Facility Name: Peach Bottom Date of Exam: 03/25/2013

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

Q#	E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
52	295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4					04		Individual jet pump flows: Not-BWR-1&2	3.0	1
57	295003 Partial or Complete Loss of AC / 6					04		System lineups	3.5	1
56	295004 Partial or Total Loss of DC Pwr / 6						01.30	Ability to locate and operate components, including local controls.	4.4	1
49	295005 Main Turbine Generator Trip / 3				04			Main generator controls	2.7	1
50	295006 SCRAM / 1				03			Reactor/turbine pressure regulating system	3.7	1
45	295016 Control Room Abandonment / 7			01				Reactor SCRAM	4.1	1
43	295018 Partial or Total Loss of CCW / 8		02					Plant operations	3.4	1
53	295019 Partial or Total Loss of Inst. Air / 8					01		Instrument air system pressure	3.5	1
55	295021 Loss of Shutdown Cooling / 4						04.03	Ability to identify post-accident instrumentation.	3.7	1
47	295023 Refueling Acc / 8			03				Ventilation isolation	3.3	1
40	295024 High Drywell Pressure / 5	01						Drywell integrity: Plant-Specific	4.1	1
48	295025 High Reactor Pressure / 3				02			Reactor/turbine pressure regulating system	3.8	1
44	295026 Suppression Pool High Water Temp. / 5		06					Suppression pool level	3.5	1
	295027 High Containment Temperature / 5									0
42	295028 High Drywell Temperature / 5		01					Drywell spray: Mark-I&II	3.7	1
51	295030 Low Suppression Pool Wtr Lvl / 5					02		Suppression pool temperature	3.9	1
58	295031 Reactor Low Water Level / 2			04				Steam cooling	4.0	1
46	295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1			04				Hot shutdown boron weight: Plant-Specific	3.2	1
54	295038 High Off-site Release Rate / 9						04.06	Knowledge of EOP mitigation strategies.	3.7	1
41	600000 Plant Fire On Site / 8	02						Fire Fighting	2.9	1
39	700000 Generator Voltage and Electric Grid Disturbances / 6	02						Over-excitation	3.3	1
	K/A Category Totals:	3	3	4	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)								
Q#	E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
62	295002 Loss of Main Condenser Vac / 3				03			RPS	3.4	1
	295007 High Reactor Pressure / 3									0
	295008 High Reactor Water Level / 2									0
63	295009 Low Reactor Water Level / 2					03		Reactor water cleanup blowdown rate	2.9	1
64	295010 High Drywell Pressure / 5						04.47	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	4.2	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
65	295015 Incomplete SCRAM / 1						04.50	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	4.2	1
	295017 High Off-site Release Rate / 9									0
59	295020 Inadvertent Cont. Isolation / 5 & 7	01						Loss of normal heat sink	3.7	1
61	295022 Loss of CRD Pumps / 1			01				Reactor SCRAM	3.7	1
	295029 High Suppression Pool Wtr Lvl / 5									0
60	295032 High Secondary Containment Area Temperature / 5		04					PCIS/NSSSS	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

ES-401 BWR Examination Outline Form ES-401-1

Plant Systems - Tier 2/Group 1 (RO)

