

Facility: Salem

Printed: 09/16/2011

Date Of Exam: 09/26/2011

| 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 | 1 | 2 | 2 | |

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/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: 09/16/2011

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 |
|--|----------|----------|----------|----------|----------|----------|--|---------------------------|----------|
| 000015/000017 RCP Malfunctions / 4 | | | | | X | | AA2.10 - When to secure RCPs on loss of cooling or seal injection | 3.7 | 1 |
| 000025 Loss of RHR System / 4 | | | | | | X | 2.4.6 - Knowledge of EOP mitigation strategies. | 4.7 | 1 |
| 000040 Steam Line Rupture - Excessive Heat Transfer / 4 | | | | | X | | AA2.02 - Conditions requiring a reactor trip | 4.7 | 1 |
| 000062 Loss of Nuclear Svc Water / 4 | | | | | X | | AA2.02 - The cause of possible SWS loss | 3.6 | 1 |
| 000065 Loss of Instrument Air / 8 | | | | | | X | 2.1.36 - Knowledge of procedures and limitations involved in core alterations. | 4.1 | 1 |
| W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4 | | | | | | X | 2.4.6 - Knowledge of EOP mitigation strategies. | 4.7 | 1 |
| K/A Category Totals: | 0 | 0 | 0 | 0 | 3 | 3 | | Group Point Total: | 6 |

PWR SRO Examination Outline

Printed: 09/16/2011

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 |
|--|----------|----------|----------|----------|----------|----------|--|---------------------------|----------|
| 000059 Accidental Liquid RadWaste Rel. / 9 | | | | | | X | 2.2.36 - Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations. | 4.2 | 1 |
| W/E07 Inad. Core Cooling / 4 | | | | | X | | EA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations | 4.0 | 1 |
| W/E08 RCS Overcooling - PTS / 4 | | | | | X | | EA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations | 4.2 | 1 |
| W/E09 Natural Circ. / 4 | | | | | | X | 2.4.11 - Knowledge of abnormal condition procedures. | 4.2 | 1 |
| K/A Category Totals: | 0 | 0 | 0 | 0 | 2 | 2 | | Group Point Total: | 4 |

PWR SRO Examination Outline

Printed: 09/16/2011

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 |
|--|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---|----------|--------|
| 006 Emergency Core Cooling | | | | | | | | | | | X | 2.4.22 - Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations. | 4.4 | 1 |
| 010 Pressurizer Pressure Control | | | | | | | | X | | | | A2.03 - PORV failures | 4.2 | 1 |
| 013 Engineered Safety Features Actuation | | | | | | | | X | | | | A2.03 - Rapid depressurization | 4.7 | 1 |
| 064 Emergency Diesel Generator | | | | | | | | X | | | | A2.22 - Potential automatic safety sequences (water/CO2) and electrical damage (loose wires) | 2.8* | 1 |
| 076 Service Water | | | | | | | | | | | X | 2.2.37 - Ability to determine operability and/or availability of safety related equipment. | 4.6 | 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: 09/16/2011

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 |
|---------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---|----------|--------|
| 011 Pressurizer Level Control | | | | | | | | X | | | | A2.01 - Excessive letdown | 3.1 | 1 |
| 034 Fuel Handling Equipment | | | | | | | | | | | X | 2.4.35 - Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects. | 4.0 | 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: 09/16/2011

Facility: Salem

Form ES-401-3

| <u>Generic Category</u> | <u>KA</u> | <u>KA Topic</u> | <u>Imp.</u> | <u>Points</u> |
|----------------------------------|------------------------|---|-------------|---------------|
| Conduct of Operations | 2.1.23 | Ability to perform specific system and integrated plant procedures during all modes of plant operation. | 4.4 | 1 |
| | 2.1.32 | Ability to explain and apply system limits and precautions. | 4.0 | 1 |
| | Category Total: | | | 2 |
| Equipment Control | 2.2.23 | Ability to track Technical Specification limiting conditions for operations. | 4.6 | 1 |
| | Category Total: | | | 1 |
| Radiation Control | 2.3.4 | Knowledge of radiation exposure limits under normal or emergency conditions. | 3.7 | 1 |
| | 2.3.14 | Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities. | 3.8 | 1 |
| | Category Total: | | | 2 |
| Emergency Procedures/Plan | 2.4.27 | Knowledge of "fire in the plant" procedure. | 3.9 | 1 |
| | 2.4.38 | Ability to take actions called for in the facility emergency plan, including supporting or acting as emergency coordinator if required. | 4.4 | 1 |
| | Category Total: | | | 2 |
| Generic Total: | | | | 7 |

