

Facility: Salem

Printed: 12/05/2012

Date Of Exam: 12/03/2012

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	3	N/A			3	3	N/A			3	18	0	0	0	
	2	2	2	1	N/A			2	1	N/A			1	9	0	0	0	
	Tier Totals	5	5	4	N/A			5	4	N/A			4	27	0	0	0	
2. Plant Systems	1	3	2	3	3	3	2	3	2	2	3	2	28	0	0	0		
	2	1	1	1	1	1	1	1	1	1	1	0	10	0	0	0		
	Tier Totals	4	3	4	4	4	3	4	3	3	4	2	38	0	0	0		
3. Generic Knowledge And Abilities Categories				1		2		3		4		10		1	2	3	4	0
				2		3		2		3				0	0	0	0	

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.

PWR RO Examination Outline

Printed: 12/05/2012

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ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1

Form ES-401-2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000007 Reactor Trip - Stabilization - Recovery / 1	X						EK1.06 - Relationship of emergency feedwater flow to S/G and decay heat removal following reactor trip	3.7	1
000011 Large Break LOCA / 3		X					EK2.02 - Pumps	2.6*	1
000015/000017 RCP Malfunctions / 4		X					AK2.10 - RCP indicators and controls	2.8*	1
000022 Loss of Rx Coolant Makeup / 2	X						AK1.03 - Relationship between charging flow and PZR level	3.0	1
000026 Loss of Component Cooling Water / 8			X				AK3.02 - The automatic actions (alignments) within the CCWS resulting from the actuation of the ESFAS	3.6	1
000027 Pressurizer Pressure Control System Malfunction / 3				X			AA1.01 - PZR heaters, sprays, and PORVs	4.0	1
000029 ATWS / 1		X					EK2.06 - Breakers, relays, and disconnects	2.9*	1
000038 Steam Gen. Tube Rupture / 3						X	2.4.8 - Knowledge of how abnormal operating procedures are used in conjunction with EOPs.	3.8	1
000054 Loss of Main Feedwater / 4						X	2.4.46 - Ability to verify that the alarms are consistent with the plant conditions.	4.2	1
000055 Station Blackout / 6					X		EA2.03 - Actions necessary to restore power	3.9	1
000056 Loss of Off-site Power / 6			X				AK3.02 - Actions contained in EOP for loss of offsite power	4.4	1
000057 Loss of Vital AC Inst. Bus / 6					X		AA2.03 - RPS panel alarm annunciators and trip indicators	3.7	1
000065 Loss of Instrument Air / 8						X	2.3.14 - Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.	3.4	1
000077 Generator Voltage and Electric Grid Disturbances / 6				X			AA1.02 - Turbine / generator controls	3.8	1
W/E04 LOCA Outside Containment / 3				X			EA1.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	4.0	1
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4			X				EK3.2 - Normal, abnormal and emergency operating procedures associated with Loss of Secondary Heat Sink	3.7	1

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ES - 401

**Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1**

Form ES-401-2

<b>E/APE # / Name / Safety Function</b>	<b>K1</b>	<b>K2</b>	<b>K3</b>	<b>A1</b>	<b>A2</b>	<b>G</b>	<b>KA Topic</b>	<b>Imp.</b>	<b>Points</b>
W/E11 Loss of Emergency Coolant Recirc. / 4					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.4	1
W/E12 - Steam Line Rupture - Excessive Heat Transfer / 4	X						EK1.1 - Components, capacity, and function of emergency systems	3.4	1
<b>K/A Category Totals:</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>Group Point Total:</b>	<b>18</b>	

