

Facility: Indian Point Unit 2

Printed: 12/10/2013

Date Of Exam: 02/10/2014

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	3		3	6	
	2	2	2	2				1	2			0	9	2		2	4	
	Tier Totals	5	5	5				4	5			3	27	5		5	10	
	2. Plant Systems	1	3	2	3	3	3	2	3	3	2	3	2	28	3		2	5
2		1	1	1	1	1	1	1	1	1	1	0	10	0	2	1	3	
Tier Totals		4	3	4	4	4	3	4	4	3	4	2	38	5		3	8	
3. Generic Knowledge And Abilities Categories				1		2		3		4		10		1	2	3	4	7
				3		2		2		3				2	2	1	2	

Note:

1. 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).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ± 1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/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.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 2

NRC Written Examination Outline

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	Number	K/A Topic	Imp.	Q#
000007 Reactor Trip – Stabilization – Recovery / 1	X						EK1.03	Knowledge of the operational implications of the following concepts as they apply to the reactor trip: - Reasons for closing the main turbine governor valve and the main turbine stop valve after a reactor trip	3.7	1
000007 Reactor Trip - Stabilization - Recovery / 1						X	2.1.45	Conduct of Operations - Ability to identify and interpret diverse indications to validate the response of another indication.	4.3	76
000008 Pressurizer Vapor Space Accident / 3				X			AA1.08	Ability to operate and/or monitor the following as they apply to the Pressurizer Vapor Space Accident: - PRT level pressure and temperature	3.8	2
000009 Small Break LOCA / 3						X	2.4.18	Emergency Procedures/Plan - Knowledge of the specific bases for EOPs.	4.0	78
000011 Large Break LOCA / 3	X						EK1.01	Knowledge of the operational implications of the following concepts as they apply to the Large Break LOCA: - Natural circulation and cooling, including reflux boiling	4.1	3
000015/000017 RCP Malfunctions / 4				X			AA1.12	Ability to operate and/or monitor the following as they apply to the Reactor Coolant Pump Malfunctions: - Reactor coolant loop flow meters	2.8	4
000022 Loss of Rx Coolant Makeup / 2			X				AK3.04	Knowledge of the reasons for the following responses as they apply to the Loss of Reactor Coolant Makeup: - Isolating letdown	3.2	5
000025 Loss of RHR System / 4		X					AK2.05	Knowledge of the interrelations between the Loss of Residual Heat Removal System and the following: - Reactor building sump	2.6	6
000026 Loss of Component Cooling Water / 8			X				AK3.02	Knowledge of the reasons for the following responses as they apply to the Loss of Component Cooling Water: - The automatic actions (alignments) within the CCWS resulting from the actuation of the ESFAS	3.6	7
000038 Steam Gen. Tube Rupture / 3						X	EA2.15	Ability to determine and interpret the following as they apply to a SGTR: - Pressure at which to maintain RCS during S/G cooldown	4.2	9
000040 Steam Line Rupture - Excessive Heat Transfer / 4	X						AK1.01	Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture: - Consequences of PTS	4.1	10

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 2

NRC Written Examination Outline

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	Number	K/A Topic	Imp.	Q#
000054 Loss of Main Feedwater / 4						X	2.4.16	Emergency Procedures/Plan - Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, severe accident management guidelines.	3.5	14
000055 Station Blackout / 6						X	2.4.17	Emergency Procedures/Plan - Knowledge of EOP terms and definitions.	3.9	12
000055 Station Blackout / 6						X	EA2.03	Ability to determine and interpret the following as they apply to a Station Blackout: - Actions necessary to restore power	4.7	79
000056 Loss of Off-site Power / 6						X	2.2.25	Equipment Control - Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	4.2	77
000056 Loss of Off-site Power / 6				X			AA1.33	Ability to operate and/or monitor the following as they apply to the Loss of Offsite Power: - PORV block valve control switch	3.3	13
000057 Loss of Vital AC Electrical Instrument Bus / 6						X	2.1.36	Conduct of Operations - Knowledge of procedures and limitations involved in core alterations.	3	8
000058 Loss of DC Power / 6			X				AK3.01	Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: - Use of DC control power by ED/Gs	3.4	11
000062 Loss of Nuclear Svc Water / 4						X	AA2.02	Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: - The cause of possible SWS loss	3.6	80
000065 Loss of Instrument Air / 8						X	AA2.07	Ability to determine and interpret the following as they apply to the Loss of Instrument Air: - Whether backup nitrogen supply is controlling valve position	2.8	15
W/E04 LOCA Outside Containment / 3		X					EK2.02	Knowledge of the interrelations between the LOCA Outside Containment and the following: - 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	16