Facility: Salem

Printed: 09/16/2011

Date Of Exam: 09/26/2011

| 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 | 2 | N/A | | | 1 | 2 | N/A | | | 0 | 9 | 0 | 0 | 0 |
| | Tier Totals | 5 | 5 | 5 | N/A | | | 4 | 5 | N/A | | | 3 | 27 | 0 | 0 | 0 |
| 2. Plant Systems | 1 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 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 | 3 | 3 | 4 | 4 | 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:

- 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 RO Examination Outline

Printed: 09/16/2011

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 | | EA2.03 - Reactor trip breaker position | 4.2 | 1 |
| 000008 Pressurizer Vapor Space Accident / 3 | | | | | | X | 2.2.39 - Knowledge of less than or equal to one hour Technical Specification action statements for systems. | 3.9 | 1 |
| 000009 Small Break LOCA / 3 | | | X | | | | EK3.28 - Manual ESFAS initiation requirements | 4.5 | 1 |
| 000011 Large Break LOCA / 3 | | | | | | X | 2.1.8 - Ability to coordinate personnel activities outside the control room. | 3.4 | 1 |
| 000015/000017 RCP Malfunctions / 4 | | X | | | | | AK2.07 - RCP seals | 2.9 | 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 | | | | | | AK1.01 - Loss of RHRS during all modes of operation | 3.9 | 1 |
| 000026 Loss of Component Cooling Water / 8 | | | | | | X | 2.1.32 - Ability to explain and apply system limits and precautions. | 3.8 | 1 |
| 000027 Pressurizer Pressure Control System Malfunction / 3 | | | | X | | | AA1.03 - Pressure control when on a steam bubble | 3.6 | 1 |
| 000029 ATWS / 1 | | | | | X | | EA2.04 - CVCS centrifugal charging pump operating indication | 3.2* | 1 |
| 000038 Steam Gen. Tube Rupture / 3 | X | | | | | | EK1.02 - Leak rate vs. pressure drop | 3.2 | 1 |
| 000040 Steam Line Rupture - Excessive Heat Transfer / 4 | | X | | | | | AK2.01 - Valves | 2.6* | 1 |
| 000054 Loss of Main Feedwater / 4 | | | X | | | | AK3.01 - Reactor and/or turbine trip, manual and automatic | 4.1 | 1 |
| 000056 Loss of Off-site Power / 6 | | | | X | | | AA1.08 - HVAC chill water pump and unit | 2.5* | 1 |
| 000062 Loss of Nuclear Svc Water / 4 | | | | | X | | AA2.06 - The length of time after the loss of SWS flow to a component before that component may be damaged | 2.8* | 1 |
| 000065 Loss of Instrument Air / 8 | | | X | | | | AK3.08 - Actions contained in EOP for loss of instrument air | 3.7 | 1 |
| W/E04 LOCA Outside Containment / 3 | | | | X | | | EA1.2 - Operating behavior characteristics of the facility | 3.6 | 1 |
| W/E11 Loss of Emergency Coolant Recirc. / 4 | | X | | | | | EK2.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features | 3.6 | 1 |
| K/A Category Totals: | 3 | 3 | 3 | 3 | 3 | 3 | | Group Point Total: | 18 |

