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December 20, 2002  
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Operational Safety Branch  
Division of Reactor Safety  
United States Nuclear Regulatory Commission  
Region 1  
475 Allendale Road  
King of Prussia  
Pennsylvania, 19406-1415  
Att: Mr. R J Conte

SENIOR REACTOR AND REACTOR OPERATOR INITIAL EXAMINATION –  
INDIAN POINT STATION, UNITS 2 AND 3

Dear Mr. Conte,

In accordance with your letter of November 21, 2002, please find attached the examination outlines for the Indian Point Energy Center Reactor Operator and Senior Reactor Operator initial examinations.

If you have any questions, please contact Mr. Bill Altic at (914) 788-2629 for Unit 2, Mr. Steve Joubert at (914) 788-2973 for Unit 3, or me at (914) 788-2904.

Sincerely,

Frank Wilson  
Superintendent – Operations Training  
Indian Point Energy Center

## Review Comments for Exam Outline IP#2 LOIT exam

- Requested addition of one critical task to Scenario #1, "Manual reactor trip" although safety significant not really discriminating. After trip of second feed pump the operators must note reactor didn't trip and just push 2 buttons. It should be very obvious after trip of second feed pump that reactor should have tripped.
- RO, admin JPM A.3, replace this is only GET level - although borderline acceptable try to come up with something more discriminating for making a licensing decision.
- ⑥ *More than 40% Alt Path on SRO U JPM outline*
- Consider whether JPMs S3 and S4 should be sequenced.
- RO, admin JPM A.1.b review with other examiners to determine if really discriminating - take partial logs and identify 3 Out of spec readings CST level, Cont Air Temp, 21 Accum pressure.
- Ensure written SRO only question # 76 is written at the SRO level.

**Indian Point Unit 2 & 3**  
**2003 NRC Written Examination**  
**Written Examination Outline Methodology**

The written examination outline was developed using an electronic random outline generator. The application was developed using Visual Basic code, relying on a true random function based on the PC system clock. The random generator selects topics in a Microsoft Access Database containing Revision 2 of the PWR K&A catalogue. The selected data is then written to a separate data table.

The following topic area was deleted for generation of the March 2003 NRC RO/SRO written examination:

**System 025: Ice Condenser. The facilities do not have an Ice Condenser system**

The process used to develop the outlines is as follows:

- **System 025** above was suppressed prior to generation
- For Tier 1 and Tier 2 generic items, only the items required to be included on the NRC supplemental suppression guidance document are included in the generation process
- NO other topics or items were suppressed
- Outline is generated for all topics with KA importance  $\geq 2.5$
- 25 potential SRO topics are randomly selected from Tier 1 AA2 and required generic items, Tier 2 A2 and required generic items, and Tier 3 generic items
- For RO/SRO outlines, the potential SRO 10CFR55.43(b) exam topics (Generic, Tier 1 and Tier 2 A2's) are randomly and automatically selected. The remaining topics are then randomly selected for either both exams or the RO exam, until all required topics are entered.
- For RO/SRO outlines, the resulting examination outline will contain 75 or less common topics.
  - *For the IP2 and IP3 examination, topics numbered 72 -100 on the far right column of the outlines are the SRO only or RO only selected topics. Numbers 1 – 71 are common topics. The numbers correspond to the planned test item numbers on the subsequent examination.*
  - *Initial review of the SRO outline indicates that approximately 7. of the 29 SRO only topics may not be suitable for 10CFR55.43(b) test item development.*
  - *To ensure that the minimum number of 10CFR55.43(b) topics can be developed, some common topics may have to be split into job-specific test items or some SRO only outline items may have to be changed to more suitable 10CFR55.43(b) topics and appropriately documented as required.*

**Indian Point Unit 2 & 3  
2003 NRC Written Examination  
Written Examination Outline Methodology**

Written Outline selected topic disposition:

- Topic may be accepted as is.
- KA topics could be potentially duplicated due to the application write process. If a KA topic is duplicated on an outline, it is manually removed and randomly replaced. No justification provided.
- ALL other rejected topics are listed on ES-401-10 with justification, including topics selected to replace the rejected item, and method of selection.

Identification of Plant Specific Priorities:

- Focus on PSA or plant events.
- Attempt to spread across Tier 1 and Tier 2
- Philosophy is to replace or substitute for:
  - lower priority topics.
  - topics that will be difficult to develop a valid written test item.
  - topics that are heavily weighted unnecessarily as a result of the random generation process.
- For the IP2/IP3 examination, a common written examination outline was developed. Plant Specific Priorities were added in accordance with PSA information that was reasonably common to both of the units.

Indian Point Units 2 & 3  
Operating Examination  
Plant Specific Priorities

Plant Specific Analysis (PSA) high importance items were intentionally included in the IP2 and IP3 operating examinations.

**Scenario events:**

Loss of Feed (IP2 & IP3)  
ATWS (IP2 & IP3)  
LOCA (IP3)  
SGTR (Backup scenario for IP2 and IP3) (Also plant event)  
Loss of all AC Power (IP3)

Each of the scenarios considered transients, (ie., turbine trip failure), operator actions (manual reactor trip, emergency boration), and equipment failures (safeguards actuation failures), that were important to plant safety for both Indian Point units.

**JPMs:**

At least one high importance operator action is included in each section of the JPM walkthrough.

Simulator – Depressurize RCS after SGTR

In-Plant – Align City Water Cooling to Charging Pumps

By the nature of the examination, each event or task has some relevance to the plant specific analysis. The events above were specifically selected due to their overall importance.

