bypass valve fails to open, complicating post-scram and post-blowdown reactor level control
8	See Scenario Guide	ALL	Emergency blowdown due to exceeding Reactor Building temperature limits in more than one area

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

Scenario Outline

ES-D-1

Simulation Facility Peach Bottom

Scenario No. #2 (modified)

Op Test No. 2011 NRC

Examiners _____

Operators _____ CRS (SRO)

_____ URO (ATC)
_____ PRO (BOP)

Scenario Summary

The scenario begins with the reactor at 100% power. The turnover will direct the crew to perform the Master Trip Solenoid Valves Routine Test. Following this test, the operating TBCCW pump will trip and the standby pump will fail to automatically start, requiring the crew to manually start the standby TBCCW pump and restore the system in accordance with ON-118 "Loss of TBCCW". Next, an emergency service water pump will spuriously start, requiring the crew to remove the pump from service and apply Tech Specs for the inoperable ESW pump.

The 'A' recirc pump will then trip, requiring the crew to carry out the actions of OT-112 "Unexplained/ Unexpected Change in Core Flow", which includes inserting GP-9-2 "Fast Reactor Power Reduction" Table 1 control rods. The crew should also establish single loop operation per GP-5 "Power Operations" and consult Technical Specifications.

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".

Initial Conditions Turnover

IC-82, 100% power

See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*	Event Description
1	See Scenario Guide	N PRO CRS	Master trip solenoid valves routine test
2	See Scenario Guide	C URO CRS	TBCCW pump trip with failure of standby pump to auto-start
3	See Scenario Guide	I PRO TS CRS	ESW pump spurious start / shutdown ESW pump (Tech Spec)
4	See Scenario Guide	R URO TS CRS	Recirc pump trip / single loop (Tech Spec) / insert GP-9-2 Table 1 rods
5	See Scenario Guide	M ALL	Loss of stator cooling water / scram (electric ATWS)
6	See Scenario Guide	I URO CRS	RWCU fails to isolate on SBLC initiation / manually isolate RWCU
7	See Scenario Guide	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 (new)

Op Test No. 2011 NRC

Examiners _____

Operators _____ CRS (SRO)

URO (ATC)

PRO (BOP)

Scenario Summary

The scenario begins with the reactor at ~500 psig and ~5% power during a reactor startup. Following turnover, the crew will continue the reactor startup in accordance with GP-2 "Normal Plant Startup" by cycling the HPCI steam supply valve and raising recirc pump speeds to the 30% limiter. After these evolutions are complete, a radiation monitor will fail upscale and a drywell 18-inch vent damper will fail to isolate, requiring the crew to isolate the penetration and consult Tech Specs. Following this event, the crew will be required to swap RBCCW pumps due to a report from the field indicating excessive seal leakage from the running RBCCW pump.

A failure in the controller for the 'A' Recirc M-G set will cause the Recirc pump speed to oscillate. The crew should recognize the changes in core and jet pump flows and "lock up" the 'A' Recirc pump. Following this, the 'H' SRV will inadvertently open, requiring the crew to take actions to close the valve, and to maximize torus cooling, in accordance with OT-114 "Inadvertent Opening of a Relief Valve". The crew will not be successful in closing the SRV, and a rupture in the SRV downcomer will result in pressurizing the torus air space, challenging primary containment. The crew must execute OT-101 "High Drywell Pressure", T-101 "RPV Control" and T-102 "Primary Containment Control".

When the crew inserts a manual scram due to rising drywell pressure, reactor pressure will lower below 450 psig, which along with a high drywell pressure (2 psig) signal will cause low-pressure ECCS pumps to auto-start. The crew must manually secure the ECCS pumps to prevent overfilling the RPV. Attempts to spray the primary containment will fail due to multiple spray valve failures, requiring the crew to perform a T-112 "Emergency Blowdown" when the Pressure Suppression Pressure (PSP) Limit curve is exceeded. When drywell pressure exceeds Drywell Chilled Water (DWCW) System pressure, a DWCW piping break will occur that must be manually isolated per GP-8.B, "PCIS Isolation - Groups II and III" to eliminate a release pathway into the Turbine Building via DWCW piping. The scenario will be terminated after the RPV depressurization and DWCW isolation are performed.

Initial Conditions Turnover

IC-83, 5% power

See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*	Event Description
1	See Scenario Guide	N PRO CRS	Cycle HPCI steam supply per GP-2 "Normal Plant Startup"
2	See Scenario Guide	R URO CRS	Raise recirc pump speeds per GP-2 "Normal Plant Startup"
3	See Scenario Guide	I TS PRO CRS	Radiation monitor upscale failure with failure of drywell 18-inch vent damper to isolate (Tech Spec)
4	See Scenario Guide	C URO CRS	RBCCW pump swap due to excessive seal leakage on running pump
5	See Scenario Guide	C TS URO CRS	'A' Recirc pump speed oscillations (Tech Spec) / Lock up the 'A' Recirc pump
6	See Scenario Guide	C TS PRO CRS	SRV inadvertently opens (Tech Spec) / maximize torus cooling
7	See Scenario Guide	M ALL	Rupture in SRV downcomer / valve failures prevent containment spray
8	See Scenario Guide	C URO CRS	Drywell Chilled Water (DWCW) piping break / manually isolate DWCW
9	See Scenario Guide	ALL	Emergency blowdown due to exceeding the PSP curve

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

No ~~88~~

Scenario

#4 ???

WITHDRAWN

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FACELETT

Scenario Outline

ES-D-1

Simulation Facility Peach Bottom

Scenario No. #5 (modified)

Op Test No. 2011 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". A 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. A small Reactor coolant leak will occur in the drywell and require the use of containment sprays. The crew should enter T-102 "Primary Containment Control". 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. HPCI will trip shortly after drywell sprays are in-service and will not be recoverable. The reactor coolant leak inside the drywell will be greater than the capacity of RCIC (the only remaining high-pressure feed source). The crew should enter T-111 "Level Restoration". 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-85, 88% power

See Attached "Shift Turnover" Sheet

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

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