Q#	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	#
11	203000 RHR/LPCI: Injection Mode						10						Component cooling water systems	3.0	1
13	205000 Shutdown Cooling							06					Reactor temperatures (moderator, vessel, flange)	3.7	1
9	206000 HPCI					02							Turbine shaft sealing: BWR-2, 3, 4	2.8	1
	207000 Isolation (Emergency) Condenser														0
10	209001 LPCS					05							System venting	2.5	1
	209002 HPCS														0
4	211000 SLC		01										SBLC pumps	2.9	1
1, 22	212000 RPS	02										04. 35	Nuclear boiler instrumentation; Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.	3.7; 3.8	2
16, 24	215003 IRM							02	04				Reactor power indication response to rod position changes; Up scale or down scale trips	3.7; 3.7	2
	215004 Source Range Monitor														0
7	215005 APRM / LPRM				01								Rod withdrawal blocks	3.7	1
12, 23	217000 RCIC						03				11		Suppression pool water supply; Condensate storage tank level	3.5; 3.5	2
17	218000 ADS									08			Reactor pressure	4.2	1
2	223002 PCIS/Nuclear Steam Supply Shutoff	13											Traversing in-core probe system	2.7	1
3	239002 SRVs		01										SRV solenoids	2.8	1
20, 26	259002 Reactor Water Level Control								01		02		Loss of any number of main steam flow inputs; All individual component controllers in the automatic mode	3.3; 3.7	2
5	261000 SGTS			03									Primary containment pressure: Mark-I&II	3.2	1
15	262001 AC Electrical Distribution								09				Exceeding voltage limitations	3.1	1
8	262002 UPS (AC/DC)				01								Transfer from preferred power to alternate power supplies	3.1	1
14	263000 DC Electrical Distribution							01					Battery charging/discharging rate	2.5	1
18, 21	264000 EDGs									01		01. 27	Automatic starting of compressor and emergency generator; Knowledge of system purpose and/or function.	3; 3.9	2
19, 25	300000 Instrument Air	05									01		Main Steam Isolation Valve air; Pressure gauges	3.1; 2.6	2
6	400000 Component Cooling Water			01									Loads cooled by CCWS	2.9	1
															0
	K/A Category Totals:	3	2	2	2	2	2	3	3	2	3	2	Group Point Total:		26

ES-401	BWR Examination Outline Plant Systems - Tier 2/Group 2 (RO)												Form ES-401-1	
Q#	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	#
28	201001 CRD Hydraulic		03										Backup SCRAM valve solenoids	3.5	1
	201002 RMCS														0
	201003 Control Rod and Drive Mechanism														0
	201004 RSCS														0
	201005 RCIS														0
	201006 RWM														0
	202001 Recirculation														0
30	202002 Recirculation Flow Control				07								Minimum and maximum pump speed setpoints	2.9	1
	204000 RWCU														0
	214000 RPIS														0
	215001 Traversing In-core Probe														0
38	215002 RBM						01						RPS: BWR-3, 4, 5	3.0	1
	216000 Nuclear Boiler Inst.														0
	219000 RHR/LPCI: Torus/Pool Cooling Mode														0
37	223001 Primary CTMT and Aux.											04 49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls	4.6	1
	226001 RHR/LPCI: CTMT Spray Mode														0
36	230000 RHR/LPCI: Torus/Pool Spray Mode										09		Indicating lights and alarms	3.6	1
	233000 Fuel Pool Cooling/Cleanup														0
31	234000 Fuel Handling Equipment					03							Water as a shield against radiation	2.9	1
	239001 Main and Reheat Steam														0
	239003 MSIV Leakage Control														0
	241000 Reactor/Turbine Pressure Regulator														0
27	245000 Main Turbine Gen. / Aux.	08											Reactor/turbine pressure control system: Plant-Specific	3.4	1
	256000 Reactor Condensate														0
34	259001 Reactor Feedwater								01				Pump trip	3.7	1
29	268000 Radwaste			04									Drain sumps	2.7	1
33	271000 Offgas							08					System flow	3.1	1
	272000 Radiation Monitoring														0
	286000 Fire Protection														0
35	288000 Plant Ventilation									01			Isolation/initiation signals	3.8	1
	290001 Secondary CTMT														0
	290003 Control Room HVAC														0
32	290002 Reactor Vessel Internals						20						Main steam system	2.9	1
															0
	K/A Category Totals:	1	1	1	1	1	2	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)

