Facility: Fort Calhoun Printed: 06/21/2010

Date Of Exam: 09/17/2010

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	1	2				1	1			2	9	0			0	0
	Tier Totals	5	4	5				4	4			5	27	0			0	0
2. Plant Systems	1	3	2	3	3	3	2	2	3	2	3	2	28	0			0	0
	2	0	1	1	1	1	1	1	1	1	1	1	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: 06/21/2010

Facility: Fort Calhoun

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
000008 Pressurizer Vapor Space Accident / 3					X		AA2.19 - PZR spray valve failure, using plant parameters	3.4	1
000009 Small Break LOCA / 3		X					EK2.03 - S/Gs	3.0	1
000015/000017 RCP Malfunctions / 4			X				AK3.01 - Potential damage from high winding and/or bearing temperatures	2.5	1
000022 Loss of Rx Coolant Makeup / 2						X	2.4.6 - Knowledge of EOP mitigation strategies.	3.7	1
000025 Loss of RHR System / 4				X			AA1.10 - LPI pump suction valve and discharge valve indicators	3.1*	1
000026 Loss of Component Cooling Water / 8				X			AA1.05 - The CCWS surge tank, including level control and level alarms, and radiation alarm	3.1	1
000027 Pressurizer Pressure Control System Malfunction / 3		X					AK2.03 - Controllers and positioners	2.6	1
000029 ATWS / 1						X	2.1.31 - Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup.	4.6	1
000038 Steam Gen. Tube Rupture / 3			X				EK3.04 - Automatic actions provided by each PRM	3.9	1
000054 Loss of Main Feedwater / 4	X						AK1.01 - MFW line break depressurizes the S/G (similar to a steam line break)	4.1	1
000055 Station Blackout / 6						X	2.4.1 - Knowledge of EOP entry conditions and immediate action steps.	4.6	1
000056 Loss of Off-site Power / 6					X		AA2.86 - Main steam pressure meter scale	2.7*	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						AK1.01 - Battery charger equipment and instrumentation	2.8	1
000062 Loss of Nuclear Svc Water / 4					X		AA2.02 - The cause of possible SWS loss	2.9	1
000077 Generator Voltage and Electric Grid Disturbances / 6		X					AK2.01 - Motors	3.1	1
CE/E02 Reactor Trip - Stabilization - Recovery / 1	X						EK1.3 - Annunciators and conditions indicating signals, and remedial actions associated with the (Reactor Trip Recovery)	3.0	1

PWR RO Examination Outline

Printed: 06/21/2010

Facility: Fort Calhoun

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
CE/E05 Steam Line Rupture - Excessive Heat Transfer / 4				X			EA1.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.9	1
K/A Category Totals:	**3**	**3**	**3**	**3**	**3**	**3**	**Group Point Total:**		**18**

PWR RO Examination Outline

Printed: 06/21/2010

Facility: Fort Calhoun

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		AA2.01 - Rod position indication to actual rod position	3.7	1
000036 Fuel Handling Accident / 8						X	2.2.39 - Knowledge of less than or equal to one hour Technical Specification action statements for systems.	3.9	1
000037 Steam Generator Tube Leak / 3						X	2.2.22 - Knowledge of limiting conditions for operations and safety limits.	4.0	1
000059 Accidental Liquid RadWaste Rel. / 9			X				AK3.04 - Actions contained in EOP for accidental liquid radioactive-waste release	3.8	1
000061 ARM System Alarms / 7	X						AK1.01 - Detector limitations	2.5*	1
000076 High Reactor Coolant Activity / 9		X					AK2.01 - Process radiation monitors	2.6	1
CE/A11 RCS Overcooling - PTS / 4	X						EK1.3 - Annunciators and conditions indicating signals, and remedial actions associated with the (RCS Overcooling)	3.0	1
CE/A13 Natural Circ. / 4				X			EA1.2 - Operating behavior characteristics of the facility	3.1	1
CE/A16 Excess RCS Leakage / 2			X				EK3.2 - Normal, abnormal and emergency operating procedures associated with (Excess RCS Leakage)	2.8	1
K/A Category Totals:	**2**	**1**	**2**	**1**	**1**	**2**	**Group Point Total:**		**9**

PWR RO Examination Outline

Printed: 06/21/2010

Facility: Fort Calhoun

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		A4.08 - RCP cooling water supplies	3.2	1
004 Chemical and Volume Control							X					A1.07 - Maximum specified letdown flow	2.7	1
004 Chemical and Volume Control											X	2.4.31 - Knowledge of annunciator alarms, indications, or response procedures.	4.2	1
005 Residual Heat Removal					X							K5.03 - Reactivity effects of RHR fill water	2.9*	1
006 Emergency Core Cooling						X						K6.03 - Safety Injection Pumps	3.6	1
007 Pressurizer Relief/Quench Tank					X							K5.02 - Method of forming a steam bubble in the PZR	3.1	1
007 Pressurizer Relief/Quench Tank				X								K4.01 - Quench tank cooling	2.6	1
008 Component Cooling Water											X	2.1.28 - Knowledge of the purpose and function of major system components and controls.	4.1	1
008 Component Cooling Water								X				A2.03 - High/low CCW temperature	3.0	1
010 Pressurizer Pressure Control	X											K1.08 - PZR LCS	3.2	1
012 Reactor Protection					X							K5.02 - Power density	3.1*	1
012 Reactor Protection									X			A3.05 - Single and multiple channel trip indicators	3.6	1
013 Engineered Safety Features Actuation				X								K4.03 - Main Steam Isolation System	3.9	1
022 Containment Cooling									X			A3.01 - Initiation of safeguards mode of operation	4.1	1
026 Containment Spray		X										K2.01 - Containment spray pumps	3.4*	1
039 Main and Reheat Steam										X		A4.01 - Main steam supply valves	2.9*	1
039 Main and Reheat Steam	X											K1.02 - Atmospheric relief dump valves	3.3	1
059 Main Feedwater								X				A2.04 - Feeding a dry S/G	2.9*	1
061 Auxiliary/Emergency Feedwater	X											K1.02 - MFW System	3.4	1
062 AC Electrical Distribution			X									K3.02 - ED/G	4.1	1
063 DC Electrical Distribution			X									K3.01 - ED/G	3.7*	1
064 Emergency Diesel Generator								X				A2.14 - Effects (verification) of stopping	2.7	1

PWR RO Examination Outline

Printed: 06/21/2010

Facility: Fort Calhoun

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 ED/G under load on isolated bus	Imp.	Points
073 Process Radiation Monitoring							X					A1.01 - Radiation levels	3.2	1
076 Service Water		X										K2.01 - Service water	2.7*	1
078 Instrument Air			X									K3.01 - Containment air system	3.1*	1
078 Instrument Air										X		A4.01 - Pressure gauges	3.1	1
103 Containment				X								K4.06 - Containment isolation system	3.1	1
K/A Category Totals:	**3**	**2**	**3**	**3**	**3**	**2**	**2**	**3**	**2**	**3**	**2**	**Group Point Total:**		**28**

PWR RO Examination Outline

Printed: 06/21/2010

Facility: Fort Calhoun

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										K2.02 - One-line diagram of power supply to trip breakers	3.6	1
002 Reactor Coolant									X			A3.03 - Pressure, temperatures, and flows	4.4	1
011 Pressurizer Level Control						X						K6.04 - Operation of PZR level controllers	3.1	1
017 In-core Temperature Monitor							X					A1.01 - Core exit temperature	3.7	1
029 Containment Purge										X		A4.01 - Containment purge flow rate	2.5	1
034 Fuel Handling Equipment				X								K4.03 - Overload protection	2.6	1
035 Steam Generator								X				A2.02 - Reactor trip/turbine trip	4.2	1
045 Main Turbine Generator			X									K3.01 - Remainder of the plant	2.9	1
056 Condensate											X	2.1.23 - Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.3	1
086 Fire Protection					X							K5.03 - Effect of water spray on electrical components	3.1	1
K/A Category Totals:	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**Group Point Total:**		**10**

Generic Knowledge and Abilities Outline (Tier 3)

PWR RO Examination Outline

Printed: 06/21/2010

Facility: Fort Calhoun

Form ES-401-3

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.31	Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup.	4.6	1
	2.1.43	Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc.	4.1	1
	2.1.45	Ability to identify and interpret diverse indications to validate the response of another indication.	4.3	1
		Category Total:		**3**
Equipment Control	2.2.1	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.	4.5	1
	2.2.18	Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.	2.6	1
	2.2.41	Ability to obtain and interpret station electrical and mechanical drawings.	3.5	1
		Category Total:		**3**
Radiation Control	2.3.5	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personal monitoring equipment, etc.	2.9	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	2.4.9	Knowledge of low power /shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.	3.8	1
	2.4.37	Knowledge of the lines of authority during implementation of the emergency plan.	3.0	1
		Category Total:		**2**

Generic Knowledge and Abilities Outline (Tier 3)

PWR RO Examination Outline

Printed: 06/21/2010

Facility: Fort Calhoun

Form ES-401-3

Generic Category	KA	KA Topic	Imp.	Points
		Generic Total:		**10**

Tier / Group	Randomly Selected K/A	Reason for Rejection
2/1	013000 2.4.41	EAL classification not a RO task at FCS (Replaced with 008000 2.1.28)
2/1	026000 K4.04	Containment Spray System does not start automatically during a LOCA at FCS. (Replaced with 039000 K1.02)
2/1	076000 2.1.19	No system specific plant computer interface (Replaced with007000 K4.01)
3	000000 2.2.39	K/A addresses system specific topic, not amenable to Tier 3 question. (Replaced with 000000 2.1.43)
3	000000 2.2.44	K/A addresses system specific topic, not amenable to Tier 3 question. (Replaced with 000000 2.2.41)
3	000000 2.3.15	K/A addresses system specific topic, not amenable to Tier 3 question. (Replaced with 000000 2.4.9)
3	000000 2.3.12	Redundant to 2.3.13 which is included in outline (replaced by 2.3.5)
3	000000 2.4.02	K/A addresses system specific topic, not amenable to Tier 3 question. (Replaced with 000000 2.2.18)

Facility: Fort Calhoun Printed: 06/28/2010

Date Of Exam: 09/17/2010

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	1	1		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: 06/28/2010

Facility: Fort Calhoun

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
000008 Pressurizer Vapor Space Accident / 3						X	2.4.20 - Knowledge of operational implications of EOP warnings, cautions, and notes.	4.3	1
000025 Loss of RHR System / 4					X		AA2.05 - Limitations on LPI flow and temperature rates of change	3.5*	1
000029 ATWS / 1						X	2.4.11 - Knowledge of abnormal condition procedures.	4.2	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		AA2.05 - When to commence plant shutdown if instrument air pressure is decreasing	4.1	1
000077 Generator Voltage and Electric Grid Disturbances / 6						X	2.4.18 - Knowledge of the specific bases for EOPs.	4.0	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**3**	**3**	**Group Point Total:**		**6**

PWR SRO Examination Outline

Printed: 06/28/2010

Facility: Fort Calhoun

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
000037 Steam Generator Tube Leak / 3					X		AA2.04 - Comparison of RCS fluid inputs and outputs, to detect leaks	3.7	1
000051 Loss of Condenser Vacuum / 4					X		AA2.01 - Cause for low vacuum condition	2.7*	1
000074 Inad. Core Cooling / 4						X	2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.4	1
CE/E09 Functional Recovery						X	2.4.47 - Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	4.2	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**2**	**2**	**Group Point Total:**		**4**

PWR SRO Examination Outline

Printed: 06/28/2010

Facility: Fort Calhoun

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				A2.13 - Inadvertent SIS actuation	4.2	1
013 Engineered Safety Features Actuation								X				A2.01 - LOCA	4.8	1
039 Main and Reheat Steam								X				A2.03 - Indications and alarms for main steam and area radiation monitors (during SGTR)	3.7	1
061 Auxiliary/Emergency Feedwater											X	2.4.46 - Ability to verify that the alarms are consistent with the plant conditions.	4.2	1
062 AC Electrical Distribution											X	2.4.1 - Knowledge of EOP entry conditions and immediate action steps.	4.8	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: 06/28/2010