Facility: Indian Point Units 2 & 3		Date of Exam: 3/8/2003				Exam Level: SRO								
Tier	Group	K/A Category Point											Point Total	
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *		
1. Emergency & Abnormal Plant Evolutions	1	4	1	4				6	8			1	24	
	2	1	1	1				4	4			5	16	
	3	0	0	1				0	1			1	3	
	Tier Totals	5	2	6				10	13			7	43	
2. Plant Systems	1	1	0	1	2	2	2	2	2	2	4	1	19	
	2	3	2	2	2	1	0	0	1	1	1	4	17	
	3	0	0	0	0	0	0	0	2	1	0	1	4	
	Tier Totals	4	2	3	4	3	2	2	5	4	5	6	40	
3. Generic Knowledge and Abilities						Cat 1		Cat 2		Cat 3		Cat 4		17
						3		6		3		5		
<p>Note: 1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).</p> <p>2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by <math>\pm 1</math> from that specified in the table based on NRC revisions. The final exam must total 100 points.</p> <p>3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.</p> <p>4. Systems/evolutions within each group are identified on the associated outline.</p> <p>5. The shaded areas are not applicable to the category/tier.</p> <p>6.* The generic K/As in tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.</p> <p>7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the SRO license level, and the point totals for each system and category. K/A's below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.</p>														

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**INDIAN POINT UNITS 2 & 3**  
**PWR SRO Examination Outline**  
**Emergency and Abnormal Plant Evolutions – Tier 1/Group 1**

Form ES-401-3

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic(s)	Imp.	Q#
000001 / Continuous Rod Withdrawal / 1				X			AA1.05	Ability to operate and / or monitor the following as they apply to the Continuous Rod Withdrawal: Reactor trip switches.	4.2	57
000003 / Dropped Control Rod / 1		X					AK2.05	Knowledge of the interrelations between the Dropped Control Rod and the following: Control rod drive power supplies and logic circuits.	2.8	58
000005 / Inoperable/Stuck Control Rod / 1	X						AK1.03	Knowledge of the operational implications of the following concepts as they apply to the stuck rod: Xenon transient.	3.6	41
000011 / Large Break LOCA / 3				X			EA1.01	Ability to operate and monitor the following as they apply to a Large Break LOCA: Control of RCS pressure and temperature to avoid violating PTS limits.	3.8	61
W/E04 / LOCA Outside Containment / 3										
W/E01 & E02 / Rediagnosis & SI Termination / 3			X				EK3.2	Knowledge of the reasons for the following responses as they apply to the (Reactor Trip or Safety Injection/Rediagnosis): Normal, abnormal and emergency operating procedures associated with (Reactor Trip or Safety Injection/Rediagnosis).	3.9	62
000015 / 17 RCP Malfunctions / 4				X			AA1.22	Ability to operate and/or monitor the following as they apply to the RCP malfunctions: RCP seal failure/malfunction	4.2	52
BW/E09; CE/A13; W/E09 & E10 / Natural Circ. / 4			X				EK3.1	Knowledge of the reasons for the following responses as they apply to the (Natural Circulation Operations): Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics.	3.6	42
BW/E09; CE/A13; W/E09 & E10 / Natural Circ. / 4						X	2.4.50	Emergency Procedures/Plan: Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.3	90
000024 / Emergency Boration / 1					X		AA2.04	Ability to determine and interpret the following as they apply to the Emergency Boration: Availability of BWST.	4.2	43
000026 / Loss of Component Cooling Water / 8			X				AK3.03	Knowledge of the reasons for the following responses as they apply to the Loss of Component Cooling Water: Guidance and actions contained in EOP for Loss of CCW/nuclear service water.	4.2	44
000029 / Anticipated Transient w/o Scram / 1					X		EA2.02	Ability to determine or interpret the following as they apply to ATWS: Reactor trip alarm.	4.4	91
000040 (BW/E05; CE/E05; W/E12) / Steam Line Rupture – Excessive Heat Transfer / 4	X						AK1.06	Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture: High-energy steam line break considerations.	3.8	46
000040 (BW/E05; CE/E05; W/E12) / Steam Line Rupture – Excessive Heat Transfer / 4				X			EA1.2	Ability to operate and/or monitor the following as they apply to the (Uncontrolled Depressurization of all Steam Generators): Operating behavior characteristics of the facility.	3.7	47

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INDIAN POINT UNITS 2 & 3  
PWR SRO Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1/Group 1

Form ES-401-3

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic(s)	Imp.	Q#
CE/A11; W/E08 / RCS Overcooling – PTS / 4					X		EA2.1	Ability to determine and interpret the following as they apply to the (Pressurized Thermal Shock): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	4.2	92
000051 / Loss of Condenser Vacuum / 4				X			AA1.04	Ability to operate and / or monitor the following as they apply to the Loss of Condenser Vacuum: Rod position.	2.5	48
000055 / Station Blackout / 6					X		EA2.01	Ability to determine or interpret the following as they apply to a Station Blackout: Existing valve positioning on a loss of instrument air system.	3.7	49
000057 / Loss of Vital AC Elec. Inst. Bus / 6			X				AK3.01	Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: Actions contained in EOP for loss of vital AC electrical instrument bus.	4.4	50
000059 / Accidental Liquid Radwaste Rel. / 9					X		AA2.02	Ability to determine and interpret the following as they apply to the Accidental Liquid Radwaste Release: The permit for liquid radioactive-waste release.	3.9	93
000062 / Loss of Nuclear Service Water / 4					X		AA2.01	Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: Location of a leak in the CCWS.	3.5	51
000067 / Plant Fire On-site / 9										
000068 (BW/A06) / Control Room Evac. / 8										
000069 (W/E14) / 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.	4.4	94
000074 (W/E06 & E07) / Inad. Core Cooling / 4	X						EK1.05	Knowledge of the operational implications of the following concepts as they apply to the Inadequate Core Cooling: Definition of saturated liquid.	3.2	53
000074 (W/E06 & E07) / Inad. Core Cooling / 4	X						EK1.3	Knowledge of the operational implications of the following concepts as they apply to the (Degraded Core Cooling): Annunciators and conditions indicating signals, and remedial actions associated with the (Degraded Core Cooling).	3.9	54
000074 (W/E06 & E07) / Inad. Core Cooling / 4				X			EA1.2	Ability to operate and/or monitor the following as they apply to the (Saturated Core Cooling): Operating behavior characteristics of the facility.	3.7	55
BW/E03 / Inadequate Subcooling Margin / 4										
000076 / High Reactor Coolant Activity / 9					X		AA2.02	Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: Corrective actions required for high fission product activity in RCS.	3.4	56
BW/A02 & A03 / Loss of NNI-X/Y / 7										
K/A Category Point Totals:	4	1	4	6	8	1		Group Point Total:		24



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INDIAN POINT UNITS 2 & 3  
PWR SRO Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1/Group 2

Form ES-401-3

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic(s)	Imp.	Q#
000007 (BW/E02 & E10; CE/E02) / Reactor Trip – Stabilization – Recovery / 1						X	2.1.14	Conduct of Operations: Knowledge of system status criteria, which require the notification of plant personnel.	3.3	95
BW/A01 / Plant Runback / 1										
BW/A04 / Turbine Trip / 4										
000008 / Pressurizer Vapor Space Accident / 3		X					AK2.02	Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following: Sensors and detectors.	2.7	59
000009 / Small Break LOCA / 3				X			EA1.18	Ability to operate and monitor the following as they apply to a small break LOCA: Balancing of HPI loop flows.	3.2	60
BW/E08; W/E03 / LOCA Cooldown – Depress. / 4				X			EA1.02	Ability to operate and/or monitor the following as they apply to the (LOCA Cooldown and Depressurization): Operating behavior characteristics of the facility.	3.9	96
W/E11 / Loss of Emergency Coolant Recirc. / 4	X						EK1.2	Knowledge of the operational implications of the following concepts as they apply to the (Loss of Emergency Coolant Recirculation): Normal, abnormal and emergency operating procedures associated with (Loss of Emergency Coolant Recirculation).	4.1	99
000022 / Loss of Reactor Coolant Makeup / 2				X			AA1.08	Ability to operate and/or monitor the following as they apply to the Loss of Reactor Coolant Pump Makeup: VCT level.	3.3	63
000025 / Loss of RHR System / 4					X		AA2.07	Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: Pump cavitation.	3.7	64
000027 / Pressurizer Pressure Control System Malfunction / 3					X		AA2.15	Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: Actions to be taken if PZR pressure instrument fails high.	4.0	45
000032 / Loss of Source Range NI / 7										
000033 / Loss of Intermediate Range NI / 7					X		AA2.10	Ability to determine and interpret the following as they apply to the Loss of Intermediate Range NI: Tech Spec limits if both IR channels have failed	3.8	97
000037 / Steam Generator Tube Leak / 3						X	2.2.22	Equipment Control: Knowledge of limiting conditions for operations and safety limits.	4.1	98
000038 / Steam Generator Tube Rupture / 3			X				EK3.01	Knowledge of the reasons for the following responses as they apply to the Steam Generator Tube Rupture: Equalizing pressure on primary and secondary sides of ruptured SG	4.3	69
000054 (CE/E06) / Loss of Main Feedwater / 4						X	2.4.2	Emergency Procedures/Plan: Knowledge of system setpoints, interlocks, and automatic actions associated with EOP entry conditions	4.1	65
000054 (CE/E06) / Loss of Main Feedwater / 4						X	2.2.25	Equipment Control: Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.7	72
BW/E04; W/E05 / Inadequate Heat Transfer – Loss of Secondary Heat Sink / 4										

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INDIAN POINT UNITS 2 & 3  
PWR SRO Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1/Group 2

Form ES-401-3

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic(s)	Imp.	Q#
000058 / Loss of DC Power / 8					X		AA2.03	Ability to determine and interpret the following as they apply to the Loss of DC Power: DC loads lost, impact on ability to operate and monitor plant systems	3.9	67
000060 / Accidental Gaseous Radwaste Rel. / 9										
000061 / ARM System Alarms / 7				X			AA1.01	Ability to operate and/or monitor the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: Automatic actuation.	3.6	68
W/E16 / High Containment Radiation / 9										
000065 / Loss of Instrument Air / 8						X	2.1.2	Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.	4.0	66
CE / E09 / Functional Recovery										
K/A Category Point Totals:	1	1	1	4	4	5		Group Point Total:		16

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INDIAN POINT UNITS 2 & 3  
PWR SRO Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1/Group 3

Form ES-401-3

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic(s)	Imp.	Q#
000028 / Pressurizer Level Malfunction / 2			X				AK3.02	Knowledge of the reasons for the following responses as they apply to the Pressurizer Level Control Malfunctions: Relationships between PZR pressure increase and reactor makeup/letdown imbalance.	3.2	70
000036 (BW/A08) / Fuel Handling Accident / 8						X	2.2.28	Equipment Control: Knowledge of new and spent fuel movement procedures	3.5	100
000056 / Loss of Off-site Power / 6					X		AA2.51	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: $\Delta T$ , (core, heat exchanger, etc.)	3.4	71
BW/E13 & E14 / EOP Rules and Enclosures										
BW/A05 / Emergency Diesel Actuation / 6										
CE/A16 / Excess RCS Leakage / 2										
W/E13 / Steam Generator Over-pressure / 4										
W/E15 / Containment Flooding / 5										
K/A Category Point Totals:	0	0	1	0	1	1		Group Point Total:		3

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INDIAN POINT UNITS 2 & 3  
PWR SRO Examination Outline  
Plant Systems – Tier 2/Group 1

Form ES-401-3

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic(s)	Imp.	Q#
001 Control Rod Drive								X				A2.03	Ability to (a) predict the impacts of the following malfunction or operations on the CRDS- and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effect of stuck rod or Misaligned rod.	4.2	73
003 Reactor Coolant Pump									X			A3.04	Ability to monitor automatic operation of the RCPs, including: RCS flow.	3.6	1
003 Reactor Coolant Pump				X								K4.04	Knowledge of RCPs design feature(s) and/or interlock(s) which provide for the following: Adequate cooling of RCP motor and seals.	3.1	2
004 Chemical and Volume Control						X						K6.17	Knowledge of the effect of a loss or malfunction of the following will have on the CVCS: Flow paths for emergency boration	4.6	3
013 Engineered Safety Features Actuation							X					A1.01	Ability to predict and/or monitor changes in parameters (to Prevent exceeding design limits) associated with operating the ESFAS controls including: RCS pressure and temperature.	4.2	4
014 Rod Position Indication										X		A4.01	Ability to manually operate and/or monitor in the control room: Rod selection control.	3.1	17
015 Nuclear Instrumentation					X							K5.02	Knowledge of the operational implications of the following concepts as they apply to the NIS: Discriminator/compensation operation.	2.9	5
017 In-Core Temperature Monitor										X		A4.01	Ability to manually operate and/or monitor in the control room: Actual in-core temperatures.	4.1	6
022 Containment Cooling										X		A4.04	Ability to manually operate and/or monitor in the control room: Valves in the CCS.	3.2	7
025 Ice Condenser													SUPPRESSED		
026 Containment Spray							X					A1.01	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: Containment pressure.	4.2	18
056 Condensate								X				A2.04	Ability to (a) predict the impacts of the following malfunctions or operations on the Condensate System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of condensate pumps.	2.8	74

