Facility: Peach Bottom Printed: 12/21/2006

Date Of Exam: 02/05/2007

Tier	Group	RO K/A Category Points												SRO-Only Points				
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2			G*	Total
1. Emergency & Abnormal Plant Evolutions	1	3	3	4	N/A			3	4	N/A		3	20	0			0	0
	2	1	1	1				1	1			2	7	0			0	0
	Tier Totals	4	4	5				4	5			5	27	0			0	0
2. Plant Systems	1	2	2	3	3	3	2	1	3	3	2	2	26	0			0	0
	2	1	1	2	1	1	1	1	1	1	1	1	12	0	0		0	0
	Tier Totals	3	3	5	4	4	3	2	4	4	3	3	38	0			0	0
3. Generic Knowledge And Abilities Categories		1		2		3		4		10		1	2	3	4		0	
		2		3		3		2				0	0	0	0			

Note:

1. Ensure that at least two topics from every 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 ES-401, Attachment 2, 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.

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.

BWR RO Examination Outline

Printed: 12/21/2006

Facility: Peach Bottom

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1 (RO / SRO)** **Form ES-401-1**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic(s)	IR	#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4					X		AA2.02 - Neutron monitoring	3.1	1
295003 Partial or Complete Loss of AC Pwr / 6				X			AA1.04 - D.C. electrical distribution system	3.6	1
295004 Partial or Complete Loss of DC Pwr / 6		X					AK2.02 - Batteries	3.0	1
295005 Main Turbine Generator Trip / 3					X		AA2.05 - Reactor power	3.8	1
295006 SCRAM / 1			X				AK3.01 - Reactor water level response	3.8	1
295016 Control Room Abandonment / 7			X				AK3.01 - Reactor SCRAM	4.1*	1
295018 Partial or Total Loss of CCW / 8			X				AK3.03 - Securing individual components (prevent equipment damage)	3.1	1
295018 Partial or Total Loss of CCW / 8						X	2.1.14 - Knowledge of system status criteria which require the notification of plant personnel.	2.5	1
295019 Partial or Total Loss of Instrument Air / 8						X	2.1.28 - Knowledge of the purpose and function of major system components and controls.	3.2	1
295021 Loss of Shutdown Cooling / 4	X						AK1.01 - Decay heat	3.6	1
295023 Refueling Acc / 8				X			AA1.02 - Fuel pool cooling and cleanup system	2.9	1
295024 High Drywell Pressure / 5						X	2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	1
295025 High Reactor Pressure / 3	X						EK1.04 - Decay heat generation	3.6	1
295026 Suppression Pool High Water Temp. / 5		X					EK2.06 - Suppression pool level	3.5	1
295028 High Drywell Temperature / 5			X				EK3.02 - RPV flooding	3.5	1
295030 Low Suppression Pool Wtr Lvl / 5		X					EK2.09 - SPDS/ERIS/CRIDS/GDS: Plant-Specific	2.5	1
295031 Reactor Low Water Level / 2					X		EA2.03 - Reactor pressure	4.2*	1
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1	X						EK1.07 - Shutdown margin	3.4	1
295038 High Off-Site Release Rate / 9					X		EA2.01 - †Off-site	3.3*	1
600000 Plant Fire On Site / 8				X			AA1.08 - Fire fighting equipment used on each class of fire	2.6	1
K/A Category Totals:	**3**	**3**	**4**	**3**	**4**	**3**	**Group Point Total:**		**20**

BWR RO Examination Outline

Printed: 12/21/2006

Facility: Peach Bottom

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2 (RO / SRO)** **Form ES-401-1**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic(s)	IR	#
295008 High Reactor Water Level / 2						X	2.4.50 - Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.3	1
295009 Low Reactor Water Level / 2		X					AK2.03 - Recirculation system	3.1	1
295013 High Suppression Pool Temp. / 5					X		AA2.01 - Suppression pool temperature	3.8	1
295022 Loss of CRD Pumps / 1						X	2.1.23 - Ability to perform specific system and integrated plant procedures during different modes of plant operation.	3.9	1
295029 High Suppression Pool Wtr Lvl / 5				X			EA1.03 - RHR/LPCI	2.9	1
295032 High Secondary Containment Area Temperature / 5	X						EK1.01 - Personnel protection	3.6	1
295036 Secondary Containment High Sump/Area Water Level / 5			X				EK3.03 - Isolating affected systems	3.5	1
K/A Category Totals:	**1**	**1**	**1**	**1**	**1**	**2**	**Group Point Total:**		**7**