PWR RO Examination Outline

Printed: 09/16/2011

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 |
|---|----------|----------|----------|----------|----------|----------|--|---------------------------|----------|
| 000003 Dropped Control Rod / 1 | | | X | | | | AK3.09 - Recording of group bank position for dropped rod (reference point used to withdraw dropped rod to equal height with other rods in the bank) | 3.0* | 1 |
| 000032 Loss of Source Range NI / 7 | X | | | | | | AK1.01 - Effects of voltage changes on performance | 2.5 | 1 |
| 000033 Loss of Intermediate Range NI / 7 | | | | | X | | AA2.01 - Equivalency between source-range, intermediate-range, and power-range channel readings | 3.0 | 1 |
| 000051 Loss of Condenser Vacuum / 4 | | | X | | | | AK3.01 - Loss of steam dump capability upon loss of condenser vacuum | 2.8* | 1 |
| 000060 Accidental Gaseous Radwaste Rel. / 9 | | X | | | | | AK2.02 - Auxiliary building ventilation system | 2.7 | 1 |
| 000074 Inad. Core Cooling / 4 | | X | | | | | EK2.01 - RCP | 3.6 | 1 |
| W/E03 LOCA Cooldown - Depress. / 4 | X | | | | | | EK1.1 - Components, capacity, and function of emergency systems | 3.4 | 1 |
| W/E13 Steam Generator Over-pressure / 4 | | | | X | | | EA1.2 - Operating behavior characteristics of the facility | 3.0 | 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 |
| K/A Category Totals: | 2 | 2 | 2 | 1 | 2 | 0 | | Group Point Total: | 9 |

PWR RO Examination Outline

Printed: 09/16/2011

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 | | | | | | | | | K3.02 - S/G | 3.5 | 1 |
| 004 Chemical and Volume Control | | | | | | X | | | | | | K6.05 - Sensors and detectors | 2.5 | 1 |
| 005 Residual Heat Removal | | | | | | | | | | | X | 2.4.46 - Ability to verify that the alarms are consistent with the plant conditions. | 4.2 | 1 |
| 005 Residual Heat Removal | X | | | | | | | | | | | K1.01 - CCWS | 3.2 | 1 |
| 006 Emergency Core Cooling | | | | X | | | | | | | | K4.06 - Recirculation of minimum flow through pumps | 2.7 | 1 |
| 007 Pressurizer Relief/Quench Tank | | | | | | | | | X | | | A3.01 - Components which discharge to the PRT | 2.7* | 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 | | | | | | | | | K3.01 - RCS | 3.8 | 1 |
| 010 Pressurizer Pressure Control | | | | | | | | | | X | | A4.03 - PORV and block valves | 4.0 | 1 |
| 012 Reactor Protection | | | | | | | | | | | X | 2.4.6 - Knowledge of EOP mitigation strategies. | 3.7 | 1 |
| 012 Reactor Protection | | | | X | | | | | | | | K4.06 - Automatic or manual enable/disable of RPS trips | 3.2 | 1 |
| 013 Engineered Safety Features Actuation | | | | | | | | | | X | | A4.01 - ESFAS-initiated equipment which fails to actuate | 4.5 | 1 |
| 013 Engineered Safety Features Actuation | | | | | | | X | | | | | A1.04 - S/G level | 3.4 | 1 |
| 022 Containment Cooling | | | X | | | | | | | | | K3.02 - Containment instrumentation readings | 3.0 | 1 |
| 026 Containment Spray | | | | | | | | | | X | | A4.01 - CSS controls | 4.5 | 1 |
| 026 Containment Spray | | | | | | | | | X | | | A3.01 - Pump starts and correct MOV positioning | 4.3 | 1 |
| 039 Main and Reheat Steam | | | | | | | X | | | | | A1.06 - Main steam pressure | 3.0 | 1 |
| 039 Main and Reheat Steam | | | | | X | | | | | | | K5.01 - Definition and causes of steam/water hammer | 2.9 | 1 |
| 059 Main Feedwater | | | | | | | | X | | | | A2.12 - Failure of feedwater regulating valves | 3.1* | 1 |
| 061 Auxiliary/Emergency Feedwater | | | | | X | | | | | | | K5.03 - Pump head effects when control valve is shut | 2.6 | 1 |
| 062 AC Electrical Distribution | X | | | | | | | | | | | K1.03 - DC distribution | 3.5 | 1 |

PWR RO Examination Outline

Printed: 09/16/2011

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 |
|----------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---|-----------|--------|
| 063 DC Electrical Distribution | | | | | | | | X | | | | A2.01 - Grounds | 2.5 | 1 |
| 064 Emergency Diesel Generator | | X | | | | | | | | | | K2.02 - Fuel oil pumps | 2.8* | 1 |
| 073 Process Radiation Monitoring | | | | | | | | X | | | | A2.01 - Erratic or failed power supply | 2.5 | 1 |
| 076 Service Water | | X | | | | | | | | | | K2.01 - Service water | 2.7* | 1 |
| 078 Instrument Air | X | | | | | | | | | | | K1.04 - Cooling water to compressor | 2.6 | 1 |
| 103 Containment | | | | | | | X | | | | | A1.01 - Containment pressure, temperature, and humidity | 3.7 | 1 |
| K/A Category Totals: | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | Group Point Total: | 28 | |

PWR RO Examination Outline

Printed: 09/16/2011

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 | | | | | | | | | K3.02 - RCS | 3.4* | 1 |
| 011 Pressurizer Level Control | | X | | | | | | | | | | K2.02 - PZR heaters | 3.1 | 1 |
| 033 Spent Fuel Pool Cooling | X | | | | | | | | | | | K1.05 - RWST | 2.7* | 1 |
| 035 Steam Generator | | | | | | | X | | | | | A1.01 - S/G wide and narrow range level during startup, shutdown, and normal operations | 3.6 | 1 |
| 041 Steam Dump/Turbine Bypass Control | | | | | | X | | | | | | K6.03 - Controller and positioners, including ICS, S/G, CRDS | 2.7 | 1 |
| 045 Main Turbine Generator | | | | | | | | | | X | | A4.06 - Turbine stop valves | 2.8 | 1 |
| 056 Condensate | | | | | | | | X | | | | A2.04 - Loss of condensate pumps | 2.6 | 1 |
| 071 Waste Gas Disposal | | | | | X | | | | | | | K5.04 - Relationship of hydrogen/oxygen concentrations to flammability | 2.5 | 1 |
| 072 Area Radiation Monitoring | | | | X | | | | | | | | K4.03 - Plant ventilation systems | 3.2* | 1 |
| 086 Fire Protection | | | | | | | | | X | | | A3.02 - Actuation of the FPS | 2.9 | 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: 09/16/2011

Facility: Salem

Form ES-401-3

| <u>Generic Category</u> | <u>KA</u> | <u>KA Topic</u> | <u>Imp.</u> | <u>Points</u> |
|----------------------------------|------------------------|--|-------------|---------------|
| Conduct of Operations | 2.1.36 | Knowledge of procedures and limitations involved in core alterations. | 3.0 | 1 |
| | 2.1.37 | Knowledge of procedures, guidelines, or limitations associated with reactivity management. | 4.3 | 1 |
| | Category Total: | | | 2 |
| Equipment Control | 2.2.12 | Knowledge of surveillance procedures. | 3.7 | 1 |
| | 2.2.22 | Knowledge of limiting conditions for operations and safety limits. | 4.0 | 1 |
| | 2.2.42 | Ability to recognize system parameters that are entry-level conditions for Technical Specifications. | 3.9 | 1 |
| | Category Total: | | | 3 |
| Radiation Control | 2.3.4 | Knowledge of radiation exposure limits under normal or emergency conditions. | 3.2 | 1 |
| | 2.3.11 | Ability to control radiation releases. | 3.8 | 1 |
| | Category Total: | | | 2 |
| Emergency Procedures/Plan | 2.4.18 | Knowledge of the specific bases for EOPs. | 3.3 | 1 |
| | 2.4.27 | Knowledge of "fire in the plant" procedure. | 3.4 | 1 |
| | 2.4.43 | Knowledge of emergency communications systems and techniques. | 3.2 | 1 |
| | Category Total: | | | 3 |
| Generic Total: | | | 10 | |

| Facility: SALEM | | Date of Examination: 09/19/11 |
|---|--|--|
| Examination Level: • RO SRO | | Operating Test Number: 09-01 NRC |
| Administrative Topic (See Note) | Type Code* | Describe activity to be performed |
| Conduct of Operations | R,D | Respond to a Void in the Reactor Vessel (calculate RPV Head vent time) 2.1.25 Ability to interpret reference materials such as graphs, curves, tables, etc. RO-3.9 |
| Conduct of Operations | R,N | TCAF a Loss of Spent Fuel Pool Cooling. (Calculate the time at which Spent Fuel Pool temperature will exceed Design Bases 2.1.44 Knowledge of RO duties in the control room during fuel handling, such as responding to alarms from the fuel handling area, communication with the fuel storage facility, systems operated from the control room in support of fueling operations, and supporting instrumentation. RO-3.9 |
| Equipment Control | R,M | Prepare a manual tagout. 2.2.13 Knowledge of tagging and clearance procedures. RO 4.1. |
| Radiation Control | | N/A |
| Emergency Procedures / Plan | S,D,P | Perform the duties of the Secondary Communicator during an Alert 2.4.39 Knowledge of ROs responsibilities in Emergency Plan implementation. RO 3.9 |
| 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: <u>SALEM</u> | | Date of Examination: <u>09/19/2011</u> |
|--|------------|--|
| Examination Level: RO • SRO | | Operating Test Number: <u>09-01 NRC</u> |
| Administrative Topic (See Note) | Type Code* | Describe activity to be performed |
| Conduct of Operations | R, N | Determine the required actions based on abnormal Secondary Plant chemistry conditions. 2.1.34 Knowledge of primary and secondary plant chemistry limits. SRO-3.5 |
| Conduct of Operations | R,D | Determine the TSAS for a dropped rod and complete the applicable log 2.1.18 Ability to make accurate, clear, and concise logs, records, status boards, and reports. SRO-3.8 |
| Equipment Control | R,M | Review completed Shutdown Margin calculation. 2.2.12 Knowledge of surveillance procedures SRO 4.1 |
| Radiation Control | R,D | Select release path (and mark up prints) for Radioactive Liquid Release. 2.3.6 Ability to approve release permits SRO-3.8 |
| Emergency Plan | S,M,P | Classify Emergency / Non-Emergency Events, and complete the ICMF. 2.4.29 Knowledge of the Emergency Plan SRO 4.4 |
| <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 & RO retakes) (N)ew or (M)odified from bank (1) (P)revious 2 exams (1; randomly selected)</p> | | |

| | |
|--|--------------------------------------|
| Facility: SALEM | Date of Examination: 09/19/11 |
| Exam Level : RO SRO-I SRO-U | Operating Test No.: 09-01 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) Respond to successive dropped control rods at power (003 AA2.03 RO-3.6 SRO-3.8) | A,D,S,P | 1 |
| b) Raise ECCS Accumulator Level with a Safety Injection Pump (006 A4.07 RO-4.4 SRO- 4.4) | D, S | 2 |
| c) Respond to a PZR Spray Valve Failure (010 A4.01 RO-3.7 SRO-3.5) | A,D,L,S,P | 3 |
| d) Respond to a Loss of Secondary Heat Sink (Initiate Bleed and Feed using head vent valves) (EPE E05 EA1.1 RO-4.1 SRO-4.0) | A,L,N,S | 4 (pri) |
| e) TCAF Turbine Trip <P-9 (Loss of TAC Tank exp tank level) (Generic 2.4.31 RO-4.2 SRO-4.1) | A, N, S | 4(sec) |
| f) Transfer 4KV Group busses to APT, trip Rx upon ATWT (062 A4.01 RO-3.3 SRO-3.1) | A,N,S | 6 |
| g) TCAF Undercompensated IRNI in TRIP-2 (EPE 007 EA1.05 RO-4.0 SRO-4.1) | A,L,D,S | 7 |
| h) TCAF loss of the CCW system. (008 A4.01 RO-3.3 SRO-3.1) | N,EN,L,S | 8 |

| In-Plant Systems (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U) | | |
|--|------------|---------|
| i) Locally control Charging Flow (APE 068 AA1.22 RO-4.0 SRO- 4.3) | D,E, R | 2 |
| j) Reset TDAFW pump steam inlet trip valve 1MS52 (APE 068 AA1.02 RO-4.3 SRO-4.5) | D, E, R, P | 4 (sec) |
| k) TCAF Control Room Evacuation (Trip the Main Turbine, Open the Main Generator Exciter Field Breaker, Trip the SGFPs.) APE 068 AA1.04, AA1.23, AA1.27 All K/A values >2.5 | D, E | 6 |

@ All RO and SRO-I control room (and in plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions ; in-plant systems and functions may overlap those tested in the control room.