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INDIAN POINT UNITS 2 & 3  
PWR SRO Examination Outline  
Plant Systems – Tier 2/Group 1

Form ES-401-3

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic(s)	Imp.	Q#
059 Main Feedwater				X								K4.19	Knowledge of MFW design feature(s) and/or interlock(s), which provide for the following: Automatic feedwater isolation of MFW.	3.4	8
059 Main Feedwater										X		A4.03	Ability to manually operate and monitor in the control room: Feedwater control during power increase and decrease.	2.9	9
061 Auxiliary / Emergency Feedwater						X						K6.02	Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Pumps.	2.7	10
063 DC Electrical Distribution			X									K3.02	Knowledge of the effect that a loss or malfunction of the DC electrical system will have on the following: Components using DC control power.	3.7	24
063 DC Electrical Distribution	X											K1.03	Knowledge of the physical connections and/or cause-effect relationships between the DC distribution system and the following systems: Battery Charger and battery	3.5	23
068 Liquid Radwaste											X	2.4.31	Emergency Procedures / Plan: Knowledge of annunciators alarms and indications, and use of the response instructions.	3.4	75
071 Waste Gas Disposal					X							K5.04	Knowledge of the operational implication of the following concepts as they apply to the Waste Gas Disposal System: Relationship of hydrogen/oxygen concentrations to flammability.	3.1	11
072 Area Radiation Monitoring									X			A3.01	Ability to monitor automatic operation of the ARM system, including: Changes in ventilation alignment.	3.1	12
K/A Category Point Totals:	1	0	1	2	2	2	2	2	2	4	1	Group Point Total:			19

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INDIAN POINT UNITS 2 & 3  
PWR SRO Examination Outline  
Plant Systems – Tier 2/Group 2

Form ES-401-3

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic(s)	Imp.	Q#
002 Reactor Coolant															
006 Emergency Core Cooling		X										K2.02	Knowledge of bus power supplies to the following: Valve operators for accumulators.	2.9	13
010 Pressurizer Pressure Control									X			A3.02	Ability to monitor automatic operation of the PZR PCS, including: PZR pressure.	3.5	14
011 Pressurizer Level Control		X										K2.02	Knowledge of bus power supplies to the following: PZR heaters.	3.2	15
012 Reactor Protection					X							K5.01	Knowledge of the operational implications of the following concepts as they apply to the RPS: DNB.	3.8	16
012 Reactor Protection											X	2.4.12	Emergency Procedures/Plan: Knowledge of general operating crew responsibilities during emergency operations	3.9	27
016 Non-nuclear Instrumentation											X	2.1.28	Conduct of Operations: Knowledge of the purpose and function of major system components and controls.	3.3	76
027 Containment Iodine Removal															
028 Hydrogen Recombiner and Purge Control										X		A4.02	Ability to manually operate and/or monitor in the control room: Location and interpretation of containment pressure indications.	3.9	31
029 Containment Purge															
033 Spent Fuel Pool Cooling								X				A2.02	Ability to (a) predict the impacts of the following malfunctions or operations on the Spent Fuel Pool Cooling System; and (b) based those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of SFPCS.	3.0	19
034 Fuel Handling Equipment				X								K4.02	Knowledge of design features and/or interlocks which provide for the following: Fuel movement	3.3	32
035 Steam Generator											X	2.4.4	Emergency Procedures/Plan: Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	20
039 Main and Reheat Steam	X											K1.06	Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems: Condenser steam dump.	3.0	21

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INDIAN POINT UNITS 2 & 3  
PWR SRO Examination Outline  
Plant Systems – Tier 2/Group 2

Form ES-401-3

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic(s)	Imp.	Q#
055 Condenser Air Removal			X									K3.01	Knowledge of the effect that a loss or malfunction of the CARS will have on the following: Main condenser.	2.7	22
062 AC Electrical Distribution											X	2.1.33	Conduct or Operations: Ability to recognize indications for system operating parameters which are entry level conditions for Technical Specifications	4.0	77
062 AC Electrical Distribution	X											K1.03	Knowledge of the physical connections and/or cause-effect relationships between the AC distribution system and the following systems: DC Distribution	4.0	26
064 Emergency Diesel Generator			X									K3.03	Knowledge of the effect that a loss or malfunction of the ED/G system will have on the following: ED/G (Manual loads).	3.9	25
073 Process Radiation Monitoring															
075 Circulating Water															
079 Station Air	X											K1.01	Knowledge of the physical connections and/or cause-effect relationships between the SAS and the following systems: IAS.	3.1	28
086 Fire Protection				X								K4.07	Knowledge of design feature(s) and/or interlock(s) which provide for the following: MT/G and T/G protection.	2.8	29
103 Containment															
K/A Category Point Totals:	3	2	2	2	1	0	0	1	1	1	4	Group Point Total:			17

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INDIAN POINT UNITS 2 & 3  
PWR SRO Examination Outline  
Plant Systems – Tier 2/Group 3

Form ES-401-3

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic(s)	Imp.	Q#
005 Residual Heat Removal								X				A2.02	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: Pressure transient protection during cold shutdown.	3.7	30
007 Pressurizer Relief / Quench Tank															
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: Consequences of High/Low Surge Tank Level	3.5	78
041 Steam Dump/Turbine Bypass Control									X			A3.03	Ability to monitor automatic operation of the SDS, including: Steam flow.	2.8	33
045 Main Turbine Generator															
076 Service Water															
078 Instrument Air											X	2.1.23	Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.0	79
K/A Category Point Totals:	0	0	0	0	0	0	0	2	1	0	1	Group Point Total:			4



Plant-Specific Priorities			
System / Topic	Recommended Replacement for....	Reason	Points
APE 054 G2.4.2 (Question 65)	EPE 038EK1.04	High PRA importance; Event as well as mitigating system	1
APE 058 AA2.03 (Question 67)	APE 060AK2.01	High PRA importance; Loss of high importance system	1
SYS 004 K6.17 (Question 3)	SYS 004K2.04	High PRA importance; Risk significant post-accident human error	1
APE 015/017 AA1.22 (Question 52)	APE 068 AA1.20	High PRA importance; Risk significant post-accident human error	1
EPE 038 EK3.01 (Question 69)	EPE E16 EK3.4	High PRA importance; Event as well as risk significant post-accident human error	1
SYS 012 Generic 2.4.12 (Question 27)	SYS 075 Generic 2.4.30	High PRA importance; Event as well as mitigating systems	1
Plant-Specific Priority Total: (limit 10)			6

Facility: Indian Point Units 2 & 3		Date of Exam: 3/8/2003	Exam Level: SRO	
Category	K/A #	Topic	Imp.	Q#
Conduct of Operations	2.1.11	Knowledge of less than one hour technical specification action statements for systems.	3.8	80
	2.1.20	Ability to execute procedure steps.	4.2	81
	2.1.8	Ability to coordinate personnel activities outside the control room.	3.6	34
	Total			3
Equipment Control	2.2.6	Knowledge of the process for making changes in procedures as described in the safety analysis report.	3.3	82
	2.2.22	Knowledge of LCOs and Safety Limits	4.1	83
	2.2.34	Knowledge of the process for determining the internal and external effects on core reactivity.	3.2	84
	2.2.33	Knowledge of control rod programming.	2.9	36
	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	3.5	37
	2.2.13	Knowledge of tagging and clearance procedures.	3.8	35
	Total			6
Radiation Control	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	85
	2.3.2	Knowledge of facility ALARA program.	2.9	86
	2.3.9	Knowledge of the process for performing a containment purge.	3.4	38
	Total			3
Emergency Procedures / Plan	2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm.	3.6	87
	2.4.24	Knowledge of loss of cooling water procedures.	3.7	88
	2.4.12	Knowledge of general operating crew responsibilities during emergency operations.	3.9	89
	2.4.29	Knowledge of the emergency plan.	4.0	40
	2.4.19	Knowledge of EOP layout, symbols, and icons.	3.7	39
	Total			5
Tier 3 Point Total SRO				17

Tier / Group	Randomly Selected K/A	Reason for Rejection
2/1 (Question 23)	063 A4.03	No indication available for applicable topic in control room at facility. Replaced with randomly selected 063 K1.03.
1/2 (Question 97)	033 AA2.11	Redundant Topic (Double Jeopardy) with SYS 015K5.02 (Question 5). Replaced with manually selected 033 AA2.10.
1/3 (Question 100)	036 AA1.04	Would not yield 10CFR55.43(b) question for SRO. Replaced with manually selected Generic topic 2.2.28 to ensure coverage of 10CFR55.43(b) item 6 and/or 7 for SRO. (Was not randomly selected as part of generic tier 3).
2/2 (Question 26)	073 A1.01	Controls of PRM system are not operated in a manner that will cause change in the plant condition required by the topic. Replaced with randomly generated 062 K1.03
3 (Question 82)	2.1.18	Topic switched for RO 2.2.6 (RO 93) for SRO Only application
2/1 (Question 4)	013 A1.09	No suitable test item. Manually selected closest suitable KA to the selected topic (013A1.01)
1/1 (Question 41)	005 AK2.01	No suitable test item. Randomly selected topic in 005 area (005 AK1.03)
2/2 (Question 77)	062 A2.12	No suitable test item. Manually selected Generic topic 2.1.33 to ensure 10CFR55.43(b) coverage for SRO
2/3 (Question 78)	008 A2.07	No suitable test item. Manually selected 008 A2.02 in same topic area
1/2 (Question 98)	037 G2.1.30	Not suitable for SRO. Manually selected Generic topic 2.2.22 to ensure 10CFR55.43 (b) coverage for SRO
1/2 (Question 99)	E05 G2.1.27	Too many similar topics. Randomly selected E11 EK1.2 to replace
2/2 (Question 32)	034 K6.02	Too many similar topics. Randomly selected 034 K4.02 to replace

Initial NRC License Examination  
Indian Point Unit 2  
Written Test Item Summary  
Senior Reactor Operator

Question #	K/A	Source	Cognitive	Comments
1	003 A3.04	New	Higher	
2	003 K4.04	New	Higher	
3	004 K6.17	Bank	Higher	
4	013 A1.01	Bank	Memory	
5	015 K5.02	Bank	Higher	
6	017 A4.01	Bank	Higher	
7	022 A4.04	New	Memory	
8	059 K4.19	Modified	Higher	
9	059 A4.03	New	Memory	
10	061 K6.02	Bank	Higher	
11	071 K5.04	Modified	Memory	
12	072 A3.01	New	Memory	
13	006 K2.02	New	Memory	
14	010 A3.02	New	Higher	
15	011 K2.02	New	Memory	
16	012 K5.01	Bank	Memory	
17	014 A4.01	Bank	Memory	
18	026 A1.01	New	Higher	
19	033 A2.02	New	Higher	
20	035 G2.4.4	New	Higher	
21	039 K1.06	Bank	Higher	
22	055 K3.01	Bank	Higher	
23	063 K1.03	New	Memory	
24	063 K3.02	Bank	Higher	
25	064 K3.03	Modified	Higher	
26	062 K1.03	Bank	Higher	
27	012 G2.4.12	New	Memory	
28	079 K1.01	New	Memory	
29	086 K4.07	Bank	Memory	
30	005 A2.02	Modified	Higher	
31	028 A4.02	New	Memory	
32	034 K4.02	New	Memory	
33	041 A3.03	New	Higher	
34	G2.1.8	Bank	Memory	
35	G2.2.13	Bank	Memory	
36	G2.2.33	Modified	Higher	
37	G2.2.2	Modified	Higher	
38	G2.3.9	New	Memory	
39	G2.4.19	New	Memory	
40	G2.4.29	Bank	Memory	
41	005 AK1.03	Bank	Higher	
42	E09 EK3.1	Bank	Memory	
43	024 AA2.04	Bank	Higher	
44	026 AK3.03	Bank	Memory	
45	027 AA2.15	New	Higher	
46	040 AK1.06	Bank	Higher	
47	040 EA1.2	Bank	Memory	
48	051 AA1.04	Bank	Higher	
49	055 EA2.01	Bank	Higher	
50	057 AK3.01	New	Higher	

Initial NRC License Examination  
Indian Point Unit 2  
Written Test Item Summary  
Senior Reactor Operator

51	062 AA2.01	Bank	Higher	
52	015/017 AA1.22	Bank	Higher	
53	074 EK1.05	Modified	Higher	
54	074 EK1.3	Modified	Memory	
55	075 EA1.2	Bank	Memory	
56	076 AA2.02	Bank	Memory	
57	001 AA1.05	New	Memory	
58	003 AK2.05	New	Higher	
59	008 AK2.02	Bank	Higher	
60	009 EA1.18	New	Higher	
61	011 EA1.01	Modified	Memory	
62	E01/E02 EK3.2	Bank	Memory	
63	022 AA1.08	Bank	Higher	
64	025 AA2.07	Bank	Memory	
65	054 G2.4.2	Bank	Higher	
66	065 G2.1.2	New	Memory	
67	058 AA2.03	Modified	Memory	
68	061 AA1.01	Bank	Higher	
69	038 EK3.01	Bank	Memory	
70	028 AK3.02	New	Higher	
71	036 AA2.51	New	Higher	
72	054 G2.2.25	New	Memory	SRO
73	001 A2.03	Bank	Higher	SRO
74	056 A2.04	New	Higher	SRO
75	068 G2.4.31	Bank	Memory	SRO
76	016 G2.1.28	Bank	Higher	
77	062 G2.1.33	New	Higher	SRO
78	008 A2.02	New	Higher	SRO
79	078 G2.1.23	New	Higher	SRO
80	G2.1.11	Bank	Higher	SRO
81	G2.1.20	Modified	Higher	SRO
82	G2.2.6	New	Memory	SRO
83	G2.2.22	Bank	Memory	SRO
84	G2.2.34	Bank	Higher	
85	G2.3.10	Bank	Higher	SRO
86	G2.3.2	Bank	Memory	SRO
87	G2.4.45	Bank	Higher	SRO
88	G2.4.24	New	Higher	SRO
89	G2.4.12	Bank	Memory	SRO
90	E09 G2.4.50	Bank	Higher	SRO
91	029 EA2.02	New	Higher	SRO
92	E08 EA2.1	Bank	Higher	SRO
93	059 AA2.02	New	Memory	SRO
94	069 AA2.02	Bank	Higher	SRO
95	007 G2.1.14	New	Higher	SRO
96	E03 EA1.02	Bank	Higher	
97	033 AA2.10	New	Higher	SRO
98	037 G2.2.22	Modified	Higher	SRO
99	E11 EK1.2	Bank	Higher	
100	036 G2.2.28	Bank	Higher	SRO

Facility: Indian Point 2 & 3		Date of Exam: 3/8/2003				Exam Level: RO								
Tier	Group	K/A Category Point											Point Total	
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *		
1. Emergency & Abnormal Plant Evolutions	1	4	0	3				4	5			0	16	
	2	1	2	3				5	4			2	17	
	3	0	0	1				0	1			1	3	
	Tier Totals	5	2	7				9	10			3	36	
2. Plant Systems	1	3	0	0	5	3	2	1	1	4	3	1	23	
	2	4	2	4	1	2	0	2	1	1	1	2	20	
	3	0	1	2	1	0	0	1	1	1	1	0	8	
	Tier Totals	7	3	6	7	5	2	4	3	6	5	3	51	
3. Generic Knowledge and Abilities						Cat 1		Cat 2		Cat 3		Cat 4		13
						3		4		2		4		
<p>Note: 1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).</p> <p>2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by <math>\pm 1</math> from that specified in the table based on NRC revisions. The final exam must total 100 points.</p> <p>3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.</p> <p>4. Systems/evolutions within each group are identified on the associated outline.</p> <p>5. The shaded areas are not applicable to the category/tier.</p> <p>6.* The generic K/As in tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.</p> <p>7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the SRO license level, and the point totals for each system and category. K/A's below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.</p>														

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INDIAN POINT UNITS 2 & 3  
PWR RO Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1/Group 1

Form ES-401-4

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic(s)	Imp.	Q#
00005 Inoperable/Stuck Control Rod / 1	X						AK1.03	Knowledge of the operational implications of the following concepts as they apply to the stuck rod: Xenon transient.	3.2	41
000015/17 RCP Malfunctions / 4				X			AA1.22	Ability to operate and/or monitor the following as they apply to the RCP malfunctions: RCP seal failure/malfunction	4.0	52
BW/E09; CE/A13; W/E09 & 10 Natural Circ./ 4			X				EK3.1	Knowledge of the reasons for the following responses as they apply to the (Natural Circulation Operations): Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics.	3.3	42
000024 Emergency Boration / 1					X		AA2.04	Ability to determine and interpret the following as they apply to the Emergency Boration: Availability of BWST.	3.4	43
000026 / Loss of Component Cooling Water / 8			X				AK3.03	Knowledge of the reasons for the following responses as they apply to the Loss of Component Cooling Water: Guidance and actions contained in EOP for Loss of CCW/Nuclear Service Water.	4.0	44
000027 / Pressurizer Pressure Control System Malfunction / 3					X		AA2.15	Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: Actions to be taken if PZR pressure instrument fails high.	3.7	45
000040 (BW/E05; CE/E05; W/E12) / Steam Line Rupture – Excessive Heat Transfer / 4	X						AK1.06	Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture: High-energy steam line break considerations.	3.7	46
000040 (BW/E05; CE/E05; W/E12) / Steam Line Rupture – Excessive Heat Transfer / 4				X			EA1.2	Ability to operate and/or monitor the following as they apply to the (Uncontrolled Depressurization of all Steam Generators): Operating behavior characteristics of the facility.	3.6	47
CE/A11; W/E08 / RCS Overcooling – PTS / 4										
000051 / Loss of Condenser Vacuum / 4				X			AA1.04	Ability to operate and / or monitor the following as they apply to the Loss of Condenser Vacuum: Rod position.	2.5	48
000055 / Station Blackout / 6					X		EA2.01	Ability to determine or interpret the following as they apply to a Station Blackout: Existing valve positioning on a loss of instrument air system.	3.4	49
000057 / Loss of Vital AC Elec. Inst. Bus / 6			X				AK3.01	Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: Actions contained in EOP for loss of vital AC electrical instrument bus.	4.1	50
000062 / Loss of Nuclear Service Water / 4					X		AA2.01	Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: Location of a leak in the CCWS.	2.9	51
000067 / Plant Fire On-site / 9										
000068 (BW/A06) / Control Room Evac. / 8										
000069 (W/E14) / Loss of CTMT Integrity / 5										

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INDIAN POINT UNITS 2 & 3  
PWR RO Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1/Group 1

Form ES-401-4

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic(s)	Imp.	Q#
000074 (W/E06 & E07) / Inad. Core Cooling / 4	X						EK1.05	Knowledge of the operational implications of the following concepts as they apply to the Inadequate Core Cooling: Definition of saturated liquid.	2.8	53
000074 (W/E06 & E07) / Inad. Core Cooling / 4	X						EK1.3	Knowledge of the operational implications of the following concepts as they apply to the (Degraded Core Cooling): Annunciators and conditions indicating signals, and remedial actions associated with the (Degraded Core Cooling).	3.7	54
000074 (W/E06 & E07) / Inad. Core Cooling / 4				X			EA1.2	Ability to operate and/or monitor the following as they apply to the (Saturated Core Cooling): Operating behavior characteristics of the facility.	3.2	55
BW/E03 / Inadequate Subcooling Margin / 4										
000076 / High Reactor Coolant Activity / 9					X		AA2.02	Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: Corrective actions required for high fission product activity in RCS.	2.8	56
BW/A02 & A03 / Loss of NNI-X/Y / 7										
K/A Category Point Totals:	4	0	3	4	5	0		Group Point Total:		16



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**INDIAN POINT UNITS 2 & 3**  
**PWR RO Examination Outline**  
**Emergency and Abnormal Plant Evolutions – Tier 1/Group 2**

Form ES-401-4

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic(s)	Imp.	Q#
000001 / Continuous Rod Withdrawal / 1				X			AA1.05	Ability to operate and / or monitor the following as they apply to the Continuous Rod Withdrawal: Reactor trip switches.	4.3	57
000003 / Dropped Control Rod / 1		X					AK2.05	Knowledge of the interrelations between the Dropped Control Rod and the following: Control rod drive power supplies and logic circuits.	2.5	58
000007 (BW/E02 & E10; CE/E02) / Reactor Trip – Stabilization – Recovery / 1										
BW/A01 / Plant Runback / 1										
BW/A04 / Turbine Trip / 4										
000008 / Pressurizer Vapor Space Accident / 3		X					AK2.02	Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following: Sensors and detectors.	2.7	59
000009 / Small Break LOCA / 3				X			EA1.18	Ability to operate and monitor the following as they apply to a small break LOCA: Balancing of HPI loop flows.	3.4	60
000011 / Large Break LOCA / 3				X			EA1.01	Ability to operate and monitor the following as they apply to a Large Break LOCA: Control of RCS pressure and temperature to avoid violating PTS limits.	3.7	61
W/E04 / LOCA Outside Containment / 3	X						EK1.3	Knowledge of the operational implications of the following concepts as they apply to the (LOCA Outside Containment): Annunciators and conditions indicating signals, and remedial actions associated with the (LOCA Outside Containment).	3.5	97
BW/E08; W/E03 / LOCA Cooldown / Depress. / 4										
W/E11 / Loss of Emergency Coolant Recirc. / 4										
WE/01 & 02 / Rediagnosis & SI Termination / 3			X				EK3.2	Knowledge of the reasons for the following responses as they apply to the Reactor Trip or Safety Injection/Rediagnosis: Normal, abnormal and emergency operating procedures associated with (Reactor Trip or Safety Injection/Rediagnosis).	3.0	62
WE/01 & 02 / Rediagnosis & SI Termination / 3					X		EA2.2	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.	3.3	98
000022 / Loss of Reactor Coolant Makeup / 2				X			AA1.08	Ability to operate and/or monitor the following as they apply to the Loss of Reactor Coolant Pump Makeup: VCT level.	3.4	63
000025 / Loss of RHR System / 4					X		AA2.07	Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: Pump cavitation.	3.4	64
000029 / Anticipated Transient w/o Scram / 1										
000032 / Loss of Source Range NI / 7					X		AA2.04	Ability to determine and interpret the following as they apply to the Loss of Source Range instrumentation: Satisfactory Source Range/Intermediate Range overlap	3.1	72
000033 / Loss of Intermediate Range NI / 7										
000037 / Steam Generator Tube Leak / 3										

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INDIAN POINT UNITS 2 & 3  
PWR RO Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1/Group 2

Form ES-401-4

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic(s)	Imp.	Q#
000038 / Steam Generator Tube Rupture / 3			X				EK3.01	Knowledge of the reasons for the following responses as they apply to the Steam Generator Tube Rupture: Equalizing pressure on primary and secondary sides of ruptured SG	4.1	69
000054 (CE/E06) / Loss of Main Feedwater / 4						X	2.4.2	Emergency Procedures/Plan: Knowledge of system setpoints, interlocks, and automatic actions associated with EOP entry conditions	3.9	65
BW/E04; W/E05 / Inadequate Heat Transfer – Loss of Secondary Heat Sink / 4						X	2.4.6	Emergency Procedures/Plan: Knowledge of symptom based EOP mitigation strategies	3.1	100
000058 / Loss of DC Power / 8					X		AA2.03	Ability to determine and interpret the following as they apply to the Loss of DC Power: DC loads lost. Impact on ability to operate and monitor plant systems	3.5	67
000058 / Loss of DC Power / 8			X				AK3.02	Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: Actions contained in EOP for loss of DC power.	4.0	99
000059 / Accidental Liquid Radwaste Rel. / 9										
000060 / Accidental Gaseous Radwaste Rel. / 9										
000061 / ARM System Alarms / 7				X			AA1.01	Ability to operate and/or monitor the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: Automatic actuation.	3.6	68
W/E16 / High Containment Radiation / 9										
CE/E09 / Functional Recovery										
K/A Category Point Totals:	1	2	3	5	4	2		Group Point Total:		17