BWR RO Examination Outline

Printed: 12/21/2006

Facility: Peach Bottom

ES - 401 **Plant Systems - Tier 2 / Group 1 (RO / SRO)** **Form ES-401-1**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	IR	#
203000 RHR/LPCI: Injection Mode		X										K2.03 - Initiation logic	2.7*	1
205000 Shutdown Cooling				X								K4.03 - Low reactor water level: Plant-Specific	3.8	1
205000 Shutdown Cooling										X		A4.06 - Reactor water level	3.8	1
206000 HPCI								X				A2.16 - High drywell pressure: BWR-2, 3, 4	4.0	1
209001 LPCS							X					A1.05 - Torus/suppression pool water level	3.5	1
211000 SLC					X							K5.05 - Accumulator operation: Plant-Specific	2.5*	1
212000 RPS		X										K2.01 - RPS motor-generator sets	3.2	1
215003 IRM	X											K1.01 - RPS	3.9	1
215003 IRM											X	2.4.50 - Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.3	1
215005 APRM/LPRM			X									K3.03 - Reactor manual control system: Plant-Specific	3.3	1
215005 APRM/LPRM									X			A3.06 - Maximum disagreement between flow comparator channels: Plant-Specific	3.0	1
217000 RCIC	X											K1.03 - Suppression pool	3.6	1
217000 RCIC										X		A4.07 - Reactor pressure	3.9	1
218000 ADS					X							K5.01 - ADS logic operation	3.8	1
223002 PCIS/Nuclear Steam Supply Shutoff			X									K3.18 - Containment ventilation	3.0	1
223002 PCIS/Nuclear Steam Supply Shutoff											X	2.1.27 - Knowledge of system purpose and/or function.	2.8	1
239002 SRVs					X							K5.01 - Relief function of SRV operation	3.4	1
259002 Reactor Water Level Control			X									K3.04 - Recirculation system: Plant-Specific	2.9	1
261000 SGTS									X			A3.03 - Valve operation	3.0	1
262001 AC Electrical Distribution				X								K4.04 - Protective relaying	2.8	1
262002 UPS (AC/DC)				X								K4.01 - Transfer from preferred power to alternate power supplies	3.1	1

BWR RO Examination Outline

Printed: 12/21/2006

Facility: Peach Bottom

ES - 401 **Plant Systems - Tier 2 / Group 1 (RO / SRO)** **Form ES-401-1**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	IR	#
263000 DC Electrical Distribution						X						K6.01 - A.C. electrical distribution	3.2	1
263000 DC Electrical Distribution									X			A3.01 - Meters, dials, recorders, alarms, and indicating lights	3.2	1
264000 EDGs						X						K6.09 - D.C. power	3.3	1
300000 Instrument Air								X				A2.01 - Air dryer and filter malfunctions	2.9	1
400000 Component Cooling Water								X				A2.01 - Loss of CCW pump	3.3	1
K/A Category Totals:	**2**	**2**	**3**	**3**	**3**	**2**	**1**	**3**	**3**	**2**	**2**	**Group Point Total:**		**26**

BWR RO Examination Outline

Printed: 12/21/2006

Facility: Peach Bottom

ES - 401 **Plant Systems - Tier 2 / Group 2 (RO / SRO)** **Form ES-401-1**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	IR	#
201001 CRD Hydraulic											X	2.4.31 - Knowledge of annunciators alarms and indications, and use of the response instructions.	3.3	1
202001 Recirculation			X									K3.07 - Vessel bottom head drain temperature	2.9	1
204000 RWCU						X						K6.08 - PCIS/NSSSS	3.5	1
214000 RPIS	X											K1.04 - RMCS: Plant-Specific	3.2	1
215001 Traversing In-Core Probe									X			A3.03 - Valve operation: Not-BWR1	2.5*	1
216000 Nuclear Boiler Inst.			X									K3.14 - High pressure coolant injection: Plant-Specific	3.8	1
230000 RHR/LPCI: Torus/Pool Spray Mode										X		A4.12 - Suppression pool level	3.8	1
233000 Fuel Pool Cooling/Clean-up		X										K2.02 - RHR pumps	2.8*	1
241000 Reactor/Turbine Pressure Regulator					X							K5.03 - Reactor power vs. reactor pressure	3.5	1
245000 Main Turbine Generator/Aux							X					A1.03 - Turbine valve position	2.7	1
259001 Reactor Feedwater								X				A2.07 - Reactor water level control system malfunctions	3.7	1
286000 Fire Protection				X								K4.06 - Fire suppression capability that does not rely on the displacement of oxygen (Halon): Plant-Specific	3.4	1
K/A Category Totals:	1	1	2	1	1	1	1	1	1	1	1	**Group Point Total:**		12

