

Facility: Indian Point Unit 3		Date of Exam: 5/11/15																
Tier	Group	RO K/A Category Points											SRO-Only Points					
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	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	2				1	2				1	9	0	0	0	
	Tier Totals	4	5	5				4	5				4	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	0	1	1	1	1	1	1	10	0	0	0		
	Tier Totals	3	3	4	4	3	3	3	4	3	4	4	38	0	0	0		
3. Generic Knowledge and Abilities Categories				1		2		3		4		10		1	2	3	4	0
				2		3		2		3		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  $\pm 1$  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.

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO)						Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1							N/A - Not randomly selected		
000008 Pressurizer Vapor Space Accident / 3			X				AK3.05 – ECCS termination or throttling criteria	4.0	1
000009 Small Break LOCA / 3				X			EA1.09 - RCP	3.6	2
000011 Large Break LOCA / 3	X						EK1.01 – Natural circulation and cooling, including reflux boiling	4.1	3
000015/17 RCP Malfunctions / 4		X					AK2.08 - CCWS	2.6	4
000022 Loss of Rx Coolant Makeup / 2	X						AK1.01 – Consequences of thermal shock to RCP seals	2.8	5
000025 Loss of RHR System / 4						X	2.4.13 – Knowledge of crew roles and responsibilities during EOP usage	4.0	6
000026 Loss of Component Cooling Water / 8					X		AA2.03 – The valve lineups necessary to restart the CCWS while bypassing the portion of the system causing the abnormal condition	2.6	7
000027 Pressurizer Pressure Control System Malfunction / 3			X				AK3.03 – Actions contained in EOP or PZR PCS malfunction	3.7	8
000029 ATWS / 1		X					EK2.06 – Breakers, relays, and disconnects	2.9	9
000038 Steam Gen. Tube Rupture / 3							N/A - Not randomly selected		
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4							000040 – Not randomly selected W/E 12 selected – see # 18 below		
000054 (CE/E06) Loss of Main Feedwater / 4					X		AA2.06 – AFW adjustments needed to maintain proper T-ave. and S/G level	4.0	10
000055 Station Blackout / 6	X						EK1.02 – Natural circulation cooling	4.1	11
000056 Loss of Off-site Power / 6							N/A - Not randomly selected		
000057 Loss of Vital AC Inst. Bus / 6						X	2.4.11 – Knowledge of abnormal condition procedures	4.0	12
000058 Loss of DC Power / 6			X				AK3.02 – Actions contained in EOP for loss of dc power	4.0	13
000062 Loss of Nuclear Svc Water / 4						X	2.1.39 – Knowledge of conservative decision making practices	3.6	14
000065 Loss of Instrument Air / 8					X		AA2.05 – When to commence plant shutdown if instrument air pressure is decreasing	3.4	15
W/E04 LOCA Outside Containment / 3				X			EA1.3 – Desired operating results during abnormal and emergency situations	3.8	16
W/E11 Loss of Emergency Coolant Recirc. / 4							N/A - Not randomly selected		
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4				X			EA1.2 – Operating behavior characteristics of the facility	3.7	17
000077 Generator Voltage and Electric Grid Disturbances / 6							N/A - Not randomly selected		

ES-401		PWR Examination Outline						Form ES-401-2	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
W/E12 Steam Line Rupture - Excessive Heat Transfer / 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	3.6	18
K/A Category Totals:	3	3	3	3	3	3	Group Point Total:	18	

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)						Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1	X						AK1.02 - SUR	3.6	19
000003 Dropped Control Rod / 1					X		AA2.03 – Dropped rod, using in-core/excore instrumentation, in-core or loop temperature measurements	3.6	20
000005 Inoperable/Stuck Control Rod / 1		X					AK2.01 – Controllers and positioners	2.5	21
000024 Emergency Boration / 1			X				AK3.01 – When emergency boration is required	4.1	22
000028 Pressurizer Level Malfunction / 2							N/A - Not randomly selected		
000032 Loss of Source Range NI / 7							N/A - Not randomly selected		
000033 Loss of Intermediate Range NI / 7							N/A - Not randomly selected		
000036 (BW/A08) Fuel Handling Accident / 8							N/A - Not randomly selected		
000037 Steam Generator Tube Leak / 3							N/A - Not randomly selected		
000051 Loss of Condenser Vacuum / 4							N/A - Not randomly selected		
000059 Accidental Liquid RadWaste Rel. / 9					X		AA2.02 – The permit for liquid radioactive-waste release	2.9	23
000060 Accidental Gaseous Radwaste Rel. / 9							N/A - Not randomly selected		
000061 ARM System Alarms / 7							N/A - Not randomly selected		
000067 Plant Fire On-site / 8							N/A - Not randomly selected		
000068 (BW/A06) Control Room Evac. / 8							N/A - Not randomly selected		
000069 Loss of CTMT Integrity / 5							N/A - Not randomly selected W/E14 selected – see # 27 below		
000074 (W/E06) Inad. Core Cooling / 4							N/A - Not randomly selected W/E07 selected – see # 25 below		
000076 High Reactor Coolant Activity / 9						X	2.1.28 – Knowledge of the purpose and function of major system components and controls	4.1	24
W/E01 & E02 Rediagnosis & SI Termination / 3							N/A - Not randomly selected		
W/E13 Steam Generator Over-pressure / 4							N/A - Not randomly selected		
W/E15 Containment Flooding / 5							N/A - Not randomly selected		
W/E16 High Containment Radiation / 9							N/A - Not randomly selected		
BW/A01 Plant Runback / 1							N/A - Not randomly selected		
BW/A02&A03 Loss of NNI-X/Y / 7							N/A - Not randomly selected		
BW/A04 Turbine Trip / 4							N/A - Not randomly selected		
BW/A05 Emergency Diesel Actuation / 6							N/A - Not randomly selected		
BW/A07 Flooding / 8							N/A - Not randomly selected		
BW/E03 Inadequate Subcooling Margin / 4							N/A - Not randomly selected		
BW/E08; W/E03 LOCA Cooldown - Depress. / 4							N/A - Not randomly selected		
BW/E09; CE/A13; W/E09 Natural Circ. / 4							N/A - Not randomly selected W/E10 selected – see #26 below		
BW/E13&E14 EOP Rules and Enclosures							N/A - Not randomly selected		
CE/A11; W/E08 RCS Overcooling - PTS / 4							N/A - Not randomly selected		
CE/A16 Excess RCS Leakage / 2							N/A - Not randomly selected		

ES-401	PWR Examination Outline							Form ES-401-2	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
CE/E09 Functional Recovery							N/A - Not randomly selected		
W/E07 Inad. Core Cooling / 4				X			EA1.2 – Operating behavior characteristics of the facility	3.2	25
W/E10 Natural Circ. / 4			X				EK3.3 – Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations	3.4	26
W/E14 Loss of CTMT Integrity / 5		X					EK2.1 – Components, and functions of control and safety systems, including instrumentation signals, interlocks, failure modes, and automatic and manual features	3.4	27
K/A Category Point Totals:	1	2	2	1	2	1	Group Point Total:	9	

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO)											Form ES-401-2	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump							X					A1.03 – RCP motor stator winding temperatures	2.6	28
004 Chemical and Volume Control						X						K6.04 – Knowledge pf the effect of a loss or malfunction on the following CVCS components: Pumps	2.8	29
005 Residual Heat Removal					X							K5.05 - Plant response during "solid plant": pressure change due to the relative incompressibility of water	2.7	30
006 Emergency Core Cooling											X	2.1.23 - Ability to perform specific system and integrated plant procedures during all modes of plant operation	4.3	31
006 Emergency Core Cooling					X							K5.06 - Relationship between ECCS flow and RCS pressure	3.5	32
007 Pressurizer Relief/Quench Tank							X					A1.02 - Maintaining quench tank pressure	2.7	33
008 Component Cooling Water				X								K4.01 – Knowledge of the CCWS design feature(s) and/or interlock(s) which provide for the following: Automatic start of standby pump	3.1	34
010 Pressurizer Pressure Control						X						K6.02 - PZR	3.2	35
012 Reactor Protection					X							K5.02 – Power density	3.1	36
012 Reactor Protection											X	2.1.45 – Ability to identify and interpret diverse indications to validate the response of another indication	4.3	37
013 Engineered Safety Features Actuation			X									K3.01 - Fuel	4.4	38
022 Containment Cooling										X		A4.05 – Ability to manually operate and/or monitor in the control room: Containment readings of temperature, pressure, and humidity system	3.8	39
022 Containment Cooling		X										K2.01 – Knowledge of power supplies to the following: Containment cooling fans	3.0	40
025 Ice Condenser												N/A - Not randomly selected, not applicable to Indian Point Unit 3		
026 Containment Spray		X										K2.02 - Knowledge of bus power supplies to the following: MOVs	2.7	41
026 Containment Spray									X			A4.05 – Containment spray reset switches	3.5	42
039 Main and Reheat Steam				X								K4.06 – Prevent reverse steam flow on steam line break	3.3	43
059 Main Feedwater								X				A2.06 – Loss of steam flow to MFW system	2.7	44

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO)											Form ES-401-2	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
061 Auxiliary/Emergency Feedwater			X									K3.01 - RCS	4.4	45
062 AC Electrical Distribution									X			A3.04 - Operation of inverter (e.g., precharging synchronizing light, static transfer)	2.7	46
063 DC Electrical Distribution								X				A2.01 - Grounds	2.5	47
064 Emergency Diesel Generator				X								K4.05 – Incomplete-start relay	2.8	48
064 Emergency Diesel Generator											X	2.1.32 – Ability to explain and apply system limits and precautions	3.8	49
073 Process Radiation Monitoring			X									K3.01 – Radioactive effluent releases	3.6	50
076 Service Water										X		A4.01 – SWS pumps	2.9	51
076 Service Water	X											K1.07 – Secondary closed cooling water	2.5	52
078 Instrument Air	X											K1.03 – Containment air	3.3	53
103 Containment								X				A2.05 – Emergency containment entry	2.9	54
103 Containment									X			A3.01 – Containment isolation	3.9	55
K/A Category Point Totals:	2	2	3	3	3	2	2	3	2	3	3	Group Point Total:		28

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO)												Form ES-401-2	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#	
001 Control Rod Drive		X										K2.05 – M/G sets	3.1	56	
002 Reactor Coolant												N/A - Not randomly selected			
011 Pressurizer Level Control				X								K4.01 - Operation of PZR heater cutout at low PZR level	3.3	57	
014 Rod Position Indication								X				A2.02 - Loss of power to the RPIS	3.1	58	
015 Nuclear Instrumentation												N/A - Not randomly selected			
016 Non-nuclear Instrumentation												N/A - Not randomly selected			
017 In-core Temperature Monitor												N/A - Not randomly selected			
027 Containment Iodine Removal												N/A - Not randomly selected			
028 Hydrogen Recombiner and Purge Control												N/A - Not randomly selected			
029 Containment Purge												N/A - Not randomly selected			
033 Spent Fuel Pool Cooling									X			A3.02 - Spent fuel leak or rupture	2.9	59	
034 Fuel Handling Equipment											X	2.1.40 – Knowledge of refueling administrative requirements	2.8	60	
035 Steam Generator	X											K1.13 – Condensate system	2.7	61	
041 Steam Dump/Turbine Bypass Control												N/A - Not randomly selected			
045 Main Turbine Generator							X					A1.06 - Expected response of secondary plant parameters following T/G trip	3.3	62	
055 Condenser Air Removal												N/A - Not randomly selected			
056 Condensate												N/A - Not randomly selected			
068 Liquid Radwaste												N/A - Not randomly selected			
071 Waste Gas Disposal			X									K3.05 - ARM and PRM systems	3.2	63	
072 Area Radiation Monitoring												N/A - Not randomly selected			
075 Circulating Water												N/A - Not randomly selected			
079 Station Air										X		A4.01 - Cross-tie valves with IAS	2.7	64	
086 Fire Protection						X						K6.04 - Fire, smoke, and heat detectors	2.6	65	
K/A Category Point Totals:	1	1	1	1	0	1	1	1	1	1	1	Group Point Total:		10	



Category	K/A #	Topic	RO	
			IR	#
1. Conduct of Operations	2.1.29	Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc.	4.1	66
	2.1.44	Knowledge of RO duties in the control room during fuel handling, such as responding to alarms from the fuel handling area, communication with the fuel storage facility, systems operated from the control room in support of fueling operations, and supporting instrumentation.	3.9	67
	Subtotal			2
2. Equipment Control	2.2.23	Ability to track Technical Specification limiting conditions for operations.	3.1	68
	2.2.38	Knowledge of conditions and limitations in the facility license.	3.6	69
	2.2.40	Ability to apply Technical Specifications for a system.	3.4	70
	Subtotal			3
3. Radiation Control	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	3.2	71
	2.3.15	Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	2.9	72
	Subtotal			2
4. Emergency Procedures / Plan	2.4.12	Knowledge of general operating crew responsibilities during emergency operations.	4.0	73
	2.4.23	Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations.	3.4	74
	2.4.30	Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator.	2.7	75
	Subtotal			3
Tier 3 Point Total				10

Tier / Group	K/A	Randomly Selected K/A	Reason for Rejection
T1 / G1	000022AK1.04	Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Makeup: Reason for changing from manual to automatic control of charging flow valve controller.	This K/A does not apply to Indian Point Unit 3. No procedural or operational guidance to require auto operation related to loss of RCS makeup. Typically, procedural guidance would take the controls to manual for a failure related to RCS makeup.
T1 / G2	000001AK1.19	Knowledge of the operational implications of the following concepts as they apply to Continuous Rod Withdrawal: Voids Coefficient.	This K/A does not apply to Indian Point Unit 3. Indian Point does not have procedural guidance related to the voids coefficient. Not operationally significant for a PWR.
T1 / G2	000005AK2.03	Knowledge of the interrelations between the Inoperable / Stuck Control Rod and the following: Metroscope.	This K/A does not apply to Indian Point Unit 3. It does not apply to IP3 rod control equipment.
T1 / G2	000076G2.2.7	High Reactor Coolant Activity: Knowledge of the process for conducting special or infrequent tests.	This generic K/A does not apply well to the event. This Abnormal event and IPTE requirements do not share any defined relationships / procedural guidance.
T2 / G1	004000K6.26	Knowledge of the effect of a loss or malfunction on the following CVCS components: Methods of pressure control of solid plant (PZR relief and water inventory).	This K/A as rejected due to overlap with question #30 which was the same concept of solid pressure operations related to RHR. Concept is too limited with regard to systems operation to generate two operationally valid and discriminating questions.
T2 / G1	008000K4.07	Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following: Operation of the CCW swing-bus power supply and its associated breakers and controls.	This K/A does not apply to Indian Point Unit 3. It does not apply to the IP3 CCW System.

Tier / Group	K/A	Randomly Selected K/A	Reason for Rejection
T2 / G1	012000G2.3.11	Reactor Protection System: Ability to control radiation releases.	This Generic K/A does not apply well to this system. No known direct relationships. Would be difficult to generate an operationally relevant, valid, and discriminating question.
T2 / G1	022000A4.02	Containment Cooling System – CCS Pumps	This K/A as rejected due to overlap with questions 40 and 41 associated with the Containment Spray System. Although containment spray pumps could be related to this K/A, there are no “pumps” in the Containment Cooling System, only Containment Fan Cooler Units (FCUs). The Containment Spray System is already being evaluated by questions 40 and 41.
T2 / G1	064000G2.2.43	Emergency Diesel Generator – Knowledge of the process used to track inoperable alarms.	This Generic K/A does not apply well to this system. The EDG controls are not in the control room at IP3 and the alarms that are in the control room are not required for operability. It would be difficult to write an operationally relevant, valid, and discriminating question for this generic KA applied to this system.
T2 / G2	034000G2.4.42	Fuel Handling Equipment – Knowledge of emergency response facilities.	This Generic K/A does not apply well to this equipment / system. No known direct relationships. Would be difficult to generate an operationally relevant, valid, and discriminating question.

**Facility:** IPEC

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Date Of Exam: 05/11/2015

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	3		3	6	
	2	0	0	0				0	0			0	0	2	2	4		
	Tier Totals	0	0	0				0	0			0	0	0	5	5	10	
2.  Plant Systems	1	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	0	2	1	3	
	Tier Totals	0	0	0	0	0	0	0	0	0	0	0	0	5		3	8	
3. Generic Knowledge And Abilities Categories					1		2		3		4		0	1	2	3	4	7
					0		0		0		0			2	1	2	2	

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- 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.
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# PWR SRO Examination Outline

Printed: 05/04/15

Facility: IPEC

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		EA2.04 - If reactor should have tripped but has not done so, manually trip the reactor and carry out actions in ATWS EOP	4.4	1
000038 Steam Gen. Tube Rupture / 3					X		EA2.10 - Flowpath for charging and letdown flows	3.3	1
000040 Steam Line Rupture - Excessive Heat Transfer / 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
000056 Loss of Off-site Power / 6						X	2.4.18 - Knowledge of the specific bases for EOPs.	4.0	1
000077 Generator Voltage and Electric Grid Disturbances / 6						X	2.2.25 - Knowledge of bases in Technical Specifications.	4.2	1
W/E11 Loss of Emergency Coolant Recirc. / 4					X		EA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	4.2	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: 6</b>		

# PWR SRO Examination Outline

Printed: 05/04/15

Facility: IPEC

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
000033 Loss of Intermediate Range NI / 7						X	2.2.25 – Knowledge of the bases in Technical Specifications.	4.2	1
000036 Fuel Handling Accident / 8						X	2.1.23 - Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.4	1
000060 Accidental Gaseous Radwaste Rel. / 9					X		AA2.02 - The possible location of a radioactive-gas leak, with the assistance of PEO, health physics and chemistry personnel	4.0	1
000074 Inad. Core Cooling / 4					X		EA2.02 - Availability of main or auxiliary feedwater	4.6	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: 4</b>		

**PWR SRO Examination Outline**

Printed: 05/04/15

Facility: IPEC

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				A2.01 - Problems with RCP seals, especially rates of seal leak-off	3.9	1
008 Component Cooling Water											X	2.1.7 - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.7	1
039 Main and Reheat Steam								X				A2.04 - Malfunctioning steam dump	3.7	1
061 Auxiliary/Emergency Feedwater								X				A2.04 - Pump failure or improper operation.	3.8	1
062 AC Electrical Distribution											X	2.4.40 - Knowledge of SRO responsibilities in emergency plan implementation.	4.5	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: 5</b>		

# PWR SRO Examination Outline

Printed: 05/04/15

Facility: IPEC

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				A2.04 - Loss of heat sinks	4.6	1
028 Hydrogen Recombiner and Purge Control								X				A2.02 - LOCA condition and related concern over hydrogen	3.9	1
072 Area Radiation Monitoring											X	2.4.1 - Knowledge of EOP entry conditions and immediate action steps.	4.8	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>2</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>Group Point Total:</b>	<b>3</b>	



# Generic Knowledge and Abilities Outline (Tier 3)

## PWR SRO Examination Outline

Printed: 05/04/15

**Facility:** IPEC

**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>	2.1.35	Knowledge of the fuel-handling responsibilities of SROs.	3.9	1
	2.1.5	.Ability to use procedures related to shift staffing, such as minimum crew complement.	3.9	1
	<b>Category Total:</b>			<b>2</b>
<b>Equipment Control</b>	2.2.37	Ability to determine operability and / or availability of safety related equipment.	4.6	1
	<b>Category Total:</b>			<b>1</b>
<b>Radiation Control</b>	2.3.5	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personal monitoring equipment, etc.	2.9	1
	2.3.11	Ability to control radiation releases.	4.3	1
	<b>Category Total:</b>			<b>2</b>
<b>Emergency Procedures/Plan</b>	2.4.38	Ability to take actions called for in the facility emergency plan, including supporting or acting as emergency coordinator if required.	4.4	1
	2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm.	4.3	1
	<b>Category Total:</b>			<b>2</b>

**Generic Total:** 7

Tier / Group	K/A	Randomly Selected K/A	Reason for Rejection
T1 / G1	000077G2.1.39	Generator Voltage and Electric Grid Disturbances – Knowledge of conservative decision making practices.	This K/A was rejected due to overlap with RO question 14 which tested the same generic K/A associated with conservative decision making. Too difficult to generate two operationally valid, relevant, and discriminating questions related to this generic topic.
T1 / G2	000033G2.1.6	Loss of Intermediate Range NI – Ability to manage the control room crew during plant transients.	This K/A was rejected because it would be difficult to write an operationally valid, relevant, and discriminating question that adequately matches the K/A. This generic K/A is more applicable to the operating exam.
T2 / G1	061000A2.06	Auxiliary Feedwater - Back leakage of MFW	This K/A was rejected due to the difficulty in writing a question that is operationally valid, relevant, and discriminating while not testing “trivial information”. This condition has not been a problem at Indian Point and the instructions to mitigate are in an unused attachment of a normal operating instruction.
T3 / COO	194000G2.1.39	Knowledge of conservative decision making practices.	This K/A was rejected due to overlap with RO question 14 which tested the same generic K/A associated with conservative decision making. Too difficult to generate two operationally valid, relevant, and discriminating questions related to this generic topic.
T3 / EC	194000G2.2.35	Ability to determine Technical Specification Mode of Operation.	This K/A was rejected because of the difficulty writing an SRO level question based on RO required level knowledge. Technical Specification Mode / Applicability is RO level knowledge (“above the line”).

Facility: <u>Indian Point 3</u>		Date of Examination: <u>5/11/15</u>
Examination Level: RO X	SRO <input type="checkbox"/>	Operating Test Number: <u>1</u>

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N S	Perform Offsite Power Sources Surveillance 2.1.18 – Ability to make accurate, clear, and concise logs, records, status boards, and reports. RO – 3.6 (45.13)
Conduct of Operations	N R	Hydrogen Recombiner Operation Determine Required Heater Power IAW 3-SOP-CB-007. 2.1.25 – Ability to interpret reference materials, such as graphs, curves, tables, etc. RO – 3.9 (45.12)
Equipment Control	N/A	N/A
Radiation Control	N R	Determine Radiological Conditions, RWP Requirements, and Potential Dose 2.3.7 – Ability to comply with radiation work permit requirements during normal or abnormal conditions. RO – 3.5 (45.10)
Emergency Procedures/Plan	D S	Perform Initial Unusual Event Notification 2.4.39 – Knowledge of RO responsibilities in emergency plan implementation. RO – 3.9 (45.11)

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

\* Type Codes & Criteria:

- (C)ontrol room, (S)imulator, or Class(R)oom
- (D)irect from bank ( $\leq 3$  for ROs;  $\leq 4$  for SROs & RO retakes)
- (N)ew or (M)odified from bank ( $\geq 1$ )
- (P)revious 2 exams ( $\leq 1$ ; randomly selected)

Facility: <u>Indian Point 3</u>		Date of Examination: <u>5/11/15</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: <u>1</u>

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N R	Update Electrical Power Availability for Shutdown Safety Assessment 2.1.18 – Ability to make accurate, clear, and concise logs, records, status boards, and reports. SRO – 3.8 (45.13)
Conduct of Operations	D R or S	Determine Isolation Boundaries for CCW Leak Using Plant Prints 2.1.25 - Ability to interpret reference materials, such as graphs, curves, tables, etc. SRO – 4.2 (45.12)
Equipment Control	N R	Review completed Service Water Pump Surveillance. 2.2.12 – Knowledge of surveillance procedures. SRO – 4.1 (45.13)
Radiation Control	N R	Review / Authorize a Liquid Waste Release 2.3.6 – Ability to approve release permits. SRO – 3.8 (45.10)
Emergency Procedures/Plan	D R or S	Classify Event and Complete Form EP-1, Part 1 2.4.41 – Knowledge of the emergency action level thresholds and classifications. SRO – 4.6 (45.11)

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

\* Type Codes & Criteria: (C)ontrol room, (S)imulator, or Class(R)oom  
(D)irect from bank ( $\leq 3$  for ROs;  $\leq 4$  for SROs & RO retakes)  
(N)ew or (M)odified from bank ( $\geq 1$ )  
(P)revious 2 exams ( $\leq 1$ ; randomly selected)

Facility: <u>Indian Point 3</u>		Date of Examination: <u>5/11/15</u>	
Exam Level: RO X    SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: <u>1</u>	
Control Room Systems <sup>@</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)			
System / JPM Title	Type Code*	Safety Function	
S-1	Respond to Turbine 1 <sup>st</sup> Stage Pressure Transmitter Failure (412A) IAW 3-INST-1 and subsequent T <sub>avg</sub> recovery with manual rods (Continuous rod motion) IAW 3-AOP-ROD-1. (use 50% Power IC)	A, D, S	1
S-2	Transfer Buses 1-4 to the Station Aux Transformer	D, P, S	6
S-3	Fill an Accumulator with a SI Pump	D, S	2
S-4	Depressurize the RCS following a SGTR (using PORVs) IAW E-3.	A, D, S	3
S-5	RHR Pump Trip while on shutdown cooling IAW 3-AOP-RHR-1	L, S	4P
S-6	Swap Essential Service Water Pumps (Check valve on O/S pump sticks open) (ensure pressure does not drop below trip setpoint)	A, N, S	4S
S-7	Verify Containment Spray Operation IAW E-0, step 9. (Manually initiate and stop RCPs)	A, D, S	5
S-8	Pressurizer Pressure Channel fails low, trip bistables.	D, S	7
In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
P-1	Locally Start and Synchronize for Parallel Operation # 31 EDG IAW 3-SOP-EL-001.	D	6
P-2	Perform a Radioactive Liquid Release (Monitor Tank) IAW 3-SOP-WDS-014	A, N, R	9
P-3	Local Charging Pump Operation (sect. 4.10) from RWST with CCW <u>not</u> available, requiring alignment to city water cooling (sect. 4.11) IAW 3-SOP-ESP-001.	A, E, M, R	8
<p><sup>@</sup> All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.</p>			
* Type Codes	Criteria for RO / SRO-I / SRO-U		
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	<p>4-6 / 4-6 / 2-3</p> <p>≤ 9 / ≤ 8 / ≤ 4</p> <p>≥ 1 / ≥ 1 / ≥ 1</p> <p>- / - / ≥ 1 (control room system)</p> <p>≥ 1 / ≥ 1 / ≥ 1</p> <p>≥ 2 / ≥ 2 / ≥ 1</p> <p>≤ 3 / ≤ 3 / ≤ 2 (randomly selected)</p> <p>≥ 1 / ≥ 1 / ≥ 1</p>		

Facility: <u>Indian Point 3</u>		Date of Examination: <u>5/11/15</u>	
Exam Level: RO    SRO-I X    SRO-U		Operating Test No.: <u>1</u>	
Control Room Systems® (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)			
System / JPM Title		Type Code*	Safety Function
S-1	Respond to Turbine 1 <sup>st</sup> Stage Pressure Transmitter Failure (412A) IAW 3-INST-1 and subsequent T <sub>avg</sub> recovery with manual rods (Continuous rod motion) IAW 3-AOP-ROD-1. (use 50% Power IC)	A, D, S	1
S-3	Fill an Accumulator with a SI Pump	D, S	2
S-4	Depressurize the RCS following a SGTR (using PORVs) IAW E-3.	A, D, S	3
S-5	RHR Pump Trip while on shutdown cooling IAW 3-AOP-RHR-1	L, S	4P
S-6	Swap Essential Service Water Pumps (Check valve on O/S pump sticks open) (ensure pressure does not drop below trip setpoint)	A, N, S	4S
S-7	Verify Containment Spray Operation IAW E-0, step 9. (Manually initiate and stop RCPs)	A, D, S	5
S-8	Pressurizer Pressure Channel fails low, trip bistables.	D, S	7
In-Plant Systems® (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
P-1	Locally Start and Synchronize for Parallel Operation # 31 EDG IAW 3-SOP-EL-001.	D	6
P-2	Perform a Radioactive Liquid Release (Monitor Tank) IAW 3-SOP-WDS-014	A, N, R	9
P-3	Local Charging Pump Operation (sect. 4.10) from RWST with CCW <u>not</u> available, requiring alignment to city water cooling (sect. 4.11) IAW 3-SOP-ESP-001.	A, E, M, R	8
@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.			
* Type Codes		Criteria for RO / SRO-I / SRO-U	
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator		4-6 / 4-6 / 2-3  $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / $\geq 1$ (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$	

Facility: Indian Point 3 Scenario No.: 1 Op-Test No.: 1

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions: Approx. 75% Power, power ascension in progress to 100% power IAW 3-POP-2.1, Attachment 2. 2 Condensate Pumps are in service. Fuel is Conditioned.

Turnover: Continue power ascension to 100% IAW 3-POP-2.1, Attachment 2 Returning from maintenance on 32 MBFP (oil leak). 32 Charging Pump is out of service, tagged due to a packing leak (maintenance has pump disassembled).

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (ATC) N (BOP) N (CRS)	Raise load IAW 3-POP-2.1
2	MAL-SGN002B	I (BOP) I (ATC) TS (CRS)	31 Steam Generator Pressure (PT-419B) Channel fails high.
3	MAL-SIS003C	I (BOP) TS (CRS)	33 Accumulator Low Pressure Alarm actuates.
4	MAL-ATS004B	C (ALL)	32 MBFP trips.
5	MAL-GEN001 MAL-GEN002	C(ALL)*	IF crew does not trip reactor due to 32 MBFP trip, insert MTG Voltage Regulator Failure and within 3 minutes a direct MTG Trip from Buchanan.*
6	MAL-SGN004A MAL-SGN004B	M(ALL)	Automatic Turbine / Reactor Trip / Safety Injection. Coincident with the Reactor Trip, #31 SG Safety Valve will fail open.
7	MAL-SIS004A	C (CRS) C(BOP)	31 Safety Injection Pump fails to auto start.
8	MAL-SGN005A	M(ALL)	31 SG Tube Rupture
(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: Indian Point 3 Scenario No.: 3 Op-Test No.: 1

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions: 100% Power, # 32 Component Cooling Water Pump is out of service for Maintenance (Motor replacement)

Turnover: 100% Power, # 32 Component Cooling Water Pump is out of service for Maintenance (Motor replacement) . Maintain 100%

Event No.	Mal. No.	Event Type*	Event Description
1	MAL-CFW005C	C BOP/CRS R (ATC) TS (CRS)	#33 Condensate Pump Trips, crew responds IAW 3-AOP-FW-1. Technical Specification for delta I (discuss at minimum after scenario)
2	MAL-SGN001F	I (ATC or BOP) TS (CRS)	32 SG Controlling level channel fails low (LT427B).
3	MAL-MSS009A	M (ALL)	Steam Leak in Turbine Building.
4	MAL-RPS002A MAL-RPS002B	C/M (ALL)	The reactor will not trip from the control room and the crew responds per FR-S-1, ATWS
5	MAL-RHR001B MAL-SIS004C	C (BOP)	Following SI actuation, #32 RHR Pump and #33 SI did not start. BOP starts pumps per 3-RO-1 RNO.
6	MAL-MSS013A MAL-MSS013B MAL-MSS013C MAL-MSS013D	M (ALL)	Failure of MSIVs to close from Control Room. (2 will be closed locally after AFW is throttled to 100 gpm per ECA-2.1).
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			



Facility: Indian Point 3 Scenario No.: 4 Op-Test No.: 1

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions: 100% Power with 31 EDG out of service due to malfunctioning governor. 31 Charging Pump I/S, 35 Service Water Pump I/S

Turnover: 100% Power with 31 EDG out of service due to malfunctioning governor. Maintain 100% power. 31 Charging Pump I/S, 35 Service Water Pump I/S.

Event No.	Malf. No.	Event Type*	Event Description
1	MAL-SWS001E	C (BOP) TS (CRS)	35 SWP trips
2	MAL-NIS006A	C (ATS) C (CRS) TS (CRS)	Power Range Channel 41 Upper Detector Fails High
3	MAL-EPS005C	C (ALL) TS (CRS)	480V Bus 5A Fault
4	N/A	R (ATC)	Tech Spec required plant shutdown
5	MAL-EPS001	M(ALL)	Station Blackout
6	MAL-DSG001B	C (BOP)	32 EDG fail to start
7	MAL-PRS003C	C (ATC)	PZR PORV Fails Open (455C fails open after loss of all AC, we need to isolate block valve later)
8	MAL-SWS001F	C (BOP)	SW pump does not auto start after bus energized 32 EDG comes back, 6A bus back. Failure of 36 SW pump to auto start.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			