Q#	E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
78	295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4					02		Neutron monitoring	3.2	1
	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									0
	295016 Control Room Abandonment / 7									0
82	295018 Partial or Total Loss of CCW / 8						02.40	Ability to apply Technical Specifications for a system.	4.7	1
80	295019 Partial or Total Loss of Inst. Air / 8						04.49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.4	1
79	295021 Loss of Shutdown Cooling / 4						04.31	Knowledge of annunciator alarms, indications, or response procedures.	4.1	1
76	295023 Refueling Acc / 8					02		Fuel pool level	3.7	1
81	295024 High Drywell Pressure / 5						04.46	Ability to verify that the alarms are consistent with the plant conditions.	4.2	1
	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									0
77	295030 Low Suppression Pool Wtr Lvl / 5					03		Reactor pressure	3.9	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
	K/A Category Totals:	0	0	0	0	3	4	Group Point Total:		7

ES-401 BWR Examination Outline Form ES-401-1

Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO)

Q#	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
83	295012 High Drywell Temperature / 5					01		Drywell temperature	3.9	1
	295013 High Suppression Pool Temp. / 5									0
	295014 Inadvertent Reactivity Addition / 1									0
85	295015 Incomplete SCRAM / 1						04.34	Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects	4.1	1
	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
	295034 Secondary Containment Ventilation High Radiation / 9									0
	295035 Secondary Containment High Differential Pressure / 5									0
84	295036 Secondary Containment High Sump/Area Water Level / 5						01.20	Ability to interpret and execute procedure steps.	4.6	1
	500000 High CTMT Hydrogen Conc. / 5									0
	K/A Category Totals:	0	0	0	0	1	2	Group Point Total:		3

ES-401 BWR Examination Outline Form ES-401-1

Plant Systems - Tier 2/Group 1 (SRO)

Q#	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
90	211000 SLC								04				Inadequate system flow	3.4	1
89	212000 RPS											04.50	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	4.0	1
88	215003 IRM											04.45	Ability to prioritize and interpret the significance of each annunciator or alarm.	4.3	1
	215004 Source Range Monitor														0
	215005 APRM / LPRM														0
	217000 RCIC														0
86	218000 ADS								02				Large break LOCA	3.6	1
	223002 PCIS/Nuclear Steam Supply Shutoff														0
	239002 SRVs														0
	259002 Reactor Water Level Control														0
	261000 SGTS														0
	262001 AC Electrical Distribution														0
	262002 UPS (AC/DC)														0
87	263000 DC Electrical Distribution								01				Grounds	3.2	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)

Q#	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														0
	230000 RHR/LPCI: Torus/Pool Spray Mode														0
	233000 Fuel Pool Cooling/Cleanup														0
92	234000 Fuel Handling Equipment					05							Fuel orientation	3.7	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														0
	268000 Radwaste														0
93	271000 Offgas											01.25	Ability to interpret reference materials, such as graphs, curves, tables, etc.	4.2	1
	272000 Radiation Monitoring														0
	286000 Fire Protection														0
91	288000 Plant Ventilation								02				Low reactor water level. Plant-Specific	3.6	1
	290001 Secondary CTMT														0
	290003 Control Room HVAC														0
	290002 Reactor Vessel Internals														0
															0
	K/A Category Totals:	0	0	0	0	1	0	0	1	0	0	1	Group Point Total:		3