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 2

NRC Written Examination Outline

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	Number	K/A Topic	Imp.	Q#
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4					X		EA2.01	Ability to determine and interpret the following as they apply to the Loss of Secondary Heat Sink: - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	4.4	81
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4		X					EK2.01	Knowledge of the interrelations between the Loss of Secondary Heat Sink and the following: - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.7	17
W/E11 Loss of Emergency Coolant Recirc. / 4					X		EA2.01	Ability to determine and interpret the following as they apply to the Loss of Emergency Coolant Recirculation: - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	3.4	18

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 2

NRC Written Examination Outline

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	Number	K/A Topic	Imp.	Q#
000003 Dropped Control Rod / 1	X						AK1.10	Knowledge of the operational implications of the following concepts as they apply to Dropped Control Rod: - Definitions of core quadrant power tilt	2.6	20
000005 Inoperable/Stuck Control Rod / 1			X				AK3.03	Knowledge of the reasons for the following responses as they apply to the Inoperable/Stuck Control Rod: - Tech-Spec limits for rod mismatch	3.6	21
000033 Loss of Intermediate Range NI / 7					X		AA2.01	Ability to determine and interpret the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: - Equivalency between source-range, intermediate-range, and power-range channel readings	3.0	22
000036 Fuel Handling Accident / 8	X						AK1.01	Knowledge of the operational implications of the following concepts as they apply to Fuel Handling Incidents: - Radiation exposure hazards	3.5	23
000037 Steam Generator Tube Leak / 3						X	2.2.37	Equipment Control - Ability to determine operability and/or availability of safety related equipment.	4.6	82
000060 Accidental Gaseous Radwaste Rel. / 9		X					AK2.02	Knowledge of the interrelations between the Accidental Gaseous Radwaste Release and the following: - Auxiliary building ventilation system	2.7	24
000068 Control Room Evac. / 8						X	2.1.06	Conduct of Operations - Ability to manage the control room crew during plant transients.	4.8	83
000069 Loss of CTMT Integrity / 5					X		AA2.02	Ability to determine and interpret the following as they apply to the Loss of Containment Integrity: - Verification of automatic and manual means of restoring integrity	3.9	25
000074 Inad. Core Cooling / 4				X			EA1.12	Ability to operate and/or monitor the following as they apply to an Inadequate Core Cooling: - RCS temperature and pressure indicators	4.1	26
W/E02 SI Termination / 3					X		EA2.02	Ability to determine and interpret the following as they apply to the SI Termination: - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	4.0	84

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 2

NRC Written Examination Outline

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	Number	K/A Topic	Imp.	Q#
W/E03 LOCA Cooldown - Depress. / 4		X					EK2.02	Knowledge of the interrelations between the LOCA Cooldown and Depressurization and the following: - 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	3.7	27
W/E10 Natural Circ. / 4					X		EA2.01	Ability to determine and interpret the following as they apply to the Natural Circulation with Steam Void in Vessel with/without RVLIS: - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	3.9	85
W/E10 Natural Circ. / 4			X				K3.02	Knowledge of the reasons for the following responses as they apply to the Natural Circulation with Steam Void in Vessel with/without RVLIS: - Normal, abnormal and emergency operating procedures associated with Natural Circulation with Steam Void in Vessel with/without RVLIS	3.2	19

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 2

**NRC Written Examination Outline
Plant Systems - Tier 2 / Group 1**

ES-401

Form ES-401-2

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	C	Number	K/A Topic	Imp	Q#
003 Reactor Coolant Pump	X											K1.03	Knowledge of the physical connections and/or cause-effect relationships between the RCPS and the following systems: - RCP seal system	3.3	28
004 Chemical and Volume Control						X						K6.31	Knowledge of the effect of a loss or malfunction on the following CVCS components: - Seal injection system and limits on flow range	3.1	29
005 Residual Heat Removal	X											K1.12	Knowledge of the physical connections and/or cause-effect relationships between the RHRS and the following systems: - Safeguard pumps	3.1	30
005 Residual Heat Removal								X				A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Failure modes for pressure, flow, pump motor amps, motor temperature, and tank level instrumentation	2.9	86
006 Emergency Core Cooling							X					A1.07	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ECCS controls including: - Pressure, high and low	3.3	31
007 Pressurizer Relief/Quench Tank									X			A3.01	Ability to monitor automatic operation of the PRTS, including: - Components which discharge to the PRT	2.7	32
007 Pressurizer Relief/Quench Tank					X							K5.02	Knowledge of the operational implications of the following concepts as they apply to the PRTS: - Method of forming a steam bubble in the PZR	3.1	33
008 Component Cooling Water			X									K3.01	Knowledge of the effect that a loss or malfunction of the CCWS will have on the following: - Loads cooled by CCWS	3.4	34
008 Component Cooling Water								X				A2.02	Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - High/low surge tank level	3.5	87
010 Pressurizer Pressure Control						X						K6.01	Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS: - Pressure detection systems	2.7	35

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 2

**NRC Written Examination Outline
Plant Systems - Tier 2 / Group 1**

ES-401

Form ES-401-2

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	C	Number	K/A Topic	Imp	Q#
012 Reactor Protection			X									K3.04	Knowledge of the effect that a loss or malfunction of the RPS will have on the following: - ESFAS	3.8	37
013 Engineered Safety Features Actuation											X	2.1.30	Conduct of Operations - Ability to locate and operate components, including local controls.	4.4	36
013 Engineered Safety Features Actuation		X										K2.01	Knowledge of bus power supplies to the following: - ESFAS/safeguards equipment control	3.6	38
022 Containment Cooling											X	2.4.22	Emergency Procedures/Plan - Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations.	3.4	39
022 Containment Cooling									X			A3.01	Ability to monitor automatic operation of the CCS, including: - Initiation of safeguards mode of operation	4.1	40
026 Containment Spray												A2.03	Ability to (a) predict the impacts of the following malfunctions or operations on the CSS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Failure of ESF	4.1	41
039 Main and Reheat Steam							X					A1.06	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MRSS controls including: - Main steam pressure	3.0	42
059 Main Feedwater			X									K3.04	Knowledge of the effect that a loss or malfunction of the MFW System will have on the following: - RCS	3.6	43
059 Main Feedwater										X		A4.01	Ability to manually operate and/or monitor in the control room: - MFW turbine trip indication	3.1	44
061 Auxiliary/Emergency Feedwater				X								K4.02	Knowledge of AFW System design feature(s) and/or interlock(s) which provide for the following: - AFW automatic start upon loss of MFW pump, S/G level, blackout, or safety injection	4.5	45
061 Auxiliary/Emergency Feedwater					X							K5.01	Knowledge of the operational implications of the following concepts as they apply to the AFW System: - Relationship between AFW flow and RCS heat transfer	3.6	51

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 2

**NRC Written Examination Outline
Plant Systems - Tier 2 / Group 1**

ES-401

Form ES-401-2

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic	Imp	Q#
062 AC Electrical Distribution								X				A2.04	Ability to (a) predict the impacts of the following malfunctions or operations on the A.C. Distribution System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Effect on plant of de-energizing a bus	3.4	46
062 AC Electrical Distribution										X		A4.07	Ability to manually operate and/or monitor in the control room: - Synchronizing and paralleling of different AC supplies	3.1	48
062 AC Electrical Distribution											X	2.2.36	Equipment Control - Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	4.2	88
063 DC Electrical Distribution		X										K2.01	Knowledge of bus power supplies to the following: - Major DC loads	2.9	47
064 Emergency Diesel Generator				X								K4.11	Knowledge of ED/G System design feature(s) and/or interlock(s) which provide for the following: - Automatic load sequencer: safeguards	3.5	49
073 Process Radiation Monitoring	X											K1.01	Knowledge of the physical connections and/or cause-effect relationships between the PRM System and the following systems: - Those systems served by PRMs	3.6	50
076 Service Water								X				A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the SWS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Loss of SWS	3.5	52
076 Service Water											X	2.4.8	Emergency Procedures/Plan - Knowledge of how abnormal operating procedures are used in conjunction with EOPs.	4.5	89
078 Instrument Air				X								K4.02	Knowledge of IAS design feature(s) and/or interlock(s) which provide for the following: - Cross-over to other air systems	3.2	53
103 Containment										X		A4.03	Ability to manually operate and/or monitor in the control room: - ESF slave relays	2.7	54

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 2

**NRC Written Examination Outline
Plant Systems - Tier 2 / Group 1**

ES-401

Form ES-401-2

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic	Imp	Q#
---------------	----	----	----	----	----	----	----	----	----	----	---	--------	-----------	-----	----

103 Containment								X				A2.03	Ability to (a) predict the impacts of the following malfunctions or operations on the Containment System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Phase A and B isolation	3.8	90
103 Containment							X					A1.01	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Containment System controls including: - Containment pressure, temperature, and humidity	3.7	55

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 2

**NRC Written Examination Outline
Plant Systems - Tier 2 / Group 2**

ES-401

Form ES-401-2

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	C	Number	K/A Topic	Imp	Q#
---------------	----	----	----	----	----	----	----	----	----	----	---	--------	-----------	-----	----

001 Control Rod Drive		X										K2.03	Knowledge of bus power supplies to the following: - One-line diagram of power supplies to logic circuits	2.7	56
002 Reactor Coolant						X						K6.07	Knowledge of the effect of a loss or malfunction on the following RCS components: - Pumps	2.5	57
014 Rod Position Indication					X							K5.02	Knowledge of the operational implications of the following concepts as they apply to the RPIS: - RPIS independent of demand position	2.8	58
015 Nuclear Instrumentation				X								K4.03	Knowledge of NIS design feature(s) and/or interlock(s) which provide for the following: - Reading of source range/intermediate range/power range outside control room	3.9	59
016 Non-Nuclear Instrumentation System (NNIS)			X									K3.09	Knowledge of the effect that a loss or malfunction of the NNIS will have on the following: - ESFAS	3.5	61
017 In-core Temperature Monitor								X				A2.02	Ability to (a) predict the impacts of the following malfunctions or operations on the ITM System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Core damage	3.6	60
029 Containment Purge System (CPS)							X					A1.02	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Containment Purge System controls including: - Radiation levels	3.4	62
034 Fuel Handling Equipment								X				A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the Fuel Handling System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Dropped fuel element	4.4	91
035 Steam Generator System (S/GS)								X				A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the S/GS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Faulted or ruptured S/Gs	4.6	93

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 2

**NRC Written Examination Outline
Plant Systems - Tier 2 / Group 2**

ES-401

Form ES-401-2

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	C	Number	K/A Topic	Imp	Q#
045 Main Turbine Generator									X			A3.04	Ability to monitor automatic operation of the MT/G System, including: - T/G trip	3.4	63
072 Area Radiation Monitoring											X	2.4.18	Emergency Procedures/Plan - Knowledge of the specific bases for EOPs.	4.0	92
072 Area Radiation Monitoring										X		A4.02	Ability to manually operate and/or monitor in the control room: - Major components	2.5	64
086 Fire Protection	X											K1.03	Knowledge of the physical connections and/or cause-effect relationships between the Fire Protection System and the following systems: - AFW System	3.4	65

Generic Knowledge and Abilities Outline (Tier 3)

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 2

Form ES-401-3

Facility	Indian Point Unit 3		Date of Exam		RO		SRO-Only	
Category	K/A #	Topic	IR	Q#	IR	Q#		
1. Conduct of Operations	2.1.23	Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.3	66				
	2.1.40	Knowledge of refueling administrative requirements.	2.8	67				
	2.1.45	Ability to identify and interpret diverse indications to validate the response of another indication.	4.3	68				
	2.1.25	Conduct of Operations - Ability to interpret reference materials such as graphs, curves, tables etc.			4.2	94		
	2.1.36	Conduct of Operations - Knowledge of procedures and limitations involved in core alterations.			4.1	95		
	Subtotal			3		2		
2. Equipment Control	2.2.6	Knowledge of the process for making changes to procedures.	3.0	69				
	2.2.12	Knowledge of surveillance procedures.	3.7	70				
	2.2.25	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.2	75				
	2.2.17	Equipment Control - Knowledge of the process for managing maintenance activities during power operations, such as risk assessments, work prioritization, and coordination with the transmission system operator.			3.8	96		
	2.2.18	Equipment Control - Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.			3.9	97		
	Subtotal			3		2		

Generic Knowledge and Abilities Outline (Tier 3)

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 2

Form ES-401-3

Facility	Indian Point Unit 3		Date of Exam					
Category	K/A #	Topic	RO		SRO-Only			
			IR	Q#	IR	Q#		
3. Radiological Controls								
	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	71				
	2.3.12	Radiological Controls - Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.2	72				
	2.3.4	Radiological Controls - Knowledge of radiation exposure limits under normal and emergency conditions.			3.7	98		
	Subtotal			2		1		
4. Emergency Procedures/plan	2.4.35	Emergency Procedures/Plan - Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects..	3.8	73				
	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	74				
	2.4.32	Emergency Procedures/Plan - Knowledge of operator response to loss of all annunciators.			4.0	99		
	2.4.46	Emergency Procedures/Plan - Ability to verify that the alarms are consistent with the plant conditions.			4.2	100		
	Subtotal			2		2		
Tier 3 Point Totals				10		7		

Description of program used to generate IPEC Unit 2 February 10, 2014 Written Exam K/As

Generated the RO and SRO sample plan using the "NKEG" Database Program, version 1.1, developed by Westinghouse Electric Company. This program will automatically produce a Random Sample Plan based on NUREG 1122, Rev. 2, Supplement 1 K/As.

K/As were suppressed prior to the outline generation process as provided for in the examiner standard, the list of suppressed K/As is provided as required by the examiners standard.

Inappropriate and inapplicable K/As were discarded during the outline development process and are included in the record of rejected K/As. The replacement K/As were replaced using the random sample function of the NKEG database program.

Tier / Group	Randomly Selected K/A		Reason for Rejection
R 1/1	0000082307 Pressurizer Vapor Space Accident	Radiological Controls - Ability to comply with radiation work permit requirements during normal and abnormal conditions.	Rejected because Generic KA is not applicable to Pressurizer Vapor Space Accident
R 1/1	000029A104 ATWS	Ability to operate and/or monitor the following as they apply to a ATWS: - BIT inlet valve switches	Rejected because the BIT has been removed.
R 1/1	0000582305 Loss of DC Power	Radiological Controls - Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	Rejected because this Generic KA is not applicable to Loss of DC Power.
R 1/1	0000622305 Loss of Nuclear Service Water	Emergency Procedures/Plan – Knowledge of emergency communications systems and techniques.	Rejected because this Generic KA is not applicable to Loss of Nuclear Service Water
R 1/1	0000272130 Pressurizer Pressure Control System Malfunction	Conduct of Operations – Ability to locate and operate components, including local controls.	Rejected because this KA is best evaluated during Simulator or JPM examination. Unable to write a discriminatory RO question.
R 1/1	000054K301 Loss of main Feedwater	Knowledge of the reasons for the following responses as they apply to the Loss of Main Feedwater (MFW): - Reactor and/or turbine trip, manual and automatic	Rejected due to overlap with question 1.
R 1/1	0000572239	Equipment Control – Knowledge of less than or equal to one hour technical specification action statements for systems.	Rejected because there are no TS actions ≤ one hour for vital AC.
R 1/2	0000052121 Inoperable/Stuck Control Rod	Conduct of Operations – Ability to verify the controlled procedure copy.	Rejected because this Generic KA is best evaluated with a JPM. Unable to write a discriminatory RO question.

R 1/2	0000012132 Continuous Rod Withdrawal	Ability to explain and apply all system limits and precautions.	IPEC Unit 2 has defeated automatic rod withdrawal and manual uncontrolled rod withdrawal requires a reactor trip. Due to equipment configuration unable to write a discriminatory RO question that does not overlap with an existing JPM
R 2/1	0060002114 Emergency Core Cooling	Conduct of Operations – Knowledge of criteria or conditions that require plant-wide announcements, such as pump starts, reactor trips, mode changes, etc.	Rejected because this Generic KA is best evaluated during simulator scenarios. Unable to write a discriminatory RO question.
R 2/1	0260002241 Containment Spray	Equipment Control – Ability to obtain and interpret station electrical and mechanical drawings.	Rejected because this Generic KA is best evaluated with a JPM or during a simulator scenario. Unable to write a discriminatory RO question.
R 2/1	010000K502 Pressurizer Pressure Control	Knowledge of the operational implications of the following concepts as they apply to the PZR PCS: - Constant enthalpy expansion through a valve	Rejected due to overlap with question 2.
R 2/1	064000A405 Emergency Diesel Generator	Ability to manually operate and/or monitor in the control room: - Transfer of ED/G control between manual and automatic	There are no controls for EDGs in the control room at IPEC Unit 2. There is very limited indication. Unable to write a discriminatory RO question.
R 2/1	073000K502	Knowledge of the operational implications of the following concepts as they apply to the PRM System: - Radiation intensity changes with source distance	
R 2/2	014000K501	Knowledge of the operational implications of the following concepts as they apply to the RPIS: - Reasons for differences between RPIS and step counter	

R 2/2	033000K302 Spent Fuel Pool Cooling System (SFPCS)	Knowledge of the effect that a loss or malfunction of the Spent Fuel Pool Cooling System will have on the following: - Area and ventilation radiation monitoring systems	Rejected because at IPEC a loss of cooling without a loss of inventory will take an excessively long time to produce an effect on radiation monitors. Unable to write a discriminatory RO question.
R 2/2	035000A302 Steam Generator	Ability to monitor automatic operation of the S/G, including: - MAD valves	Rejected because MAD valves are not applicable at IPEC.
R 3	2.4.32	Knowledge of operator response to loss of all annunciators.	Rejected because the same Generic KA was selected for SRO Only question. Topic too narrow in scope to develop 2 independent questions.
R 3	2.4.13	Knowledge of crew roles and responsibilities during EOP usage	Rejected because this KA is best evaluated during Simulator exam. Unable to write a discriminatory RO Question.
S 1/2	00WE062219 Inadequate Core Cooling	Equipment Control - Knowledge of maintenance work order requirements.	Rejected because this Generic KA is not related to Inadequate Core Cooling. Unable to write a discriminatory SRO question.
S 2/1	0000252240 Loss of RHR System	Equipment Control – Ability to apply technical specifications for a system	Rejected because action statements for loss of RHR are less than one hour (i.e., immediately). Unable to write a discriminatory SRO question.
S 2/2	079000A201 Station Air	Ability to (a) predict the impacts of the following malfunctions or operations on the SAS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Cross-connection with IAS	Rejected because Station Air and Instrument Air systems are normally cross connected at IPEC. This is not a malfunction.
S 2/2	014000A204 Rod Position Indication	Ability to (a) predict the impacts of the following malfunctions or operations on the RPIS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Misaligned rod	Per discussion with Lead Examiner, unable to write a discriminatory SRO question.

S 3	2.1.6	Conduct of Operations - Ability to manage the control room crew during plant transients.	Rejected because this Generic KA is best evaluated during simulator scenarios. Unable to write a discriminatory SRO question.

When the outline was submitted, only one KA was selected for the RO Tier 2 (Plant Systems) Generic column. This is the result of a problem with the NKEG WOG NRC KA Exam Generator.

The error was identified by Dave Silk.

The Exam Generator did not select another generic KA after several attempts. After a discussion with Dave Silk, we randomly selected a new Plant systems KA for a System that was already represented twice (013 Engineered Safety Features Actuation).

Facility: IPEC Unit 2Date of Examination: Feb 10, 2014Examination Level: RO ☒ SRO ☐

Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M, R	Replace a Watchstander Due to Illness (KA GENERIC 2.1.5 RO-2.9 SRO-3.9)
Conduct of Operations	M, R	Determine Reactor Vessel Venting Time Per FR-I.3, Attachment 1 (KA GENERIC 2.1.25 RO-3.9 SRO-4.2)
Equipment Control	M, R	Demonstrate Proficiency in use of Generator Capability Curve (KA GENERIC 2.2.41 RO-3.5 SRO-3.9)
Radiation Control	M, R	Review a SG Tube Leakrate Determination using 2- AOP-SG-1 (KA GENERIC 2.3.14 RO-3.4 SRO-3.8)
Emergency Procedures/Plan		NA RO

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 (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
 (N)ew or (M)odified from bank (≥ 1)
 (P)revious 2 exams (≤ 1 ; randomly selected)

Facility: <u>IPEC Unit 2</u>		Date of Examination: <u>Feb 10, 2014</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: _____
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M, R	Replace a Watchstander Due to Illness (KA GENERIC 2.1.5 RO-2.9 SRO-3.9)
Conduct of Operations	M, R	Review Reactor Vessel Venting Time Per FR-I.3, Attachment 1 (KA GENERIC 2.1.25 RO-3.9 SRO-4.2)
Equipment Control	M, R	Demonstrate Proficiency in use of Generator Capability Curve (KA GENERIC 2.2.41 RO-3.5 SRO-3.9)
Radiation Control	M, R	Review a SG Tube Leakrate Determination using 2- AOP-SG-1 (KA GENERIC 2.3.14 RO-3.4 SRO-3.8)
Emergency Procedures/Plan		Classify Emergency Events requiring Emergency Plan Implementation (Time Critical) (KA GENERIC 2.4.38 SRO-4.4)
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 (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) (N)ew or (M)odified from bank (≥ 1) (P)revious 2 exams (≤ 1 ; randomly selected)		