**PWR RO Examination Outline**

Printed: 12/05/2012

Facility: Salem

ES - 401

**Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2**

Form ES-401-2

<b>E/APE # / Name / Safety Function</b>	<b>K1</b>	<b>K2</b>	<b>K3</b>	<b>A1</b>	<b>A2</b>	<b>G</b>	<b>KA Topic</b>	<b>Imp.</b>	<b>Points</b>
000003 Dropped Control Rod / 1		X					AK2.05 - Control rod drive power supplies and logic circuits	2.5	1
000074 Inad. Core Cooling / 4			X				EK3.04 - Tripping RCPs	3.9	1
000076 High Reactor Coolant Activity / 9				X			AA1.04 - Failed fuel-monitoring equipment	3.2	1
W/E02 SI Termination / 3		X					EK2.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.4	1
W/E03 LOCA Cooldown - Depress. / 4	X						EK1.3 - Annunciators and conditions indicating signals, and remedial actions associated with the LOCA Cooldown and Depressurization	3.5	1
W/E08 RCS Overcooling - PTS / 4	X						EK1.2 - Normal, abnormal and emergency operating procedures associated with Pressurized Thermal Shock	3.4	1
W/E10 Natural Circ. / 4				X			EA1.2 - Operating behavior characteristics of the facility	3.6	1
W/E15 Containment Flooding / 5						X	2.1.45 - Ability to identify and interpret diverse indications to validate the response of another indication.	4.3	1
W/E16 High Containment Radiation / 9					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.0	1
<b>K/A Category Totals:</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>		<b>Group Point Total:</b>	<b>9</b>

PWR RO Examination Outline

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ES - 401

Plant Systems - Tier 2 / Group 1

Form ES-401-2

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
003 Reactor Coolant Pump						X						K6.02 - RCP seals and seal water supply	2.7	1
003 Reactor Coolant Pump					X							K5.03 - Effects of RCP shutdown on T-ave., including the reason for the unreliability of T-ave. in the shutdown loop	3.1	1
004 Chemical and Volume Control				X								K4.16 - Temperature at which the temperature control valve automatically diverts flow from the demineralizer to the VCT; reason for this diversion	2.6	1
004 Chemical and Volume Control								X				A2.18 - High VCT level	3.1	1
005 Residual Heat Removal										X		A4.02 - Heat exchanger bypass flow control	3.4*	1
005 Residual Heat Removal				X								K4.10 - Control of RHR heat exchanger outlet flow	3.1	1
006 Emergency Core Cooling			X									K3.01 - RCS	4.1*	1
006 Emergency Core Cooling						X						K6.10 - Valves	2.6	1
007 Pressurizer Relief/Quench Tank					X							K5.02 - Method of forming a steam bubble in the PZR	3.1	1
008 Component Cooling Water				X								K4.02 - Operation of the surge tank, including the associated valves and controls	2.9	1
010 Pressurizer Pressure Control		X										K2.01 - PZR heaters	3.0	1
012 Reactor Protection									X			A3.01 - Individual channel	3.8	1
013 Engineered Safety Features Actuation										X		A4.03 - ESFAS initiation	4.5	1
022 Containment Cooling							X					A1.02 - Containment pressure	3.6	1
026 Containment Spray											X	2.4.31 - Knowledge of annunciator alarms, indications, or response procedures.	4.2	1
039 Main and Reheat Steam					X							K5.08 - Effect of steam removal on reactivity	3.6	1
039 Main and Reheat Steam											X	2.1.28 - Knowledge of the purpose and function of major system components and controls.	4.1	1
059 Main Feedwater	X											K1.05 - RCS	3.1*	1
059 Main Feedwater							X					A1.07 - Feed Pump speed, including normal control speed for ICS	2.5*	1

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ES - 401

Plant Systems - Tier 2 / Group 1

Form ES-401-2

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
061 Auxiliary/Emergency Feedwater	X											K1.03 - Main steam system	3.5	1
061 Auxiliary/Emergency Feedwater			X									K3.02 - S/G	4.2	1
062 AC Electrical Distribution							X					A1.03 - Effect on instrumentation and controls of switching power supplies	2.5	1
063 DC Electrical Distribution		X										K2.01 - Major DC loads	2.9*	1
064 Emergency Diesel Generator	X											K1.03 - Diesel fuel oil supply system	3.6	1
073 Process Radiation Monitoring			X									K3.01 - Radioactive effluent releases	3.6	1
076 Service Water								X				A2.02 - Service water header pressure	2.7	1
078 Instrument Air									X			A3.01 - Air pressure	3.1	1
103 Containment										X		A4.09 - Containment vacuum system	3.1*	1
<b>K/A Category Totals:</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>		<b>Group Point Total:</b>	<b>28</b>

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Plant Systems - Tier 2 / Group 2

