Facility: Salem Printed: 09/17/2014

Date Of Exam: 12/15/2014

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				2	2			0	9	0			0	0	
	Tier Totals	5	5	4				5	5			3	27	0			0	0	
2. Plant Systems	1	2	2	3	3	3	2	2	3	2	3	3	28	0			0	0	
	2	1	1	1	1	1	1	1	1	1	1	0	10	0	0		0	0	
	Tier Totals	3	3	4	4	4	3	3	4	3	4	3	38	0			0	0	
3. Generic Knowledge And Abilities Categories		1			2			3			4		10	1	2	3	4	0	
		3			3			2			2			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: 09/17/2014

Facility: Salem

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		EA2.05 - Reactor trip first-out indication	3.4	1
000008 Pressurizer Vapor Space Accident / 3				X			AA1.06 - Control of PZR level	3.6	1
000011 Large Break LOCA / 3			X				EK3.12 - Actions contained in EOP for emergency LOCA (large break)	4.4	1
000015/000017 RCP Malfunctions / 4		X					AK2.08 - CCWS	2.6	1
000022 Loss of Rx Coolant Makeup / 2	X						AK1.01 - Consequences of thermal shock to RCP seals	2.8	1
000025 Loss of RHR System / 4		X					AK2.02 - LPI or Decay Heat Removal/RHR pumps	3.2*	1
000026 Loss of Component Cooling Water / 8				X			AA1.02 - Loads on the CCWS in the control room	3.2	1
000027 Pressurizer Pressure Control System Malfunction / 3		X					AK2.03 - Controllers and positioners	2.6	1
000029 ATWS / 1						X	2.4.50 - Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	4.2	1
000038 Steam Gen. Tube Rupture / 3			X				EK3.03 - Automatic actions associated with high radioactivity in S/G sample lines	3.6*	1
000040 Steam Line Rupture - Excessive Heat Transfer / 4	X						AK1.01 - Consequences of PTS	4.1	1
000055 Station Blackout / 6				X			EA1.07 - Restoration of power from offsite	4.3	1
000057 Loss of Vital AC Inst. Bus / 6			X				AK3.01 - Actions contained in EOP for loss of vital ac electrical instrument bus	4.1	1
000058 Loss of DC Power / 6						X	2.4.46 - Ability to verify that the alarms are consistent with the plant conditions.	4.2	1
000065 Loss of Instrument Air / 8						X	2.1.7 - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	1
000077 Generator Voltage and Electric Grid Disturbances / 6					X		AA2.02 - Voltage outside the generator capability curve	3.5	1
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	X						EK1.2 - Normal, abnormal and emergency operating procedures associated with Loss of Secondary Heat Sink	3.9	1

PWR RO Examination Outline

Printed: 09/17/2014

Facility: Salem

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
W/E11 Loss of Emergency Coolant Recirc. / 4					X		EA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	3.4	1
K/A Category Totals:	**3**	**3**	**3**	**3**	**3**	**3**	**Group Point Total:**		**18**

PWR RO Examination Outline

Printed: 09/17/2014

Facility: Salem

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2** **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000005 Inoperable/Stuck Control Rod / 1					X		AA2.03 - Required actions if more than one rod is stuck or inoperable	3.5	1
000024 Emergency Boration / 1		X					AK2.01 - Valves	2.7	1
000032 Loss of Source Range NI / 7			X				AK3.01 - Startup termination on source-range loss	3.2	1
000036 Fuel Handling Accident / 8	X						AK1.01 - Radiation exposure hazards	3.5	1
000076 High Reactor Coolant Activity / 9				X			AA1.04 - Failed fuel-monitoring equipment	3.2	1
W/E03 LOCA Cooldown - Depress. / 4	X						EK1.2 - Normal, abnormal and emergency operating procedures associated with LOCA Cooldown and Depressurization	3.6	1
W/E07 Inad. Core Cooling / 4		X					EK2.2 - Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility	3.5	1
W/E08 RCS Overcooling - PTS / 4					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.5	1
W/E10 Natural Circ. / 4				X			EA1.3 - Desired operating results during abnormal and emergency situations	3.4	1
K/A Category Totals:	**2**	**2**	**1**	**2**	**2**	**0**	**Group Point Total:**		**9**

PWR RO Examination Outline

Printed: 09/17/2014

Facility: Salem

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						K6.04 - Containment isolation valves affecting RCP operation	2.8	1
003 Reactor Coolant Pump		X										K2.02 - CCW pumps	2.5*	1
004 Chemical and Volume Control								X				A2.30 - Reduction of boron concentration in the letdown flow; its effects on reactor operation	3.3	1
005 Residual Heat Removal		X										K2.01 - RHR pumps	3.0	1
006 Emergency Core Cooling										X		A4.01 - Pumps	4.1	1
006 Emergency Core Cooling											X	2.4.46 - Ability to verify that the alarms are consistent with the plant conditions.	4.2	1
007 Pressurizer Relief/Quench Tank								X				A2.01 - Stuck-open PORV or code safety	3.9	1
008 Component Cooling Water											X	2.2.37 - Ability to determine operability and/or availability of safety related equipment.	3.6	1
010 Pressurizer Pressure Control			X									K3.01 - RCS	3.8	1
010 Pressurizer Pressure Control					X							K5.02 - Constant enthalpy expansion through a valve	2.6	1
012 Reactor Protection				X								K4.02 - Automatic reactor trip when RPS setpoints are exceeded for each RPS function; basis for each	3.9	1
012 Reactor Protection											X	2.4.9 - Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.	3.8	1
013 Engineered Safety Features Actuation			X									K3.01 - Fuel	4.4	1
022 Containment Cooling							X					A1.04 - Cooling water flow	3.2	1
022 Containment Cooling								X				A2.04 - Loss of service water	2.9*	1
026 Containment Spray										X		A4.05 - Containment spray reset switches	3.5	1
039 Main and Reheat Steam					X							K5.08 - Effect of steam removal on reactivity	3.6	1
039 Main and Reheat Steam									X			A3.02 - Isolation of the MRSS	3.1	1
059 Main Feedwater										X		A4.03 - Feedwater control during power increase and decrease	2.9*	1

PWR RO Examination Outline

Printed: 09/17/2014

Facility: Salem

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						K6.02 - Pumps	2.6	1
062 AC Electrical Distribution			X									K3.01 - Major system loads	3.5	1
063 DC Electrical Distribution	X											K1.03 - Battery charger and battery	2.9	1
064 Emergency Diesel Generator									X			A3.05 - Operation of the governor control of frequency and voltage control in parallel operation	2.8	1
073 Process Radiation Monitoring					X							K5.02 - Radiation intensity changes with source distance	2.5	1
073 Process Radiation Monitoring							X					A1.01 - Radiation levels	3.2	1
076 Service Water				X								K4.01 - Conditions initiating automatic closure of closed cooling water auxiliary building header supply and return valves	2.5*	1
078 Instrument Air	X											K1.02 - Service air	2.7*	1
103 Containment				X								K4.06 - Containment isolation system	3.1	1
K/A Category Totals:	**2**	**2**	**3**	**3**	**3**	**2**	**2**	**3**	**2**	**3**	**3**	**Group Point Total:**		**28**

PWR RO Examination Outline

Printed: 09/17/2014

Facility: Salem

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
001 Control Rod Drive					X							K5.06 - Effects of control rod motion on axial offset	3.8	1
002 Reactor Coolant									X			A3.03 - Pressure, temperatures, and flows	4.4	1
011 Pressurizer Level Control						X						K6.06 - Correlation of demand signal indication on charging pump flow valve controller to the valve position	2.5*	1
015 Nuclear Instrumentation				X								K4.02 - Rod motion inhibits	3.7	1
017 In-core Temperature Monitor			X									K3.01 - Natural circulation indications	3.5*	1
028 Hydrogen Recombiner and Purge Control		X										K2.01 - Hydrogen recombiners	2.5*	1
033 Spent Fuel Pool Cooling								X				A2.01 - Inadequate SDM	3.0	1
045 Main Turbine Generator							X					A1.06 - Expected response of secondary plant parameters following T/G trip	3.3	1
056 Condensate	X											K1.03 - MFW	2.6*	1
068 Liquid Radwaste										X		A4.04 - Automatic isolation	3.8	1
K/A Category Totals:	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**Group Point Total:**		**10**

Generic Knowledge and Abilities Outline (Tier 3)

PWR RO Examination Outline

Printed: 09/17/2014

Facility: Salem

Form ES-401-3

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.2	Knowledge of operator responsibilities during all modes of plant operation.	4.1	1
	2.1.27	Knowledge of system purpose and/or function.	3.9	1
	2.1.42	Knowledge of new and spent fuel movement procedures.	2.5	1
		Category Total:		**3**
Equipment Control	2.2.13	Knowledge of tagging and clearance procedures.	4.1	1
	2.2.22	Knowledge of limiting conditions for operations and safety limits.	4.0	1
	2.2.40	Ability to apply Technical Specifications for a system.	3.4	1
		Category Total:		**3**
Radiation Control	2.3.7	Ability to comply with radiation work permit requirements during normal or abnormal conditions.	3.5	1
	2.3.13	Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.4	1
		Category Total:		**2**
Emergency Procedures/Plan	2.4.14	Knowledge of general guidelines for EOP usage.	3.8	1
	2.4.29	Knowledge of the emergency plan.	3.1	1
		Category Total:		**2**
		Generic Total:		**10**

Facility: Salem Printed: 09/17/2014

Date Of Exam: 12/15/2014

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	5			5	10	
2. Plant Systems	1	0	0	0	0	0	0	0	0	0	0	0	0	3			2	5	
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2		1	3	
	Tier Totals	0	0	0	0	0	0	0	0	0	0	0	0	5			3	8	
3. Generic Knowledge And Abilities Categories		1			2			3			4		0	1	2	3	4	7	
		0			0			0			0			2	2	1	2		

Note:

1. Ensure that at least two topics from every 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 SRO Examination Outline

Printed: 09/17/2014

Facility: Salem

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	2.4.30 - 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
000029 ATWS / 1						X	2.4.41 - Knowledge of the emergency action level thresholds and classifications.	4.6	1
000056 Loss of Off-site Power / 6						X	2.1.7 - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.7	1
000062 Loss of Nuclear Svc Water / 4					X		AA2.02 - The cause of possible SWS loss	3.6	1
W/E04 LOCA Outside Containment / 3					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	4.2	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
K/A Category Totals:	**0**	**0**	**0**	**0**	**3**	**3**	**Group Point Total:**		**6**

PWR SRO Examination Outline

Printed: 09/17/2014

Facility: Salem

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2** **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000001 Continuous Rod Withdrawal / 1					X		AA2.05 - Uncontrolled rod withdrawal, from available indications	4.6	1
000003 Dropped Control Rod / 1					X		AA2.01 - Rod position indication to actual rod position	3.9	1
000036 Fuel Handling Accident / 8						X	2.4.11 - Knowledge of abnormal condition procedures.	4.2	1
000060 Accidental Gaseous Radwaste Rel. / 9						X	2.1.32 - Ability to explain and apply system limits and precautions.	4.0	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**2**	**2**	**Group Point Total:**		**4**

PWR SRO Examination Outline

Printed: 09/17/2014

Facility: Salem

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
006 Emergency Core Cooling											X	2.4.6 - Knowledge of EOP mitigation strategies.	4.7	1
026 Containment Spray								X				A2.07 - Loss of containment spray pump suction when in recirculation mode, possibly caused by clogged sump screen, pump inlet high temperature exceeded cavitation, voiding), or sump level below cutoff (interlock) limit	3.9	1
059 Main Feedwater								X				A2.03 - Overfeeding event	3.1*	1
064 Emergency Diesel Generator											X	2.2.22 - Knowledge of limiting conditions for operations and safety limits.	4.7	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**2**	**Group Point Total:**		**5**

PWR SRO Examination Outline

Printed: 09/17/2014

Facility: Salem

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
002 Reactor Coolant											X	2.1.20 - Ability to interpret and execute procedure steps.	4.6	1
033 Spent Fuel Pool Cooling								X				A2.02 - Loss of SFPCS	3.0	1
041 Steam Dump/Turbine Bypass Control								X				A2.02 - Steam valve stuck open	3.9	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**1**	**Group Point Total:**		**3**

Generic Knowledge and Abilities Outline (Tier 3)

PWR SRO Examination Outline

Printed: 09/17/2014

Facility: Salem

Form ES-401-3

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.20	Ability to interpret and execute procedure steps.	4.6	1
	2.1.25	Ability to interpret reference materials, such as graphs, curves, tables, etc.	4.2	1
		Category Total:		**2**
Equipment Control	2.2.5	Knowledge of the process for making design or operating changes to the facility.	3.2	1
	2.2.19	Knowledge of maintenance work order requirements.	3.4	1
		Category Total:		**2**
Radiation Control	2.3.12	Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.7	1
		Category Total:		**1**
Emergency Procedures/Plan	2.4.18	Knowledge of the specific bases for EOPs.	4.0	1
	2.4.29	Knowledge of the emergency plan.	4.4	1
		Category Total:		**2**
		Generic Total:		**7**

Tier/Group	Randomly Selected K/A	Reason for Rejection
SRO 1/1	025 AA2.04	Sampled on CERT exam.
SRO 1/1	056 2.1.44	(ES-401, D.1.b)
SRO 1/1	E05 2.1.40	Refueling admin requirements NA to Loss of Secondary Heat Sink
SRO 1/2	005 2.4.6	Oversampling of rod/rod control problem. Already have 001 cont rod withdrawl and 003 dropped rod on outline.
SRO 2/1	039 A2.04	Essentially the same KA as 041 A2.02 on this exam. (Malfunctioning steam dump/stuck open steam dump)
SRO 2/1	076 2.3.11	(ES-401, D.1.b)
SRO 2/2	072 A2.01	ARM erratic power supply not conducive to SRO level question.
SRO 2/2	017 2.4.26	Facility protection requirements NA to In core temp monitoring system.
SRO 3	2.3.5	Neither SRO level nor written exam conducive to use radiation monitors.
RO 1/1	054 2.1.39	(ES-401, D.1.b)
RO 1/1	062 AA1.03	SWS system cannot be used as backup to CCW System.
RO 1/1	065 2.2.17	(ES-401, D.1.b)
RO 1/1	E04 2.1.45	(ES-401, D.1.b)
RO 1/1	054 2.1.25	(ES-401, D.1.b)
RO 1/1	E04 2.1.2	(ES-401, D.1.b)
RO 1/1	056 2.2.43	(ES-401, D.1.b)
RO 1/2	068 2.1.39	(ES-401, D.1.b)

RO 1/2	060 2.2.7	(ES-401, D.1.b)
RO 2/1	006 A2.06	Water hammer in ECCS system not addressed in procedures.
RO 2/1	007 2.2.4	No unit difference in PRT systems.
RO 2/1	008 2.2.6	(ES-401, D.1.b)
RO 2/1	039 K4.07	Salem does not have a Reactor Building. MSLI is applicable to containment isolation.
RO 2/1	022 2.4.28	(ES-401, D.1.b)
RO 2/1	073 2.1.40	(ES-401, D.1.b)
RO 2/1	003 K5.03	Sampled on CERT exam.
RO 2/1	039 A4.04	Salem does not have Emergency Feedwater pumps turbines
RO 2/2	041 K2.01	Salem does not have an ICS.
RO 2/2	086 2.1.17	(ES-401, D.1.b)
RO 3	2.2.41	Cannot "obtain" drawings during a written exam. More suitable for operating exam.
RO 3	2.3.5	Very close to 2.3.13 on this exam. Oversampling of radiation monitors/alarms. Also more suited to Operating exam.

Facility: **SALEM** Date of Examination: **12/08/14**

Examination Level: • RO SRO Operating Test Number: **13-01 NRC**

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	S,N	Calculate leakrate into containment sump. 2.1.25 (RO 3.9)
Conduct of Operations	R,M	Calculate Quadrant Power Tilt Ratio 2.1.43 Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant temperature, secondary plant, fuel depletion, etc. (RO 4.1)
Equipment Control	R,D,P	Prepare a manual tagout. 2.2.13 Knowledge of tagging and clearance procedures. RO 4.1.
Radiation Control	NA	NA
Emergency Procedures / Plan	S,M	Activate ERDS during an ALERT 2.4.43

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, (≤3 for ROs; ≤4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥1)
(P)revious 2 exams (≤1; randomly selected)

Facility: **SALEM** Date of Examination: **12/08/14**

Examination Level: RO • SRO Operating Test Number: **13-01 NRC**

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R,M	Operate the Chilled Water System (Identify and Isolate Non-Essential Heat Loads) 2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc.
Conduct of Operations	R,M	Review completed QPTR 2.1.18 Ability to make accurate ,clear, and concise logs, records, status boards, and reports. SRO 3.8
Equipment Control	R,D	Evaluate a tagging request. 2.2.13 Knowledge of tagging and clearance procedures SRO 4.3
Radiation Control	R,M	Authorize a Radioactive Gas Release. 2.3.6 Ability to approve release permits. SRO-3.8
Emergency Procedures / Plan	R,N	Make an Emergency Classification Protective Action Recommendation (PAR) 2.4.44

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, (≤3 for ROs; ≤4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥1)
(P)revious 2 exams (≤1; randomly selected)

Facility: **SALEM** Date of Examination: **12/8/14**

Exam Level : **RO** SRO-I SRO-U Operating Test No.: **13-01 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) Perform a Boration Flow Capability to the RCS Surveillance Test (004 A4.18 RO-4.3 SRO-4.4)	D,S	1
b) Transfer to Cold Leg Recirc w/ a cont sump suct valve failure	A,D,EN,S	2
c) TCAF PZR Pressure Malfunction (Isolate leaking PZR PORV)	N,S	3
d) Respond to a Loss of Secondary Heat Sink (Initiate Bleed and Feed using Rx Head Vent Valves)	A,D,P,S	4 (pri)
e) Perform RCS cooldown/depressurization IAW EOP-TRIP-4 Natural Circulation Cooldown	M,A,S	4 (sec)
f) Perform a CFCU Operability and Service Water Flow Verification	M,S	5
g) Failure of Permissive P-6 to block Source Range Hi Flux trip during Rx S/U (012 A4.03 RO-3.6 SRO-3.6)	A,D,L,S	7
h) Start a CCW pump IAW EOP-APPX-1.	A,EN,L,M,S	8
In-Plant Systems (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)		
i) Unload and shutdown an EDG.	D,R	6
j) Transfer PZR BU heaters to emergency power source during LOOP	D,E	3
k) Commence a radioactive liquid waste release, and respond to high activity during the release.	A,D,R	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 (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** Date of Examination: **12/8/14**

Exam Level : **RO** [SRO-I] SRO-U Operating Test No.: **13-01 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) Perform a Boration Flow Capability to the RCS Surveillance Test (004 A4.18 RO-4.3 SRO-4.4)	D,S	1
b) Transfer to Cold Leg Recirc w/ a cont sump suct valve failure	A,D,EN,S	2
c) TCAF PZR Pressure Malfunction (Isolate leaking PZR PORV)	N,S	3
d) Respond to a Loss of Secondary Heat Sink (Initiate Bleed and Feed using Rx Head Vent Valves)	A,D,P,S	4 (pri)
e)		
f) Perform a CFCU Operability and Service Water Flow Verification	M,S	5
g) Failure of Permissive P-6 to block Source Range Hi Flux trip during Rx S/U (012 A4.03 RO-3.6 SRO-3.6)	A,D,L,S	7
h) Start a CCW pump IAW EOP-APPX-1.	A,EN,L,M,S	8
In-Plant Systems (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)		
i) Unload and shutdown an EDG.	D,R	6
j) Transfer PZR BU heaters to emergency power source during LOOP	D,E	3
k) Commence a radioactive liquid waste release, and respond to high activity during the release.	A,D,R	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 (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.: 13-01 NRC

Examiners: _____ Operators:
_____
_____

Initial Conditions: 90% power, EOL.

Turnover: Raise Rx power to 98.5% @ 10% per hour IAW IOP-4, Power Operation.

Event No.	Malf. No.	Event Type*	Event Description
1		R CRS/RO N PO	Raise power
2	AN0266	C CRS	EDG Air Receiver low pressure (TS)
3	CC0172C CC0361B	C CRS/PO	CCW pump trip w / failure of standby pump to start (TS)
4	RC007D	C CRS/RO	RCP seal degradation
5	MS0092H	M ALL	Steam leak in containment
6	MS0092 E-H	C ALL	MSLI failure (Loss of Secondary Coolant)
7	RP318L1 RP318L2	C CRS/RO	Containment Spray pumps fail to start on SEC signal
			CT's: 1. Start minimum complement of containment cooling. 2. Minimize AFW flow

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

Facility: SALEM 1 & 2 Scenario No.: ESG-3 Op-Test No.: 13-01 NRC

Examiners: _____ Operators:
_____
_____

Initial Conditions: 100% power, MOL.

Turnover: Maintain current power. Perform weekly Vacuum Pump swap IAW S2.OP-SO.AR-0001.

Event No.	Malf. No.	Event Type*	Event Description
1		N PO	Swap condenser vacuum pumps
2	VL0336 VL0337	C CRS/PO	Loss of condenser vacuum (recoverable)
3	EL0144	C ALL	Loss of 2A 460 volt vital bus (TS)
4	TU0055	I ALL	Turbine Inlet steam pressure transmitter (PT-505) failure (TS)
5	MS0302	M ALL	Steam dump failure (pressure transmitter) when swapping to MS-Pressure Control Mode
6	RP0108	C CRS/RO	Failure of automatic Safety Injection
7	AF0181B AF0183	C ALL	Loss of All AFW flow – FRHS condensate pump recovery
			CT's: #1 Initiate manual Safety Injection #2 Establish Condensate flow in FRHS

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

Facility: SALEM 1 & 2 Scenario No.: ESG-4 Op-Test No.: 13-01 NRC

Examiners: _____ Operators:
_____
_____

Initial Conditions: 4% power, BOL. Unit is returning from forced outage to repair all 4 RCP diffuser vanes bolting issue. 24 SW pump is C/T for strainer repair.

Turnover: Raise power to 18% @10% per hour.

Event No.	Malf. No.	Event Type*	Event Description
1		R ALL	Raise power
2	SW0216B	C ALL	#2 SW bay leak (TS)
3	RC0002	C ALL	RCS leak (TS)
4	CV0208A CV0208B	C CRS/RO	Centrifugal charging pump fails during swap from PDP while responding to RCS leak.
5	RC0002	M CRS/RO	SBLOCA
6	EL0134	C ALL	LOOP coincident with SI initiation
7	O/R A701 B DI	C CRS/PO	2C SEC fails to initiate
8	RP318S1 RP318S2	C CRS/RO	High head ECCS fails to inject (one pump failed from Event 4 above, other pump doesn't start)
			CT's: #1 Establish High Head ECCS #2 Start minimum SW pumps

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

Facility: SALEM 1 & 2 Scenario No.: ESG-5(Spare) Op-Test No.: 13-01 NRC

Examiners: _____ Operators:
_____
_____

Initial Conditions: 75% power MOL. Power was reduced 30 minutes ago due to 21 SGFP Governor problems. PZR PORV 2PR1 was declared inoperable 3 hours ago due to intermittent control circuit anomalies, and the PORV Block valve 2PR6 was shut and deenergized to comply with TSAS 3.4.5 action b.
Turnover: Maintain current power

Event No.	Malf. No.	Event Type*	Event Description
1	CV0035	C CRS/RO	Charging Master Flow Controller fails low
2	PR0017C		Non-controlling PZR level Channel III fails (TS)
3	SG0078C	C ALL	90 gpd SGTL (TS)
4		R CRS/RO N PO	Downpower
5	SG0078C	M ALL	SGTR
6	AF0182B	C CRS/PO	22 AFW pp pressure override failure
7	EL0134	C ALL	LOOP during RCS cooldown
8	VL0298	C CRS/RO	PZR PORV fails shut/SGTR depress unavail →SGTR-5
			CT's: #1 Isolate AFW #2 C/D to, and maintain, RCS temp

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