Facility: <u>IPEC Unit 2</u>		Date of Examination: <u>Feb 10, 2014</u>
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: _____
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
a. Emergency Borate (004000A4.18 RO-4.3 SRO-4.1)	A, S, M	1
b. Perform the Required Action to Align the SI System for Recirculation during Transfer to Cold Leg Recirculation (000011A1.11 RO-4.2 SRO-4.2)	A, D, S, EN	2
c. Respond to a Pressurizer Low Pressure Alarm (000027A1.01 RO-4.0 SRO-3.9)	A, N, S	3
d. Transfer Main Feed from LFBV to MFRVs During Power Ascension (059000A4.03 RO-2.9 SRO-2.9)	N, S, L	4S
e. Perform the Required Actions to Reset FCU Services and Ventilation (022000A4.01 RO-3.6 SRO-3.6)	D, S, EN	5
f. Transfer Buses 1, 2, 3, or 4 to the Unit Auxiliary Transformer (062000A4.01 RO-3.3 SRO-3.1)	D, S, L	6
g. Respond to Instrument Failure (412A low Rods do not stop) 016000A2.01 RO-3.0 SRO-3.1)	A, D, S,	7
h. Start a Reactor Coolant Pump (003000A4. 06 RO-2.9 SRO-2.9)	D, S,	4P
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Align Nitrogen Bottle to the Atmospheric SD (039000A4.07 RO-2.8 SRO-2.9)	N, E	8
j. Release a small gas decay tank (071000A4.05 RO-2.6 SRO-2.6)	D, R	9
k. Perform the Required Actions to Replace 21 Feedwater Regulating Bypass Valve Air Lines for Local Operation during Loss of Secondary Heat Sink (00WE05A101 RO – 4.1 SRO – 4.0)	D, E	4S
<p>[@] 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	

Facility: <u>IPEC Unit 2</u>		Date of Examination: <u>Feb 10, 2014</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: _____
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
a. Emergency Borate (004000A4.18 RO-4.3 SRO-4.1)	A, S, M	1
b. Perform the Required Action to Align the SI System for Recirculation during Transfer to Cold Leg Recirculation (000011A1.11 RO-4.2 SRO-4.2)	A, D, S, EN	2
c. Respond to a Pressurizer Low Pressure Alarm (000027A1.01 RO-4.0 SRO-3.9)	A, N, S	3
d. Transfer Main Feed from LFBV to MFRVs During Power Ascension (059000A4.03 RO-2.9 SRO-2.9)	N, S, L	4S
e. Perform the Required Actions to Reset FCU Services and Ventilation (022000A4.01 RO-3.6 SRO-3.6)	D, S, EN	5
f. Transfer Buses 1, 2, 3, or 4 to the Unit Auxiliary Transformer (062000A4.01 RO-3.3 SRO-3.1)	D, S, L	6
g. Respond to Instrument Failure (412A low Rods do not stop) 016000A2.01 RO-3.0 SRO-3.1)	A, D, S,	7
h. NA SRO		
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Align Nitrogen Bottle to the Atmospheric SD (039000A4.07 RO-2.8 SRO-2.9)	N, E	8
j. Release a small gas decay tank (071000A4.05 RO-2.6 SRO-2.6)	D, R	9
k. Perform the Required Actions to Replace 21 Feedwater Regulating Bypass Valve Air Lines for Local Operation during Loss of Secondary Heat Sink (00WE05A101 RO – 4.1 SRO – 4.0)	D, E	4S
[@] 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	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	$\leq 9 / \leq 8 / \leq 4$
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$
(EN)gineered safety feature	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	$\geq 1 / \geq 1 / \geq 1$
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)
(R)CA	$\geq 1 / \geq 1 / \geq 1$
(S)imulator	

Facility: <u>IPEC Unit 2</u>		Date of Examination: <u>Feb 10, 2014</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: _____
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
a. NA SRO-U		
b. Perform the Required Action to Align the SI System for Recirculation during Transfer to Cold Leg Recirculation (000011A1.11 RO-4.2 SRO-4.2)	A, D, S, EN	2
c. Respond to a Pressurizer Low Pressure Alarm (000027A1.01 RO-4.0 SRO-3.9)	A, N, S	3
d. NA SRO-U		
e. NA SRO-U		
f. Transfer Buses 1, 2, 3, or 4 to the Unit Auxiliary Transformer (062000A4.01 RO-3.3 SRO-3.1)	D, S, L	6
g. NA SRO-U		
h. NA SRO-U		
In-Plant Systems® (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Align Nitrogen Bottle to the Atmospheric SD (039000A4.07 RO-2.8 SRO-2.9)	N, E	8
j. Release a small gas decay tank (071000A4.05 RO-2.6 SRO-2.6)	D, R	9
k. NA SRO-U		
@ 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 $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / ≥ 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 2 Scenario No.: 1

Op-Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions:

Reset simulator to 90% power IC Load Simulator Schedule-Scenario1

The Plant is at 90% power.

22 SI Pump is OOS

Ensure 23 Charging Pump, 23 SWP and 26 SWP are in service

Turnover:

Return plant to 100% power over the next hour.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (ATC) N (CRS) N (BOP)	Power Escalation
2	MOT-SWS008A	C(BOP) TS(CRS)	23 SW Pump trips.
3	XMT-SGN034A	I (ATC) I (CRS)	PT-404 Steam Header Pressure fails high causing MBFPs to be placed in manual.
4	MAL-EPS007D	C (ALL) TS(CRS)	480V Bus 6A fault.
5	MAL-RCS006A	M(ALL)	Small Break LOCA
6	BKR-PPL003/4	M(ALL)	ATWS
7	MOC-AFW001	C(CRS) C(BOP)	21 AFW Pump failure
8	RLY-PPL487/488	C(CRS)	Automatic Safety Injection failure
9	RLY-PPL085/090	C(CRS) C(BOP)	Phase A Isolation failure
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: Indian Point 2 Scenario No.: 2

Op-Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions:

Reset simulator to 100% power IC Load Simulator Schedule-Scenario2

The Plant is at 100% power.

Ensure 25 SWP and 22 Charging Pump in service.

Turnover:

Perform power reduction to 90% for turbine valve testing.

Event No.	Mal. No.	Event Type*	Event Description
1	N/A	R (ATC) N (CRS) N (BOP)	Power Reduction
2	MOT- CFW001B	C (ALL) TS(CRS)	21 Condensate Pump trip. TS for AFD.
3	BST- CCW009A	C(BOP) C(CRS)	RCP Thermal Barrier CCW Return Valve (FCV-625) spurious closure.
4	MAL- EPS007B	C (ALL) TS(CRS)	480V Bus 3A fault.
5	CNH- PCS007D	C(ATC) C(CRS)	22 FRV fails in auto.
6	CVH- CFW005A	M(ALL)	22 FRV fails in manual.
7	MOC- AFW002 CVH- ATS017B	M(ALL)	Failure of 22 and 23 AFW to start which along with other conditions leads to loss of heat sink.
8	AOV- MSS036A/ CVH- MSS030B	C(ALL)	Failure of Turbine Stop/Control Valve pair.
9	AOV- RCS002A	C(ALL)	Failure of PORV requiring opening of reactor head vent valves

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: Indian Point 2 Scenario No.: 3

Op-Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions:

Reset simulator to 4% power IC Load Simulator Schedule-Scenario3

The Plant is at 4% power. 23 Charging Pump is OOS. 22 MBFP is OOS. PORV 456 is OOS

Ensure 21 Charging Pump in service, Ensure 23 CCW Pump is in service

Turnover:

Perform power ascension to 10% for turbine sync.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (ATC) N (CRS) N (BOP)	Power Ascension
2	MOT-CVC003B	C (ATC) C(CRS) TS(CRS)	21 Charging Pump trip
3	MOC-CCW003A	C (BOP) C (CRS) TS(CRS)	23 CCW pump trip with failure of other CCW pumps to autostart
4	XMT-CRF012A	TS(CRS)	Control Rod D8 IRPI fails low.
5	XMT-CFW036A	C (ALL)	PT-408A fails high causing 21 MFW Pump to go to minimum speed.
6	MAL-ATS005A	M(ALL)	21 MFW Pump trips.
7	MAL-RCS014D	M(ALL)	24 SGTR.
8	AOV-CAS009A	C(ALL)	Failure of air to containment making PORVs required for depressurization.
9	AOV-RCS002A	C(ALL)	PORV will not close causing team to transition to ECA-3.1
10	MOC-CNM008/9	C(BOP)	21 and 22 Containment Recirc Fans fail to autostart.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor