NRC Exam

Facility: **Watts Bar** Date of Exam: **May 2009** **RO**

Tier	Group	RO K/A Category Points											SRO-Only Points		
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A		3	18			
	2	2	2	1				1	2			1	9			
	Tier Totals	5	5	4				4	5			4	27			
2. Plant Systems	1	3	2	2	3	3	3	2	3	2	2	3	28			
	2	1	1	1	1	1	1	1	1	1	0	1	10			
	Tier Totals	4	3	3	4	4	4	3	4	3	2	4	38			
3. Generic Knowledge and Abilities		1		2				3			4		10	1	2	3	4	
		2		2				3			3							

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/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

Note: This outline was provided by the Chief Examiner.

NRC Exam

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

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#
000008 Pressurizer Vapor Space Accident / 3						**2.2.20**	Knowledge of the process for managing troubleshooting activities.	2.6	1
000009 Small Break LOCA / 3		**03**					Interrelations between SBLOCA and S/Gs.	3.0	1
000011 Large Break LOCA / 3				**05**			Operate/monitor man/auto transfer of charging suction to borated source.	4.3	1
000015/17 RCP Malfunctions / 4		**10**					Interrelations between RCP malfunctions and indicators/controls.	2.8	1
000025 Loss of RHR System / 4			**01**				Reasons for shift to alternate flowpath as it applies to Loss of RHR.	3.1	1
000026 Loss of Component Cooling Water / 8			**04**				Reasons for effect on CCW flow header of a loss of CCW.	3.5	1
000027 Pressurizer Pressure Control System Malfunction / 3	**03**						Op implications of latent heat of vaporization.	2.6	1
000029 ATWS / 1				**12**			Operate/monitor M/G set pwr supply & Rx trip brkrs.	4.1	1
000038 Steam Gen. Tube Rupture / 3	**03**						Op implications of natural circulation.	3.9	1
000054 (CE/E06) Loss of Main Feedwater / 4						**2.2.22**	Knowledge of LCOs and safety limits.	4.0	1
000056 Loss of Offsite Power / 6	**04**						Implication of saturation conditions for the systems.	3.1	1
000057 Loss of Vital AC Elec. Inst. Bus / 6					**19**		Determine/interpret auto actions that occur.	4.0	1
000058 Loss of DC Power / 6				**02**			Operate/monitor dc input brkr, freq. meter, ac output detector and ground fault detector.	3.1	1
000062 Loss of Nuclear Service Water / 4					**01**		Determine/interpret location of a leak in the SWS	2.9	1
000065 Loss of Instrument Air / 8			**03**				Reasons for effects on plant ops of isolating certain equipment from instrument air.	2.9	1
W/E04 LOCA Outside Containment / 3		**01**					Interrelations between LOCA outside containment and components and functions of control and safety systems, incl. instrumentation, signals, interlocks, failure modes and auto and manual features.	3.5	1
W/E11 Loss of Emergency Coolant Recirc. / 4					**01**		Determine/interpret facility conditions and select appropriate procedures.	3.4	1
000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4						**2.2.36**	Analyze effect of maintenance activities on status of LCOs.	3.1	1
K/A Category Point Totals:	**3**	**3**	**3**	**3**	**3**	**3**	Group Point Total:		**18**

NRC Exam

ES-401 PWR Examination Outline Form ES-401-2
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1					01		Determine/interpret reactor tripped brkr indicator.	4.2	1
000003 Dropped Control Rod / 1						2.2.44	Interpret indications to verify status and operation of a system, and operator actions and directives affecting conditions.	4.2	1
000028 Pressurizer Level Malfunction / 2	01						Op implications of PZR ref. leak abnormalities	2.8	1
000033 Loss of Intermediate Range NI / 7					01		Determine/interpret equivalency between source range, intermediate range, and power range channel readings	3.0	1
000059 Accidental Liquid RadWaste Rel. / 9		02					Interrelations with radioactive gas monitors	2.7	1
000076 High Reactor Coolant Activity / 9			05				Reasons for corrective actions as a result of high fission product rad level in RCS	2.9	1
W/E08 RCS Overcooling - PTS / 4				03			Operate/monitor desired operating results.	3.6	1
(W/E14) High Containment Pressure / 5		01					Interrelations between Loss of CTMT Integrity and components and functions of control and safety systems, incl. instrumentation, signals, interlocks, failure modes and auto and manual features.	3.4	1
W/E15 Containment Flooding / 5	02						Op implications of procedures	2.7	1
K/A Category Point Totals:	2	2	1	1	2	1	Group Point Total:		9

NRC Exam

ES-401	PWR Examination Outline Plant Systems- Tier 2/Group 1 (RO)											Form ES-401-2		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump		02										Knowledge of pwr supplies to CCW pumps.	2.5	1
004 Chemical and Volume Control								05				Impacts of RCP seal failures on CVCS, and procedures.	4.0	1
					08							Imp of Keff by means other than 6-factor formula: relationship of count rate to reactivity changes.	2.6	1
005 Residual Heat Removal			06									Effect of loss on CSS.	3.1	1
006 Emergency Core Cooling										05		Manually operate/monitor transfer of ECCS flowpaths prior to recirculation.	3.9	1
007 Pressurizer Relief/Quench Tank				01								Design/interlocks for quench tank cooling	2.6	1
					02							Method of forming steam bubble in the PZR.	3.1	1
008 Component Cooling Water											2.4.2	Sys. setpoints, interlocks, auto actions associated with EOP entry conditions.	4.5	1
010 Pressurizer Pressure Control						04						Effect of loss/malf. of PRT.	2.9	1
012 Reactor Protection								01				Impacts of and procedures for faulty bistable operation.	3.1	1
											2.4.35	Local AO tasks during emerg., including effects.	3.8	1
013 Engineered Safety Features Actuation		01										Power supplies to ESFAS equipment control.	3.6	1
022 Containment Cooling									01			Monitor auto ops. of initiation of safeguards mode.	4.1	1
025 Ice Condenser	02											Connections/cause & effect with refrigerant systems.	2.7	1
				02								Features/interlocks for system control.	2.8	1
026 Containment Spray				09								Features/interlocks for rad release (interlock on RWST isol. after swapover).	3.7	1
039 Main and Reheat Steam									02			Monitor auto operation of MRSS isolation.	3.1	1
059 Main Feedwater								03				Impacts of and procedures for overfeeding event.	2.7	1
061 Auxiliary/Emergency Feedwater					03							Implications of pp. head effects when control vlv shut.	2.6	1
062 AC Electrical Distribution											2.4.11	Knowledge of abnormal procedures.	4.0	1
063 DC Electrical Distribution							01					Effects on battery capacity of discharge rate.	2.5	1
064 Emergency Diesel Generator						07						Effects of loss of air rcvrs.	2.7	1
						08						Effects of loss of fuel tanks.	3.2	1
073 Process Radiation Monitoring			01									Effect of loss/malf. on releases.	3.6	1
076 Service Water							02					Predict changes associated with reactor & turb. bldg. closed cooling water temps.	2.6	1
078 Instrument Air										01		Monitor pressure gauges.	3.1	1
	01											Relations with sensor air.	2.8	1
103 Containment	01											Relations with CCS	3.6	1
K/A Category Point Totals:	3	2	2	3	3	3	2	3	2	2	3	Group Point Total:		28

NRC Exam

ES-401 PWR Examination Outline Plant Systems- Tier 2/Group 2 (RO) Form ES-401-2

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
001 Control Rod Drive						03						Effect of loss on reactor trip breakers.	3.7	1
002 Reactor Coolant			03									Effect of loss/malf. on containment.	4.2	1
016 Non-nuclear Instrumentation					01							Separation of control and protection circuits.	2.7	1
017 In-Core Temperature Monitor	01											Relationship with plant computer.	3.2	1
027 Containment Iodine Removal		01										Power supplies to fans.	3.1	1
033 Spent Fuel Pool Cooling				01								Design features for spent fuel level.	2.9	1
034 Fuel Handling Equipment							02					Monitor water level in refuel canal	2.9	1
045 Main Turbine Generator											2.2.37	Determine operability/availability of safety related equipment.	3.6	1
068 Liquid Radwaste									02			Monitor automatic isolation.	3.6	1
072 Area Radiation Monitoring								01				Impacts/procedures of erratic or failed power supply.	2.7	1
K/A Category Point Totals:	1	1	1	1	1	1	1	1	1	0	1	Group Point Total:		10

ES-401	Generic Knowledge and Abilities Outline (Tier 3)	Form ES-401-3

NRC EXAM

Facility: **Watts Bar**	Date of Exam: **May 2009**					**RO**
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.4	Operator responsibilities for shift staffing.	3.3	1		
	2.1.42	New and spent fuel movement procedures.	2.5	1		
	Subtotal			2		
2. Equipment Control	2.2.20	Process for managing troubleshooting activities.	2.6	1		
	2.2.21	Pre- and post-maintenance operability requirements.	2.9	1		
	Subtotal			2		
3. Radiation Control	2.3.12	Radiological safety principles pertaining to licensed operator duties.	3.2	1		
	2.3.14	Knowledge of radiation or contamination hazards.	3.4	1		
	2.3.15	Radiation monitoring systems.	2.9	1		
	Subtotal			3		
4. Emergency Procedures / Plan	2.4.9	Low power/shutdown implications in accident mitigation.	3.8	1		
	2.4.19	EOP layout, symbols and icons.	3.4	1		
	2.4.27	Knowledge of fire in the plant procedures.	3.4	1		
	Subtotal			3		
Tier 3 Point Total				10		

Note: This outline was provided by the Chief Examiner.

Facility: **Watts Bar** Date of Exam: **May 2009** **SRO**

Tier	Group	RO K/A Category Points											SRO-Only Points		
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total
1. Emergency & Abnormal Plant Evolutions	1				N/A					N/A				3	3	6
	2													2	2	4
	Tier Totals													5	5	10
2. Plant Systems	1													2	3	5
	2													1	2	3
	Tier Totals													3	5	8
3. Generic Knowledge and Abilities		1		2		3		4						1	2	3	4	7
														1	2	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/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

Note: This outline was provided by the Chief Examiner.

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO)						Form ES-401-2		
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#
000008 Pressurizer Vapor Space Accident / 3						**2.1.20**	Interpret and execute procedure steps.	4.6	1
000011 Large Break LOCA / 3					**01**		Determine actions, based on RCS temperature and pressure.	4.7	1
000025 Loss of RHR System / 4					**06**		Determine existence of proper RHR overpressure protection.	3.4	1
000056 Loss of Offsite Power / 6						**2.4.45**	Prioritize and interpret the significance of each annunciator or alarm.	4.3	1
000065 Loss of Instrument Air / 8					**03**		Location and isolation of leaks.	2.9	1
W/E04 LOCA Outside Containment / 3						**2.4.21**	Parameters and logic used to assess the status of safety functions.	4.6	1
K/A Category Point Totals:					**3**	**3**	Group Point Total:		**6**

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO)							Form ES-401-2	
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#
0000028 Pressurizer Level Malfunction / 2					**01**		Interpret PZR level indicators and alarms.	3.6	1
000076 High Reactor Coolant Activity / 9					**02**		Determine corrective actions for high reactor coolant activity.	3.4	1
W/E03 LOCA Cooldown - Depress. / 4						**2.4.30**	Events that must be reported to internal organizations or external agencies.	4.1	1
W/E10 Natural Circ. With Steam Void / 4						**2.2.37**	Determine operability and/or availability of safety related equipment.	4.6	1
K/A Category Point Totals:					**2**	**2**	Group Point Total:		**4**

ES-401	PWR Examination Outline Plant Systems- Tier 2/Group 1 (SRO)											Form ES-401-2		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
005 Residual Heat Removal								**03**				Impacts of and procedures for motor/pump malf.	3.1	1
008 Component Cooling Water											**2.4.41**	Obtain and interpret station electrical and mechanical drawings.	4.6	1
026 Containment Spray											**2.2.38**	Conditions and limitations in the facility license.	4.5	1
062 AC Electrical Distribution								**06**				Keeping safeguards buses electrically separate.	3.9	1
063 DC Electrical Distribution											**2.2.37**	Determine operability and/or availability of safety related equipment.	4.6	1
K/A Category Point Totals:								**2**			**3**	Group Point Total:		**5**

ES-401	PWR Examination Outline Plant Systems- Tier 2/Group 2 (SRO)												Form ES-401-2	
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
028 Hydrogen Recombiner and Purge Control											**2.4.49**	Perform without reference to procedures immediate operation of components and controls.	4.4	1
055 Condenser Air Removal											**2.1.19**	Use plant computers to evaluate system or component status.	3.8	1
079 Station Air								**01**				Cross connection with IAS.	3.2	1
K/A Category Point Totals:								**1**			**2**	Group Point Total:		**3**

ES-401	Generic Knowledge and Abilities Outline (Tier 3)	Form ES-401-3

NRC EXAM

Facility: **Watts Bar**	Date of Exam: **May 2009**					**SRO**
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.8	Coordinate activities outside the control room.			4.1	1
	Subtotal					1
2. Equipment Control	2.2.15	Determine expected plant configuration using documents.			4.3	1
	2.2.42	System parameters that are Tech Spec entry conditions.			4.6	1
	Subtotal					2
3. Radiation Control	2.3.4	Radiation exposure limits.			3.7	1
	2.3.15	Knowledge of radiation monitoring systems.			3.1	1
	Subtotal					2
4. Emergency Procedures / Plan	2.4.35	Local AO emergency tasks and operational effects.			4.0	1
	2.4.38	Take actions of EPlan, incl. emergency coordinator.			4.4	1
	Subtotal					2
Tier 3 Point Total						7

Note: This outline was provided by the Chief Examiner.

Facility: **Watts Bar** Date of Examination: 05/18/2009

Examination Level: RO ☒ SRO ☐ Operating Test Number: 1

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R, M	2.1.7 *Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.* Calculate Shutdown Margin
Conduct of Operations	R, M	2.1.25 *Ability to interpret reference materials, such as graphs, curves, tables, etc.* Calculate Target Boron Concentration for Load Escalation Using Appendix E of SOI-62.02.
Equipment Control	R, M	2.2.40 *Ability to apply Technical Specifications for a system.* Perform a QPTR Calculation per 0-SI-0-21.
Radiation Control	-	---
Emergency Procedures / Plan	R, D	2.4.39 *Knowledge of RO responsibilities in emergency plan implementation.* Perform Control Room Operator Medical Response Checklist.

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 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: **Watts Bar** Date of Examination: 05/18/2009

Examination Level: RO ☐ SRO ☒ Operating Test Number: 1

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R, M	2.1.7 *Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.* Perform Technical Review of Shutdown Margin Calculation.
Conduct of Operations	R, M	2.1.25 *Ability to interpret reference materials, such as graphs, curves, tables, etc.* Perform Independent Verification of Target Boron Concentration for Load Escalation Calculation.
Equipment Control	R, N	2.2.24 *Knowledge of the process used to track inoperable alarms.* Review/Approve Disabled Alarm Checklist.
Radiation Control	R, N	2.3.6 Ability to approve release permits. Review/Approve Liquid Release Permit.
Emergency Procedures / Plan	R, D	2.4.41 *Knowledge of the emergency action level thresholds and classifications.* Classify an Event (High RCS Activity, SGTR/Faulted SG).

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 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: **Watts Bar**	Date of Examination: **May 2009**
Exam Level: RO ☒ SRO-I ☐ SRO-U ☐	Operating Test Number: **1**

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. Withdraw Shutdown Banks.	ALMS	1
b. Place Excess Letdown in Service.	DC	2
c. Isolate Cold Leg Accumulators.	AENS	3
d. Place RHR Spray in Service.	ADLS	4P
e. Place the Containment H2 Recombiner in Service.	DLS	5
f. Synchronize D/G from Main Control Room.	MS	6
g. Return Power Range Monitor to Service.	ADS	7
h. Shutdown A Train Emergency Gas Treatment System.	DS	8
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Perform Local Boration of RCS.	AELMR	1
j. Local Isolation of Steam Lines Following a SGTR.	MEL	3
k. Place Cation Bed in Service for High RCS Activity.	MER	9

@ 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
(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: **Watts Bar**	Date of Examination: **May 2009**
Exam Level: RO ☐ SRO-I ☒ SRO-U ☐	Operating Test Number: **1**

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. Withdraw Shutdown Banks.	ALMS	1
b. Place Excess Letdown in Service.	DC	2
c. Isolate Cold Leg Accumulators.	AENS	3
d. Place RHR Spray in Service.	ADLS	4P
e. Place the Containment H2 Recombiner in Service.	DLS	5
f. *(Not required for I-SRO).*	-	-
g. Return Power Range Monitor to Service.	ADS	7
h. Shutdown A Train Emergency Gas Treatment System.	DS	8

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

i. Perform Local Boration of RCS.	AELMR	1
j. Local Isolation of Steam Lines Following a SGTR.	MEL	3
k. Place Cation Bed in Service for High RCS Activity.	MER	9

@ 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
(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: **Watts Bar**	Date of Examination: **May 2009**
Exam Level: RO ☐ SRO-I ☐ SRO-U ☒	Operating Test Number: **1**

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. *(Not required for U - SRO).*	-	-
b. *(Not required for U - SRO).*	-	-
c. Isolate Cold Leg Accumulators.	AENS	3
d. *(Not required for U - SRO).*	-	-
e. Place the Containment H2 Recombiner in Service.	DLS	5
f. *(Not required for U - SRO).*	-	-
g. Return Power Range Monitor to Service.	ADS	7
h. *(Not required for U - SRO).*	-	-
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Perform Local Boration of RCS.	AELMR	1
j. *(Not required for U - SRO).*	-	-
k. Place Cation Bed in Service for High RCS Activity.	MER	9

@ 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
(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	