Generic Knowledge and Abilities Outline (Tier 3)

BWR RO Examination Outline

Printed: 12/21/2006

Facility: Peach Bottom **Date of Exam:** **Form ES-401-3**

Category	KA #	Topic	IR	#
Conduct of Operations	2.1.1	Knowledge of conduct of operations requirements.	3.7	1
	2.1.20	Ability to execute procedure steps.	4.3	1
	Subtotal:			**2**
Equipment Control	2.2.24	Ability to analyze the affect of maintenance activities on LCO status.	2.6	1
	2.2.28	Knowledge of new and spent fuel movement procedures.	2.6	1
	2.2.34	Knowledge of the process for determining the internal and external effects on core reactivity.	2.8	1
	Subtotal:			**3**
Radiation Control	2.3.2	Knowledge of facility ALARA program.	2.5	1
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	2.5	1
	2.3.11	Ability to control radiation releases.	2.7	1
	Subtotal:			**3**
Emergency Plan	2.4.2	Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.	3.9	1
	2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm.	3.3	1
	Subtotal:			**2**

Tier 3 Point Total: **10**

Facility: Peach Bottom Printed: 12/21/2006

Date Of Exam: 02/05/2007

Tier	Group	RO K/A Category Points												SRO-Only Points		
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2	G*	Total
1. Emergency & Abnormal Plant Evolutions	1	0	0	0	N/A			0	0	N/A		0	0	4	3	7
	2	0	0	0				0	0			0	0	3	0	3
	Tier Totals	0	0	0				0	0			0	0	7	3	10
2. Plant Systems	1	0	0	0	0	0	0	0	0	0	0	0	0	3	2	5
	2	0	0	0	0	0	0	0	0	0	0	0	0	0 | 2	1	3
	Tier Totals	0	0	0	0	0	0	0	0	0	0	0	0	5	3	8
3. Generic Knowledge And Abilities Categories		1			2			3			4		0	1	2	3	4	7
		0			0			0			0			2	2	1	2	

Note:

1. Ensure that at least two topics from every 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 ES-401, Attachment 2, 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.

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.

BWR SRO Examination Outline

Printed: 12/21/2006

Facility: Peach Bottom

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1 (RO / SRO)** **Form ES-401-1**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic(s)	IR	#
295003 Partial or Complete Loss of AC Pwr / 6					X		AA2.02 - Reactor power, pressure, and level	4.3*	1
295004 Partial or Complete Loss of DC Pwr / 6					X		AA2.03 - Battery voltage	2.9	1
295018 Partial or Total Loss of CCW / 8					X		AA2.04 - System flow	2.9	1
295019 Partial or Total Loss of Instrument Air / 8					X		AA2.02 - Status of safety-related instrument air system loads (see AK2.1-AK2.19)	3.7	1
295023 Refueling Acc / 8						X	2.2.25 - Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.7	1
295026 Suppression Pool High Water Temp. / 5						X	2.4.30 - Knowledge of which events related to system operations/status should be reported to outside agencies.	3.6	1
295031 Reactor Low Water Level / 2						X	2.4.4 - Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**4**	**3**	**Group Point Total:**		**7**

BWR SRO Examination Outline

Printed: 12/21/2006

Facility: Peach Bottom

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2 (RO / SRO)** **Form ES-401-1**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic(s)	IR	#
5008 High Reactor Water Level / 2					X		AA2.01 - Reactor water level	3.9	1
295013 High Suppression Pool Temp. / 5					X		AA2.02 - Localized heating/stratification	3.5	1
295036 Secondary Containment High Sump/Area Water Level / 5					X		EA2.03 - Cause of the high water level	3.8	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**3**	**0**	**Group Point Total:**		**3**

