

**REVISED EXAMINATION QUESTIONS**

**FOR THE DONALD C. COOK INITIAL RETAKE**

**EXAMINATION - SEPTEMBER 10, 2001**

Facility: DCCook		Date of Exam: 09/10/2001						Exam Level: SRO					
Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	
1. Emergency & Abnormal Plant Evolutions	1	5	2	3				4	7			4	25
	2	1	2	2				3	4			3	15
	3	1	1	0				1	0			0	3
	Tier Totals	7	5	5				8	11			7	43
2. Plant Systems	1	2	2	2	2	1	2	1	2	2	2	1	19
	2	2	1	1	2	1	2	1	1	2	2	2	17
	3	1	0	1	0	0	0	0	0	1	0	1	4
	Tier Totals	5	3	4	4	2	4	2	3	5	4	4	40
3. Generic Knowledge and Abilities					Cat 1		Cat 2		Cat 3		Cat 4		17
					4		5		4		4		
<p>Note: 1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).</p> <p>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 exam must total 100 points.</p> <p>3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.</p> <p>4. Systems/evolutions within each group are identified on the associated outline.</p> <p>5. The shaded areas are not applicable to the category/tier.</p> <p>6.* The generic 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.</p> <p>7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the SRO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.</p>													

NOTE: Changes were made to the Examination Outline based upon NRC Examiner feedback on July 25, 2001.



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**Date:** 8/23/01  
**Subject:** Revised Exam Questions for Review  
**From:** Max Bailey *MB*  
**VIA:** Bill Nichols *BN*  
**To:** Pete Peterson, Region III NRC Examiner

Enclosed you will find the proposed SRO written examination questions that were revised or replaced based upon our discussion at the Region III office on August 17, 2001. Replacement questions contain reference material to support the correct answer. In addition, you will find an updated Form ES-401-3 and ES-401-10 to reflect the current SRO Examination Outline as revised.

It is our understanding that you will independently review the submitted changes, and provide comments on additional changes, as required. A prompt review with feedback will expedite our effort to finalize the examination material during the week of September 3, 2001, as requested.

PWR SRO Examination Outline

Printed: 08/23/2001

Facility: Donald C. Cook Nuclear Plant

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1

Form ES-401-3

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
003	Dropped Control Rod / 1		X					AK2.05 - Control rod drive power supplies and logic circuits	2.8	1
005	Inoperable/Stuck Control Rod / 1					X		AA2.03 - Required actions if more than one rod is stuck or inoperable	4.4	1
011	Large Break LOCA / 3			X				EK3.12 - Actions contained in EOP for emergency LOCA (large break)	4.6	1
011	Large Break LOCA / 3						X	2.1.7 - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	1
015	Reactor Coolant Pump (RCP) Malfunctions / 4					X		AA2.08 - When to secure RCPs on high bearing temperature	3.5	1
024	Emergency Boration / 1			X				AK3.02 - Actions contained in EOP for emergency boration	4.4	1
026	Loss of Component Cooling Water (CCW) / 8					X		AA2.06 - The length of time after the loss of CCW flow to a component before that component may be damaged	3.1*	1
026	Loss of Component Cooling Water (CCW) / 8						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
029	Anticipated Transient Without Scram (ATWS) / 1	X						EK1.01 - Reactor nucleonics and thermo-hydraulics behavior	3.1	1
029	Anticipated Transient Without Scram (ATWS) / 1				X			EA1.13 - Manual trip of main turbine	3.9	1

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ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1

Form ES-401-3

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
040	Steam Line Rupture / 4	X						AK1.01 - Consequences of PTS	4.4	1
051	Loss of Condenser Vacuum / 4					X		AA2.02 - Conditions requiring reactor and/or turbine trip	4.1	1
055	Loss of Offsite and Onsite Power (Station Blackout) / 6	X						EK1.01 - Effect of battery discharge rates on capacity	3.7	1
057	Loss of Vital AC Electrical Instrument Bus / 6					X		AA2.19 - The plant automatic actions that will occur on the loss of a vital ac electrical instrument bus	4.3	1
059	Accidental Liquid Radwaste Release / 9						X	2.1.23 - Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.0	1
067	Plant Fire on Site / 9					X		AA2.14 - Equipment that will be affected by fire suppression activities in each zone	4.3	1
068	Control Room Evacuation / 8						X	2.4.35 - Knowledge of local auxiliary operator tasks during emergency operations including system geography and system implications.	3.5	1
074	Inadequate Core Cooling / 4				X			EA1.12 - RCS temperature and pressure indicators	4.4	1
076	High Reactor Coolant Activity / 9					X		AA2.07 - When demineralizer resin needs to be replaced	2.7*	1

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ES - 401

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

Form ES-401-3

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
E02	SI Termination / 3	X						EK1.3 - Annunciators and conditions indicating signals, and remedial actions associated with the SI Termination	3.8	1
E06	Degraded Core Cooling / 4	X						EK1.2 - Normal, abnormal and emergency operating procedures associated with Degraded Core Cooling	4.1	1
E07	Saturated Core Cooling / 4				X			EA1.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.6	1
E08	Pressurized Thermal Shock / 4				X			EA1.2 - Operating behavior characteristics of the facility	3.9	1
E14	High Containment Pressure / 5			X				EK3.2 - Normal, abnormal and emergency operating procedures associated with High Containment Pressure	3.7	1
E14	High Containment Pressure / 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	3.8	1

**K/A Category Totals: 5 2 3 4 7 4**

**Group Point Total: 25**

PWR SRO Examination Outline

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Facility: Donald C. Cook Nuclear Plant

ES - 401 Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2 Form ES-401-3

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
007	Reactor Trip / 1				X			EA1.06 - Reactor trip (scram): verification that the control and safety rods are in after the trip	4.5	1
008	Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open) / 3		X					AK2.02 - Sensors and detectors	2.7	1
008	Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open) / 3					X		AA2.19 - PZR spray valve failure, using plant parameters	3.6	1
022	Loss of Reactor Coolant Makeup / 2			X				AK3.02 - Actions contained in SOPs and EOPs for RCPs, loss of makeup, loss of charging, and abnormal charging	3.8	1
032	Loss of Source Range Nuclear Instrumentation / 7			X				AK3.01 - Startup termination on source-range loss	3.6	1
033	Loss of Intermediate Range Nuclear Instrumentation / 7						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
033	Loss of Intermediate Range Nuclear Instrumentation / 7				X			AA1.02 - Level trip bypass	3.1	1
037	Steam Generator (S/G) Tube Leak / 3					X		AA2.12 - Flow rate of leak	4.1	1
038	Steam Generator Tube Rupture (SGTR) / 3					X		EA2.07 - Plant conditions, from survey of control room indications	4.8	1

**PWR SRO Examination Outline**

Printed: 08/23/2001

Facility: Donald C. Cook Nuclear Plant

ES - 401

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

Form ES-401-3

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
054	Loss of Main Feedwater (MFW) / 4				X			AA1.01 - AFW controls, including the use of alternate AFW sources	4.4	1
058	Loss of DC Power / 6	X						AK1.01 - Battery charger equipment and instrumentation	3.1*	1
060	Accidental Gaseous Radwaste Release / 9						X	2.3.11 - Ability to control radiation releases.	3.2	1
061	Area Radiation Monitoring (ARM) System Alarms / 7					X		AA2.04 - Whether an alarm channel is functioning properly	3.5	1
E16	High Containment Radiation / 9						X	2.4.10 - Knowledge of annunciator response procedures.	3.1	1
E16	High Containment Radiation / 9		X					EK2.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.3	1

**K/A Category Totals:    1    2    2    3    4    3**

**Group Point Total:    15**

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Facility: Donald C. Cook Nuclear Plant

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 3

Form ES-401-3

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
036	Fuel Handling Incidents / 8		X					AK2.02 - Radiation monitoring equipment (portable and installed)	3.9	1
056	Loss of Offsite Power / 6	X						AK1.01 - Principle of cooling by natural convection	4.2	1
E15	Containment Flooding / 5				X			EA1.2 - Operating behavior characteristics of the facility	2.9	1

K/A Category Totals: 1 1 0 1 0 0

Group Point Total: 3

PWR SRO Examination Outline

Printed: 08/23/2001

Facility: Donald C. Cook Nuclear Plant

ES - 401		Plant Systems - Tier 2 / Group 1											Form ES-401-3		
Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
001	Control Rod Drive System / 1	X											K1.05 - NIS and RPS	4.4	1
003	Reactor Coolant Pump System (RCPS) / 4						X						K6.04 - Containment isolation valves affecting RCP operation	3.1	1
003	Reactor Coolant Pump System (RCPS) / 4								X				A2.02 - Conditions which exist for an abnormal shutdown of an RCP in comparison to a normal shutdown of an RCP	3.9	1
013	Engineered Safety Features Actuation System (ESFAS) / 2							X					A1.10 - T-cold	3.7	1
013	Engineered Safety Features Actuation System (ESFAS) / 2										X		A4.02 - Reset of ESFAS channels	4.4	1
014	Rod Position Indication System (RPIS) / 1			X									K3.02 - Plant computer	2.8*	1
017	In-Core Temperature Monitor (ITM) System / 7				X								K4.01 - Input to subcooling monitors	3.7	1
022	Containment Cooling System (CCS) / 5										X		A4.01 - CCS fans	3.6	1
025	Ice Condenser System / 5			X									K3.01 - Containment	3.8*	1
025	Ice Condenser System / 5						X						K6.01 - Upper and lower doors of the ice condenser	3.6*	1
026	Containment Spray System (CSS) / 5								X				A2.03 - Failure of ESF	4.4	1

PWR SRO Examination Outline

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Facility: Donald C. Cook Nuclear Plant

ES - 401

Plant Systems - Tier 2 / Group 1

Form ES-401-3

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
026	Containment Spray System (CSS) / 5		X										K2.01 - Containment spray pumps	3.6	1
061	Auxiliary / Emergency Feedwater (AFW) System / 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
061	Auxiliary / Emergency Feedwater (AFW) System / 4		X										K2.02 - AFW electric driven pumps	3.7	1
063	D.C. Electrical Distribution System / 6	X											K1.02 - AC electrical system	3.2	1
068	Liquid Radwaste System (LRS) / 9				X								K4.01 - Safety and environmental precautions for handling hot, acidic, and radioactive liquids	4.1	1
071	Waste Gas Disposal System (WGDS) / 9									X			A3.03 - Radiation monitoring system alarm and actuating signals	3.8	1
072	Area Radiation Monitoring (ARM) System / 7									X			A3.01 - Changes in ventilation alignment	3.1	1
072	Area Radiation Monitoring (ARM) System / 7					X							K5.02 - Radiation intensity changes with source distance	3.2	1

K/A Category Totals: 2 2 2 2 1 2 1 2 2 2 1

Group Point Total: 19

ES - 401

Plant Systems - Tier 2 / Group 2

Form ES-401-3

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
006	Emergency Core Cooling System (ECCS) / 2	X											K1.03 - RCS	4.3	1
010	Pressurizer Pressure Control System (PZR PCS) / 3									X			A3.02 - PZR pressure	3.5	1
012	Reactor Protection System / 7						X						K6.10 - Permissive circuits	3.5	1
012	Reactor Protection System / 7							X					A1.01 - Trip setpoint adjustment	3.4*	1
016	Non-Nuclear Instrumentation System (NNIS) / 7				X								K4.02 - Sensing, signal processing, display, recording, and alarms	2.7*	1
028	Hydrogen Recombiner and Purge Control System (HRPS) / 5											X	2.4.47 - Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	3.7	1
035	Steam Generator System (S/GS) / 4										X		A4.06 - S/G isolation on steam leak or tube rupture/leak	4.6	1
055	Condenser Air Removal System (CARS) / 4			X									K3.01 - Main condenser	2.7	1
062	A.C. Electrical Distribution System / 6		X										K2.01 - Major system loads	3.4	1
062	A.C. Electrical Distribution System / 6											X	2.1.27 - Knowledge of system purpose and or function.	2.9	1

**PWR SRO Examination Outline**

Printed: 08/23/2001

Facility: Donald C. Cook Nuclear Plant

ES - 401 Plant Systems - Tier 2 / Group 2 Form ES-401-3

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
064	Emergency Diesel Generator (ED/G) System / 6				X								K4.11 - Automatic load sequencer: safeguards	4.0	1
064	Emergency Diesel Generator (ED/G) System / 6						X						K6.07 - Air receivers	2.9	1
075	Circulating Water System / 8	X											K1.08 - Emergency/essential SWS	3.2*	1
079	Station Air System (SAS) / 8								X				A2.01 - Cross-connection with IAS	3.2	1
086	Fire Protection System (FPS) / 8					X							K5.04 - Hazards to personnel as a result of fire type and methods of protection	3.5*	1
103	Containment System / 5									X			A3.01 - Containment isolation	4.2	1
103	Containment System / 5										X		A4.04 - Phase A and phase B resets	3.5*	1

**K/A Category Totals:**    2    1    1    2    1    2    1    1    2    2    2

**Group Point Total:** 17

**PWR SRO Examination Outline**

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Facility: Donald C. Cook Nuclear Plant

ES - 401 Plant Systems - Tier 2 / Group 3 Form ES-401-3

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
005	Residual Heat Removal System (RHRS) / 4											X	2.4.18 - Knowledge of the specific bases for EOPs.	3.6	1
008	Component Cooling Water System (CCWS) / 8	X											K1.02 - Loads cooled by CCWS	3.4	1
076	Service Water System (SWS) / 4									X			A3.02 - Emergency heat loads	3.7	1
078	Instrument Air System (IAS) / 8			X									K3.02 - Systems having pneumatic valves and controls	3.6	1

**K/A Category Totals:**    1   0   1   0   0   0   0   0   0   1   0   1

**Group Point Total:**    4

## Generic Knowledge and Abilities Outline (Tier 3)

Printed: 08/23/2001

### PWR SRO Examination Outline

Form ES-401-5

**Facility:** Donald C. Cook Nuclear Plant

Generic Category	KA	KA Topic	Imp.	Points
<b>Conduct of Operations</b>	2.1.4	Knowledge of shift staffing requirements.	3.4	1
	2.1.25	Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.	3.1	1
	2.1.28	Knowledge of the purpose and function of major system components and controls.	3.3	1
	2.1.33	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	4.0	1
<b>Category Total:</b>			<b>4</b>	
<b>Equipment Control</b>	2.2.13	Knowledge of tagging and clearance procedures.	3.8	1
	2.2.17	Knowledge of the process for managing maintenance activities during power operations.	3.5	1
	2.2.22	Knowledge of limiting conditions for operations and safety limits.	4.1	1
	2.2.23	Ability to track limiting conditions for operations.	3.8	1
	2.2.25	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.7	1
<b>Category Total:</b>			<b>5</b>	
<b>Radiation Control</b>	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	3.0	1
	2.3.2	Knowledge of facility ALARA program.	2.9	1
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	3.1	1
	2.3.11	Ability to control radiation releases.	3.2	1
<b>Category Total:</b>			<b>4</b>	

# Generic Knowledge and Abilities Outline (Tier 3)

Printed: 08/23/2001

## PWR SRO Examination Outline

Form ES-401-5

Facility: Donald C. Cook Nuclear Plant

Generic Category	KA	KA Topic	Imp.	Points
Emergency Procedures/Plan	2.4.11	Knowledge of abnormal condition procedures.	3.6	1
	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures.	4.0	1
	2.4.29	Knowledge of the emergency plan.	4.0	1
	2.4.44	Knowledge of emergency plan protective action recommendations.	4.0	1

**Category Total: 4**

**Generic Total: 17**

Tier / Group	Randomly Selected K/A	Reason for Rejection (Revision 2)
1 / 1	APE 068 G2.4.24	Control Room Evacuation Procedure does not address the loss of cooling water as a credible failure or a condition requiring an evacuation of the main control room for a fire.
2 / 1	072 K4.03	To meet the requirements of ES-401 Section D.1.e to have a minimum sampling of two K/As in category K5, manually selected K/A was used to replace the randomly selected KA in category 4. The deleted KA was selected to ensure diversity among the randomly selected KAs within category K4.
1 / 1*	APE 015 G2.1.7	To reduce the number of questions directed at the Reactor Coolant Pump system and abnormal procedures. Increase diversity and areas being tested by adding KA area that was not previously selected at random.
1 / 2*	EPE 038 EK1.03	To reduce the number of questions directed at the Steam Generating system and abnormal procedures. Increase diversity and areas being tested by adding KA area that was not previously selected at random.
2 / 1*	063 K4.01	To reduce the number of questions directed at the DC Electrical system and abnormal procedures. Increase diversity and areas being tested by adding KA area that was not previously selected at random.
2 / 1*	063 K1.03	To reduce the number of questions directed at the DC Electrical system and abnormal procedures. Increase diversity and areas being tested by adding KA area that was not previously selected at random.
2 / 3*	008 G2.4.18	To reduce the number of questions directed at the Component Cooling Water system and abnormal procedures. Increase diversity and areas being tested by adding KA area that was not previously selected at random.
1/1*	APE 068 2.2.4	To retain integrity of the exam and use a valid question which did not meet the intent of the selected K/A. The overall integrity of the exam outline was preserved.
2/2*	016 K4.03	To retain integrity of the exam and use a valid question which did not meet the intent of the selected K/A. The overall integrity of the exam outline was preserved.

(\*NOTE: Changes were made to the Examination Outline ES-401-3 based upon NRC Examiner feedback.