| *Type Codes: | Criteria for RO / SRO-I / SRO-U |
|---|-------------------------------------|
| (A)lternate path | 4-6 / 4-6 / 2-3 |
| (C)ontrol room | |
| (D)irect from bank | ≤ 9 / ≤ 8 / ≤ 4 |
| (E)mergency or abnormal in-plant | ≥ 1 / ≥ 1 / ≥ 1 |
| (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: 09/19/11 |
| Exam Level : RO SRO-I SRO-U | Operating Test No.: 09-01 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) Respond to successive dropped control rods at power (003 AA2.03 RO-3.6 SRO-3.8) | A,D,S,P | 1 |
| b) Raise ECCS Accumulator Level with a Safety Injection Pump (006 A4.07 RO-4.4 SRO- 4.4) | D, S | 2 |
| c) Respond to a PZR Spray Valve Failure (010 A4.01 RO-3.7 SRO-3.5) | A,D,L,S,P | 3 |
| d) Respond to a Loss of Secondary Heat Sink (Initiate Bleed and Feed using head vent valves) (EPE E05 EA1.1 RO-4.1 SRO-4.0) | A,L,N,S | 4 (pri) |
| e) TCAF Turbine Trip <P-9 (Loss of Tank exp tank level) (Generic 2.4.31 RO-4.2 SRO-4.1) | A, N, S | 4(sec) |
| f) N/A | | |
| g) TCAF Undercompensated IRNI in TRIP-2 (EPE 007 EA1.05 RO-4.0 SRO-4.1) | A,L,D,S | 7 |
| h) TCAF loss of the CCW system. (008 A4.01 RO-3.3 SRO-3.1) | N,EN,L,S | 8 |

| In-Plant Systems (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U) | | |
|--|------------|---------|
| i) Locally control Charging Flow (APE 068 AA1.22 RO-4.0 SRO- 4.3) | D,E, R | 2 |
| j) Reset TDAFW pump steam inlet trip valve 1MS52 (APE 068 AA1.02 RO-4.3 SRO-4.5) | D, E, R, P | 4 (sec) |
| k) TCAF Control Room Evacuation (Trip the Main Turbine, Open the Main Generator Exciter Field Breaker, Trip the SGFPs.) APE 068 AA1.04, AA1.23, AA1.27 All K/A values >2.5 | D, E | 6 |

@ All RO and SRO-I control room (and in plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions ; in-plant systems and functions may overlap those tested in the control room.

| *Type Codes: | Criteria for RO / SRO-I / SRO-U |
|---|-------------------------------------|
| (A)lternate path | 4-6 / 4-6 / 2-3 |
| (C)ontrol room | |
| (D)irect from bank | ≤ 9 / ≤ 8 / ≤ 4 |
| (E)mergency or abnormal in-plant | ≥ 1 / ≥ 1 / ≥ 1 |
| (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: 09/19/11 |
| Exam Level : RO SRO-I SRO-U | Operating Test No.: 09-01 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) | | |
| b) | | |
| c) Respond to a PZR Spray Valve Failure (010 A4.01 RO-3.7 SRO-3.5) | A, D, L, S, P | 3 |
| d) | | |
| e) TCAF Turbine Trip <P-9 (Loss of Tank exp tank level) (Generic 2.4.31 RO-4.2 SRO-4.1) | A, N, S | 4(sec) |
| f) | | |
| g) | | |
| h) TCAF loss of the CCW system. (008 A4.01 RO-3.3 SRO-3.1) | N,EN,S | 8 |

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

| | | |
|--|--------|---|
| i) Locally control Charging Flow (APE 068 AA1.22 RO-4.0 SRO- 4.3) | D,E, R | 2 |
| j) NA | | |
| k) TCAF Control Room Evacuation (Trip the Main Turbine, Open the Main Generator Exciter Field Breaker, Trip the SGFPs.) APE 068 AA1.04, AA1.23, AA1.27 All K/A values >2.5 | D, E | 6 |

@ All RO and SRO-I control room (and in plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions ; in-plant systems and functions may overlap those tested in the control room.

| *Type Codes: | Criteria for RO / SRO-I / SRO-U |
|---|-------------------------------------|
| (A)lternate path | 4-6 / 4-6 / 2-3 |
| (C)ontrol room | |
| (D)irect from bank | ≤ 9 / ≤ 8 / ≤ 4 |
| (E)mergency or abnormal in-plant | ≥ 1 / ≥ 1 / ≥ 1 |
| (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.: 09-01 NRC

Examiners: _____

Operators: _____

Initial Conditions: 100% power, BOL. 21 AFW pp C/T for oil leak repair. 21 CFCU is C/T. PZR Pressure channel II is O/S for calibration.

Turnover: Maintain 100% power.

| Event No. | Malf. No. | Event Type* | Event Description |
|-----------|--------------------------------|-------------|--|
| 1 | PR0017A | I CRS/RO | Controlling PZR level ch failure (TS) |
| 2 | RC0002 | C ALL | RCS leak (TS) |
| 3 | | N ALL | Power Reduction (directed based on RCS leak) |
| 4 | RC0002 | M ALL | SBLOCA (~100 gpm) |
| 5 | RP0342 RP0343 | C CRS/RO | Failure of automatic High Head injection |
| 6 | AF0182A RP318E2 O/R B606 | C CRS/PO | AFW fails to automatically actuate |
| 7 | O/R C206 | C CRS/PO | SEC fails to reset |
| 8 | RC0002 | C CRS/RO | SBLOCA escalation (ECCS flow re-initiation in TRIP-3) |
| | | | CT's 1. Establish hi head ECCS. 2. Initiate AFW flow. 3.Re-start ECCS pps |
| | | | |

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

O/R = Override

Facility: SALEM 1 & 2 Scenario No.: ESG-2 Op-Test No.: 09-01 NRC

Examiners: _____ Operators: _____

Initial Conditions: 70% power, MOL. 25 Service Water pump is C/T for strainer work.

Turnover: Raise power to 75% at 10% per hour, place 3rd Condensate pump I/S, continue power ascension to 90% power.

| Event No. | Malf. No. | Event Type* | Event Description |
|-----------|--|-------------|--|
| 1 | | N ALL | Raise Power |
| 2 | O/R AG04 | C CRS/PO | In service ABV Exhaust fan trip (TS) |
| 3 | NI0193A | I ALL | PR NI Channel fails (TS) |
| 4 | BF0105A | C | 21 SGFP oil leak |
| 5 | EH0327 O/R B433 | R ALL | 21 SGFP trip, MT fails to auto runback (PO manually initiates turbine runback, RO uses manual rod control) |
| 6 | SG0078B | M ALL | 22 SG Tube leak / tube rupture |
| 7 | RP0058 RP0059A RP0059B O/R B440 O/R B441 O/R C310 O/R C510 | C ALL | ATWT/FRSM |
| 8 | CN0086 MS0093 | C CRS/PO | Loss of condenser vacuum during SGTR cooldown |
| | | | 3 CT, insert neg reactivity, isolate rupt SG, cooldown to target temp |
| | | | |

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

Facility: SALEM 1 & 2 Scenario No.: ESG-3 Op-Test No.: 09-01 NRC

Examiners: _____ Operators: _____

Initial Conditions: 100%, EOL. 21 CFCU is C/T.

Turnover: Secure the Containment Pressure Relief in progress. Maintain current power.

| Event No. | Malf. No. | Event Type* | Event Description |
|-----------|----------------------------|-------------|--|
| 1 | CC0172B | N CRS/PO | 2VC5 (CIV) fails to shut when securing containment pressure relief. (TS) |
| 2 | O/R C808 O/R C805 | C ALL | Loss of 2B 4KV bus (TS) and subsequent failure of 22 AFW pump to stop. |
| 3 | | R ALL | Power reduction to <100%. |
| 4 | MS0088Cr | M | Steam Leak in containment. |
| 5 | RP0058 | C RO | ATWT, (auto demand-no trip-manual trip works) |
| 6 | MS0090Cr VL0420- 423 | M ALL | MSLI fails, Multiple SG depressurization, |
| 7 | RP0276A,B RP0277A,B | C CRS RO | Auto CS & Phase B isolation fails. |
| | | | Recovery of single SG in LOSC-2. |
| | | | CTs man init trip, man inti phase B, lower AFW flow to nlt 1E4 lbm/hr |

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