ES-401

PWR Examination Outline

Printed: 03/27/2012

Facility: DCPP

Date Of Exam:	02/03/2012

			RO K/A Category Points												SRO-Only Points																			
Tier	Group	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total		A2		G*	Total																
1.	1	3	3	3					3																		3		18		0		0	0
Emergency &	2	2	2	1		N/A	ļ	1	2	N	/A	1	9		0		0	0																
Abnormal Plant Evolutions	Tier Totals	5	5	4				4	5			4	27		0		0	0																
2	1	3	2	3	3	3	2	2	3	2	2	3	28		0		0	0																
–. Plant	2	1	1	1	1	0	1	1	1	1	1	1	10	0		0	0	0																
Systems	Tier Totals	4	3	4	4	3	3	3	4	3	3	4	38		0		0	0																
3. Gene	ric Knov	wled	ae A	nd	1	1		2	3	;	4	t I	10	1	2	3	4																	
Abilit	ies Cat	egor	ies	-	1	3		2		2	<u></u>	3	10	0	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.
- 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.
- 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.

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ES - 401

Form	ES-4()1-2
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E/APE # / Name / Safety Function	K1	K2	К3	A1	A2	G	КА Торіс	Imp.	Points
000007 Reactor Trip - Stabilization - Recovery / 1			X				EK3.01 - Actions contained in EOP for reactor trip	4.0	1
000008 Pressurizer Vapor Space Accident / 3		X					AK2.02 - Sensors and detectors	2.7*	1
000009 Small Break LOCA / 3	X						EK1.02 - Use of steam tables	3.5	1
000015/000017 RCP Malfunctions / 4						X	2.1.25 - Ability to interpret reference materials, such as graphs, curves, tables, etc.	3.9	1
000022 Loss of Rx Coolant Makeup / 2				Х			AA1.05 - RCP seal back pressure regulator valves and flow indicators	2.9*	1
000025 Loss of RHR System / 4		Х					AK2.05 - Reactor building sump	2.6	1
000026 Loss of Component Cooling Water / 8			Х				AK3.04 - Effect on the CCW flow header of a loss of CCW	3.5	1
000027 Pressurizer Pressure Control System Malfunction / 3	X						AK1.02 - Expansion of liquids as temperature increases	2.8	1
000054 Loss of Main Feedwater / 4					Х		AA2.04 - Proper operation of AFW pumps and regulating valves	4.2	1
000055 Station Blackout / 6				X			EA1.01 - In-core thermocouple temperatures	3.7	1
000056 Loss of Off-site Power / 6					Х		AA2.07 - Operational status of emergency feedwater pump (motor driven)	4.2	1
000057 Loss of Vital AC Inst. Bus / 6						X	2.1.30 - Ability to locate and operate components, including local controls.	4.4	1
000058 Loss of DC Power / 6			Х				AK3.01 - Use of dc control power by ED/Gs	3.4*	1
000062 Loss of Nuclear Svc Water / 4					Х		AA2.04 - The normal values and upper limits for the temperatures of the components cooled by SWS	2.5	1
W/E04 LOCA Outside Containment / 3		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
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4						X	2.4.20 - Knowledge of operational implications of EOP warnings, cautions, and notes.	3.8	1
W/E11Loss of Emergency Coolant Recirc. / 4				Х			EA1.3 - Desired operating results during abnormal and emergency situations	3.7	1

Form ES-401-2

Facility: DCPP

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E/APE # / Name / Safety Function	K1	K2	К3	A1	A2	G	КА Торіс	Imp.	Points		
W/E12 - Steam Line Rupture - Excessive Heat Transfer / 4	Х						EK1.1 - Components:, capacity, and function of emergency systems	3.4	1		
K/A Category Totals:	3	3	3	3	3	3	3 Group Point Tota				

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Form 1	ES-401-	2
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E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	КА Торіс	Imp.	Points			
000001 Continuous Rod Withdrawal / 1		X					AK2.06 - T-ave./ref. deviation meter	3.0*	1			
000024 Emergency Boration / 1	X						AK1.01 - Relationship between boron addition and change in T-ave	3.4	1			
000032 Loss of Source Range NI / 7				X			AA1.01 - Manual restoration of power	3.1*	1			
000036 Fuel Handling Accident / 8					Х		AA2.01 - ARM system indications	3.2	1			
000060 Accidental Gaseous Radwaste Rel. / 9	X						AK1.02 - Biological effects on humans of the various types of radiation, exposure levels that are acceptable for personnel in a nuclear reactor power plant; the units used for radiation intensity measurements and for radiation exposure levels	2.5	1			
000068 Control Room Evac. / 8						Х	2.4.4 - Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.	4.5	1			
W/E02 SI Termination / 3			X				EK3.4 - RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated	3.5	1			
W/E03 LOCA Cooldown - Depress. / 4					Х		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.5	1			
W/E06 Inad. Core Cooling / 4		X					EK2.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.6	1			
K/A Category Totals:	2	2	1	1	2	1	Group Point Total:					

ES - 401	-	Form E	S-401-2											
Sys/Evol # / Name	K1	K2	K3	K4	К5	K6	A1	A2	A3	A4	G	КА Торіс	Imp.	Points
003 Reactor Coolant Pump					X							K5.05 - The dependency of RCS flow rates upon the number of operating RCPs	2.8	1
003 Reactor Coolant Pump			X									K3.03 - Feedwater and emergency feedwater	2.8	1
004 Chemical and Volume Control					Х							K5.50 - Design basis letdown system temperatures: resin integrity	2.6	1
005 Residual Heat Removal				Х								K4.05 - Relation between RHR flowpath and refueling cavity	2.5	1
006 Emergency Core Cooling							Х					A1.19 - Subcooling	4.0	1
007 Pressurizer Relief/Quench Tank				Х								K4.01 - Quench tank cooling	2.6	1
008 Component Cooling Water	X											K1.04 - RCS, in order to determine source(s) of RCS leakage into the CCWS	3.3	1
010 Pressurizer Pressure Control					X							K5.01 - Determination of condition of fluid in PZR, using steam tables	3.5	1
012 Reactor Protection		X										K2.01 - RPS channels, components, and interconnections	3.3	1
013 Engineered Safety Features Actuation						X						K6.01 - Sensors and detectors	2.7*	1
013 Engineered Safety Features Actuation											X	2.4.9 - Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.	3.8	1
022 Containment Cooling											х	2.4.34 - Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects.	4.2	1
022 Containment Cooling								Х				A2.04 - Loss of service water	2.9*	1
026 Containment Spray										X		A4.05 - Containment spray reset switches	3.5	1
039 Main and Reheat Steam				Х								K4.02 - Utilization of T-ave. program control when steam dumping through atmospheric relief/dump valves, including T-ave. limits	3.1	1
059 Main Feedwater										X		A4.08 - Feed regulating valve controller	3.0*	1

ES - 401			Pl	ant S	yste	ms - '	Γier ∶	2 / G	roup	1		Form ES-401-2				
Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points		
059 Main Feedwater								Х				A2.11 - Failure of feedwater control system	3.0*	1		
061 Auxiliary/Emergency Feedwater		X										K2.01 - AFW system MOVs	3.2*	1		
061 Auxiliary/Emergency Feedwater									Х			A3.01 - AFW startup and flows	4.2	1		
062 AC Electrical Distribution								X				A2.12 - Restoration of power to a system with a fault on it	3.2	1		
063 DC Electrical Distribution	X											K1.03 - Battery charger and battery	2.9	1		
064 Emergency Diesel Generator											Х	2.1.30 - Ability to locate and operate components, including local controls.	4.4	1		
064 Emergency Diesel Generator						Х						K6.08 - Fuel oil storage tanks	3.2	1		
073 Process Radiation Monitoring			X									K3.01 - Radioactive effluent releases	3.6	1		
076 Service Water			Х									K3.07 - ESF loads	3.7	1		
078 Instrument Air	Х											K1.05 - MSIV air	3.4*	1		
078 Instrument Air									Χ			A3.01 - Air pressure	3.1	1		
103 Containment							X					A1.01 - Containment pressure, temperature, and humidity	3.7	1		
K/A Category Totals:	3	2	3	3	3	2	2	3	2	2	3	Group Point Total: 28				

S - 401 Plant Systems - Tier 2 / Group 2 Form ES-401													S-401-2	
Sys/Evol # / Name	K1	K2	К3	K4	К5	K6	A1	A2	A3	A4	G	КА Торіс	Imp.	Points
001 Control Rod Drive										Х		A4.02 - Boration/dilution	4.1	1
002 Reactor Coolant	Х											K1.05 - PRT	3.2	1
011 Pressurizer Level Control						X						K6.04 - Operation of PZR level controllers	3.1	1
015 Nuclear Instrumentation		X										K2.01 - NIS channels, components, and interconnections	3.3	1
016 Non-nuclear Instrumentation									Х			A3.01 - Automatic selection of NNIS inputs to control systems	2.9*	1
029 Containment Purge							Х					A1.02 - Radiation levels	3.4	1
033 Spent Fuel Pool Cooling				X								K4.01 - Maintenance of spent fuel level	2.9	1
045 Main Turbine Generator											X	2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.6	1
071 Waste Gas Disposal			X									K3.05 - ARM and PRM systems	3.2	1
075 Circulating Water								X				A2.01 - Loss of intake structure	3.0*	1
K/A Category Totals:	1	1	1	1	0	1	1	1	1	1	1	Group Point Total: 10		

Generic Knowledge and Abilities Outline (Tier 3)

PWR RO Examination Outline

Facility: DCPP

Printed: 03/27/2012

Form ES-401-3

Generic Category	<u>KA</u>	<u>KA Topic</u>	<u>Imp.</u>	<u>Points</u>
Conduct of Operations	2.1.26	Knowledge of industrial safety procedures (such as rotating equipment, electrical, high temperature, high pressure, caustic, chlorine, oxygen and hydrogen).	3.4	1
	2.1.40	Knowledge of refueling administrative requirements.	2.8	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	2.2.6	Knowledge of the process for making changes to procedures.	3.0	1
	2.2.35	Ability to determine Technical Specification Mode of Operation.	3.6	1
		Category Total:		2
Radiation Control	2.3.7	Ability to comply with radiation work permit requirements during normal or abnormal conditions.	3.5	1
	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.	3.4	1
		Category Total:		2
Emergency Procedures/Plan	2.4.19	Knowledge of EOP layout, symbols, and icons.	3.4	1
	2.4.28	Knowledge of procedures relating to a security event (non-safeguards information).	3.2	1
	2.4.46	Ability to verify that the alarms are consistent with the plant conditions.	4.2	1
		Category Total:		3

Generic Total:

10

ES-401

PWR Examination Outline

Printed: 03/27/2012

Facility: DCPP

				RO	K/A Category Points SRO-Only Points											oints							
Tier	Group	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total		A2		G*	Total					
1.	1	0	0	0					0				N/A		0 0					3		3	6
Emergency &	2	0	0	0		N/A		0	0	N	0	2			2	4							
Abnormal Plant Evolutions	Tier Totals	0	0	0				0	0			0	0		5		5	10					
2	1	0	0	0	0	0	0	0	0	0	0	0	0		3		2	5					
∠. Plant	2	0	0	0	0	0	0	0	0	0	0	0	0	0		2	1	3					
Systems	Tier Totals	0	0	0	0	0	0	0	0	0	0	0	0		5		3	8					
3. Gener	ric Knov	wled	ae A	nd	1	i	2	2	3	\$	2	t		1	2	3	4	_					
Abilities Categorie		ies	-	(0	(0	(0	(0	0	1	2	2	2	7						

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.
- 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.
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- 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.
- 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.

Form ES-401-2

Facility: DCPP

ES - 401

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	КА Торіс	Imp.	Points
000011 Large Break LOCA / 3					Х		EA2.03 - Consequences of managing LOCA with loss of CCW	4.2	1
000015/000017 RCP Malfunctions / 4						Х	2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.4	1
000038 Steam Gen. Tube Rupture / 3					Х		EA2.11 - Local radiation reading on main steam lines	3.9*	1
000040 Steam Line Rupture - Excessive Heat Transfer / 4					Х		AA2.02 - Conditions requiring a reactor trip	4.7	1
000055 Station Blackout / 6						X	2.4.4 - Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.	4.7	1
000062 Loss of Nuclear Svc Water / 4						Х	2.4.20 - Knowledge of operational implications of EOP warnings, cautions, and notes.	4.3	1
K/A Category Totals:	0	0	0	0	3	3	Group Poin	t Total:	6

Facility: DCPP

FC		401
EO	-	401

ES - 401 Emer	Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2										
E/APE # / Name / Safety Function	K1	K2	К3	A1	A2	G	КА Торіс	Imp.	Points		
000028 Pressurizer Level Malfunction / 2					X		AA2.04 - Ammeters and running indicators for CVCS charging pumps	3.1	1		
000051 Loss of Condenser Vacuum / 4					X		AA2.01 - Cause for low vacuum condition	2.7*	1		
W/E01 Rediagnosis / 3						X	2.4.6 - Knowledge of EOP mitigation strategies.	4.7	1		
W/E09 Natural Circ. / 4						X	2.4.21 - Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.	4.6	1		
K/A Category Totals:	0	0	0	0	2	2	Group Poin	t Total:	4		

Facility: DCPP

ES - 401			P	lant S	Syste	ms - '	Tier	2 / G	roup	1			Form ES-401-2	
Sys/Evol # / Name	K1	К2	К3	K4	К5	K6	A1	A2	A3	A4	G	КА Торіс	Imp.	Points
003 Reactor Coolant Pump											Х	2.4.8 - Knowledge of how abnormal operating procedures are used in conjunction with EOPs.	4.5	1
005 Residual Heat Removal								X				A2.04 - RHR valve malfunction	2.9	1
039 Main and Reheat Steam								X				A2.04 - Malfunctioning steam dump	3.7	1
061 Auxiliary/Emergency Feedwater								X				A2.07 - Air or MOV failure	3.5	1
076 Service Water											X	2.2.25 - Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.	4.2	1
K/A Category Totals:	0	0	0	0	0	0	0	3	0	0	2	Group Poin	t Total:	5

1

ES - 401		-	Pl	ant S	ystei	ms - '	Γier ∶	2/G	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				A2.02 - Loss of coolant pressure	4.4	1
015 Nuclear Instrumentation											Х	2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.4	1
056 Condensate								X				A2.04 - Loss of condensate pumps	2.8*	1
K/A Category Totals:	0	0	0	0	0	0	0	2	0	0	1	Group Point	Total:	3

Generic Knowledge and Abilities Outline (Tier 3)

PWR SRO Examination Outline

Facility: DCPP

Printed: 03/27/2012

Form ES-401-3

Generic Category	<u>KA</u>	KA Topic	<u>Imp.</u>	<u>Points</u>
Conduct of Operations	2.1.6	2.1.6 Ability to manage the control room crew during plant transients.		1
		Category Total:		1
Equipment Control	2.2.7	Knowledge of the process for conducting special or infrequent tests.	3.6	1
	2.2.15	Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups, tagouts, etc.	4.3	1
		Category Total:		2
Radiation Control	2.3.6	Ability to approve release permits.	3.8	1
	2.3.11	Ability to control radiation releases.	4.3	1
		Category Total:		2
Emergency Procedures/Plan	2.4.41	Knowledge of the emergency action level thresholds and classifications.	4.6	1
	2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm.	4.3	1
		Category Total:		2

Generic Total:

7

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO - T1/G1	EPE029 G2.2.25	KA asks for the bases in Technical Specifications for LCO and safety limits. Not applicable to ATWS or RO
		Randomly replaced with APE015/017 G2.1.25
RO - T1/G2	APE059AA1.03	Adequately covered by system KA 071; randomly replaced this KA with APE060 AK1.02
RO - T1/G2	APE060AK3.02	Oversampling of effects of accidental rad waste. Kept system KA 073 and randomly replaced this KA with W/E02 EK3.4
RO - T2/G1	073 A4.01	Oversampled system and not monitored in the Control Room by the RO. Randomly replaced KA with 003 K5.05
SRO – T1/G1	APE 077 G2.4.50	Unable to generate SRO level question. Alarm response would be handled by RO. Randomly replaced KA with APE 062 G2.4.20
SRO – T2/G1	062 A2.07	Not SRO level knowledge. Randomly replaced KA with 061 A2.07
SRO - T2/G2	041 A2.02	KA very similar to KA 039 A2.04. Randomly replaced KA with 002 A2.02
Date 02/08/2012		
RO – T2/G2	014 K4.03	Unable to generate plausible RO level question. Replaced with randomly selected KA 033 K4.01
RO – T2/G2	028 K2.01	Unable to generate plausible RO level question. Replaced with randomly selected KA 015 K2.01
RO – T1/G1	APE065 AA1.01	KA too close to KA for instrument air. Randomly replaced with EPE055 EA1.01