Facility Name: Peach Bottom Date of Exam: 03/25/2013

Q#	Category	K/A #	Topic	RO IR	RO #	SRO-Only IR	SRO-Only #
94	1. Conduct of Operations	2.1. 40	Knowledge of refueling administrative requirements.			3.9	1
99		2.1. 32	Ability to explain and apply system limits and precautions.			4.0	1
66		2.1. 08	Ability to coordinate personnel activities outside the control room.	3.4	1		
67		2.1. 20	Ability to interpret and execute procedure steps.	4.6	1		
75		2.1. 13	Knowledge of facility requirements for controlling vital/controlled access.	2.5	1		
		2.1.					
		Subtotal			3		2
95	2. Equipment Control	2.2. 05	Knowledge of the process for making design or operating changes to the facility.			3.2	1
100		2.2. 14	Knowledge of the process for controlling equipment configuration or status.			4.3	1
68		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		
69		2.2. 18	Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.	2.6	1		
		2.2.					
		2.2.					
		Subtotal			2		2
96	3. Radiation Control	2.3. 04	Knowledge of radiation exposure limits under normal or emergency conditions.			3.7	1
98		2.3. 15	Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.			3.1	1
70		2.3. 14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.	3.4	1		
71		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.	3.4	1		
		2.3.					
		2.3.					
		Subtotal			2		2
97	4. Emergency Procedures / Plan	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
72		2.4. 18	Knowledge of the specific bases for EOPs.	3.3	1		
73		2.4. 22	Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	3.6	1		
74		2.4. 21	Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.	4.0	1		
		2.4.					
		2.4.					
		Subtotal			3		1
Tier 3 Point Total					10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO 2 / 1 Q#22	212000 2.4.3	PBAPS does not have RPS PAM instrumentation. (Replaced with 212000 2.4.35)
SRO 1 / 2 Q#84	295036 2.1.30	Unable to construct an SRO question for this K/A that meets the requirements of NUREG-1021 (Replaced with 295036 2.1.20)
SRO 2 / 1 Q#88	215003 2.4.35	Unable to construct an SRO question for this K/A that meets the requirements of NUREG-1021 (Replaced with 215003 2.4.45)
SRO 2 / 1 Q#90	205000 A2.11	Unable to construct an SRO question for this K/A that meets the requirements of NUREG-1021 (Replaced with 211000 A2.04)
SRO 2 / 1 Q#92	234000 2.4.4	Unable to construct an SRO question for this K/A that meets the requirements of NUREG-1021 (Replaced with 234000 K5.05)

Facility: Peach Bottom Date of Examination: 03/25/2013

Examination Level: RO ☒ SRO ☐ Operating Test Number: 2013 NRC

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, S	G2.1.29(4.1) - Lineup Standby Gas Treatment System For Automatic Operation - Alternate Path, Control Switches Are Out of Position (PLOR 337CA)
Conduct of Operations	N, R	G2.1.4 (3.3) - Recognize and Report License Medical Condition Challenge (NEW)
Equipment Control	N, R	G2.2.41 (3.5) - Isolating the 3B RBCCW Heat Exchanger Due to a Leak (NEW)
Radiation Control	D, S, P (2011 NRC)	G2.3.11(3.8) - Perform PRO Duties For A Liquid Radwaste Discharge (PLOR 258C)
Emergency Plan	N/A	Not Required

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 Bottom Date of Examination: 03/25/2013

Examination Level: RO ☐ SRO ☒ Operating Test Number: 2013 NRC

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, R	G2.1.34 (3.5) - Review And Evaluate Reactor Coolant System Chemistry Limits - Condenser Tube Leak at Power (PLOR-259C)
Conduct of Operations	D, R	G2.1.32 (4.0) - Evaluation Of High CRD Temperature On Control Rod Scram Time (PLOR 347CA)
Equipment Control	N, R	G2.2.40 (4.7) - Compensatory Actions for an Inoperable Fire Door (NEW)
Radiation Control	D, R	G2.3.13 (3.8) - Review And Approve Primary Containment Purge/Vent Isolation Valve Cumulative Hour Log (PLOR 256C)
Emergency Plan	D, R	G2.4.40 (4.5) - Make EAL Classification And State/Local Notifications For SITE AREA EMERGENCY - Loss of Two Fission Product Barriers (PLOR-230C)

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 Bottom Date of Examination: 03/25/2013

