Final Submittal
(Blue Paper)

FINAL OUTLINES

ES-401-2

SEQUOYAH
2008-301

Facility: Sequoyah Printed: 01/13/2008

Date Of Exam: 01/28/2008

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	1	2	1				1	2			2	9	0	0	0
	Tier Totals	4	5	4				4	5			5	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	0	1	1	1	10	0 | 0	0	0
	Tier Totals	3	3	4	4	4	3	3	3	3	4	4	38	0	0	0
3. Generic Knowledge And Abilities Categories		1		2		3		4		10				1 2 3 4		0
		3		2		3		2						0 0 0 0		

Note:

1. Ensure that at least two topics from every 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 that are not included on the outline should be added. Refer to ES-401, Attachment 2, 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.

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: 01/13/2008

Facility: Sequoyah

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			EA1.08 - AFW System	4.4	1
000008 Pressurizer Vapor Space Accident / 3					X		AA2.29 - The effects of bubble in reactor vessel	3.9	1
000009 Small Break LOCA / 3					X		EA2.24 - RCP temperature setpoints	2.6	1
000011 Large Break LOCA / 3			X				EK3.13 - Hot-leg injection/recirculation	3.8	1
000015/000017 RCP Malfunctions / 4		X					AK2.08 - CCWS	2.6	1
000022 Loss of Rx Coolant Makeup / 2					X		AA2.03 - Failures of flow control valve or controller	3.1	1
000025 Loss of RHR System / 4		X					AK2.05 - Reactor building sump	2.6	1
000026 Loss of Component Cooling Water / 8			X				AK3.03 - Guidance actions contained in EOP for Loss of CCW	4.0	1
000027 Pressurizer Pressure Control System Malfunction / 3				X			AA1.02 - SCR-controlled heaters in manual mode	3.1*	1
000038 Steam Gen. Tube Rupture / 3						X	2.1.3 - Knowledge of shift turnover practices.	3.0	1
000040 Steam Line Rupture - Excessive Heat Transfer / 4	X						AK1.03 - RCS shrink and consequent depressurization	3.8	1
000055 Station Blackout / 6						X	2.4.29 - Knowledge of the emergency plan.	2.6	1
000056 Loss of Off-site Power / 6	X						AK1.03 - Definition of subcooling: use of steam tables to determine it	3.1*	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			AA1.01 - Nuclear service water temperature indications	3.1	1
W/E04 LOCA Outside Containment / 3						X	2.4.48 - Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions.	3.5	1
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4			X				EK3.1 - Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics	3.4	1

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

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
W/E11 Loss of Emergency Coolant Recirc. / 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	3.9	1
K/A Category Totals:	**3**	**3**	**3**	**3**	**3**	**3**	**Group Point Total:**		**18**

PWR RO Examination Outline

Printed: 01/13/2008

Facility: Sequoyah

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					AK2.05 - Rod motion lights	2.9*	1
000033 Loss of Intermediate Range NI / 7						X	2.4.21 - Knowledge of the parameters and logic used to assess the status of safety functions including: 1. Reactivity control; 2. Core cooling and heat removal; 3. Reactor coolant system integrity; 4. Containment conditions; 5. Radioactivity release control.	3.7	1
000036 Fuel Handling Accident / 8	X						AK1.01 - Radiation exposure hazards	3.5	1
000060 Accidental Gaseous Radwaste Rel. / 9				X			AA1.02 - Ventilation system	2.9	1
000069 Loss of CTMT Integrity / 5						X	2.4.45 - Ability to prioritize and interpret the significance of each annunciator or alarm.	3.3	1
000074 Inad. Core Cooling / 4			X				EK3.07 - Starting up emergency feedwater and RCPs	4.0	1
000076 High Reactor Coolant Activity / 9		X					AK2.01 - Process radiation monitors	2.6	1
W/E09 Natural Circ. / 4					X		EA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	3.1	1
W/E14 Loss of CTMT Integrity / 5					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.3	1
K/A Category Totals:	**1**	**2**	**1**	**1**	**2**	**2**	**Group Point Total:**		**9**

PWR RO Examination Outline

Printed: 01/13/2008

Facility: Sequoyah

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									K3.04 - RPS	3.9	1
003 Reactor Coolant Pump											X	2.3.10 - Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9	1
004 Chemical and Volume Control					X							K5.31 - Purpose of flow path around boric acid storage tank	3.0*	1
004 Chemical and Volume Control									X			A3.08 - Reactor power	3.9	1
005 Residual Heat Removal										X		A4.03 - RHR temperature, PZR heaters and flow, and nitrogen	2.8*	1
006 Emergency Core Cooling	X											K1.02 - ESFAS	4.3	1
007 Pressurizer Relief/Quench Tank			X									K3.01 - Containment	3.3	1
007 Pressurizer Relief/Quench Tank											X	2.1.1 - Knowledge of conduct of operations requirements.	3.7	1
008 Component Cooling Water				X								K4.07 - Operation of the CCW swing-bus power supply and its associated breakers and controls	2.6*	1
010 Pressurizer Pressure Control						X						K6.03 - PZR sprays and heaters	3.2	1
012 Reactor Protection				X								K4.04 - Redundancy	3.1	1
013 Engineered Safety Features Actuation		X										K2.01 - ESFAS/safeguards equipment control	3.6*	1
022 Containment Cooling								X				A2.04 - Loss of service water	2.9*	1
025 Ice Condenser					X							K5.02 - Heat transfer	2.6*	1
026 Containment Spray				X								K4.07 - Adequate level in containment sump for suction (interlock)	3.8*	1
026 Containment Spray											X	2.4.48 - Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions.	3.5	1
039 Main and Reheat Steam							X					A1.09 - Main steam line radiation monitors	2.5*	1
059 Main Feedwater								X				A2.07 - Tripping of MFW pump turbine	3.0*	1
059 Main Feedwater										X		A4.01 - MFW turbine trip indication	3.1*	1

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ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
061 Auxiliary/Emergency Feedwater					X							K5.01 - Relationship between AFW flow and RCS heat transfer	3.6	1
062 AC Electrical Distribution	X											K1.02 - ED/G	4.1	1
063 DC Electrical Distribution		X										K2.01 - Major DC loads	2.9*	1
064 Emergency Diesel Generator						X						K6.08 - Fuel oil storage tanks	3.2	1
073 Process Radiation Monitoring							X					A1.01 - Radiation levels	3.2	1
076 Service Water								X				A2.02 - Service water header pressure	2.7	1
076 Service Water										X		A4.02 - SWS valves	2.6	1
078 Instrument Air			X									K3.01 - Containment air system	3.1*	1
103 Containment									X			A3.01 - Containment isolation	3.9	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: 01/13/2008

Facility: Sequoyah

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						K6.05 - Function of PZR level gauges as postaccident monitors	3.1	1
015 Nuclear Instrumentation		X										K2.01 - NIS channels, components, and interconnections	3.3	1
016 Non-nuclear Instrumentation	X											K1.10 - CCS	3.1*	1
017 In-core Temperature Monitor				X								K4.03 - Range of temperature indication	3.1	1
045 Main Turbine Generator					X							K5.17 - Relationship between moderator temperature coefficient and boron concentration in RCS as T/G load increases	2.5*	1
055 Condenser Air Removal									X			A3.03 - Automatic diversion of CARS exhaust	2.5*	1
068 Liquid Radwaste										X		A4.01 - Control board for boron recovery	2.7*	1
071 Waste Gas Disposal			X									K3.04 - Ventilation system	2.7	1
075 Circulating Water											X	2.2.11 - Knowledge of the process for controlling temporary changes.	2.5	1
086 Fire Protection							X					A1.01 - Fire header pressure	2.9	1
K/A Category Totals:	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**1**	**1**	**1**	**Group Point Total:**		**10**

Generic Knowledge and Abilities Outline (Tier 3)

PWR RO Examination Outline

Printed: 01/13/2008

Facility: Sequoyah

Form ES-401-3

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.3	Knowledge of shift turnover practices.	3.0	1
	2.1.27	Knowledge of system purpose and or function.	2.8	1
	2.1.28	Knowledge of the purpose and function of major system components and controls.	3.2	1
		Category Total:		**3**
Equipment Control	2.2.26	Knowledge of refueling administrative requirements.	2.5	1
	2.2.33	Knowledge of control rod programming.	2.5	1
		Category Total:		**2**
Radiation Control	2.3.2	Knowledge of facility ALARA program.	2.5	1
	2.3.9	Knowledge of the process for performing a containment purge.	2.5	1
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9	1
		Category Total:		**3**
Emergency Procedures/Plan	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures.	3.0	1
	2.4.22	Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	3.0	1
		Category Total:		**2**

Generic Total: **10**

Facility: Sequoyah Printed: 01/13/2008

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Tier	Group	RO K/A Category Points												SRO-Only Points		
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2	G*	Total
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A		3	18	0	0	0
	2	1	2	1				1	2			2	9	0	0	0
	Tier Totals	4	5	4				4	5			5	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	0	1	1	1	10	0 / 0	0	0
	Tier Totals	3	3	4	4	4	3	3	3	3	4	4	38	0	0	0
3. Generic Knowledge And Abilities Categories		1		2		3		4		10		1	2	3	4	0
		3		2		3		2				0	0	0	0	

Note:

1. Ensure that at least two topics from every 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 that are not included on the outline should be added. Refer to ES-401, Attachment 2, 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.

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.

Facility: Sequoyah

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

E/APE # / Name / Safety Function	KA	KA Topic	Comment
000007 Reactor Trip - Stabilization - Recovery / 1	EA1.08	AFW System	
000008 Pressurizer Vapor Space Accident / 3	AA2.29	The effects of bubble in reactor vessel	
000009 Small Break LOCA / 3	EA2.24	RCP temperature setpoints	
000011 Large Break LOCA / 3	EK3.13	Hot-leg injection/recirculation	
000015/000017 RCP Malfunctions / 4	AK2.08	CCWS	
000022 Loss of Rx Coolant Makeup / 2	AA2.03	Failures of flow control valve or controller	
000025 Loss of RHR System / 4	AK2.05	Reactor building sump	
000026 Loss of Component Cooling Water / 8	AK3.03	Guidance actions contained in EOP for Loss of CCW	
000027 Pressurizer Pressure Control System Malfunction / 3	AA1.02	SCR-controlled heaters in manual mode	
000038 Steam Gen. Tube Rupture / 3	2.1.3	Knowledge of shift turnover practices.	
000040 Steam Line Rupture - Excessive Heat Transfer / 4	AK1.03	RCS shrink and consequent depressurization	

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

E/APE # / Name / Safety Function	KA	KA Topic	Comment
000055 Station Blackout / 6	2.4.29	Knowledge of the emergency plan.	KA replaced with 055 G 2.4.18 as directed by Chief Examiner. 12/20/2007
000056 Loss of Off-site Power / 6	AK1.03	Definition of subcooling: use of steam tables to determine it	
000058 Loss of DC Power / 6	AK1.01	Battery charger equipment and instrumentation	
000062 Loss of Nuclear Svc Water / 4	AA1.01	Nuclear service water temperature indications	
W/E04 LOCA Outside Containment / 3	2.4.48	Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions.	
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	EK3.1	Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics	
W/E11 Loss of Emergency Coolant Recirc. / 4	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	

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

E/APE # / Name / Safety Function	KA	KA Topic	Comment
000001 Continuous Rod Withdrawal / 1	AK2.05	Rod motion lights	
000033 Loss of Intermediate Range NI / 7	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions including: 1. Reactivity control; 2. Core cooling and heat removal; 3. Reactor coolant system integrity; 4. Containment conditions; 5. Radioactivity release control.	
000036 Fuel Handling Accident / 8	AK1.01	Radiation exposure hazards	
000060 Accidental Gaseous Radwaste Rel. / 9	AA1.02	Ventilation system	
000069 Loss of CTMT Integrity / 5	2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm.	
000074 Inad. Core Cooling / 4	EK3.07	Starting up emergency feedwater and RCPs	
000076 High Reactor Coolant Activity / 9	AK2.01	Process radiation monitors	
W/E09 Natural Circ. / 4	EA2.1	Facility conditions and selection of appropriate procedures during abnormal and emergency operations	
W/E14 Loss of CTMT Integrity / 5	EA2.2	Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	

Facility: Sequoyah

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-2**

Sys/Evol # / Name	KA	KA Topic	Comment
003 Reactor Coolant Pump	K3.04	RPS	
003 Reactor Coolant Pump	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	
004 Chemical and Volume Control	K5.31	Purpose of flow path around boric acid storage tank	Plant design does not provide a flow path around the Boric Acid Storage Tank. Replace with randomly selected K/A 004 K5.26. The selection was randomly selected within the original K/A 004 K5.
004 Chemical and Volume Control	A3.08	Reactor power	
005 Residual Heat Removal	A4.03	RHR temperature, PZR heaters and flow, and nitrogen	
006 Emergency Core Cooling	K1.02	ESFAS	
007 Pressurizer Relief/Quench Tank	K3.01	Containment	
007 Pressurizer Relief/Quench Tank	2.1.1	Knowledge of conduct of operations requirements.	
008 Component Cooling Water	K4.07	Operation of the CCW swing-bus power supply and its associated breakers and controls	
010 Pressurizer Pressure Control	K6.03	PZR sprays and heaters	
012 Reactor Protection	K4.04	Redundancy	
013 Engineered Safety Features Actuation	K2.01	ESFAS/safeguards equipment control	

Facility: Sequoyah

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-2**

Sys/Evol # / Name	KA	KA Topic	Comment
022 Containment Cooling	A2.04	Loss of service water	
025 Ice Condenser	K5.02	Heat transfer	
026 Containment Spray	K4.07	Adequate level in containment sump for suction (interlock)	
026 Containment Spray	2.4.48	Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions.	
039 Main and Reheat Steam	A1.09	Main steam line radiation monitors	KA replaced with 039 A1.05 as directed by Chief Examiner. 12/20/2007
059 Main Feedwater	A2.07	Tripping of MFW pump turbine	
059 Main Feedwater	A4.01	MFW turbine trip indication	
061 Auxiliary/Emergency Feedwater	K5.01	Relationship between AFW flow and RCS heat transfer	
062 AC Electrical Distribution	K1.02	ED/G	
063 DC Electrical Distribution	K2.01	Major DC loads	
064 Emergency Diesel Generator	K6.08	Fuel oil storage tanks	
073 Process Radiation Monitoring	A1.01	Radiation levels	
076 Service Water	A2.02	Service water header pressure	

Facility: Sequoyah

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-2**

Sys/Evol # / Name	KA	KA Topic	Comment
076 Service Water	A4.02	SWS valves	
078 Instrument Air	K3.01	Containment air system	
103 Containment	A3.01	Containment isolation	

Facility: Sequoyah

ES - 401 **Plant Systems - Tier 2 / Group 2** **Form ES-401-2**

Sys/Evol # / Name	KA	KA Topic	Comment
011 Pressurizer Level Control	K6.05	Function of PZR level gauges as postaccident monitors	
015 Nuclear Instrumentation	K2.01	NIS channels, components, and interconnections	
016 Non-nuclear Instrumentation	K1.10	CCS	
017 In-core Temperature Monitor	K4.03	Range of temperature indication	
045 Main Turbine Generator	K5.17	Relationship between moderator temperature coefficient and boron concentration in RCS as T/G load increases	
055 Condenser Air Removal	A3.03	Automatic diversion of CARS exhaust	
068 Liquid Radwaste	A4.01	Control board for boron recovery	The Boron Recovery System has been abandoned at the Sequoyah Plant. Replace with randomly selected K/A 068 A4.02. The selection was randomly selected within the original K/A 068 A4.
071 Waste Gas Disposal	K3.04	Ventilation system	
075 Circulating Water	2.2.11	Knowledge of the process for controlling temporary changes.	KA replaced with 075 G 2.2.13 as directed by Chief Examiner. 12/20/2007
086 Fire Protection	A1.01	Fire header pressure	

PWR RO Examination Outline

Form ES-401-3

Facility: Sequoyah

Generic Category	KA	KA Topic	Comment
Conduct of Operations	2.1.3	Knowledge of shift turnover practices.	
	2.1.27	Knowledge of system purpose and or function.	
	2.1.28	Knowledge of the purpose and function of major system components and controls.	
			Category Total: 3
Equipment Control	2.2.26	Knowledge of refueling administrative requirements.	
	2.2.33	Knowledge of control rod programming.	
			Category Total: 2
Radiation Control	2.3.2	Knowledge of facility ALARA program.	
	2.3.9	Knowledge of the process for performing a containment purge.	
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	
			Category Total: 3
Emergency Procedures/Plan	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures.	
	2.4.22	Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	
			Category Total: 2
			Generic Total: 10

Tier / Group	Randomly Selected K/A	Reason for Rejection
2 / 1	004 K5.31	Plant design does not provide a flow path around the Boric Acid Storage Tank. Replace with randomly selected K/A 004 K5.26
2 / 2	068 A4.01	The Boron Recovery System has been abandoned at the Sequoyah plant. Replace with randomly selected K/A 068 A4.02
2 / 1	039 A1.09	KA replaced with 039 A1.05 during exam review as directed by Chief Examiner. 12/20/2007
1 / 1	055 G2.4.29	KA replaced with 055 G 2.4.18 during exam review as directed by Chief Examiner. 12/20/2007
2 / 2	075 G2.2.11	KA replaced with 075 G 2.2.13 during exam review as directed by Chief Examiner. 12/20/2007

Final

Facility: Sequoyah Printed: 01/13/2008

Date Of Exam: 01/28/2008

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	4	3	7
	2	0	0	0				0	0			0	0	3	2	5
	Tier Totals	0	0	0				0	0			0	0	7	5	12
2. Plant Systems	1	0	0	0	0	0	0	0	0	0	0	0	0	2	2	4
	2	0	0	0	0	0	0	0	0	0	0	0	0	0 / 1	1	2
	Tier Totals	0	0	0	0	0	0	0	0	0	0	0	0	3	3	6

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 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 that are not included on the outline should be added. Refer to ES-401, Attachment 2, 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.

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.

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

E/APE # / Name / Safety Function	KA	KA Topic	Comment
000008 Pressurizer Vapor Space Accident / 3	2.4.49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	KA replaced with 008 G 2.4.41 as directed by Chief Examiner. 12/20/2007
000029 ATWS / 1	EA2.09	Occurrence of a main turbine/reactor trip	
000054 Loss of Main Feedwater / 4	AA2.05	Status of MFW pumps, regulating and stop valves	
000057 Loss of Vital AC Inst. Bus / 6	AA2.17	System and component status, using local or remote controls	
000065 Loss of Instrument Air / 8	AA2.01	Cause and effect of low-pressure instrument air alarm	
W/E11 Loss of Emergency Coolant Recirc. / 4	2.4.48	Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions.	
W/E12 - Steam Line Rupture - Excessive Heat Transfer / 4	2.4.33	Knowledge of the process used track inoperable alarms.	Unable to write question that tied process for tracking INOP alarms to a Steam Line Rupture - Excessive Heat Transfer. Replace with W/E12 G2.1.32 - New K/A supplied by Chief Examiner 8/23/07

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

E/APE # / Name / Safety Function	KA	KA Topic	Comment
000003 Dropped Control Rod / 1	2.2.26	Knowledge of refueling administrative requirements.	Unable to write question that connected Refueling Administrative Requirements to the Abnormal Plant Evolution of Dropped Control Rod. Replace with 003 G2.2.22 - New K/A supplied by Chief Examiner 8/23/07
000005 Inoperable/Stuck Control Rod / 1	AA2.03	Required actions if more than one rod is stuck or inoperable	
000051 Loss of Condenser Vacuum / 4	AA2.02	Conditions requiring reactor and/or turbine trip	
W/E02 SI Termination / 3	EA2.2	Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	
W/E16 High Containment Radiation / 9	2.2.31	Knowledge of procedures and limitations involved in initial core loading.	

Facility: Sequoyah

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-2**

Sys/Evol # / Name	KA	KA Topic	Comment
008 Component Cooling Water	A2.09	Results of excessive exit temperature from the letdown cooler, including the temperature effects on ion-exchange resins	
010 Pressurizer Pressure Control	2.4.38	Ability to take actions called for in the facility emergency plan, including (if required) supporting or acting as emergency coordinator.	
013 Engineered Safety Features Actuation	A2.05	Loss of dc control power	
103 Containment	2.2.14	Knowledge of the process for making configuration changes.	

Facility: Sequoyah

ES - 401 **Plant Systems - Tier 2 / Group 2** **Form ES-401-2**

Sys/Evol # / Name	KA	KA Topic	Comment
029 Containment Purge	2.4.38	Ability to take actions called for in the facility emergency plan, including (if required) supporting or acting as emergency coordinator.	Unable to write question related taking actions called for in the Emergency Plan to Containment Purge. Replace with 029 G2.4.46 - New K/A supplied by Chief Examiner 8/23/07
034 Fuel Handling Equipment	A2.02	Dropped cask	

PWR SRO Examination Outline

Form ES-401-3

Facility: Sequoyah

Generic Category	KA	KA Topic	Comment
Conduct of Operations	2.1.12	Ability to apply technical specifications for a system.	
	2.1.33	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	
			Category Total: 2
Equipment Control	2.2.8	Knowledge of the process for determining if the proposed change, test, or experiment involves an unreviewed safety question.	
			Category Total: 1
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	
	2.3.6	Knowledge of the requirements for reviewing and approving release permits.	
			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.	
	2.4.49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	KA replaced with 055 G 2.4.18 as directed by Chief Examiner. 12/20/2007
			Category Total: 2
			Generic Total: 7

Facility: Sequoyah Printed: 01/13/2008

Date Of Exam: 01/28/2008

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	4	3	7
	2	0	0	0				0	0			0	0	3	2	5
	Tier Totals	0	0	0				0	0			0	0	7	5	12
2. Plant Systems	1	0	0	0	0	0	0	0	0	0	0	0	0	2	2	4
	2	0	0	0	0	0	0	0	0	0	0	0	0	0 | 1	1	2
	Tier Totals	0	0	0	0	0	0	0	0	0	0	0	0	3	3	6

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 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 that are not included on the outline should be added. Refer to ES-401, Attachment 2, 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.

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: 01/13/2008

Facility: Sequoyah

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	2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	1
000029 ATWS / 1					X		EA2.09 - Occurrence of a main turbine/reactor trip	4.5	1
000054 Loss of Main Feedwater / 4					X		AA2.05 - Status of MFW pumps, regulating and stop valves	3.7	1
000057 Loss of Vital AC Inst. Bus / 6					X		AA2.17 - System and component status, using local or remote controls	3.4	1
000065 Loss of Instrument Air / 8					X		AA2.01 - Cause and effect of low-pressure instrument air alarm	3.2	1
W/E11 Loss of Emergency Coolant Recirc. / 4						X	2.4.48 - Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions.	3.8	1
W/E12 - Steam Line Rupture - Excessive Heat Transfer / 4						X	2.4.33 - Knowledge of the process used track inoperable alarms.	2.8	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**4**	**3**	**Group Point Total:**		**7**

PWR SRO Examination Outline

Printed: 01/13/2008

Facility: Sequoyah

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	2.2.26 - Knowledge of refueling administrative requirements.	3.7	1
000005 Inoperable/Stuck Control Rod / 1					X		AA2.03 - Required actions if more than one rod is stuck or inoperable	4.4	1
000051 Loss of Condenser Vacuum / 4					X		AA2.02 - Conditions requiring reactor and/or turbine trip	4.1	1
W/E02 SI Termination / 3					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	4.0	1
W/E16 High Containment Radiation / 9						X	2.2.31 - Knowledge of procedures and limitations involved in initial core loading.	2.9*	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**3**	**2**	**Group Point Total:**		**5**

PWR SRO Examination Outline

Printed: 01/13/2008

Facility: Sequoyah

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
008 Component Cooling Water								X				A2.09 - Results of excessive exit temperature from the letdown cooler, including the temperature effects on ion-exchange resins	2.8	1
010 Pressurizer Pressure Control											X	2.4.38 - Ability to take actions called for in the facility emergency plan, including (if required) supporting or acting as emergency coordinator.	4.0	1
013 Engineered Safety Features Actuation								X				A2.05 - Loss of dc control power	4.2	1
103 Containment											X	2.2.14 - Knowledge of the process for making configuration changes.	3.0	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**Group Point Total:**		**4**

PWR SRO Examination Outline

Printed: 01/13/2008

Facility: Sequoyah

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
029 Containment Purge											X	2.4.38 - Ability to take actions called for in the facility emergency plan, including (if required) supporting or acting as emergency coordinator.	4.0	1
034 Fuel Handling Equipment								X				A2.02 - Dropped cask	3.9	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**Group Point Total:**		**2**

Generic Knowledge and Abilities Outline (Tier 3)

PWR SRO Examination Outline

Printed: 01/13/2008

Facility: Sequoyah

Form ES-401-3

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.12	Ability to apply technical specifications for a system.	4.0	1
	2.1.33	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	4.0	1
		Category Total:		**2**
Equipment Control	2.2.8	Knowledge of the process for determining if the proposed change, test, or experiment involves an unreviewed safety question.	3.3	1
		Category Total:		**1**
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	3.0	1
	2.3.6	Knowledge of the requirements for reviewing and approving release permits.	3.1	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.	3.9	1
	2.4.49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	1
		Category Total:		**2**

Generic Total: 7

Tier / Group	Randomly Selected K/A	Reason for Rejection
1 / 2	003 G2.2.26	Unable to write question that connected Refueling Administrative Requirements to the Abnormal Plant Evolution of Dropped Control Rod. Replace with 003 G2.2.22 - New K/A supplied by Chief Examiner 8/23/07
1 / 1	008 G2.4.49	KA replaced with 008 G 2.4.41 during exam review as directed by Chief Examiner. 12/20/2007
2 / 2	029 G2.4.38	Unable to write question related taking actions called for in the Emergency Plan to Containment Purge. Replace with 029 G2.4.46 - New K/A supplied by Chief Examiner 8/23/07
1 / 1	E12 G2.4.33	Unable to write question that tied process for tracking INOP alarms to a Steam Line Rupture - Excessive Heat Transfer. Replace with W/E12 G2.1.32 - New K/A supplied by Chief Examiner 8/23/07
3	G2.4.49	KA replaced with G 2.4.40 during exam review as directed by Chief Examiner. 12/20/2007