Facility:	Peach Bottom ILT 13-1 2015 NRC Exam	Date of Exam:	03/23/15

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 & Plant Evolutions	1	3	4	3				4	3			3	20	2		5	7
	2	1	1	2				1	1			1	7	1		2	3
	Tier Totals	4	5	5				5	4			4	27	3		7	10
2. Plant Systems	1	3	2	3	2	3	2	2	3	2	2	2	26	3		2	5
	2	1	1	1	0	3	1	1	1	1	1	1	12	0	1	2	3
	Tier Totals	4	3	4	2	6	3	3	4	3	3	3	38	4		4	8
3. Generic Knowledge & Abilities Categories		1			2			3			4		10	1	2	3	4	7
		3			3			2			2			2	1	2	2	

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to section D.1.b of ES-401, for guidance regarding 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 KAs 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/A's
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) 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 10CFR55.43

ILT 13-1 2015 NRC Exam
Written Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
295016 Control Room Abandonment / 7						X	2.2.14 –Knowledge of the process for controlling equipment configuration or status.	4.3	76
295020 Inadvertent Containment Isolation / 5					X		AA2.04 - Ability to determine and/or interpret the following as they apply to INADVERTENT CONTAINMENT ISOLATION :Reactor Pressure	3.9	77
295031 Reactor Low Water Level / 2					X		EA2.04 - Ability to determine and/or interpret the following as they apply to REACTOR LOW WATER LEVEL : Adequate core cooling	4.8	78
295030 Low Suppression Pool Water Level / 5						X	2.2.18 –Knowledge of the process for managing maintenance activities during shut down operations, such as risk assessments, work prioritization, etc. .	3.9	79
295019 Partial or Total Loss of Inst. Air / 8						X	2.1.20 - Conduct of Operations: Ability to interpret and execute procedure steps.	4.6	80
295003 Partial or Complete Loss of AC / 6						X	2.1.2 - Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.	4.4	81
295018 Partial or Total Loss of CCW / 8						X	2.1.19 - Conduct of Operations: Ability to use plant computers to evaluate system or component status.	3.8	82
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4	X						AK1.02 - Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION : Power/flow distribution	3.3	39
295018 Partial or Complete Loss of Component Cooling Water /8	X						AK1.01 - Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER :Effects on component/system operations	3.5	40
295031 Reactor Low Water Level / 2	X						EK1.02 - Knowledge of the operational implications of the following concepts as they apply to REACTOR LOW WATER LEVEL : Natural circulation: Plant-Specific	3.8	41
295037 SCRAM Conditions Present and Reactor Power Above APRM Downscale or Unknown / 1		X					EK2.09 - Knowledge of the interrelations between SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN and the following: Reactor water level	4.0	42
295005 Main Turbine Generator Trip / 3		X					AK2.02 - Knowledge of the interrelations between MAIN TURBINE GENERATOR TRIP and the following: Feedwater temperature	2.9	43
295024 High Drywell Pressure / 5		X					EK2.09 - Knowledge of the interrelations between HIGH DRYWELL PRESSURE and the following: Suppression pool makeup: Plant-Specific	2.9	44
295003 Partial or Complete Loss of AC / 6			X				AK3.06 - Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER : Containment isolation	3.7	45
295030 Low Suppression Pool Water Level / 5			X				EK3.07 - Knowledge of the reasons for the following responses as they apply to LOW SUPPRESSION POOL WATER LEVEL: NPSH considerations for ECCS pumps	3.5	46

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Written Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
295019 Partial or Total Loss of Inst. Air / 8			X				AK3.02 - Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : Standby air compressor operation	3.5	47
295026 Suppression Pool High Water Temp. / 5				X			EA1.01 - Ability to operate and/or monitor the following as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: Suppression pool cooling	4.1	48
295025 High Reactor Pressure / 3				X			EA1.04 - Ability to operate and/or monitor the following as they apply to HIGH REACTOR PRESSURE: HPCI: Plant-Specific	3.8	49
295006 SCRAM / 1				X			AA1.04 - Ability to operate and/or monitor the following as they apply to SCRAM : Recirculation system	3.1	50
295004 Partial or Total Loss of DC Pwr / 6					X		AA2.04 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER : System lineups	3.2	51
295028 High Drywell Temperature / 5					X		EA2.04 - Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE : Drywell pressure	4.1	52
295038 High Off-site Release Rate / 9					X		EA2.04 - Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE : Source of off-site release	4.1	53
295021 Loss of Shutdown Cooling / 4						X	2.1.14 –Knowledge of criteria or conditions that require plant-wide announcements, such pump starts, reactor trips, mode changes, etc..	3.1	54
600000 Plant Fire On-site / 8						X	2.4.8 - Emergency Procedures / Plan: Knowledge of how abnormal operating procedures are used in conjunction with EOP's.	3.8	55
700000 Generator Voltage and Electric Grid Disturbances						X	2.2.42 - Equipment Control:: Ability to recognize system parameters that are entry-level conditions for Technical Specifications.	3.9	56
295023 Refueling Acc Cooling Mode / 8				X			AA1.01 - Ability to operate and/or monitor the following as they apply to REFUELING ACCIDENTS : Secondary containment ventilation	3.3	57
295016 Control Room Abandonment / 7		X					AK2.03 - Knowledge of the interrelations between CONTROL ROOM ABANDONMENT and the following: Control room HVAC	2.9	58
K/A Category Totals:	3	4	3	4	3/2	3/5	Group Point Total:		20/7

ILT 13-1 2015 NRC Exam
Written Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 2

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
295035 Secondary Containment High Differential Pressure / 5					X		EA2.01 - Ability to determine and/or interpret the following as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE: Secondary containment pressure: Plant-Specific	3.9	83
295017 High Off-site Release Rate / 9						X	2.2.12 - Equipment Control: Knowledge of surveillance procedures.	4.1	84
295015 Incomplete SCRAM / 1						X	2.1.23 – Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.4	85
295032 High Secondary Containment Area Temperature / 5	X						EK1.02 - Knowledge of the operational implications of the following concepts as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE: Radiation releases	3.6	59
295015 Incomplete SCRAM / 1		X					AK2.01 - Knowledge of the interrelations between INCOMPLETE SCRAM and the following: CRD hydraulics	3.8	60
295012 High Drywell Temperature / 5			X				AK3.01 - Knowledge of the reasons for the following responses as they apply to HIGH DRYWELL TEMPERATURE : Increased drywell cooling	3.5	61
295002 Loss of Main Condenser Vacuum / 8				X			AA1.05 - Ability to operate and/or monitor the following as they apply to LOSS OF MAIN CONDENSER VACUUM :Main Turbine	3.2	62
295014 Inadvertent Reactivity Addition / 1					X		AA2.01 - Ability to determine and/or interpret the following as they apply to INADVERTENT REACTIVITY ADDITION : Reactor power	4.1	63
295029 High Suppression Pool Water Level / 5						X	2.4.31 - Emergency Procedures / Plan: Knowledge of annunciator alarms, indications, or response procedures.	4.2	64
295035 Secondary Containment High Differential Pressure / 5			X				EK3.02 - Knowledge of the reasons for the following responses as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE : Secondary containment ventilation response	3.3	65
K/A Category Totals:	1	1	2	1	1/1	1/2	Group Point Total:		7/3

ILT 13-1 2015 NRC Exam
Written Examination Outline
Plant Systems – Tier 2 Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G		Imp.	Q#
215004 Source Range Monitor								X				A2.01 - Ability to (a) predict the impacts of the following on the SOURCE RANGE MONITOR (SRM) SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Power supply degraded	2.9	86
262002 UPS (AC/DC)								X				A2.01 - Ability to (a) predict the impacts of the following on the UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Under voltage	2.8	87
264000 EDGs											X	2.4.11-Knowledge of abnormal condition procedures.	4.2	88
241000 Reactor/Turbine Pressure Regulating System											X	2.1.7 –Ability to evaluate plant performance and make operational; judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.7	89
259002 Reactor Water Level Control								X				A2.02 - Ability to (a) predict the impacts of the following on the REACTOR WATER LEVEL CONTROL SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of any number of reactor feedwater flow inputs	3.4	90
259002 Reactor Water Level Control	X											K1.05 - Knowledge of the physical connections and/or cause- effect relationships between REACTOR WATER LEVEL CONTROL SYSTEM and the following: Reactor feedwater system	3.6	1
209001 LPCS	X											K1.05 - Knowledge of the physical connections and/or cause- effect relationships between LOW PRESSURE CORE SPRAY SYSTEM and the following: Automatic depressurization system	3.7	2
203000 RHR/LPCI: Injection Mode		X										K2.01 - Knowledge of electrical power supplies to the following: Pumps	3.5	3
400000 Component Cooling Water		X										K2.02 - Knowledge of electrical power supplies to the following: CCW valves	2.9	4

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Written Examination Outline
Plant Systems – Tier 2 Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G		Imp.	Q#
211000 SLC			X									K3.01 - Knowledge of the effect that a loss or malfunction of the STANDBY LIQUID CONTROL SYSTEM will have on following: Ability to shutdown the reactor in certain conditions	4.3	5
223002 PCIS/Nuclear Steam Supply Shutoff			X									K3.12 - Knowledge of the effect that a loss or malfunction of the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF will have on following: High pressure coolant injection: Plant-Specific	3.6	6
264000 EDGs				X								K4.08 - Knowledge of EMERGENCY GENERATORS (DIESEL/JET) design feature(s) and/or interlocks which provide for the following: Automatic startup	3.8	7
218000 ADS				X								K4.01 - Knowledge of AUTOMATIC DEPRESSURIZATION SYSTEM design feature(s) and/or interlocks which provide for the following: Prevent inadvertent initiatior of ADS logic	3.7	8
215005 APRM / LPRM					X							K5.05 - Knowledge of the operational implications of the following concepts as they apply to AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM : Core flow effects on APRM trip setpoints	3.6	9
262001 AC Electrical Distribution					X							K5.01 - Knowledge of the operational implications of the following concepts as they apply to A.C. ELECTRICAL DISTRIBUTION: Principle involved with paralleling two A.C. sources	3.1	10
215003 IRM						X						K6.01 - Knowledge of the effect that a loss or malfunction of the following will have on the INTERMEDIATE RANGE MONITOR (IRM) SYSTEM : Reactor protection system (power supply): Plant-Specific	3.8	11
211000 SLC						X						K6.03 - Knowledge of the effect that a loss or malfunction of the following will have on the STANDBY LIQUID CONTROL SYSTEM : A.C. power	3.2	12
209001 LPCS							X					A1.04 - Ability to predict and/or monitor changes in parameters associated with operating the LOW PRESSURE CORE SPRAY SYSTEM controls including: Reactor pressure	3.7	13

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Written Examination Outline
Plant Systems – Tier 2 Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G		Imp.	Q#
218000 ADS							X					A1.06 - Ability to predict and/or monitor changes in parameters associated with operating the AUTOMATIC DEPRESSURIZATION SYSTEM controls including: Suppression pool temperature	4.1	14
206000 HPCI								X				A2.04 - Ability to (a) predict the impacts of the following on the HIGH PRESSURE COOLANT INJECTION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A.C. failures: BWR-2,3,4	2.7	15
217000 RCIC								X				A2.10 - Ability to (a) predict the impacts of the following on the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Turbine control system failures	3.I	16
239002 SRVs									X			A3.02 - Ability to monitor automatic operations of the RELIEF/SAFETY VALVES including: SRV operation on high reactor pressure	4.3	17
261000 SGTS									X			A3.03 - Ability to monitor automatic operations of the STANDBY GAS TREATMENT SYSTEM including: Valve operation	3.0	18
212000 RPS										X		A4.14 - Ability to manually operate and/or monitor in the control room: Reset system following system activation	3.8	19
215004 Source Range Monitor										X		A4.03 - Ability to manually operate and/or monitor in the control room: CRT displays: Plant-Specific	2.9	20
300000 Instrument Air											X	2.4.31 – Knowledge of annunciator alarms, indications, or response procedures.	4.2	21
263000 DC Electrical Distribution											X	2.4.21 - Emergency Procedures / Plan: 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	22

ILT 13-1 2015 NRC Exam
Written Examination Outline
Plant Systems – Tier 2 Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G		Imp.	Q#
205000 Shutdown Cooling					X							K5.03 - Knowledge of the operational implications of the following concepts as they apply to SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) : Heat removal mechanisms	2.8	23
215004 Source Range Monitor			X									K3.01 - Knowledge of the effect that a loss or malfunction of the SOURCE RANGE MONITOR (SRM) SYSTEM will have on following: RPS	3.4	24
261000 SGTS								X				A2.04 - Ability to (a) predict the impacts of the following on the STANDBY GAS TREATMENT SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: High train moisture content	2.5	25
217000 RCIC	X											K1.03 - Knowledge of the physical connections and/or cause- effect relationships between REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) and the following: Suppression pool	3.6	26
K/A Category Totals:	3	2	3	2	3	2	2	3/3	2	2	2/2	Group Point Total:	26/5	

ILT 13-1 2015 NRC Exam
Written Examination Outline
Plant Systems – Tier 2 Group 2

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G		Imp.	Q#
215001 Traversing In-core Probe								X				A2.08 - Ability to (a) predict the impacts of the following on the TRAVERSING IN-CORE PROBE ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Failure to retract to shield: (Not-BWR1)	2.9	91
202002 Recirculation Flow Control											X	2.2.40 –Ability to apply Technical Specifications for a system.	4.7	92
233000 Fuel Pool Cooling/Cleanup											X	2.2.22 - Equipment Control: Knowledge of limiting conditions for operations and safety limits.	4.7	93
215002 RBM	X											K1.06 - Knowledge of the physical connections and/or cause- effect relationships between ROD BLOCK MONITOR SYSTEM and the following: Control rod selection: BWR-3,4,5	3.0	27
272000 Radiation Monitoring		X										K2.01 - Knowledge of electrical power supplies to the following: Main steamline radiation monitors	2.5	28
256000 Reactor Condensate			X									K3.08 - Knowledge of the effect that a loss or malfunction of the REACTOR CONDENSATE SYSTEM will have on following: SJAE	2.8	29
290001 Secondary CTMT					X							K5.01 - Knowledge of the operational implications of the following concepts as they apply to SECONDARY CONTAINMENT: Vacuum breaker operation	3.3	30
268000 Radwaste					X							K5.01 - Knowledge of the operational implications of the following concepts as they apply to RADWASTE : Units of radiation, dose and dose rate	2.7	31
239001Main and Reheat Steam System						X						K6.02 - Knowledge of the effect that a loss or malfunction of the following will have on the MAIN AND REHEAT STEAM SYSTEM : Plant air system	3.2	32
204000 RWCU							X					A1.07 - Ability to predict and/or monitor changes in parameters associated with operating the REACTOR WATER CLEANUP SYSTEM controls including: RWCU drain flow	2.9	33
230000 RHR/LPCI: Torus/Pool Spray Mode								X				A2.14 - Ability to (a) predict the impacts of the following on the RHR/LPCI: TORUS/SUPPRESSION POOL SPRAY MODE ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Low (or negative) suppression pool pressure during system operation	3.2	34

ILT 13-1 2015 NRC Exam
Written Examination Outline
Plant Systems – Tier 2 Group 2

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G		Imp.	Q#
233000 Fuel Pool Cooling/Cleanup									X			A3.03 - Ability to monitor automatic operations of the FUEL POOL COOLING AND CLEAN-UP including: System indicating lights and alarms	2.6	35
201002 RMCS										X		A4.02 - Ability to manually operate and/or monitor in the control room: Emergency in/notch override switch	3.5	36
259001 Reactor Feedwater											X	2.1.19 - Conduct of Operations: Ability to use plant computers to evaluate system or component status.	3.9	37
202001 Recirculation					X							K5.01 - Knowledge of the operational implications of the following concepts as they apply to RECIRCULATION SYSTEM : Indications of pump cavitation	2.7	38
K/A Category Totals:	1	1	1	0	3	1	1	1/1	1	1	1/2	Group Point Total:		12/3

Facility:	ILT 13-1 2015 NRC Exam		Date:	03/23/15			
Category	K/A #	Topic	RO		SRO-Only	
			IR	Q#	IR	Q#
1. Conduct of Operations	2.1.41	Knowledge of the refueling process.			3.7	94
	2.1.25	Ability to interpret reference materials, such as graphs, curves, tables, etc.			4.2	99
	2.1.2	Knowledge of operator responsibilities during all modes of plant operation.	4.1	66		
	2.1.27	Knowledge of system purpose and / or function.	3.9	67		
	2.1.3	Knowledge of shift or short-term relief turnover practices.	3.7	75		
	Subtotal			3		2
2. Equipment Control	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	95
	2.2.7	Knowledge of the process for conducting special or infrequent tests.	2.9	68		
	2.2.20	Knowledge of the process for managing troubleshooting activities.	2.6	69		
	2.2.1	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.	4.5	74		
	Subtotal			3		1
3. Radiation Control	2.3.11	Ability to control radiation releases.			4.3	96
	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	98
	2.3.5	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personell monitoring equipment, etc.	2.9	70		
	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	3.2	71		
	Subtotal			2		2

Facility:	ILT 13-1 2015 NRC Exam	Date:	03/23/15			
Category	K/A #	Topic	RO		SRO-Only	
			IR	Q#	IR	Q#
4. Emergency Procedures / Plan	2.4.18	Knowledge of the specific bases for EOPs.			4.0	97
	2.4.50	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.			4.0	100
	2.4.30	Knowledge of events related to system operation / status that must be reported to internal organizations or external agencies, such as the state, the NRC, or the transmission system operator.	2.7	72		
	2.4.14	Knowledge of general guidelines for EOP usage.	3.8	73		
	Subtotal			2		2
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO 2 / 1 Q #21	300000 / 2.4.41	EAL classification task for an RO question. Replaced with K/A 300000 2.4.31.
RO 2 / 2 Q #30	290001 / K4.01	Could not develop a question above General Employee Training for this K/A. Replaced with K/A 290001 K5.01.
RO 2 / 2 Q #32	201004 / K6.02	Software sampled RSCS. RSCS is no longer a PBAPS system. Replaced with K/A 239001 K6.02.
RO 1 / 1 Q #40	295028 / AK1.01	295028 was oversampled. Replaced with K/A 295018 AK1.01.
RO 1 / 1 Q #54	295021 2.1.19	G 2.1.19 had been selected three times. Replaced with K/A 295021 2.1.14.
RO 1 / 2 Q #62	295034 / AA1.05	Too many similar K/A for Secondary Containment selected. Replaced with K/A 295002 AA1.05
SRO 1 / 1 Q # 76	295016 / AA2.05	Could not make a SRO question linking the K/A. Replaced with K/A 295016 2.2.14.
SRO 1 / 1 Q #77	295004 / AA2.04	Same K/A selected for Q #51. Replaced with K/A 295020 AA2.04.
SRO 1 / 1 Q #79	295030 / 2.2.39	Could not develop a SRO question. Replaced with K/A 295030 2.2.18.
SRO 1 / 2 Q #85	295015 / 2.1.28	Not a SRO task. Could not develop a SRO question. Replaced with K/A 295015 2.1.23.
SRO 2 / 1 Q #88	264000 / 2.4.4	No EOP entry conditions bases on Emergency Diesel Generators. Replaced with K/A 26400 2.4.11.
SRO 2 / 1 Q #89	217000 2.1.14	217000 was already sampled twice. 2.1.14 is not an SRO task. Replaced with K/A 241000 2.1.7.
SRO 2 / 2 Q #92	202002 / 2.2.39	Not a SRO task. Could not develop a SRO question. Replaced with K/A 202002 2.2.40.
SRO 3 Q #98	2.3.6	Could not develop a SRO question. Replaced with 2.3.13.

Facility: Peach Bottom Date of Examination: 03/23/2015

Examination Level: RO ☒ SRO ☐ Operating Test Number: 2015 NRC

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, P, R	G2.1.45 (4.3) - Manually Calculate Drywell Bulk Average Temperature with Failed Temperature Points (PLOR-241C) (2011 NRC)
Conduct of Operations	D, S	G2.1.31 (4.6) - Perform an APRM Scram Margin Check (PLOR-219C)
Equipment Control	D, R	G2.2.41 (3.5) - Determine Status of Instrument Nitrogen Compressor Discharge Solenoid Valve Using Station Piping and Instrumentation Drawings (PLOR-220C)
Radiation Control	N/A	Not Required
Emergency Plan	N, R	G2.4.29 (3.1) - Emergency Response Organization Response Augmentation Using the Everbridge Web-based Call Out System (PLOR-92C)

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 5 are required.

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 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: 03/23/2015

Examination Level: RO ☐ SRO ☒ Operating Test Number: 2015 NRC

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, R	G2.1.7 (4.7) - Resolution of Thermal Limit Violation (PLOR-218C)
Conduct of Operations	D, R	G2.1.5 (3.9) - Evaluate Overtime Work Request (PLOR-279C)
Equipment Control	D, R	G2.2.6 (3.6) - Review a Temporary Procedure Change - Change of Intent (PLOR-222C)
Radiation Control	D, P, R	G2.3.13 (3.8) - Perform Primary Containment Purge / Vent Isolation Valve Cumulative Log (PLOR-256C) (2013 NRC)
Emergency Plan	N, R	G2.4.41 (4.6) - Make EAL Classification And State/Local Notifications for ALERT - Inability to Maintain Cold Shutdown (PLOR-153C)

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)

Peach Bottom 2015 ILT NRC Exam

Summary of JPM Tasks

JPM Category	Title	Setting / Summary
RO Administrative		
Conduct of Operations	Manually Calculate Drywell Bulk Average Temperature with Failed Temperature Points	Classroom. The candidate is directed to perform certain steps of RT-O-40C-530-2, "Drywell Temperature Monitoring", and document the results on the JPM cue sheet. They must recognize that all of the temperature points in Temperature Zone Number 4 of TI-2501 are out of service making the calculation of Bulk Average temperature INVALID. They will have to manually calculate Drywell bulk average temperature by using TI-2501, Point 136, and add 10°F as required by the RT and then report to the CRS that ON-120 "High Drywell Temperature" should be entered due to Approximate Drywell Bulk Average Temperature greater than 140°F.
	Perform an APRM Scram Margin Check	Simulator. The candidate will be directed to perform an APRM scram margin check for APRM #4. The candidate will use the APRM NUMAC drawer to get the information needed to perform the scram margin calculation. The candidate reports the amount of scram margin to the CRS.
Equipment Control	Determine Status of Instrument Nitrogen Compressor Discharge Solenoid Valve Using Station Piping and Instrumentation Drawings	Classroom. The candidate will be directed to determine the status of a degraded component in the Instrument Nitrogen System using the appropriate Piping and Instrumentation Drawings (P&IDS). The candidate should determine that: • Solenoid Valve SV-5232A should be energized with the 3AK037 Compressor running • Solenoid Valve SV-5232A is currently closed (Valve is energized to close) • Starting the 3BK037 Compressor will allow a comparison of SV-5232A and SV-5232B

		provided the 3BK037 Compressor is run for longer than 0.5 seconds.
Emergency Plan	Emergency Response Organization Response Augmentation Using the Everbridge Web-based Call Out System	Classroom with computer access. The candidate will be directed to initiate Emergency Response Organization (ERO) Activation (Call-out) in accordance with EP-AA-112-100-F-06 Section 1, Steps 1.3 - 1.11. This will require using a computer to access the web-based Everbridge callout system.
SRO Administrative		
Conduct of Operations	Resolution of a Thermal Limit Violation	Classroom. The candidate will be requested to review an official 3D Monitor Case (P1) edit and document on the cue sheet any unsatisfactory data points and document any actions that are required by applicable procedures or Technical Specifications / Technical Requirements Manual. The candidate should determine the following: • That MFLCPR is above 1.000 in one location (19-20) • GP-13, "Resolution of Thermal Limit Violations" needs to be entered • Reactor power must be reduced with the assistance of Reactor Engineering in accordance with GP-5, "Power Operations" to restore MFLCPR to below 1.000 • If MFLCPR is not restored to below 1.000 within 2 hours, thermal power must be reduced to below 25% RTP within the next 4 hours • Determine that Technical Specification LCO 3.2.2, "Minimum Critical Power Ratio (MCPR)" Condition A entry is required

	Evaluate Overtime Work Request	Classroom. The candidate will be requested to determine whether or not the operator can cover the requested shift and whether any work hour limits have already been violated. The candidate will be given the following information: • Asked to work on a scheduled day off. • One month of previous work history. With this information the candidate should determine that working would result in a work hour violation and determine that there was a violation in the previous work schedule
Equipment Control	Review a Temporary Procedure Change that Contains a Change of Intent	Classroom. A Temporary Change has been prepared for ST-O-080-520-2 "Reactor Vessel Head Flange Temperature Surveillance" step 6.1.2, to ensure reactor vessel flange and head flange temperature is greater than 65 degrees F. The candidate is assigned as the SRO Reviewer for the temporary change to the surveillance procedure. The candidate should identify that the proposed change to step 6.1.2 constitutes a "change of intent" in accordance with procedure AD-PB-101-1003.
Radiation Control	Perform Primary Containment Purge / Vent Isolation Valve Cumulative Log	Classroom. The candidate is requested to perform the Plant Staff review and approval of ST-O-007-560-2, "Primary Containment Purge/Vent Isolation Valve Cumulative Hour Log", and annotate any errors on procedure copy, and inform CRS of any issues/errors. The candidate should recognize multiple calculation errors on Data Sheet 1 and determines that the "Accumulated Total Time Since Beginning of Year" is 93 Hr, 22 Min versus 80 Hr, 22 Min. They should report to Shift Management that the "Accumulated Total Time Since Beginning of Year" is greater than 90 hours.

Emergency Plan	Make EAL Classification And State/Local Notifications for ALERT - Inability to Maintain Cold Shutdown	Classroom. The candidate is directed, as the Emergency Director, to make an Emergency Action Level (EAL) classification and complete the State/Local Event Notification form (if required) for an ALERT. The conditions will require the candidate to reference the more infrequently used COLD MATRIX of the EALs. EAL MU1is referenced due to the loss of Off-site power. This is a correct EAL classification but not the highest classification that exists. EAL CU5 is referenced. CU5 is a correct classification but not the highest classification. EAL CA5 is the correct EAL classification for Unit 3. The Reactor Head is removed which means that the RCS is not intact. Primary containment is not intact because of fuel handling and Reactor building differential pressure is positive therefore Secondary Containment is not established
CONTROL ROOM SYSTEMS		
	Reactor Operator Actions on a Recirculation Pump Trip (Alternate Path - Thermal Hydraulic Instability Exists Without Operable OPRM System)	Simulator. The candidate will be directed to trip the "A" Recirc Pump and perform the Immediate Operator Actions of OT-112, "Unexpected/Unexplained Change in Core Flow". As control rods are being inserted the candidate should observe power oscillations indicating Thermal Hydraulic Instability (THI) and then should shut down the reactor by taking the reactor mode switch to the "shutdown" position.
	Startup HPCI in the CST to CST Mode (Alternate Path - Turbine Exhaust Diaphragm High Pressure)	Simulator. The candidate will be directed you to start up HPCI in the CST to CST Mode in accordance with Rapid Response Card (RRC) 23.1-2, "HPCI System Operation During a Plant Event" and lower reactor pressure to 500 psig. The candidate should recognize that annunciator 221 E-3 is alarming for a

		HPCI Exhaust Diaphragm rupture condition and that the HPCI system needs to be shut down. HPCI can be shut down using either SO 23.2.A-2, "HPCI System Shutdown" or the Rapid Response procedure RRC 23.1-2.
	Operate the High Pressure Service Water System (Alternate Path - Low Heat Exchanger Delta P)	Simulator. The candidate is directed to place Unit 2 HPSW in service with the 2A HPSW pump supplying the 2D RHR heat exchanger using SO 32.1.A-2 "High Pressure Service Water System Startup and Normal Operations". The candidate should recognize that the 2D RHR heat exchanger differential pressure is less than 20 psid and "RHR Heat Exchanger Tube to Shell Low Press" alarm 226 E-4 is NOT clear and must start the 2C HPSW pump to clear the low DP condition, then throttle open MO-2-10-89B to raise total HPSW flow to between 6600 and 10600 gpm.
	Drywell Venting via the 2 Inch Vents (Alternate Path – Main Stack High Radiation)	Simulator. The candidate will be directed to maximize venting the drywell via the 2" vents in accordance with OT-101, Step 3. 7 "High Drywell Pressure" to lower drywell pressure to 0.70 psig. Once drywell venting is in progress, PR/RR-2-02-3-404B will slowly rise and annunciator 003 D-2 "Main Stack Radiation High" will alarm. Examinee must terminate Drywell venting at this time by closing several valves.
	Load Diesel Generator to 500kW (Alternate Path – Differential/G round Fault)	Simulator. The candidate is directed to synchronize the E-4 Diesel Generator to the E-43 Bus and pick up 500 KW in accordance with Section 4.2 of SO 52A.1.B, "Diesel Generator Operations". During the diesel generator run alarm "E-4 Diesel Generator Differential and Ground" is received. Guidance from the alarm response card will have the candidate trip the output breaker and trip the diesel generator.

	Initialize the Rod Worth Minimizer	Simulator. The candidate will be directed to initialize the Rod Worth Minimizer (RWM) using procedure SO 62A.1.A-2. This is accomplished using various pushbuttons for system initialization and system diagnostics, and on the RWM computer touch screen acknowledging all RWM messages and verifying system permissives are active.
	ECW System Makeup to Emergency Cooling Tower Using ESW System	Simulator. The candidate will be directed to makeup to the Emergency Cooling Tower to a level of 18ft 3in, then restore to a normal lineup, using the "A" HPSW Pump / Heat Exchanger IAW SO 48.7.A "Emergency Cooling Water System Makeup To Tower Using A High Pressure Service Water Pump. The task will require starting the HPSW pump and performing several motor-operated valve manipulations to send water to the Emergency Cooling Tower.
	Manually Place Standby Gas Treatment System on Equipment Cell Exhaust	Simulator. The candidate is directed to place SBGT on Equipment Cell Exhaust using SO 9A.7.G,"Standby Gas Treatment System (SBGT) Manual Startup on Equipment Cell Exhaust". Several SBGT and reactor building ventilation system dampers will need to be manipulated and the 'A' SBGT fan placed in service. Reactor building pressure differentials and SBGT system flow will need to be verified.
IN-PLANT SYSTEMS	Alternate RPV Injection Using the Standby Liquid Control Test Tank	RCA. The candidate will be directed to perform procedure T-244-2, "Alternate Injection Using the SBLC Test Tank" up to and including Step 4.6. This task requires going to the Emergency Operating Procedure Tool Locker and obtaining the T-244 Tool Kit and 50 foot length of air hose. The candidate must then go to reactor building elevation 195' to the SBLC system area, install the section of hose, and verify/manipulate several hand operated valves.

	RPV Venting During Containment Flooding	RCA. The candidate will be directed to perform sections 4.3.and 4.4 of procedure T-252-2, "RPV Venting During Containment Flooding" to setup the HPCI and RCIC Steam Line Drain flow paths. The task includes going to the EOP Tool Locker and obtaining the T-252 Tool Kit, and then going to the Cable Spreading Room to remove several fuses and verifying several HPCI and RCIC system valve positons with the main control room.
	Loss of RBCCW - Plant Actions for the Instrument Nitrogen System	RCA. The candidate will be directed to perform steps 2.10 and 2.11 of procedure ON-113, "Loss of RBCCW" on Unit 2. The task includes opening several air-operated instrument air backup to instrument nitrogen system valves and shutting down the Instrument Nitrogen Compressors.

Facility: Peach Bottom Date of Examination: 03/23/2015

Exam Level: RO ☒ SRO-I ☐ SRO-U ☐ Operating Test Number: 2015 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. 295001 AA1.06 (3.3/3.4) - Reactor Operator Actions on a Recirculation Pump Trip (Alternate Path - Thermal Hydraulic Instability Exists Without Operable OPRM System)(PLOR-374CA)	A, N, S	1
b. 206000 A3.07 (3.9/3.8) - Startup HPCI in the CST to CST Mode (Alternate Path - Turbine Exhaust Diaphragm High Pressure) (PLOR-353CA) 2011 NRC Exam	A, D, EN, P,S	2
c. 203000 A4.02 (4.1/4.1) Manual Startup of LPCI for Injection (Alternate Path – RHR Injection Valve Trips on Thermal Overload)	A, EN, N, S	4
d. 223001 A2.07 (4.2/4.3) – Drywell Venting via the 2 Inch Vents (Alternate Path – Main Stack High Radiation) (PLOR-321CA)	A, D, S	5
e. 264000 A4.04 (3.7/3.7) – Load Diesel Generator to 500kW (Alternate Path – Differential/Ground Fault) (PLOR-373CA)	A, N, S	6
f. 201006 A3.01 (3.2/3.1) - Initialize the Rod Worth Minimizer (PLOR-366C)	D, L, S	7
g. 400000 A4.01 (3.1/3.0) - ECW System Makeup to Emergency Cooling Tower Using ESW System (PLOR-270C) 2011 NRC Exam	D, EN, P, S	8
h. 295017 AA1.09 (3.6/3.8) - Manually Place Standby Gas Treatment System on Equipment Cell Exhaust (PLOR-18C)	D, EN, S	9
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. 295031 EA1.08 (3.8/3.9) – Alternate RPV Injection Using the Standby Liquid Control Test Tank (PLOR-105P)	D, E, R	2
j. 206000 K1.01 (3.8/3.8) - RPV Venting During Containment Flooding (PLOR-91P)	D, E, L, R	4
k. 295018 AA1.01 (3.3/3.4) – Loss of RBCCW (Plant Actions for the Instrument Nitrogen System) (PLOR-96P) 2011 NRC Exam	D, P, 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
(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: 03/23/2015

Exam Level: RO ☐ SRO-I ☒ SRO-U ☐ Operating Test Number: 2015 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. 295001 AA1.06 (3.3/3.4) - Reactor Operator Actions on a Recirculation Pump Trip (Alternate Path - Thermal Hydraulic Instability Exists Without Operable OPRM System)(PLOR-374CA)	A, N, S	1
b. 206000 A3.07 (3.9/3.8) - Startup HPCI in the CST to CST Mode (Alternate Path - Turbine Exhaust Diaphragm High Pressure) (PLOR-353CA) 2011 NRC Exam	A, D, EN, P,S	2
c. 203000 A4.02 (4.1/4.1) Manual Startup of LPCI for Injection (Alternate Path – RHR Injection Valve Trips on Thermal Overload)	A, EN, N, S	4
d. 223001 A2.07 (4.2/4.3) – Drywell Venting via the 2 Inch Vents (Alternate Path – Main Stack High Radiation) (PLOR-321CA)	A, D, S	5
e. 264000 A4.04 (3.7/3.7) – Load Diesel Generator to 500kW (Alternate Path – Differential/Ground Fault) (PLOR-373CA)	A, N, S	6
f.		
g. 400000 A4.01 (3.1/3.0) - ECW System Makeup to Emergency Cooling Tower Using ESW System (PLOR-270C) 2011 NRC Exam	D, EN, P, S	8
h. 295017 AA1.09 (3.6/3.8) - Manually Place Standby Gas Treatment System on Equipment Cell Exhaust (PLOR-18C)	D, EN, S	9

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

i. 295031 EA1.08 (3.8/3.9) – Alternate RPV Injection Using the Standby Liquid Control Test Tank (PLOR-105P)	D, E, R	2
j. 206000 K1.01 (3.8/3.8) - RPV Venting During Containment Flooding (PLOR-91P)	D, E, L, R	4
k. 295018 AA1.01 (3.3/3.4) – Loss of RBCCW (Plant Actions for the Instrument Nitrogen System) (PLOR-96P) 2011 NRC Exam	D, P, 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
(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: 03/23/2015

Exam Level: RO ☐ SRO-I ☐ SRO-U ☒ Operating Test Number: 2015 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. 295001 AA1.06 (3.3/3.4) - Reactor Operator Actions on a Recirculation Pump Trip (Alternate Path - Thermal Hydraulic Instability Exists Without Operable OPRM System)(PLOR-374CA)	A, N, S	1
b. 206000 A3.07 (3.9/3.8) - Startup HPCI in the CST to CST Mode (Alternate Path - Turbine Exhaust Diaphragm High Pressure) (PLOR-353CA) 2011 NRC Exam	A, D, EN, P,S	2
c.		
d.		
e.		
f.		
g.		
h. 295017 AA1.09 (3.6/3.8) - Manually Place Standby Gas Treatment System on Equipment Cell Exhaust (PLOR-18C)	D, EN, S	9
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i.		
j. 206000 K1.01 (3.8/3.8) - RPV Venting During Containment Flooding (PLOR-91P)	D, E, L, R	5
k. 295018 AA1.01 (3.3/3.4) – Loss of RBCCW (Plant Actions for the Instrument Nitrogen System) (PLOR-96P) 2011 NRC Exam	D, P, 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
(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.** 2015 NRC

Examiners _____ **Operator** _____ CRS (SRO)

_____ _____ URO (ATC)

_____ _____ PRO (BOP)

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

Following shift turnover, the PRO will raise Reactor Pressure Set to 915 psig using GP-2-2, "Normal Plant Startup". Then the URO will continue the startup by raising reactor power by withdrawing control rods in accordance with the approved startup sequence until 3 main turbine bypass valves are open with reactor pressure at 915 psig using procedure GP-2-2, "Normal Plant Startup". During this evolution a control rod will become mispositioned due to a Reactor Manual Control System timer failure, requiring the crew to execute ON-122, "Mispositioned Control Rod" to return the control rod to the correct target position.

Following Control Rod withdrawal, the steam supply valve for in-service Steam Jet Air Ejector fails closed due to a loss of its normal air supply. The loss of steam to the air ejector will cause main condenser vacuum to get worse. The crew should recognize the lowering vacuum condition and enter procedure OT-106 "Condenser Low Vacuum". The CRS should direct the crew to place the steam supply valve alternate air supply in service and restore the air ejector to normal service and thereby reestablishing normal main condenser vacuum.

Once main condenser vacuum is normal there will be a loss of a 125 VDC bus, which will result in loss of multiple ECCS, RCIC, the E-1 Emergency Diesel Generator, and multiple main control room annunciators. The crew should recognize the condition and enter procedure SE-13 "Loss of a 125 or 250 VDC Safety Related Bus". The CRS should direct the crew to perform actions to minimize plant impact such as cross-tie electrical feeds on the 13kV auxiliary busses, place the control switch for the E-1 Emergency Diesel Generator in pull-to-lock, and functionally test all main control room annunciators. The crew should also enter procedure ON-123 "Loss of Control Room Annunciators". The CRS should reference Technical Specifications for required actions with multiple ECCS inoperable.

A Primary Containment Isolation valve will fail open. The failed valve will require the CRS to evaluate the situation in Tech Specs and determine that the penetration must be isolated within four hours.

When the CRS has determined the Tech Spec action, the startup level control system will experience a control signal failure resulting in the startup level control valve failing closed. The valve closure will halt any makeup to the RPV and subsequently RPV level will lower. The crew should recognize the lowering RPV level and enter procedure OT-100 "Reactor Level Low". Placing the startup level control valve controller into manual will not return control of the makeup valve. The URO will need to establish RPV level control using the "C" RFP discharge valve

and RFP speed.

Once RPV level is stabilized, a steam leak will develop in the primary containment with a stuck open Torus to Drywell vacuum breaker. The crew should recognize the rise in drywell temperature and pressure and enter procedure OT-101 "High Drywell Pressure". OT-101 actions include maximizing drywell cooling and isolating steam supply valves in the drywell in order to identify the possible leak location. When drywell pressure reaches 1.2 psig the crew should attempt to scram the reactor. When the mode switch is placed in shutdown no control rods will insert due to an electric ATWS. The crew should enter procedure T-101 "RPV Control" to respond to the ATWS condition. The control rods will fully insert and the ATWS will be terminated when Alternate Rod Insertion is initiated using Rapid Response Card RRC 3B.1-2 "ARI During a Plant Event". **(Critical Task; Insert all control rods using ARI)**

When drywell pressure reaches 2 psig the crew will enter procedure T-102 "Primary Containment Control" to respond to the degrading condition. The crew should spray the primary containment using procedure T-204 "Initiation of Containment Sprays Using RHR" to maintain below the Pressure Suppression Pressure Limit. **(Critical Task; Spray the Drywell before the Pressure Suppression Pressure Limit Curve is exceeded)** When Torus Sprays are placed in-service, the RHR pump will trip and another RHR will need to be placed in-service. The scenario will be terminated when Primary Containment pressure is stable due to spraying containment.

Initial Conditions IC-71 Approximately 5% power

Turnover

Unit 2 startup is in progress.
Drywell purge has just been secured. The extra RO will begin inerting Containment shortly after turnover.
Reactor Power is approximately 5% with direction to continue to raise Reactor power with control rods.
Reactor pressure is 450 psig with direction to raise pressure set to 915 psig.

Event No.	Malfunction No.	Event Type*	Event Description
1	See Scenario Guide	N PRO CRS	Raise Pressure set to 915 psig
2	See Scenario Guide	R URO CRS	Raise reactor power by withdrawing control rods until 3 main turbine bypass valves are open with reactor pressure at 940 psig
3	See Scenario Guide	C URO CRS	A control rod becomes mispositioned, requiring execution of ON-122 "Mispositioned Control Rod"
4	See Scenario Guide	C PRO CRS	Steam supply valve for in-service Steam Jet Air Ejector fails closed / lowering main condenser vacuum
5	See Scenario Guide	C TS PRO CRS	Loss of 125 VDC bus / multiple ECCS inoperable (Tech Spec)
6	See Scenario Guide	TS CRS	Failure of a Primary Containment isolation valve
7	See Scenario Guide	C URO CRS	Startup level control valve fails closed / lowering RPV level
8	See Scenario Guide	M ALL	Reactor coolant leak inside the drywell / Torus to Drywell vacuum breaker fails open
9	See Scenario Guide	C URO CRS	ATWS / Control rods inserted using Alternate Rod Insertion
10	See Scenario Guide	C PRO CRS	RHR pump running in Torus Spray trips

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

Simulation Facility Peach Bottom **Scenario No.** #2 **Op Test No.** 2015 NRC

Examiners _____ **Operator** _____ CRS (SRO)

_____ _____ URO (ATC)

_____ _____ PRO (BOP)

Scenario Summary

The scenario begins with the reactor at 50% power during a plant startup.

Following shift turnover the Crew will place the Reactor Core Isolation Cooling (RCIC) system in a test flow path at rated flow for data collection using procedure SO 13.1.B-2, "RCIC System Manual Operation". While the RCIC system is in service the Crew will continue the startup by raising reactor power by withdrawing control rods in accordance with the approved startup sequence using procedure GP-2-2, "Normal Plant Startup". During this evolution a control rod will become stuck due to mechanical binding, requiring the Crew to adjust control rod drive pressure by executing procedure SO 62.1.A-2, "Withdrawing/Inserting a Control Rod" in order to place the control rod to the correct target position.

Once the stuck control rod is at the correct target position, the 'A' station air compressor will trip on low oil pressure. The Crew should recognize the trip of the compressor and enter procedure ON-119, "Loss of Instrument Air". The Crew should start the backup air compressor and direct Equipment Operators to manipulate local valves to restore the 'A' Instrument air header to normal pressure.

Once the 'A" Instrument air system is returned to normal, the already in-service 'B' RHR Pump will experience an overcurrent condition. The Crew should recognize the higher than normal pump motor amperage and remove the 'B' RHR pump from service and the CRS should direct that Torus Cooling be secured using procedure SO 10.1.D-2, "RHR System Torus Cooling". The CRS should reference Technical Specifications for the inoperable RHR Pump.

Following the Technical Specification determination, the Motor Driven fire pump will become INOP. When the Crew determines that the MDFP is INPO the CRS will consult the TRM to determine appropriate actions.

Following the TRM determination, a primary system steam leak will occur downstream of the inboard Main Steam Isolation Valve (MSIV), allowing steam to enter the Reactor Building. The Crew should respond to high area temperature alarms and respond to the condition using procedure T-103 "Secondary Containment Control". The CRS should initiate evacuation of the Reactor Building and direct a manual scram of the reactor using procedure GP-4 "Scram". During the GP-4 shutdown, the 'A" Reactor Recirculation Pump (RRP) will fail to change speed. The Crew will be required to trip the 'A" RRP.

A CRD hydraulic malfunction will result in a hydraulic ATWS, requiring the Crew to execute T-101 "RPV Control" and T-117 "Level/Power Control." **(Critical Task; Inhibit ADS before an automatic depressurization occurs.)** The Crew should lower RPV level using T-240 "Termination and Prevention of Injection into the

RPV" and be inserting control rods by perform T-220 "Driving Control Rods During Failure to Scram" and T-216 "Control Rod Insertion by Manual Scram or Individual Scram Test Switches" to insert control rods. **(Critical Task; Attempt to shutdown the Reactor by performing one or more of the following: T-216, "Control Rod Insertion by Manual Scram or Individual Scram Test Switched", T-220, "Driving Control Rods During a Failure to Scram", Injecting Standby Liquid Control before Torus temperature exceeds 110^{0}F)**The MSIVs will fail to automatically isolate on a Group 1 isolation signal and will have to be manually closed by the Crew. **(Critical Task; Close at least one MSIV in each steam line following receipt of a Group I isolation signal and failure of the MSIVs to isolate.)**

The scenario may be terminated when the Crew has control of RPV pressure and RPV level has been lowered and is greater than -195 inches using T-240 "Termination and Prevention of Injection into the RPV". **(Critical Task; Maintain core cooling by restoring and/or maintaining RPV level above -195 inches but below the level that will cause a sustained Reactor power rise above 25% power.)**

Initial Conditions IC-13, Approximately 50% Reactor power

Turnover Reactor power is approximately 50%. Continue the Reactor startup by withdrawing Control Rods.
The "B" Loop of RHR is running in Torus cooling to support the RCIC operation.
The PRO is directed to place RCIC in the CST to CST mode for data collection.

Event No.	Malfunction No.	Event Type*	Event Description
1	See Scenario Guide	N PRO CRS	Place RCIC in test flow mode of operation
2	See Scenario Guide	R URO CRS	Raise reactor power by withdrawing control rods
3	See Scenario Guide	C URO CRS	A control rod becomes stuck, requiring execution of SO 62.1.A-2 "Withdrawing/Inserting a Control Rod"
4	See Scenario Guide	C PRO CRS	'A' Instrument Air Compressor trips / place backup air compressor in service
5	See Scenario Guide	C TS PRO CRS	'B' RHR Pump overcurrent condition (Tech Spec)
6	See Scenario Guide	TS CRS	Motor Driven Fire Pump INOP
7	See Scenario Guide	C ALL	Primary system steam leak into the Reactor Building
8	See Scenario Guide	C URO CRS	'A" Reactor Recirculation Pump fails to operate during manual scram
9	See Scenario Guide	M ALL	ATWS (hydraulic)
10	See Scenario Guide	C PRO	Main Steam Isolation Valves fail to automatically isolate / Close manually

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

Simulation Facility Peach Bottom **Scenario No.** #4 (Spare) **Op Test No.** 2015 NRC

Examiners _____ **Operator** _____ CRS (SRO)

_____ _____ URO (ATC)

_____ _____ PRO (BOP)

Scenario Summary The scenario begins with the reactor at 100% power with the 'B' Emergency Service Water (ESW) Pump in service for an evaluation of flow through the Emergency Diesel Generator heat exchangers.

Shortly after taking the shift the Crew will swap Electrohydraulic Control (EHC) Pumps using procedure SO 1D.6.A-2 "Placing the EHC Oil System Standby Pump in Service". The 'B' EHC pump will be started ad the 'A' EHC pump will be shut down.

Once the "B" EHC pump is in service, an Equipment Operator will report a Core Spray snubber is INOP. The CRS will review the TRM and Tech Spec and determine that the Core Spray loop is INOP.

After the Tech Spec determination is made, the in-service Steam Packing Exhauster (SPE) blower will trip. The Crew should recognize the trip condition and restart the tripped blower or start the standby blower using alarm response procedures.

After the SPE blower is placed in service a leak will develop on the discharge of the running 'B' ESW Pump requiring the Crew to recognize the condition and secure the 'B' ESW pump. The CRS should reference Technical Specifications for the inoperable ESW pump and also for inoperable fire barriers due to doors being intentionally left open in response to the flooding.

Once the Technical Specification determinations have been made, 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 reduce reactor power as directed by ON-113 "Loss of RBCCW." The Crew should reduce power using procedure GP-9 "Fast Power Reduction". As a result of the loss of RBCCW the 'B' Recirculation Pump will experience a mechanical seal failure which is the source of a steam leak into the primary containment. The Crew should enter procedure OT-101 "Drywell High Pressure". Temperatures on the recirculation pump will rise requiring the Crew to remove the pump from service and they should enter procedure OT-112 "Unexpected/Unexplained Change in Core Flow". When primary containment pressure reaches 1.2 psig the Crew will shut down the reactor using procedure GP-4 "Scram". When the Crew places the mode switch in shut down the control rods will not insert due to a failure of the reactor mode switch. Depressing the manual scram pushbuttons will insert the control rods. **(Critical Task; Shutdown the Reactor by placing the Reactor Mode Switch in "SHUTDOWN" prior to Drywell pressure exceeding the 2 psig scram setpoint.)**

As the steam leak progresses the Crew should execute proceduresT-101 "RPV

Control" and T-102 "Primary Containment Control". The Crew should spray the primary containment using procedure T-204 "Initiation of Containment Sprays Using RHR". **(Critical Task; Spray the Drywell in accordance with T-204, "Initiation of Containment Sprays using RHR", when conditions permit, but before Drywell Temperature exceeds 281^{0}F.)** A Drywell Chilled Water system to RBCCW system leak will develop allowing steam to leak into the RBCCW Room outside of the primary containment. The Crew will need to isolate the RBCCW system using procedure GP-8.B "PCIS Isolation – Groups 2 and 3". **(Critical Task; Isolate RBCCW from the Drywell in the Control Room.)**

The scenario may be terminated when the reactor is shut down with RPV level is under control, Primary Containment sprays are in service, and the RBCCW leak is isolated.

Initial Conditions IC-14, 100% power

Turnover Unit 2 is at 100% power.
There is a leak in the RBCCW system that requires the head tank to be filled every 12 hours. The head tank was last filled 6 hours ago.
The "B" ESW pump is in-service to do a flow evaluation of flow through the D/G heat exchangers. The test is expected to be completed within the hour.
Following turnover the PRO will be directed to place the "B" EHC pump in-service and secure the "A" EHC pump.

Event No.	Malfunction No.	Event Type*	Event Description
1	See Scenario Guide	N PRO CRS	Swap EHC Pumps
2	See Scenario Guide	TS CRS	INOP Core Spray pump discharge snubber
3	See Scenario Guide	C PRO CRS	Steam Packing Exhauster (SPE) fan trip / (re)start SPE fan
4	See Scenario Guide	C PRO TS CRS	'B' ESW Room flood / secure the 'B' ESW Pump (Tech Spec)
5	See Scenario Guide	R URO CRS	Loss of RBCCW / fast reactor power reduction (w/ recirc and rods)
6	See Scenario Guide	C URO CRS	'B' Recirculation Pump seal failure / Steam leak in primary containment
7	See Scenario Guide	I URO CRS	Failure to automatically scram (manual scram pushbuttons are required to scram the reactor)
8	See Scenario Guide	M ALL	Drywell to RBCCW leak / Steam leak in RBCCW Room outside of primary containment

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