Exam Level: RO ☒ SRO-I ☐ SRO-U ☐ Operating Test Number: 2013 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. 233000 A2.02 (3.1/3.3) – Fuel Pool Cooling and Cleanup / HPSW Injection into the Fuel Pool (Alternate Path – HPSW Pump Overcurrent, Use Other Pump) (NEW)	A, L, N, S	9
b. 206000 A2.09 (3.5/3.7) - High Pressure Coolant Injection / Raise HPCI Flow (Alternate Path - Suction Valves Fail to Swap on Low Condensate Storage Tank Level) (PLOR-333CA)	A, D, EN, P, S	2
c. 239001 A4.01(4.2/4.0) - Main Steam System / Open Main Steam Isolation Valves After a Group-1 Isolation (PLOR-083C)	D, L, S	3
d. 209001 A4.04 (2.9/2.9) - Core Spray System / Perform Pump Capacity Test For IST (Alternate Path - Min Flow Valve Fails To Open) (PLOR-335CA)	A, D, EN, S	4
e. 223002 A4.03 (3.6/3.5) - Primary Containment Isolation System / Perform a Group 1 PCIS Isolation Reset (GP-8A) (PLOR-024C)	D, EN, L, S	5
f. 262001 A4.04 (3.6/3.7) – AC Distribution / Excite the Main Generator (PLOR-031C)	D, S	6
g. 212000 A4.14 (3.8/3.8) - Reactor Protection System / Reset a Full Scram (PLOR-004C)	D, EN, L, S	7
h. 400000 A4.01 (3.1/3.0) - Component Cooling Water / Verify Isolation Of Drywell Chilled Water And RBCCW (Alternate Path - RBCCW Is Supplying Drywell Chilled Water Loads)- (PLOR-310CA)	A, D, S	8
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. 217000 A4.07 (3.9/3.8) – Reactor Core Isolation Cooling / Defeat RCIC Interlocks IAW T-251-3 (PLOR157P)	D,E, R	2
j. 218000 K4.04 (3.5/3.6) – Bypass of SV-9130A and B IAW T-331-3 (NEW)	N, E, R	3
k. 286000 A4.06 (3.4/3.4) - Fire Protection System / Diesel Driven Fire Pump Manual Start (Alternate Path - Battery Status Lights Not Lit (PLOR-327PA)	A, D	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
(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 Bottom Date of Examination: 03/25/2013

Exam Level: RO ☐ SRO-I ☒ SRO-U ☐ Operating Test Number: 2013 NRC

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e. 223002 A4.03 (3.6/3.5) - Primary Containment Isolation System / Perform a Group 1 PCIS Isolation Reset (GP-8A) (PLOR-024C)	D, EN, L, S	5
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g. 212000 A4.14 (3.8/3.8) - Reactor Protection System / Reset a Full Scram (PLOR-004C)	D, EN, L, S	7
h. 400000 A4.01 (3.1/3.0) - Component Cooling Water / Verify Isolation Of Drywell Chilled Water And RBCCW (Alternate Path - RBCCW Is Supplying Drywell Chilled Water Loads)- (PLOR-310CA)	A, D, S	8
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j. 218000 K4.04 (3.5/3.6) – Bypass of SV-9130A and B IAW T-331-3 (NEW)	N, E, R	3
k. 286000 A4.06 (3.4/3.4) - Fire Protection System / Diesel Driven Fire Pump Manual Start (Alternate Path - Battery Status Lights Not Lit (PLOR-327PA)	A, D	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.
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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	

Facility: Peach Bottom Date of Examination: 03/25/2013

Exam Level: RO ☐ SRO-I ☐ SRO-U ☒ Operating Test Number: 2013 NRC

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h. 400000 A4.01 (3.1/3.0) - Component Cooling Water / Verify Isolation Of Drywell Chilled Water And RBCCW (Alternate Path - RBCCW Is Supplying Drywell Chilled Water Loads)- (PLOR-310CA)	A, D, S	8
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j. 218000 K4.04 (3.5/3.6) – Bypass of SV-9130A and B IAW T-331-3 (NEW)	N, E, R	3
k.		

@ 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	

Simulation Facility Peach Bottom **Scenario No.** #1 **Op Test No.** 2013 NRC

Examiners _____ **Operators** _____ CRS (SRO)

_____ _____ URO (ATC)

_____ _____ PRO (BOP)

Scenario Summary

The scenario begins with the reactor at 100% power.