Facility: Fort Calhoun

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
028 Hydrogen Recombiner and Purge Control											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
034 Fuel Handling Equipment	X											K1.04 - NIS	3.5	1
075 Circulating Water								X				A2.01 - Loss of intake structure	3.2	1
K/A Category Totals:	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**Group Point Total:**		**3**

Generic Knowledge and Abilities Outline (Tier 3)

PWR SRO Examination Outline

Printed: 06/28/2010

Facility: Fort Calhoun

Form ES-401-3

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.6	Ability to manage the control room crew during plant transients.	4.8	1
	2.1.43	Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc.	4.3	1
		Category Total:		**2**
Equipment Control	2.2.25	Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.	4.2	1
		Category Total:		**1**
Radiation Control	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	3.7	1
	2.3.5	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personal monitoring equipment, etc.	2.9	1
		Category Total:		**2**
Emergency Procedures/Plan	2.4.8	Knowledge of how abnormal operating procedures are used in conjunction with EOPs.	4.5	1
	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines.	4.4	1
		Category Total:		**2**
		Generic Total:		**7**

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/1	000027 2.4.01	No EOP entry condition related to Pressurizer Pressure Control System Malfunction. (Replaced with 000062 AA2.02)
1/1	000038 EA2.11	No FCS procedure for local steam line radiation readings (Replaced with 000077 2.4.18)
1/2	000003 2.4.35	No local auxiliary operator task for dropped control rod (Replaced with 000074 2.4.49)
1/2	000059 AA2.01	No specific failure indication light arrangement for waste liquid release at FCS (Replaced with 000051 AA2.01)
1/2	000060 2.4.47	Will be tested during a simulator scenario event. (Replaced with CE E09 2.4.47)
3	000000 2.1.32	K/A addresses system specific topic, not amenable to Tier 3 question. (Replaced with 000000 2.1.43)

Facility: Fort Calhoun Date of Examination: 9/20/2010
Examination Level: **RO** Revision Number: 0

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
A-1 Conduct of Operations	N	Determine Boron Addition Rate Without Using ERF Computer KA: 2.1.37 (RO Imp: 4.3)
A-2 Conduct of Operations	D	Determine Maximum Diesel Generator Load Based on Weather Conditions KA: 2.1.25 (RO Imp: 3.9)
A-3 Equipment Control	M	Use P&IDs to determine equipment affected by closure of Instrument Air Valve KA: 2.2.41 (RO Imp: 3.5)
A-4 Radiation Control	N	Read a Survey Map and Apply RWP Requirements KA: 2.3.7 (RO Imp: 3.5)
Emergency Procedures/Plan		

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

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: Fort Calhoun Date of Examination: 9/20/2010
Examination Level: **SRO** Revision Number: 0

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
A-5 Conduct of Operations	M	Approve Movement of Spent Fuel Assemblies KA : 2.1.42 (SRO Imp: 3.4)
A-6 Conduct of Operations	N	Review Manual Calorimetric Calculation KA: 2.1.7 (SRO Imp: 4.7)
A-7 Equipment Control	M	Determine Equipment Operability Requirements during Mode Change KA: 2.2.37 (SRO Imp: 4.6)
A-8 Radiation Control	M	Determine Primary to Secondary Leakage and Required Actions KA: 2.3.11 (SRO Imp: 4.3)
A-9 Emergency Procedures/Plan	M	Classify Emergency Action Levels and make Protective Action Recommendations KA: 2.4.41 (SRO Imp: 4.6)

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

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: __Fort Calhoun_ _____ Date of Examination: 9/20/2010
Exam Level: **RO** Revision Number.: 0

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
S-1. Emergency Boration with Loss of BASTs / KA: 004000 A2.14 (3.8/3.9)	M, A, L, S	1
S-2. Transfer Clutch Power Supply/X-Tie Instrument Buses / KA 062000 A4.01 (3.3/3.1)	D, A, S	6
S-3 Transfer Pressurizer Pressure Control during Plant Cooldown / KA 010000 A4.01 (3.7/3.5)	N,A,L,S	3
S-4. Alternate Decay Heat Removal using S/G's (shutdown cooling)/ KA 041000 A4.06 (2.9/3.1)	N,A,L,S	4S
S-5 Lower Level in Pressurizer Quench Tank / KA 007000 A1.01 (2.9/3.1)	N, S	5
S-6 Adjust T-Cold Calibration / KA 012000 A4.02 (3.3/3.4)	D,S	7
S-7 LPSI Pump Operability Test / KA 006000 A4.01 (4.1/3.9)	N, EN,S	2
S-8. Restoration of Auxiliary Building Ventilation / MTL-1353	N, A, S	9
In-Plant Systems[@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
P-1 Minimize DC Loads / KA 000055 EA1.04 (3.5/3.9)	D, E,L	6
P-2 Manual Operation of Raw Water Strainer to clear blockage / 076000 A2.01 (3.5/3.7)	N,A	4S
P-3 Startup Containment Hydrogen Purge and Makeup / KA 028000 A2.02 (3.5/3.9)	D, R, E,L	5

@ 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: __Fort Calhoun_ _____ Date of Examination: 9/20/2010
Exam Level**:** **ISRO** Revision Number.: 0

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
S-1. Emergency Boration with Loss of BASTs / KA: 004000 A2.14 (3.8/3.9)	M, A, L, S	1
S-2. Transfer Clutch Power Supply/X-Tie Instrument Buses / KA 062000 A4.01 (3.3/3.1)	D, A, S	6
S-3 Transfer Pressurizer Pressure Control during Plant Cooldown / KA 010000 A4.01 (3.7/3.5)	N,A,L,S	3
S-4. Alternate Decay Heat Removal using S/G's (shutdown cooling)/ KA 041000 A4.06 (2.9/3.1)	N,A,L,S	4S
S-5 Lower Level in Pressurizer Quench Tank / KA 007000 A1.01 (2.9/3.1)	N, S	5
S-6 Adjust T-Cold Calibration / KA 012000 A4.02 (3.3/3.4)	D,S	7
S-7 LPSI Pump Operability Test / KA 006000 A4.01 (4.1/3.9)	N, EN,S	2

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

P-1 Minimize DC Loads / KA 000055 EA1.04 (3.5/3.9)	D, E,L	6
P-2 Manual Operation of Raw Water Strainer to clear blockage / 076000 A2.01 (3.5/3.7)	N,A	4S
P-3 Startup Containment Hydrogen Purge and Makeup / KA 028000 A2.02 (3.5/3.9)	D, R, E,L	5

@ 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: __Fort Calhoun_ _____ Date of Examination: 9/20/2010
Exam Level: **USRO** Revision Number.: 0

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
S-7 LPSI Pump Operability Test / KA 006000 A4.01 (4.1/3.9)	N, EN,S	2
S-8. Restoration of Auxiliary Building Ventilation / MTL-1353	N, A, S	9

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

P-1 Minimize DC Loads / KA 000055 EA1.04 (3.5/3.9)	D, E,L	6
P-2 Manual Operation of Raw Water Strainer to clear blockage / 076000 A2.01 (3.5/3.7)	N,A	4S
P-3 Startup Containment Hydrogen Purge and Makeup / KA 028000 A2.02 (3.5/3.9)	D, R, E,L	5

@ 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: Fort Calhoun	Scenario No: 2010-1	Revision: 0
Examiners: _____ _____ _____	Operators: _____ _____ _____	
Initial Conditions: Plant at 95% power. FW-54 OOS. RM-054A out of service, RM-054B lined up to sample both S/G's. A Tornado Watch has been issued, AOP-01 has been entered.		
Turnover: AOP-15 was entered and power lowered to 95% due to a flow streaming event. AOP-15, section III actions were taken and AOP-15 was exited. You are directed to return plant power to 100%		

Event No.	Malf No.	Event Type*	Event Description
1		R-ATCO N-BOPO	Raise Reactor power to 100%
2		C-ATCO T-CRS	Charging Pump, CH-1B, Degraded Performance
3		N-BOPO	A Tornado Warning is issued for the plant
4		I-ATCO	VCT Level Transmitter Fails Low.
5		C-ATCO T-CRS	Containment Cooling Fan VA-3B fails
6		C-BOPO N-ATCO T-CRS	480V Bus 1B3A fault
7		M-All	Steam Generator A Tube Rupture
8		M- All	Loss of Offsite Power

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d)		Actual Attributes
1.	Total malfunctions (5–8)	6
2.	Malfunctions after EOP entry (1–2)	1
3.	Abnormal events (2–4)	2
4.	Major transients (1–2)	2
5.	EOPs entered/requiring substantive actions (1–2)	1
6.	EOP contingencies requiring substantive actions (0–2)	2
7.	Critical tasks (2–3)	3

Facility: Fort Calhoun	Scenario No: 2010-2	Revision: 0
Examiners: _____ _____ _____	Operators: _____ _____ _____	
Initial Conditions: Plant at 50% due to only having one condensate pump available		
Turnover: Diesel Generator D-1 out of service. Condensate Pumps FW-2A and FW-2C tagged out. FW-10 Surveillance Test OP-ST-AFW-0004 in Progress.		

Event No.	Malf No.	Event Type*	Event Description
1		N-BOPO T-CRS	FW-10 Surveillance Test (fails)
2		C-ATCO T-CRS	CR HVAC Unit Fails
3		I-ATCO T-CRS	WR NI Channel "D" Fails
4		C-ALL	Waste Gas Decay Tank Ruptures
5		C-ATCO	Two Reactor Coolant Pumps Seals Fail
6		R-ATCO N-BOPO	AOP-05 Power Reduction
7		M-ALL	Steam line Break inside Containment from S/G A
8		I-ATCO	CPHS Fails to actuate

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5–8)	7
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	4
4. Major transients (1–2)	1
5. EOPs entered/requiring substantive actions (1–2)	1
6. EOP contingencies requiring substantive actions (0–2)	2
7. Critical tasks (2–3)	3

Facility: Fort Calhoun	Scenario No: 2010-3	Revision: 0
Examiners: _____ _____ _____	Operators: _____ _____ _____	
Initial Conditions: Plant at 100% Power. Waste Monitor Tank Release in Progress		
Turnover: Diesel Generator D-1 out of service. Power Range NI channel "A" Out of Service		

Event No.	Malf No.	Event Type*	Event Description
1		C-ATCO T-CRS	CCW Leak at pump discharge
2		C-BOPO	Instrument Air Compressor Trips, backup fails to load
3		I-ATCO T-CRS	Pressurizer Level Transmitter, LT-101Y, fails high
4		C-ATCO T-CRS	Power Range NI Channel "C" detector Failure
5		R-ATCO N-BOPO	OP-4 Power Reduction
6		M-ALL	Turbine trip / Reactor Trip
7		M-ALL	Pressurizer Safety Valve fails open
8		I-ATCO	PPLS Fails to actuate

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5–8)	7
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	2
4. Major transients (1–2)	2
5. EOPs entered/requiring substantive actions (1–2)	1
6. EOP contingencies requiring substantive actions (0–2)	1
7. Critical tasks (2–3)	3

Facility: Fort Calhoun	Scenario No: 2010-4	Revision: 0
Examiners: _____ _____ _____	Operators: _____ _____ _____	
Initial Conditions: Plant Operating at 100% Power.		
Turnover:		

Event No.	Malf No.	Event Type*	Event Description
1		I-ATCO T-CRS	Pressurizer Level Transmitter, LT-101Y, fails High
2		C-ATCO	Letdown Backpressure Instrument, PCV-210, fails Low
3		C-BOPO	FW Pump trips. Backup Pumps fail to auto start
4		I-ATCO	Pressurizer Pressure Transmitter, PT-103Y, fails low
5		I-ALL T-CRS	Loss of Instrument Bus "A"
6		C-BOPO	Bearing Water Pump, AC-9B trips, AC-9A fails to start
7		M-All	Manual Reactor Trip
8		I-BOPO	TCV-909-2 Fails Open
9		I-BOPO	SGLS fails to actuate

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5–8)	7
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	2
4. Major transients (1–2)	2
5. EOPs entered/requiring substantive actions (1–2)	1
6. EOP contingencies requiring substantive actions (0–2)	2
7. Critical tasks (2–3)	2

Facility: Fort Calhoun Date of Exam: 9/20/2010 Revision Number.: 0

APPLICANT	EVENT TYPE	Scenarios									TOTAL	MINIMUM(*)		
		1			2			3						
		CREW POSITION			CREW POSITION			CREW POSITION						
		CRS	ATCO	BOPO	CRS	ATCO	BOPO	CRS	ATCO	BOPO		R	I	U
R-1	RX		1								1	1	1	0
	NOR		6				1,6				3	1	1	1
	I/C		2,4,5				4				4	4	4	2
	MAJ		7,8				7				3	2	2	1
	TS											0	2	2
R-2	RX					6					1	1	1	0
	NOR			1,3						5	2	1	2	1
	I/C			6		2,3,4,8				2	5	4	4	2
	MAJ			7,8		7				7	3	2	2	1
	TS											0	2	2
R-3	RX					6					1	1	1	0
	NOR			1,3							2	1	1	1
	I/C			6		2,3,4,8					5	4	4	2
	MAJ			7,8		7					3	2	2	1
	TS											0	2	2
U-1	RX	1						5			2	1	1	0
	NOR	3						5			1	1	1	1
	I/C	2,4,5,6						1,2,3,4,8			9	4	4	2
	MAJ	7,8						6,7			3	2	2	1
	TS	2,5,6						1,3,4			6	0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.

2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.

3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

ES-301 **Transient and Event Checklist** **Form ES-301-5**

Facility: Fort Calhoun Date of Exam: 9/20/2010 Revision Number.: 0

APPLICANT	EVENT TYPE	Scenarios									TOTAL	MINIMUM(*)		
		1			2			3						
		CREW POSITION			CREW POSITION			CREW POSITION						
		CRS	ATCO	BOPO	CRS	ATCO	BOPO	CRS	ATCO	BOPO		R	I	U
U-2	RX	1									1	1	1	0
	NOR	3					1,6				3	1	1	1
	I/C	2,4,5,6					4				5	4	4	2
	MAJ	7,8					7				3	2	2	1
	TS	2,5,6									3	0	2	2
I-1	RX		1		6						2	1	1	0
	NOR		6		1						2	1	2	1
	I/C		2,4,5		2,3,4,5,8						8	4	4	2
	MAJ		7,8		7						3	2	2	1
	TS				1,2,3						3	0	2	2
I-2	RX		1					5			2	1	1	0
	NOR		6				1,6	5			4	1	1	1
	I/C		2,4,5				4	1,2,3,4,8			9	4	4	2
	MAJ		7,8				7	6,7			5	2	2	1
	TS							1,3,4			3	0	2	2
I-3	RX				6				5		2	1	1	0
	NOR			1,3	1						3	1	1	1
	I/C			6	2,3,4,5,8				1,3,4,8		10	4	4	2
	MAJ			7,8	7				7		4	2	2	1
	TS				1,2,3						3	0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.

2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.

3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: Fort Calhoun Date of Exam: 9/20/2010 Revision Number.: 0

APPLICANT	EVENT TYPE	Scenarios									TOTAL	MINIMUM(*)		
		1			2			3						
		CREW POSITION			CREW POSITION			CREW POSITION						
		CRS	ATCO	BOPO	CRS	ATCO	BOPO	CRS	ATCO	BOPO		R	I	U
I-4	RX	1				6					2	1	1	0
	NOR	3								5	2	1	1	1
	I/C	2,4,5,6				2,3,4,8				2	9	4	4	2
	MAJ	7,8				7				7	4	2	2	1
	TS	2,5,6									3	0	2	2
I-5	RX				6				5		2	1	1	0
	NOR				1						1	1	2	1
	I/C				2,3,4,5,8				1,3,4,8		9	4	4	2
	MAJ				7				7		2	2	2	1
	TS				1,2,3						3	0	2	2
	RX											1	1	0
	NOR											1	1	1
	I/C											4	4	2
	MAJ											2	2	1
	TS											0	2	2
	RX											1	1	0
	NOR											1	1	1
	I/C											4	4	2
	MAJ											2	2	1
	TS											0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.

2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.

3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.