BWR SRO Examination Outline

Printed: 12/21/2006

Facility: Peach Bottom

ES - 401 **Plant Systems - Tier 2 / Group 1 (RO / SRO)** **Form ES-401-1**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	IR	#
206000 HPCI								X				A2.09 - †Low condensate storage tank level: BWR-2, 3, 4	3.7	1
212000 RPS								X				A2.17 - Main steamline high radiation	4.2*	1
218000 ADS											X	2.1.33 - Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	4.0	1
259002 Reactor Water Level Control											X	2.2.22 - Knowledge of limiting conditions for operations and safety limits.	4.1	1
263000 DC Electrical Distribution								X				A2.02 - Loss of ventilation during charging	2.9	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**2**	**Group Point Total:**		**5**

BWR SRO Examination Outline

Printed: 12/21/2006

Facility: Peach Bottom

ES - 401 **Plant Systems - Tier 2 / Group 2 (RO / SRO)** **Form ES-401-1**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	IR	#
202002 Recirculation Flow Control								X				A2.07 - Loss of feedwater signal inputs: Plant-Specific	3.3	1
245000 Main Turbine Generator/Aux								X				A2.05 - Generator trip	3.8	1
290001 Secondary CTMT											X	2.1.32 - Ability to explain and apply system limits and precautions.	3.8	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**1**	**Group Point Total:**		**3**

Generic Knowledge and Abilities Outline (Tier 3)

BWR SRO Examination Outline

Printed: 12/21/2006

Facility: Peach Bottom **Date of Exam:** **Form ES-401-3**

Category	KA #	Topic	IR	#
Conduct of Operations	2.1.4	Knowledge of shift staffing requirements.	3.4	1
	2.1.6	Ability to supervise and assume a management role during plant transients and upset conditions.	4.3	1
	Subtotal:			**2**
Equipment Control	2.2.18	Knowledge of the process for managing maintenance activities during shutdown operations.	3.6	1
	2.2.29	Knowledge of SRO fuel handling responsibilities.	3.8	1
	Subtotal:			**2**
Radiation Control	2.3.1	Knowledge of 10 CFR 20 and related facility radiation control requirements.	3.0	1
	Subtotal:			**1**
Emergency Plan	2.4.22	Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	4.0	1
	2.4.33	Knowledge of the process used track inoperable alarms.	2.8	1
	Subtotal:			**2**

Tier 3 Point Total: 7

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO 2 / 1	262002 A1.02	Peach Bottom uses static inverters for uninterruptable power supplies, not motor-generators.
RO 2 / 2	290003 A3.02	At Peach Bottom, there is no direct association between the Control Room HVAC System and the Fire Protection System.
SRO 1 / 1	295024 A2.05	Peach Bottom has no direct indication or procedural guidance for determining suppression chamber air space temperature.
SRO 1 / 2	295008 G2.4.49	Unable to construct an SRO question for this KA that meets the requirements of NUREG-1023.
SRO 2 / 1	259002 G2.1.14	Unable to construct an SRO question for this KA that meets the requirements of NUREG-1023.
SRO 3	G2.3.2	This KA was already sampled on the RO portion of the exam. Unable to construct an additional question at the SRO level.

Facility: Peach Bottom Date of Examination: 2/5/2007

Examination Level: RO ☒ SRO ☐ Operating Test Number: 2007 NRC

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, P, R	G2.1.7 - Calculate Drywell Bulk Average Temperature [2005 NRC]
Conduct of Operations	N, R	G2.1.25 - Perform Reactor Coolant Leakage Surveillance [NEW]
Equipment Control	D, R	G2.2.11 - Prepare A Partial Procedure [PLOR-205C]
Radiation Control		
Emergency Plan	D, S	G2.4.43 - Perform Personnel Notifications During A Security Threat [PLOR-217C]

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: 2/5/2007

Examination Level: RO ☐ SRO ☒ | Operating Test Number: 2007 NRC

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, P, R	G2.1.4 - Evaluate Shift Staffing [2002 NRC]
Conduct of Operations	M, R	G2.1.7 - Evaluate A P1 Edit And Take Corrective Action For A Thermal Limit Violation [PLOR-218C]
Equipment Control	D, R	G2.2.11 - Prepare A Partial Procedure [PLOR-205C]
Radiation Control	N, R	G2.3.9 - Review And Approve Primary Containment Purge/Vent Isolation Valve Cummulative Hour Log [NEW]
Emergency Plan	M, R	G2.4.38 - Review And Authorize Issuance Of Thyroid Blocking Agent (KI) [PLOR-215C]

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: 2/5/2007

Exam Level: RO ☒ SRO-I ☐ SRO-U ☐ Operating Test Number: 2007 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 - Inject Boron Into RPV (Alternate Path - RWCU Fails To Isolate) [PLOR-301CA] - SET 1	A, D, S	1
b. 295031 EA1.02 - Manually Initiate HPCI (Alternate Path - Manual Initiation Pushbutton Fails To Operate) [PLOR-300CA] - SET 2	A, D, L, S	2
c. 218000 A4.03 - ADS Reset Following Blowdown [PLOR-023C / 2005 NRC] - SET 3	D, L, P, S	3
d. 209001 A4.04 - Perform Core Spray B Pump Capacity Test For IST (Alternate Path - Minimum Flow Valve Fails To Open) [NEW] - SET 4	A, N, S	4
e. 219000 A4.13 - HPSW Injection Into The Torus [PLOR-081C] - SET 1	D, S	5
f. 262001 A4.04 - Synchronize Turbine Generator Output With Grid At Minimum Load [PLOR-017C] - SET 4	D, S	6
g. 400000 G2.1.23 - Restore TBCCW Following Loss Of Both Pumps [PLOR-068C] - SET 3	D, S	8
h. 261000 A2.10 - PRO Scram Actions (Alternate Path - SBGT Fails To Automatically Initiate) [NEW] - SET 2	A, L, N, S	9
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. 201001 A2.09 - Low CRD Scram Air Header Pressure - Unit 3 (Alternate Path - Place Standby Regulator In Service) [PLOR-316PA / 2002 NRC]	A, D, E, P, R	1
j. 295031 EA1.05 - Defeat RCIC Low Pressure Isolation - Unit 3 [PLOR-086P]	D, E, R	2
k. 264000 A2.10 - Diesel Generator Air Start Solenoid Override [PLOR-049P]	D, E	6

@ 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
(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: 2/5/2007

Exam Level: RO ☐ SRO-I ☒ SRO-U ☐ | Operating Test Number: 2007 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 - Inject Boron Into RPV (Alternate Path - RWCU Fails To Isolate) [PLOR-301CA] - SET 1	A, D, S	1
b. 295031 EA1.02 - Manually Initiate HPCI (Alternate Path - Manual Initiation Pushbutton Fails To Operate) [PLOR-300CA] - SET 2	A, D, L, S	2
c. 218000 A4.03 - ADS Reset Following Blowdown [PLOR-023C / 2005 NRC] - SET 3	D, L, P, S	3
d. 209001 A4.04 - Perform Core Spray B Pump Capacity Test For IST (Alternate Path - Minimum Flow Valve Fails To Open) [NEW] - SET 4	A, N, S	4
e. 219000 A4.13 - HPSW Injection Into The Torus [PLOR-081C] - SET 1	D, S	5
f.		
g. 400000 G2.1.23 - Restore TBCCW Following Loss Of Both Pumps [PLOR-068C] - SET 3	D, S	8
h. 261000 A2.10 - PRO Scram Actions (Alternate Path - SBGT Fails To Automatically Initiate) [NEW] - SET 2	A, L, N, S	9
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. 201001 A2.09 - Low CRD Scram Air Header Pressure - Unit 3 (Alternate Path - Place Standby Regulator In Service) [PLOR-316PA / 2002 NRC]	A, D, E, P, R	1
j. 295031 EA1.05 - Defeat RCIC Low Pressure Isolation - Unit 3 [PLOR-086P]	D, E, R	2
k. 264000 A2.10 - Diesel Generator Air Start Solenoid Override [PLOR-049P]	D, E	6

@ 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
(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: 2/5/2007

Exam Level: RO ☐ SRO-I ☐ SRO-U ☒ | Operating Test Number: 2007 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.		
b. 295031 EA1.02 - Manually Initiate HPCI (Alternate Path - Manual Initiation Pushbutton Fails To Operate) [PLOR-300CA] - SET 2	A, D, L, S ESF	2
c. 218000 A4.03 - ADS Reset Following Blowdown [PLOR-023C / 2005 NRC] - SET 3	D, L, P, S ESF	3
d. 209001 A4.04 - Perform Core Spray B Pump Capacity Test For IST (Alternate Path - Minimum Flow Valve Fails To Open) [NEW] - SET 4	A, N, S ESF	4
e.		
f.		
g.		
h.		
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. 201001 A2.09 - Low CRD Scram Air Header Pressure - Unit 3 (Alternate Path - Place Standby Regulator In Service) [PLOR-316PA / 2002 NRC]	A, D, E, P, R	1
j.		
k. 264000 A2.10 - Diesel Generator Air Start Solenoid Override [PLOR-049P]	D, E	6

@ 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
(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.** 2007 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 should continue with the reactor startup, pulling control rods in accordance with the approved startup sequence. A control rod will drift out, requiring the crew to execute ON-121 "Drifting Control Rod" and declare the affected control rod inoperable.

Following the control rod drift, the crew should secure drywell purge in preparation for inerting the drywell. Once drywell purge is secured, an inadvertent RCIC initiation will occur, requiring the crew to perform a RCIC shutdown and declare it inoperable. This event will be followed by a failure of the in-service CRD flow control valve, which will require the crew to enter ON-107 "Loss of CRD Regulating Function" and shift to the alternate flow control valve.

Next, a Recirc system leak will develop in the drywell requiring entry into OT-101 "High Drywell Pressure". The crew should take actions for the rising drywell pressure and should manually scram the reactor and enter T-100 "Scram". During the scram, seven rods will fail to insert resulting in an ATWS. When drywell pressure reaches 2 psig, the crew should enter T-101 "RPV Control" and T-102 "Primary Containment Control". Multiple failures of drywell spray valves will prevent spraying the drywell, requiring the crew to perform T-112 "Emergency Blowdown" when drywell temperature cannot be restored and maintained below 281 degrees F. With several rods stuck out, the crew should terminate and prevent injection in accordance with T-240 prior to the emergency depressurization.

Initial Conditions IC-70, 5% power

Turnover See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1		R	URO CRS	Power ascension with control rods
2		C TS	ALL	Control rod drifts out
3		N	PRO CRS	Secure drywell purge
4		TS	CRS	Inadvertent RCIC initiation
5		C	URO CRS	CRD flow control valve failure
6		M	ALL	Recirculation system leak in the drywell
7		C	URO CRS	Seven rods stick full out during the scram
8		C	PRO CRS	Drywell spray valve failures – prevents drywell spray

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

Simulation Facility Peach Bottom **Scenario No.** #2 **Op Test No.** 2007 NRC

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

_____ _____ URO (ATC)

_____ _____ PRO (BOP)

Scenario Summary The scenario begins with the reactor at 41% power and a plant shutdown in progress. The crew will lower reactor power using reactor recirculation flow and at approximately 35% power the crew will secure a condensate pump. Following the condensate pump shutdown, MCC E-324-D-A will de-energize, resulting in loss of power to the E-3 diesel generator auxiliaries and an inoperable diesel generator.

This will be followed by a trip of the 'B' recirc pump due to a failed RPT breaker. The crew should carry out the actions of OT-112 "Unexplained/Unexpected Change in Core Flow", which includes consulting Technical Specifications. A loss of offsite power will occur next, requiring entry into SE-11 "Loss of Off-Site Power". The crew should stabilize plant parameters using T-100 "Scram" and should recognize and respond to a failure of the HPCI flow controller to operate in automatic. The E-2 diesel generator output breaker will fail to automatically close, the E-4 diesel generator will fail to automatically start, and the E-3 diesel generator will not start at all. The crew should manually close the E-2 diesel generator output breaker and manually start the E-4 diesel generator using the quick-start pushbutton.

Following this event, a steam leak will develop in the drywell, requiring the crew to execute T-101 "RPV Control" and T-102 "Primary Containment Control."

Initial Conditions IC-71, 41% power

Turnover See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1		R	URO CRS	Lower reactor power with reactor recirculation flow
2		N	PRO CRS	Secure a condensate pump
3		TS	CRS	Loss of MCC E324-D-A / E-3 diesel generator auxiliaries
4		C TS	URO CRS	Recirc RPT breaker trip
5		M	ALL	Loss of off-site power
6		C	PRO CRS	E-2 diesel generator breaker fails to auto close E-3 diesel generator fails to start (auto and manual) E-4 diesel generator fails to auto start
7		I	URO CRS	HPCI flow controller fails in automatic
8		M	ALL	Steam leak in the drywell

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

Simulation Facility Peach Bottom **Scenario No.** #3 **Op Test No.** 2007 NRC

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

_____ _____ URO (ATC)

_____ _____ PRO (BOP)

Scenario Summary The scenario begins with the reactor at 100% power. The 2B EHC Pump is blocked out of service for filter replacement. Following shift turnover, the crew should transfer RPS bus 'B' to the alternate supply to facilitate repairs for a failed trip coil on the 'B' RPS bus feeder breaker. The failed 'B' RPS feeder breaker will already be inoperable when the crew takes the shift.

Following the RPS bus transfer, the RCIC 250 VDC bus will de-energize, rendering RCIC inoperable and requiring a Tech Spec entry. Next, the running RBCCW pump will trip and the standby pump will fail to start, resulting in a complete loss of RBCCW. The crew should reduce RBCCW loads (e.g. RWCU) and reactor power as directed by ON-113 "Loss of RBCCW."

The crew should perform a GP-4 manual scram due to the inability to restore RBCCW to the recirculation pump motors. An ATWS will occur requiring the crew to execute T-101 "RPV Control" and T-117 "Level/Power Control." Shortly after SLC is initiated the SLC pump will trip, requiring the URO to place the alternate SLC pump in service. A drywell vent valve will fail to isolate on low RPV level and the PRO should manually isolate the valve.

A failure of the only available EHC pump will cause the turbine to trip and the turbine bypass valves to close, requiring the crew to utilize SRVs for reactor pressure control. The crew should perform T-216 "Control Rod Insertion By Manual Scram or Individual Scram Test Switches" to bypass ARI and RPS, drain the scram discharge volume and initiate another scram.

Initial Conditions IC-72, 100% power

Turnover See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1		N TS	ALL	Transfer RPS bus to alternate supply (failed trip coil on 'B' RPS feeder breaker)
2		TS	CRS	RCIC 250 VDC bus failure
3		C	URO CRS	Loss of RBCCW
4		R	URO CRS	Reduce reactor power
5		M	ALL	ATWS (hydraulic)
6		C	URO CRS	Standby liquid control pump trips
7		I	PRO CRS	Drywell vent valve (AO-2509) fails to isolate
8		C	PRO CRS	'A' EHC pump trips / loss of turbine bypass valves

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

Simulation Facility Peach Bottom **Scenario No.** #4 **Op Test No.** 2007 NRC

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

_____ _____ URO (ATC)

_____ _____ PRO (BOP)

Scenario Summary The scenario begins with the plant at 76% power and the 'B' RHR pump blocked for motor replacement. Following turnover the crew will perform a main turbine master trip solenoid valves routine test. Following this test, the SBO line will fail, requiring a Tech Spec (TRM) entry. A loss of feedwater heaters will require the crew to respond to a positive reactivity addition and reduce reactor power to ensure thermal limits are not exceeded. The crew will then receive an RPS half scram due to a failed low vacuum pressure transmitter (blown fuse). This will require a Tech Spec entry. Troubleshooting and repairs will be time-compressed, allowing the crew to reset the half scram.

After RPS is reset, a steam leak will develop in the Turbine Building. As the steam leak grows in magnitude, the crew should recognize the need to shutdown the plant. During the manual scram, a reactor mode switch failure will require the crew to use the manual pushbuttons or Alternate Rod Insertion (ARI) to terminate the ATWS.

A failure of the Group I isolation will require a manual isolation but the 'D' MSL will fail to isolate. The crew should enter T-104 "Radioactive Release" to evaluate and control the release. The inability to restore instrument nitrogen to the SRVs will result in a loss of all non-ADS SRVs.

When the release exceeds the General Emergency level, the crew should perform an Emergency Blowdown in accordance with T-112 "Emergency Blowdown."

Initial Conditions IC-73, 76% power

Turnover See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1		N	PRO CRS	Perform the main turbine master trip solenoid valves routine test
2		TS	CRS	SBO line failure (TRM)
3		C	URO CRS	Loss of extraction steam to feedwater heaters / power reduction
4		I TS	URO CRS	Failure of a vacuum transmitter / RPS half scram & reset
5		M	ALL	Steam leak in the turbine building
6		I	URO CRS	Reactor mode switch failure (manual scram / ARI work)
7		C	PRO CRS	Group I failure to auto isolate / failure of the 'D' MSL to manually isolate
8		C	PRO CRS	Unable to restore drywell nitrogen / only ADS SRVs available for pressure control / depressurization

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