Following shift turnover, the crew will stroke Main Steam Sample Valves AO-2-02-316 and 317 as part of a surveillance test for primary containment isolation valves. Shortly after stroking the valves, Reactor Building to Torus vacuum breaker isolation valve AO-2502A will fail partially open requiring the crew to declare the valve inoperable per Technical Specifications.

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".

Next 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. HPCI and RCIC will initiate on low RPV level. The HPCI system flow controller will fail in automatic and must be adjusted in manual to allow the system to inject. The HPCI system will trip shortly after it injects and will not be recoverable. 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 crew will not be able to spray containment with the initial loop of RHR selected. The other loop of RHR will be available and should be used to spray containment.

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. The scenario will be terminated when the reactor has been depressurized and reactor level has been recovered and controlled.

Initial Conditions IC-118, 100% power

Turnover See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1	See Scenario Guide	N	PRO CRS	Stroke time primary containment isolation valves for surveillance testing
2	See Scenario Guide	TS	CRS	Reactor Bldg to Torus vacuum breaker isolation valve fails open (Tech Spec)
3	See Scenario Guide	C	URO CRS	Service Water pump trip / manual start of the standby pump

Event No.	Malfunction No.	Event Type*		Event Description
4	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
5	See Scenario Guide	R	URO CRS	Condensate pump trip with recirc runback failure / power reduction
6	See Scenario Guide	M	ALL	Loss of #2 auxiliary bus / loss of condensate & feedwater / reactor coolant leak inside the drywell
7	See Scenario Guide	C	PRO CRS	HPCI controller fails in automatic
8	See Scenario Guide	C	URO CRS	RPS failure requires ARI to scram the reactor
9	See Scenario Guide	C	ALL	HPCI turbine trip, requiring an emergency blowdown to restore level with low-pressure ECCS
10	See Scenario Guide	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

Simulation Facility Peach Bottom **Scenario No.** #2 **Op Test No.** 2013 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 perform the Master Trip Solenoid Valve Routine Test.

Next, 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 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. The crew should verify compliance with Technical Specifications for recirc loop flow differentials.

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 with Condensate.

Initial Conditions IC-119, 100% power

Turnover See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1	See Scenario Guide	N	PRO CRS	Perform the master trip solenoid valve routine test
2	See Scenario Guide	R	URO CRS	Turbine stop valve fails closed / power reduction
3	See Scenario Guide	C TS	URO CRS	'A' Recirc pump speed oscillations (Tech Spec) / Lock up the 'A' Recirc pump
4	See Scenario Guide	C TS	PRO CRS	Inadvertent HPCI initiation / shutdown HPCI (Tech Spec)
5	See Scenario Guide	M	ALL	HPCI steam leak into secondary containment

Event No.	Malfunction No.	Event Type*	Event Description
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

Simulation Facility Peach Bottom **Scenario No.** #3 **Op Test No.** 2013 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 is required to swap operating TBCCW pumps for inspection of a noisy bearing on the 'A' TBCCW pump.

Next, an individual control rod drive scram accumulator will experience low pressure and alarm in the main control room. The crew will initiate corrective action but the accumulator pressure will remain low requiring the crew to declare the control rod slow or inoperable per Technical Specifications.

Shortly after this, the E-4 diesel generator will inadvertently start, requiring the crew to shutdown the E-4 diesel generator and apply Technical Specifications for an inoperable diesel generator.

The crew should then recognize and respond to lowering main condenser vacuum caused by a failure of the in service steam jet air ejector steam supply valve. The crew must enter OT-106 "Condenser Low Vacuum" and reduce reactor power in accordance with GP-9-2 "Fast Power Reduction".

Following the power reduction, a turbine lube oil malfunction will result in a high bearing temperature and vibration condition for the main turbine, requiring the crew to scram the reactor and trip the main turbine. A CRD hydraulic malfunction will result in a low-power ATWS, requiring the crew to execute T-101 "RPV Control" and T-117 "Level/Power Control." In addition, the scram discharge volume (SDV) will fail to completely isolate, requiring the crew to manually isolate the SDV.

When SBLC is initiated the SBLC pump will trip, requiring the URO to place the alternate SBLC pump in service. The second SBLC pump will trip shortly after being placed in service. A failure of the only available EHC pump will cause the turbine bypass valves to close, requiring the crew to utilize HPCI and/or SRVs for reactor pressure control. The crew should perform T-220 "Driving Control Rods During Failure to Scram" to insert control rods. The crew will need to adjust control rod drive water pressure in order to successfully insert the control rods. The scenario may be terminated when the crew has control of RPV power and level using T-240 "Termination and Prevention of Injection into the RPV" and the crew is inserting control rods.

Initial Conditions IC-120, 100% power

Turnover See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1	See Scenario Guide	N	PRO CRS	Swap operating TBCCW Pumps
2	See Scenario Guide	TS	CRS	Individual control rod drive scram accumulator low pressure (Tech Spec)
3	See Scenario Guide	I TS	PRO CRS	E4 diesel generator spurious start / diesel generator shutdown (Tech Spec)
4	See Scenario Guide	C	PRO	Failure of Steam Jet Air Ejector steam supply valve / re-open by placing additional valve air supply in service

Event No.	Malfunction No.	Event Type*		Event Description
5	See Scenario Guide	R	URO CRS	Fast reactor power reduction (w/ recirc)
6	See Scenario Guide	C	URO CRS	Main turbine high temperature and vibration / reactor scram
7	See Scenario Guide	M	ALL	ATWS (hydraulic) / turbine bypass valves fail closed
8	See Scenario Guide	C	URO CRS	Standby liquid control (SBLC) pump trips / start second SBLC pump /second pump trips
9	See Scenario Guide	C	PRO CRS	Two in-series scram discharge volume (SDV) vent valves fail to automatically isolate
10	See Scenario Guide	C	URO	Low CRD drive water pressure / adjust to drive control rods

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

Simulation Facility Peach Bottom **Scenario No.** #4 **Op Test No.** 2013 NRC

Examiners _____ **Operators** _____ CRS (SRO)

_____ _____ URO (ATC)

_____ _____ PRO (BOP)

Scenario Summary

The scenario begins with the reactor at approximately 6% 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 '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.

Following the ARI failure, 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 Tech Spec determination is made, while still executing ON-121, a second control rod will drift in, requiring the crew to perform an immediate reactor scram and enter T-100 "Scram". A subsequent trip of the 'C' reactor feed pump will complicate RPV level control post-scram.

While T-100 actions are in progress, a leak will develop in the torus, requiring the crew to enter T-103 "Secondary Containment Control" and T-102 "Primary Containment Control". When torus level reaches 12.5 feet, the crew will be directed to enter T-101 "RPV Control" and perform a depressurization.

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". The scenario may be terminated when the RPV is depressurized and HPSW is injecting into the torus.

Initial Conditions IC-121, 6% power

Turnover See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1	See Scenario Guide	N	PRO CRS	Secure drywell purge
2	See Scenario Guide	C	PRO CRS	Drywell chiller trip / place standby chiller in service
3	See Scenario Guide	TS	CRS	ARI power supply failure (Tech Spec)
4	See Scenario Guide	R	URO CRS	Power ascension with control rods
5	See Scenario Guide	C TS	URO PRO CRS	Drifting control rod (Tech Spec)

Event No.	Malfunction No.	Event Type*		Event Description
6	See Scenario Guide	C	ALL	2nd Drifting control rod, Manual Scram, T-100
7	See Scenario Guide	I	URO CRS	'C' reactor feed pump trip
8	See Scenario Guide	M	ALL	Torus leak into secondary containment / emergency blowdown
9	See Scenario Guide	C	PRO CRS	Turbine bypass jack fails, preventing rapid depressurization to the main condenser

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