Form ES-401-2

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
001 Control Rod Drive							X					A1.01 - T-ave. and no-load T-ave	3.8	1
011 Pressurizer Level Control						X						K6.04 - Operation of PZR level controllers	3.1	1
015 Nuclear Instrumentation								X				A2.02 - Faulty or erratic operation of detectors or compensating components	3.1	1
017 In-core Temperature Monitor					X							K5.03 - Indication of superheating	3.7	1
027 Containment Iodine Removal		X										K2.01 - Fans	3.1*	1
033 Spent Fuel Pool Cooling				X								K4.03 - Anti-siphon devices	2.6	1
041 Steam Dump/Turbine Bypass Control			X									K3.02 - RCS	3.8	1
045 Main Turbine Generator									X			A3.11 - Generator trip	2.6*	1
068 Liquid Radwaste	X											K1.07 - Sources of liquid wastes for LRS	2.7	1
086 Fire Protection										X		A4.02 - Fire detection panels	3.5	1
<b>K/A Category Totals:</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>		<b>Group Point Total:</b>	<b>10</b>

## Generic Knowledge and Abilities Outline (Tier 3)

### PWR RO Examination Outline

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Form ES-401-3

<u>Generic Category</u>	<u>KA</u>	<u>KA Topic</u>	<u>Imp.</u>	<u>Points</u>
<b>Conduct of Operations</b>	2.1.28	Knowledge of the purpose and function of major system components and controls.	4.1	1
	2.1.40	Knowledge of refueling administrative requirements.	2.8	1
	<b>Category Total:</b>			<b>2</b>
<b>Equipment Control</b>	2.2.12	Knowledge of surveillance procedures.	3.7	1
	2.2.20	Knowledge of the process for managing troubleshooting activities.	2.6	1
	2.2.44	Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.	4.2	1
	<b>Category Total:</b>			<b>3</b>
<b>Radiation Control</b>	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.	3.4	1
	2.3.15	Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	2.9	1
	<b>Category Total:</b>			<b>2</b>
<b>Emergency Procedures/Plan</b>	2.4.3	Ability to identify post-accident instrumentation.	3.7	1
	2.4.19	Knowledge of EOP layout, symbols, and icons.	3.4	1
	2.4.27	Knowledge of "fire in the plant" procedure.	3.4	1
	<b>Category Total:</b>			<b>3</b>

**Generic Total: 10**



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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	3		3	6
	2	0	0	0				0	0				0	0	2		2	4
	Tier Totals	0	0	0				0	0				0	0	0	5		5
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:

- 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).
- 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.
- 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.
- 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.
- 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.
- Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
- \* 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.
- 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.
- 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.

**PWR SRO Examination Outline**

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ES - 401

**Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1**

**Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000007 Reactor Trip - Stabilization - Recovery / 1						X	2.1.20 - Ability to interpret and execute procedure steps.	4.6	1
000009 Small Break LOCA / 3						X	2.2.44 - Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.	4.4	1
000025 Loss of RHR System / 4					X		AA2.05 - Limitations on LPI flow and temperature rates of change	3.5*	1
000054 Loss of Main Feedwater / 4					X		AA2.05 - Status of MFW pumps, regulating and stop valves	3.7	1
000062 Loss of Nuclear Svc Water / 4						X	2.4.6 - Knowledge of EOP mitigation strategies.	4.7	1
W/E12 - Steam Line Rupture - Excessive Heat Transfer / 4					X		EA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	4.0	1
<b>K/A Category Totals:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>		<b>Group Point Total:</b>	<b>6</b>

**PWR SRO Examination Outline**

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ES - 401

**Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2**

**Form ES-401-2**

<b>E/APE # / Name / Safety Function</b>	<b>K1</b>	<b>K2</b>	<b>K3</b>	<b>A1</b>	<b>A2</b>	<b>G</b>	<b>KA Topic</b>	<b>Imp.</b>	<b>Points</b>
000001 Continuous Rod Withdrawal / 1					X		AA2.03 - Proper actions to be taken if automatic safety functions have not taken place	4.8	1
000028 Pressurizer Level Malfunction / 2						X	2.2.43 - Knowledge of the process used to track inoperable alarms.	3.3	1
000069 Loss of CTMT Integrity / 5					X		AA2.01 - Loss of containment integrity	4.3	1
W/E16 High Containment Radiation / 9						X	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.	4.1	1
<b>K/A Category Totals:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>		<b>Group Point Total:</b>	<b>4</b>

**PWR SRO Examination Outline**

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ES - 401

Plant Systems - Tier 2 / Group 1

Form ES-401-2

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
005 Residual Heat Removal								X				A2.02 - Pressure transient protection during cold shutdown	3.7	1
012 Reactor Protection								X				A2.01 - Faulty bistable operation	3.6	1
026 Containment Spray											X	2.4.50 - Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	4.0	1
039 Main and Reheat Steam								X				A2.04 - Malfunctioning steam dump	3.7	1
103 Containment											X	2.4.22 - Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	4.4	1
<b>K/A Category Totals:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>Group Point Total:</b>		<b>5</b>

**PWR SRO Examination Outline**

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ES - 401

**Plant Systems - Tier 2 / Group 2**

Form ES-401-2

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
016 Non-nuclear Instrumentation											X	2.2.37 - Ability to determine operability and/or availability of safety related equipment.	4.6	1
034 Fuel Handling Equipment								X				A2.01 - Dropped fuel element	4.4	1
086 Fire Protection								X				A2.03 - Inadvertent actuation of the FPS due to circuit failure or welding	2.9	1
<b>K/A Category Totals:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>Group Point Total:</b>	<b>3</b>	

# Generic Knowledge and Abilities Outline (Tier 3)

## PWR SRO Examination Outline

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**Facility:** Salem

**Form ES-401-3**

<u>Generic Category</u>	<u>KA</u>	<u>KA Topic</u>	<u>Imp.</u>	<u>Points</u>
<b>Conduct of Operations</b>	2.1.32	Ability to explain and apply system limits and precautions.	4.0	1
	2.1.35	Knowledge of the fuel-handling responsibilities of SROs.	3.9	1
	<b>Category Total:</b>			<b>2</b>
<b>Equipment Control</b>	2.2.11	Knowledge of the process for controlling temporary design changes.	3.3	1
	2.2.37	Ability to determine operability and/or availability of safety related equipment.	4.6	1
	<b>Category Total:</b>			<b>2</b>
<b>Radiation Control</b>	2.3.13	Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.8	1
	<b>Category Total:</b>			<b>1</b>
<b>Emergency Procedures/Plan</b>	2.4.26	Knowledge of facility protection requirements, including fire brigade and portable fire fighting equipment usage.	3.6	1
	2.4.29	Knowledge of the emergency plan.	4.4	1
	<b>Category Total:</b>			<b>2</b>

**Generic Total: 7**

Tier/Group	Randomly Selected K/A	Reason for Rejection
RO 2/2	002 K4.09	Salem has no RCS loop isolation valves. Randomly automatically replaced with System 068, Liquid Radwaste system, K1.07.
RO 2/1	026 K4.08	Containment spray system has no suction auto swapover feature, it is part of the RHR system. Randomly automatically replaced with System 026 Containment Spray system, 2.4.31.
RO 2/1	061 Gen 2.2.41	"Ability to obtain" drawings N/A to written exam. Randomly automatically replaced with System 012, RPS system, A3.01.
RO 2/1	064 Gen 2.1.19	"Ability to use Plant Computer" N/A to written exam. Randomly automatically replaced with system 064, EDG system, K1.03.
RO 2/1	086 Gen 2.1.13	Knowledge of requirements for controlling vital area access not related to Fire Protection system. Randomly automatically replaced with system 086, Fire Protection system A4.02.
RO 1/2	024 Gen 2.1.13	Knowledge of requirements for controlling vital area access not related to Emergency Boration. Randomly automatically replaced with 003 Dropped Control Rod, AK2.05. (see next deletion also)
RO 1/2	003 AK2.03	Salem does not have a metroscope associated with Rod Control. Randomly automatically replaced with 003, AK2.05.
RO 1/1	054 Gen 2.1.17	"Ability to make accurate, clear, and concise verbal reports" more suited to operating exam evaluation. Randomly automatically replaced with 054 2.4.46.
RO 1/1	062 Gen 2.1.15	"Knowledge of administrative requirements such as standing orders, night orders..." not applicable to loss of Nuclear Service Water. Randomly automatically replaced with 065 Loss of Instrument Air, 2.3.14.
RO 1/1	025 AA1.09	K/A overlapped from previous 2 exams. Deleted per NRC instruction. Randomly replaced with 077 Generator Voltage and Electric Grid Disturbances, AA1.02. This K/A was not sampled on the previous 2 exams.
RO 1/1	008 AK1.01	K/A overlapped from previous 2 exams. Deleted per NRC instruction. Randomly replaced with E12 Uncontrolled Depressurization of All Steam Generators, EK1.1. This K/A was not sampled on the 2 previous exams.
SRO 2/1	010 A2.03	K/A overlapped from previous 2 exams. Deleted per NRC instruction. Randomly replaced with 005 Residual Heat Removal system, A2.02. This K/A was not sampled on the 2 previous exams.
SRO 3	2.3.4	K/A overlapped from previous 2 exams. Deleted per NRC instruction. Randomly replaced with 2.3.13. (Was sampled on the 08-01 RO exam.)

SRO 3	2.1.6	“Ability to manage the control room crew during plant transients” more suited to operating exam evaluation. Randomly automatically replaced with 2.1.32
SRO 1/1	E11 Gen 2.2.5	Knowledge of process for making design or operating changes to the facility NA to Loss of Emergency Coolant Recirculation. Randomly automatically replaced with PZR Vapor Space Accident 008, 2.1.4. (see next deletion also)
SRO 1/1	008 Gen 2.1.4	Individual Licensed Operator Responsibilities NA to PZR Vapor Space Accident. Randomly automatically replaced with 009 Small Break LOCA, 2.2.44.
SRO 1/1	E06 Gen 2.2.6	Knowledge of the process for making changes to procedures NA to Degraded Core Cooling. 028 PZR Level Control Malfunctions 2.2.43
SRO 2/2	029 Gen 2.1.4	Knowledge of individual licensed operator responsibilities related to shift staffing...NA to Containment Purge. Randomly automatically replaced with System 016 Non-Nuclear Instrumentation, 2.2.37



Facility: <u>SALEM</u>		Date of Examination: <u>11/26/12</u>
Examination Level:      • RO      SRO		Operating Test Number: <u>11-01 NRC</u>
Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R,M	Calculate Shutdown Margin 2.1.25 Ability to interpret reference materials such as graphs, curves, tables, etc.. RO 3.9
Conduct of Operations	R,N	Perform Manual AFD calculation. 2.1.18 Ability to make accurate, clear, and concise logs, records, status boards, and reports. RO 3.6
Equipment Control	S,N	Perform ST.CVC-010 Borated Water Sources (Simulator) 2.2.37 Ability to determine operability and/or availability of safety related equipment. RO 3.6
Radiation Control	R,M,P	Perform radiation dose calculation and determine if any Dose Limit will be exceeded. 2.3.4 Knowledge of radiation exposure limits under normal and emergency conditions. RO 3.2
Emergency Procedures / Plan	N/A	
<p>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.</p>		
<p>*Type Codes and Criteria      (C)ontrol Room, (S)imulator, or Class(R)oom             (D)irect from bank, (≤3 for ROs; ≤4 for SROs &amp; RO retakes)             (N)ew or (M)odified from bank (≥1)             (P)revious 2 exams (≤1; randomly selected)</p>		

Facility: <b>SALEM</b>		Date of Examination: <b>11/26/12</b>
Examination Level: RO • SRO		Operating Test Number: <b>11-01 NRC</b>
Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R,D	Review a completed surveillance to demonstrate Operability of 21 CFCU 2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. SRO-4.2
Conduct of Operations	R,D	Direct Actions for Spent Fuel Movement (Determine work which would require suspension of Fuel Movement) 2.1.42 Knowledge of new and spent fuel movement procedures. SRO-3.4
Equipment Control	R,M	Review an OTSC to an Implementing Procedure 2.2.6 Knowledge of the process for making changes in procedures . SRO 3.6
Radiation Control	R,N	Determine required actions upon Radioactive Effluent Monitor failure 2.3.11 Ability to control radiation releases SRO 4.3 (based on Pilgrim 1/2011 NRC Exam SRO A3)
Emergency Procedures / Plan	S,M,P	Classify Emergency / Non-Emergency Events, and complete the ICMF. 2.4.29 Knowledge of the Emergency Plan SRO 4.4
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 and Criteria (C)ontrol Room, (S)imulator, or Class(R)oom (D)irect from bank, ( $\leq 3$ for ROs; $\leq 4$ for SROs & RO retakes) (N)ew or (M)odified from bank ( $\geq 1$ ) (P)revious 2 exams ( $\leq 1$ ; randomly selected)		

Facility: <b>SALEM</b>	Date of Examination: <b>11/26/2012</b>
Exam Level : <span style="border: 1px solid black; padding: 2px;">RO</span> SRO-I    SRO-U	Operating Test No.: <b>11-01 NRC</b>

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) Perform a Control Rod Operability Verification. 001 A4.03 RO-4.0 SRO-3.7	A,D,S	1
b) Perform ECCS Accumulator check valve forward flow surveillance (S2.OP-ST.SJ-0006) 006 A4.02, RO-4.0, SRO 3.8	N,A,L,S,EN	2
c) TCAF Pressurizer Pressure Malfunction (Failed open Pressurizer Spray Valve) 010 A4.01, RO 3.7 SRO 3.5	A,D,P,L,S	3
d) TCAF loss of RHR in Shutdown Cooling Mode APE 025 AA1.09 RO-3.2 SRO 3.1	D,L,S	4(pri)
e) TCAF Turbine Trip <P-9 (MT ASO trip) Generic 2.4.31 RO-4.2 SRO-4.1	M,A,P,S	4(sec)
f) Adjust PZR Relief Tank (PRT) Level and Pressure 007 A4.04 RO-2.6 SRO-2.6	D,S	5
g) Respond to a loss of Control Air APE 065 AA2.06 RO 3.6 SRO 4.2	A,N,S	8
h) Perform an Authorized Release of Radioactive Liquid Waste to the Circulating Water System (and respond to High Radiation with failure of 2WL51 to automatically shut.) 068 A4.03 RO-3.9, SRO-3.8	A,D,S	9

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

i) Locally Borate the RCS APE 068 AA1.08 RO- 4.2 SRO- 4.2	D,E,R	2
j) Start and synch EDG Start and synchronize an EDG 064 A2.09 RO-3.1 SRO-3.3	D,R	6
k) Start the SBO Air Compressor Generic 2.1.23 RO-4.3 SRO-4.4	D,E,P	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: <b>SALEM</b>	Date of Examination: <b>11/26/2012</b>
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U	Operating Test No.: <b>11-01 NRC</b>

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) Perform a Control Rod Operability Verification. 001 A4.03 RO-4.0 SRO-3.7	A,D,S	1
b) Perform ECCS Accumulator check valve forward flow surveillance (S2.OP-ST.SJ-0006) 006 A4.02, RO-4.0, SRO 3.8	N,A,L,S,EN	2
c) TCAF Pressurizer Pressure Malfunction (Failed open Pressurizer Spray Valve) 010 A4.01, RO 3.7 SRO 3.5	A,D,P,L,S	3
d)		
e) TCAF Turbine Trip <P-9 (MT ASO trip) Generic 2.4.31 RO-4.2 SRO-4.1	M,A,P,S	4(sec)
f) Adjust PZR Relief Tank (PRT) Level and Pressure 007 A4.04 RO-2.6 SRO-2.6	D,S	5
g) Respond to a loss of Control Air APE 065 AA2.06 RO 3.6 SRO 4.2	A,N,S	8
h) Perform an Authorized Release of Radioactive Liquid Waste to the Circulating Water System (and respond to High Radiation with failure of 2WL51 to automatically shut.) 068 A4.03 RO-3.9, SRO-3.8	A,D,S	9

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

i) Locally Borate the RCS APE 068 AA1.08 RO- 4.2 SRO- 4.2	D,E,R	2
j) Start and synch EDG Start and synchronize an EDG 064 A2.09 RO-3.1 SRO-3.3	D,R	6
k) Start the SBO Air Compressor Generic 2.1.23 RO-4.3 SRO-4.4	D,E,P	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: SALEM 1 & 2 Scenario No.: ESG-1 Op-Test No.: 11-01 NRC

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions: 100% power, EOL. PZR Pressure channel II is O/S for calibration.

Turnover: Maintain current power. Perform IST Room Cooler Valves Modes 1-6 IAW S2.OP-ST.SW-0014.

Event No.	Malf. No.	Event Type*	Event Description
1		N CRS/PO	Safety Related Room cooler surveillance (TS)
2	SG0095A	I	SG NR Ch failure (TS)
3	TA0314 RD0061	R, C ALL	Stator Water runback w/ subsequent auto rod control failure
4	O/R CF12	C CRS/PO	MS10 failure in automatic
5	RP0176A C812/C809 RC0001	M ALL	Inadvertent SI, 2C 4KV vital bus UV following Rx trip, LBLOCA
6	RP318A1,2	C ALL	Lo Head ECCS fails to actuate
7	RP0277A,B	C CRS RO	CS fails to actuate
8	CV62B	C RO	Charging pump cavitation
			CT's: Init Cont Spray, initiate Lo head ECCS, xfer to CLR, trip cavitating charging pp.

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: SALEM 1 & 2 Scenario No.: ESG-2 Op-Test No.: 11-01 NRC

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions: 75% power, MOL. Power was reduced 30 minutes ago due to a short duration oscillation on 21SGFP speed. PZR PORV 2PR1 was declared inoperable 3 hours ago due to control circuit problems, and its motor operated block valve 2PR6 is shut and power is removed from its breaker to comply with TSAS 3.4.5 action b.

Turnover: Maintain current power.

Event No.	Malf. No.	Event Type*	Event Description
1	RC0014B	I CRS RO	22 RC Loop Tavg Channel failure (TS)
2	SG0078C	C ALL	500 gpd SGTL on 23 SG. (TS)
3		R ALL	Power reduction
4	SG0078C	M ALL	SGTR on 23 SG
5	EL0134	C ALL	Loss of Off Site power during SGTR RCS cooldown (RO/CRS restart safeguards loads, PO re-establish RCS cooldown via SG atmospheric reliefs)
6	VL0298	C CRS RO	Only available PZR PORV 2PR2 fails to open results in SGTR without RCS pressure control
			CTs: 1. Isolate feedwater into and steam flow out of 23 SG, 2. Cooldown and maintain CET Target temperature.

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: SALEM 1 & 2 Scenario No.: ESG-3 Op-Test No.: 11-01 NRC

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions: 47%, BOL, Rod control is in manual for insertion of new NI currents, currently performing SC.IC-DC.NIS-0021 for 2N41. 21 Charging pump is C/T due to bio-fouling. 22 charging pump is in service. 23 charging pump is inoperable but available. 21 SGFP O/S for speed control troubleshooting, HDPs O/S, calorimetric just performed SAT IAW requirement of S2.OP-IO.ZZ-0004, Power Operations. 21 and 22 condensate pumps in service. 23A Circulator C/T for corrective maintenance. Minor CW grassing has been occurring.

Turnover: Raise power to 51% @ 10% per hour, place all HDP I/S, continue power ascension to 60% at 10% per hour, all IAW IOP-4.

Event No.	Malf. No.	Event Type*	Event Description
1		N ALL	Raise power
2	AN3855 AN0023 DA003D	CRS	2A1 125VDC batter charger trip (TS)
3	PR0016A	CRS RO	PZR Press Inst fails hi (during first 1% power up) (TS)
4	C325 CN0086B	C CRS PO	Loss of Circ Water Bus Section 23 causes loss of 2 more "A" circulators, degrading Condenser Vacuum
5		R ALL	Power reduction.
6	CN0117A	M ALL	21 Condensate pump trip causes loss of only operating SGFP → Manual Rx trip
7	AF0181B AF0181A B606	C CRS PO	Sequential loss of all AFW → FRHS Red Path
8	CV0208B	C ALL	FRHS Bleed and Feed initiation (no centrifugal charging pumps available) Cond pump recovery.
			CT#1 Establish AFW flow CT#2 Establish RCS Bleed and Feed

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor