

**Facility:** Cook Nuclear Plant

Printed: 04/12/2010

Date Of Exam: 06/21/2010

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	2	1				2	1			1	9	0	0	0		
	Tier Totals	5	5	4				5	4			4	27	0	0	0		
2. Plant Systems	1	3	2	3	3	2	2	3	3	2	2	3	28	0	0	0		
	2	1	1	0	1	1	1	1	1	1	1	1	10	0	0	0		
	Tier Totals	4	3	3	4	3	3	4	4	3	3	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:**

- Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
- The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
- Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.
- Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
- Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
- Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
- \* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
- On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G\* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
- For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

PWR RO Examination Outline

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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
000008 Pressurizer Vapor Space Accident / 3		X					AK2.01 - Valves	2.7*	1
000009 Small Break LOCA / 3					X		EA2.38 - Existence of head bubble	3.9	1
000011 Large Break LOCA / 3				X			EA1.05 - Manual and/or automatic transfer of suction of charging pumps to borated source	4.3	1
000015/000017 RCP Malfunctions / 4	X						AK1.04 - Basic steady state thermodynamic relationship between RCS loops and S/Gs resulting from unbalanced RCS flow	2.9	1
000025 Loss of RHR System / 4				X			AA1.09 - LPI pump switches, ammeter, discharge pressure gauge, flow meter, and indicators	3.2	1
000027 Pressurizer Pressure Control System Malfunction / 3						X	2.2.40 - Ability to apply Technical Specifications for a system.	3.4	1
000029 ATWS / 1		X					EK2.06 - Breakers, relays, and disconnects	2.9*	1
000054 Loss of Main Feedwater / 4			X				AK3.04 - Actions contained in EOPs for loss of MFW	4.4	1
000055 Station Blackout / 6			X				EK3.02 - Actions contained in EOP for loss of offsite and onsite power	4.3	1
000056 Loss of Off-site Power / 6	X						AK1.03 - Definition of subcooling: use of steam tables to determine it	3.1*	1
000057 Loss of Vital AC Inst. Bus / 6				X			AA1.02 - Manual control of PZR level	3.8	1
000058 Loss of DC Power / 6						X	2.4.20 - Knowledge of operational implications of EOP warnings, cautions, and notes.	3.8	1
000065 Loss of Instrument Air / 8						X	2.4.8 - Knowledge of how abnormal operating procedures are used in conjunction with EOPs.	3.8	1
000077 Generator Voltage and Electric Grid Disturbances / 6					X		AA2.07 - Operational status of engineered safety features	3.6	1
W/E04 LOCA Outside Containment / 3		X					EK2.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.5	1
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4			X				EK3.3 - Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations	4.0	1



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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
000051 Loss of Condenser Vacuum / 4				X			AA1.04 - Rod position	2.5*	1
000059 Accidental Liquid RadWaste Rel. / 9	X						AK1.02 - Biological effects on humans of various types of radiation, exposure levels that are acceptable for nuclear power plant personnel, and the units used for radiation-intensity measurements and for radiation exposure levels	2.6	1
000061 ARM System Alarms / 7						X	2.2.36 - Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	3.1	1
000067 Plant Fire On-site / 9	X						AK1.02 - Fire fighting	3.1	1
000068 Control Room Evac. / 8		X					AK2.07 - ED/G	3.3	1
W/E03 LOCA Cooldown - Depress. / 4				X			EA1.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	4.0	1
W/E09 Natural Circ. / 4			X				EK3.2 - Normal, abnormal and emergency operating procedures associated with Natural Circulation Operations	3.2	1
W/E14 Loss of CTMT Integrity / 5		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	3.4	1
W/E16 High Containment Radiation / 9					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.0	1
<b>K/A Category Totals:</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>		<b>Group Point Total:</b>	<b>9</b>

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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										K2.02 - CCW pumps	2.5*	1
004 Chemical and Volume Control											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
004 Chemical and Volume Control			X									K3.08 - RCP seal injection	3.6	1
005 Residual Heat Removal						X						K6.03 - RHR heat exchanger	2.5	1
006 Emergency Core Cooling	X											K1.11 - CCWS	2.8	1
007 Pressurizer Relief/Quench Tank										X		A4.10 - Recognition of leaking PORV/code safety	3.6	1
008 Component Cooling Water								X				A2.05 - Effect of loss of instrument and control air on the position of the CCW valves that are air operated	3.3*	1
010 Pressurizer Pressure Control								X				A2.01 - Heater failures	3.3	1
012 Reactor Protection									X			A3.04 - Circuit breaker	2.8*	1
012 Reactor Protection						X						K6.02 - Redundant channels	2.9	1
013 Engineered Safety Features Actuation					X							K5.02 - Safety system logic and reliability	2.9	1
013 Engineered Safety Features Actuation				X								K4.04 - Auxiliary feed actuation signal	4.3*	1
022 Containment Cooling			X									K3.02 - Containment instrumentation readings	3.0	1
025 Ice Condenser							X					A1.03 - Glycol flow to ice condenser air handling units	2.5*	1
026 Containment Spray		X										K2.02 - MOVs	2.7*	1
039 Main and Reheat Steam					X							K5.08 - Effect of steam removal on reactivity	3.6	1
059 Main Feedwater							X					A1.07 - Feed Pump speed, including normal control speed for ICS	2.5*	1
059 Main Feedwater										X		A4.03 - Feedwater control during power increase and decrease	2.9*	1
061 Auxiliary/Emergency Feedwater			X									K3.02 - S/G	4.2	1
062 AC Electrical Distribution	X											K1.03 - DC distribution	3.5	1
063 DC Electrical Distribution				X								K4.04 - Trips	2.6?	1
064 Emergency Diesel Generator											X	2.4.50 - Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	4.2	1
064 Emergency Diesel Generator				X								K4.04 - Overload ratings	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
073 Process Radiation Monitoring								X				A2.01 - Erratic or failed power supply	2.5	1
076 Service Water							X					A1.02 - Reactor and turbine building closed cooling water temperatures	2.6*	1
076 Service Water											X	2.4.6 - Knowledge of EOP mitigation strategies.	3.7	1
078 Instrument Air									X			A3.01 - Air pressure	3.1	1
103 Containment	X											K1.02 - Containment isolation/containment integrity	3.9	1
<b>K/A Category Totals:</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>Group Point Total:</b>	<b>28</b>	

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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							K5.05 - Interrelation of indicated charging flow rate with volume of water required to bring PZR level back to programmed level hot/cold	2.8	1
014 Rod Position Indication										X		A4.01 - Rod selection control	3.3	1
016 Non-nuclear Instrumentation	X											K1.04 - MFW System	2.7*	1
029 Containment Purge								X				A2.03 - Startup operations and the associated required valve lineups	2.7	1
035 Steam Generator						X						K6.02 - Secondary PORV	3.1	1
041 Steam Dump/Turbine Bypass Control		X										K2.01 - ICS, normal and alternate power supply	2.8*	1
056 Condensate											X	2.2.44 - Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.	4.2	1
068 Liquid Radwaste				X								K4.01 - Safety and environmental precautions for handling hot, acidic, and radioactive liquids	3.4	1
072 Area Radiation Monitoring									X			A3.01 - Changes in ventilation alignment	2.9*	1
086 Fire Protection							X					A1.03 - Fire doors	2.7	1
<b>K/A Category Totals:</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>Group Point Total:</b>	<b>10</b>								