

**Final Submittal**  
(Blue Paper)

**FINAL OUTLINES**

**VOGTLE MAY 2006 RETAKE EXAM**

**05000424/2005302 AND 05000425/2005302**

**WRITTEN ONLY ON  
MAY 1, 2006**

**Facility:** Vogtle Electric Generating Plant

Printed: 12/09/2005

Date Of Exam: 05/01/2006

Tier	Group	RO K/A Category Points												SRO-Only Points					
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	K	A	A2	G*	Total	
1. Emergency & Abnormal Plant Evolutions	1	3	3	3				3	3				3	18	0	0	0	0	0
	2	2	1	2				1	1				2	9	0	0	0	0	0
	Tier Totals	5	4	5				4	4				5	27	0	0	0	0	0
2. Plant Systems	1	2	2	3	3	3	2	2	3	2	3	3	28	0	0	0	0	0	0
	2	1	1	1	1	1	1	1	0	1	1	1	10	0	0	0	0	0	0
	Tier Totals	3	3	4	4	4	3	3	3	3	4	4	38	0	0	0	0	0	0
3. Generic Knowledge And Abilities Categories				1		2		3		4		10	1	2	3	4	0		
				3		2		2		3			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 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. Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

**PWR RO Examination Outline**

Printed: 12/09/2005

Facility: Vogtle Electric Generating Plant

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	2.1.11 - Knowledge of less than one hour technical specification action statements for systems.	3.0	1
000009 Small Break LOCA / 3					X		EA2.38 - Existence of head bubble	3.9	1
000015/000017 RCP Malfunctions / 4		X					AK2.07 - RCP seals	2.9	1
000022 Loss of Rx Coolant Makeup / 2	X						AK1.04 - Reason for changing from manual to automatic control of charging flow valve controller	2.9	1
000025 Loss of RHR System / 4						X	2.1.23 - Ability to perform specific system and integrated plant procedures during all modes of plant operation.	3.9	1
000026 Loss of Component Cooling Water / 8				X			AA1.07 - Flow rates to the components and systems that are serviced by the CCWS; interactions among the components	2.9	1
000027 Pressurizer Pressure Control System Malfunction / 3		X					AK2.03 - Controllers and positioners	2.6	1
000029 ATWS / 1		X					EK2.06 - Breakers, relays, and disconnects	2.9*	1
000038 Steam Gen. Tube Rupture / 3			X				EK3.04 - Automatic actions provided by each PRM	3.9	1
000040 Steam Line Rupture - Excessive Heat Transfer / 4	X						AK1.04 - Nil ductility temperature	3.2	1
000054 Loss of Main Feedwater / 4					X		AA2.04 - Proper operation of AFW pumps and regulating valves	4.2	1
000055 Station Blackout / 6	X						EK1.01 - Effect of battery discharge rates on capacity	3.3	1
000057 Loss of Vital AC Inst. Bus / 6				X			AA1.04 - RWST and VCT valves	3.5	1
000058 Loss of DC Power / 6				X			AA1.01 - Cross-tie of the affected dc bus with the alternate supply	3.4*	1
000062 Loss of Nuclear Svc Water / 4					X		AA2.02 - The cause of possible SWS loss	2.9	1
000065 Loss of Instrument Air / 8			X				AK3.03 - Knowing effects on plant operation of isolating certain equipment from instrument air	2.9	1
W/E04 LOCA Outside Containment / 3			X				EK3.2 - Normal, abnormal and emergency operating procedures associated with LOCA Outside Containment	3.4	1
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4						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

**PWR RO Examination Outline**

Facility: Vogtle Electric Generating Plant

Printed: 12/09/2005

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
K/A Category Totals:	3	3	3	3	3	3	Group Point Total:	18	

**PWR RO Examination Outline**

Printed: 12/09/2005

Facility: Vogtle Electric Generating Plant

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
000028 Pressurizer Level Malfunction / 2	X						AK1.01 - PZR reference leak abnormalities	2.8*	1
000033 Loss of Intermediate Range NI / 7						X	2.4.1 - Knowledge of EOP entry conditions and immediate action steps.	4.3	1
000036 Fuel Handling Accident / 8					X		AA2.01 - ARM system indications	3.2	1
000037 Steam Generator Tube Leak / 3	X						AK1.02 - Leak rate vs. pressure drop	3.5	1
000059 Accidental Liquid RadWaste Rel. / 9		X					AK2.02 - Radioactive-gas monitors	2.7	1
000076 High Reactor Coolant Activity / 9						X	2.1.30 - Ability to locate and operate components, including local controls.	3.9	1
W/E06 Inad. Core Cooling / 4				X			EA1.3 - Desired operating results during abnormal and emergency situations	3.7	1
W/E15 Containment Flooding / 5			X				EK3.3 - Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations	2.9	1
W/E16 High Containment Radiation / 9			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	2.9	1
<b>K/A Category Totals:</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>		<b>Group Point Total:</b>	<b>9</b>

## PWR RO Examination Outline

Facility: Vogtle Electric Generating Plant

Printed: 12/09/2005

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									K3.02 - S/G	3.5	1
004 Chemical and Volume Control						X						K6.17 - Flow paths for emergency boration	4.4	1
004 Chemical and Volume Control										X		A4.11 - RCP seal injection	3.4	1
005 Residual Heat Removal		X										K2.03 - RCS pressure boundary motor-operated valves	2.7*	1
006 Emergency Core Cooling					X							K5.09 - Thermodynamics of water and steam, including subcooled margin, superheat, and saturation	3.3	1
007 Pressurizer Relief/Quench Tank					X							K5.02 - Method of forming a steam bubble in the PZR	3.1	1
008 Component Cooling Water			X									K3.01 - Loads cooled by CCWS	3.4	1
010 Pressurizer Pressure Control		X										K2.02 - Controller for PZR spray valve	2.5	1
010 Pressurizer Pressure Control											X	2.4.31 - Knowledge of annunciators alarms and indications, and use of the response instructions.	3.3	1
012 Reactor Protection				X								K4.07 - First-out indication	3.0	1
013 Engineered Safety Features Actuation					X							K5.01 - Definitions of safety train and ESF channel	2.8	1
013 Engineered Safety Features Actuation											X	2.1.32 - Ability to explain and apply all system limits and precautions.	3.4	1
022 Containment Cooling									X			A3.01 - Initiation of safeguards mode of operation	4.1	1
026 Containment Spray	X											K1.01 - ECCS	4.2	1
026 Containment Spray										X		A4.01 - CSS controls	4.5	1
039 Main and Reheat Steam							X					A1.06 - Main steam pressure	3.0	1
059 Main Feedwater								X				A2.04 - Feeding a dry S/G	2.9*	1
061 Auxiliary/Emergency Feedwater	X											K1.10 - Diesel fuel oil	2.6*	1
062 AC Electrical Distribution			X									K3.01 - Major system loads	3.5	1
062 AC Electrical Distribution									X			A3.04 - Operation of inverter (e.g., precharging synchronizing light, static transfer)	2.7	1
063 DC Electrical Distribution								X				A2.01 - Grounds	2.5	1
064 Emergency Diesel Generator					X							K6.07 - Air receivers	2.7	1
064 Emergency Diesel Generator										X		A4.03 - Synchroscope	3.2	1
073 Process Radiation Monitoring			X									K4.01 - Release termination	4.0	1

**PWR RO Examination Outline**

Facility: Vogtle Electric Generating Plant

Printed: 12/09/2005

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 when radiation exceeds setpoint	Imp.	Points
076 Service Water								X				A2.01 - Loss of SWS	3.5*	1
078 Instrument Air				X								K4.03 - Securing of SAS upon loss of cooling water	3.1*	1
103 Containment							X					A1.01 - Containment pressure, temperature, and humidity	3.7	1
103 Containment											X	2.4.31 - Knowledge of annunciators alarms and indications, and use of the response instructions.	3.3	1
<b>K/A Category Totals:</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>3</b>		<b>Group Point Total: 28</b>	

## PWR RO Examination Outline

Facility: Vogtle Electric Generating Plant

Printed: 12/09/2005

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					A1.11 - Required primary system subcooling during shutdown; location of indication	3.7	1
011 Pressurizer Level Control			X									K3.02 - RCS	3.5	1
015 Nuclear Instrumentation		X										K2.01 - NIS channels, components, and interconnections	3.3	1
033 Spent Fuel Pool Cooling											X	2.1.33 - Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	3.4	1
034 Fuel Handling Equipment	X											K1.01 - RCS	2.5	1
035 Steam Generator						X						K6.03 - S/G level detector	2.6	1
041 Steam Dump/Turbine Bypass Control									X			A3.05 - Main steam pressure	2.9*	1
045 Main Turbine Generator										X		A4.01 - Turbine valve indicators (throttle, governor, control, stop, intercept), alarms, and annunciators	3.1	1
079 Station Air				X								K4.01 - Cross-connect with IAS	2.9	1
086 Fire Protection					X							K5.03 - Effect of water spray on electrical components	3.1	1
<b>K/A Category Totals:</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>Group Point Total:</b>	<b>10</b>	

# Generic Knowledge and Abilities Outline (Tier 3)

## PWR RO Examination Outline

Printed: 12/09/2005

Facility: Vogtle Electric Generating Plant

Form ES-401-3

<u>Generic Category</u>	<u>KA</u>	<u>KA Topic</u>	<u>Imp.</u>	<u>Points</u>
<b>Conduct of Operations</b>	2.1.19	Ability to use plant computer to obtain and evaluate parametric information on system or component status.	3.0	1
	2.1.23	Ability to perform specific system and integrated plant procedures during all modes of plant operation.	3.9	1
	2.1.25	Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.	2.8	1
	<b>Category Total:</b>			<b>3</b>
<b>Equipment Control</b>	2.2.25	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	2.5	1
	2.2.27	Knowledge of the refueling process.	2.6	1
	<b>Category Total:</b>			<b>2</b>
<b>Radiation Control</b>	2.3.9	Knowledge of the process for performing a containment purge.	2.5	1
	2.3.11	Ability to control radiation releases.	2.7	1
	<b>Category Total:</b>			<b>2</b>
<b>Emergency Procedures/Plan</b>	2.4.7	Knowledge of event based EOP mitigation strategies.	3.1	1
	2.4.22	Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	3.0	1
	2.4.24	Knowledge of loss of cooling water procedures.	3.3	1
	<b>Category Total:</b>			<b>3</b>

**Generic Total: 10**

**Facility:** Vogtle Electric Generating Plant

Printed: 02/22/2006

Date Of Exam: 05/01/2006

Tier	Group	RO K/A Category Points											SRO-Only Points									
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	K	A	A2	G*	Total				
1. Emergency & Abnormal Plant Evolutions	1	0	0	0				0	0				0	0	0	0	3	3	6			
	2	0	0	0				0	0				0	0	0	0	0	0	0	2	2	4
	Tier Totals	0	0	0				0	0				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	0	0	3	2	5				
	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	3				
	Tier Totals	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	3	8				
3. Generic Knowledge And Abilities Categories				1		2		3		4		0		1	2	3	4	7				
				0		0		0		0				2	2	2	1					

**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 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. 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: 02/22/2006

**Facility:** Vogtle Electric Generating Plant

**ES - 401**

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

**Form ES-401-2**

/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000007 Reactor Trip - Stabilization - Recovery / 1						X	2.1.14 - Knowledge of system status criteria which require the notification of plant personnel.	3.3	1
000011 Large Break LOCA / 3					X		EA2.10 - Verification of adequate core cooling	4.7	1
000056 Loss of Off-site Power / 6					X		AA2.42 - Occurrence of a reactor trip	4.1	1
000065 Loss of Instrument Air / 8						X	2.4.35 - Knowledge of local auxiliary operator tasks during emergency operations including system geography and system implications.	3.5	1
W/E11 Loss of Emergency Coolant Recirc. / 4					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	4.2	1
W/E12 - Steam Line Rupture - Excessive Heat Transfer / 4						X	2.4.6 - Knowledge symptom based EOP mitigation strategies.	4.0	1
<b>K/A Category Totals:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>		<b>Group Point Total:</b>	<b>6</b>

**PWR SRO Examination Outline**

Printed: 02/22/2006

**Facility:** Vogtle Electric Generating Plant

**ES - 401**

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

**Form ES-401-2**

/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000001 Continuous Rod Withdrawal / 1					X		AA2.05 - Uncontrolled rod withdrawal, from available indications	4.6	1
000024 Emergency Boration / 1						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
000061 ARM System Alarms / 7						X	2.2.22 - Knowledge of limiting conditions for operations and safety limits.	4.1	1
W/E08 RCS Overcooling - PTS / 4					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	4.1	1
<b>K/A Category Totals:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>		<b>Group Point Total:</b>	<b>4</b>

**PWR SRO Examination Outline**

Printed: 02/22/2006

Facility: Vogtle Electric Generating Plant

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	2.4.4 - Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	1
012 Reactor Protection								X				A2.07 - Loss of dc control power	3.7	1
039 Main and Reheat Steam								X				A2.02 - Decrease in turbine load as it relates to steam escaping from relief valves	2.7*	1
063 DC Electrical Distribution											X	2.2.25 - Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.7	1
078 Instrument Air								X				A2.01 - Air dryer and filter malfunctions	2.9	1
<b>K/A Category Totals:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>Group Point Total:</b>		<b>5</b>

**PWR SRO Examination Outline**

Printed: 02/22/2006

Facility: Vogtle Electric Generating Plant

ES - 401

Plant Systems - Tier 2 / Group 2

Form ES-401-2

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
002 Reactor Coolant											X	2.2.22 - Knowledge of limiting conditions for operations and safety limits.	4.1	1
034 Fuel Handling Equipment	X											K1.02 - RHRS	3.2	1
075 Circulating Water								X				A2.01 - Loss of intake structure	3.2	1
<b>K/A Category Totals:</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>Group Point Total:</b>		<b>3</b>