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INDIAN POINT UNITS 2 & 3  
PWR RO Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1/Group 3

Form ES-401-4

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic(s)	Imp.	Q#
000028 / Pressurizer Level Malfunction / 2			X				AK3.02	Knowledge of the reasons for the following responses as they apply to the Pressurizer Level Control Malfunctions: Relationships between PZR pressure increase and reactor makeup/letdown imbalance.	2.9	70
000036 (BW/A08) / Fuel Handling Accident / 8										
000056 / Loss of Off-site Power / 6					X		AA2.51	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: $\Delta T$ , (core, heat exchanger, etc.)	3.3	71
000065 / Loss of Instrument Air / 8						X	2.1.2	Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.	3.9	66
BW/E13 & E14 / EOP Rules and Enclosures										
BW/A07 / Flooding / 8										
CE/A16 / Excess RCS Leakage / 2										
WE13 / Steam Generator Over-pressure / 4										
WE15 / Containment Flooding / 5										
K/A Category Point Totals:	0	0	1	0	1	1		Group Point Total:		3

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INDIAN POINT UNITS 2 & 3  
PWR RO Examination Outline  
Plant Systems – Tier 2/Group 1

Form ES-401-4

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic(s)	Imp.	Q#
001 Control Rod Drive				X								K4.02	Knowledge of CRDS design feature(s) and/or interlock(s) which provide for the following: Control rod mode select control (movement control).	3.8	73
001 Control Rod Drive									X			A3.05	Ability to monitor automatic operation of the CRDS, including: Individual versus group position	3.5	78
003 Reactor Coolant Pump									X			A3.04	Ability to monitor automatic operation of the RCPS, including: RCS flow.	3.6	1
003 Reactor Coolant Pump				X								K4.04	Knowledge of RCPS design feature(s) and/or interlock(s) which provide for the following: Adequate cooling of RCP motor and seals.	2.8	2
004 Chemical and Volume Control					X							K5.19	Knowledge of the operational implications of the following concepts as they apply to the CVCS: Concept of SDM.	3.5	74
004 Chemical and Volume Control						X						K6.17	Knowledge of the effect of a loss or malfunction of the following will have on the CVCS: Flow paths for emergency boration	4.4	3
013 Engineered Safety Features Actuation								X				A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the ESF Actuation System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: LOCA	4.6	75
013 Engineered Safety Features Actuation							X					A1.01	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ESFAS controls including: RCS pressure and temperature.	4.0	4
015 Nuclear Instrumentation					X							K5.02	Knowledge of the operational implications of the following concepts as they apply to the NIS: Discriminator/compensation operation.	2.7	5
015 Nuclear Instrumentation				X								K4.03	Knowledge of NIS design feature(s) and/or interlock(s) provide for the following: Reading of source range/intermediate range/power range outside Control Room.	3.9	76
017 In-Core Temperature Monitor	X											K1.01	Knowledge of the physical connections and/or cause/effect relationship between the ITM system and the following: Plant computer	3.2	77
017 In-Core Temperature Monitor										X		A4.01	Ability to manually operate and/or monitor in the Control Room: Actual in-core temperatures.	3.8	6

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INDIAN POINT UNITS 2 & 3  
PWR RO Examination Outline  
Plant Systems – Tier 2/Group 1

Form ES-401-4

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic(s)	Imp.	Q#
022 Containment Cooling										X		A4.04	Ability to manually operate and/or monitor in the Control Room: Valves in the CCS.	3.1	7
025 Ice Condenser													SUPPRESSED		
056 Condensate	X											K1.03	Knowledge of the physical connections and/or cause-effect relationships between the Condensate system and the following systems: MFW	2.6	83
056 Condensate											X	2.1.2	Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.	3.3	79
059 Main Feedwater				X								K4.19	Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Automatic feedwater isolation of MFW.	3.2	8
059 Main Feedwater										X		A4.03	Ability to manually operate and monitor in the Control Room: Feedwater control during power increase and decrease.	2.9	9
061 Auxiliary / Emergency Feedwater						X						K6.02	Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Pumps.	2.6	10
061 Auxiliary / Emergency Feedwater				X								K4.04	Knowledge of AFW design feature(s) and/or interlock(s) which provide for the following: Prevention of AFW runoff by limiting AFW flow.	3.1	80
068 Liquid Radwaste									X			A3.02	Ability to monitor automatic operation of the Liquid Radwaste System including: Automatic isolation.	3.6	81
068 Liquid Radwaste	X											K1.07	Knowledge of the interrelations and/or cause-effect relationships between the Liquid Radwaste System and the following: Sources of liquid waste for LRS.	2.7	82
071 Waste Gas Disposal					X							K5.04	Knowledge of the operational implication of the following concepts as they apply to the Waste Gas Disposal System: Relationship of hydrogen/oxygen concentrations to flammability.	2.5	11
072 Area Radiation Monitoring									X			A3.01	Ability to monitor automatic operation of the ARM system, including: Changes in ventilation alignment.	2.9	12
K/A Category Point Totals:	3	0	0	5	3	2	1	1	4	3	1	Group Point Total:			23

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INDIAN POINT UNITS 2 & 3  
PWR RO Examination Outline  
Plant Systems – Tier 2/Group 2

Form ES-401-4

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic(s)	Imp.	Q#
002 Reactor Coolant					X							K5.19	Knowledge of the operational implications of the following concepts as they apply to the RCS: Neutron embrittlement.	2.6	84
006 Emergency Core Cooling		X										K2.02	Knowledge of bus power supplies to the following: Valve operators for accumulators.	2.5	13
010 Pressurizer Pressure Control									X			A3.02	Ability to monitor automatic operation of PZR PCS, including: PZR pressure.	3.6	14
011 Pressurizer Level Control		X										K2.02	Knowledge of bus power supplies to the following: PZR heaters.	3.1	15
012 Reactor Protection					X							K5.01	Knowledge of the operational implications of the following concepts as they apply to the RPS: DNB.	3.3	16
012 Reactor Protection											X	2.4.12	Emergency Procedures/Plan: Knowledge of general operating crew responsibilities during emergency operations	3.4	27
014 Rod Position Indication										X		A4.01	Ability to manually operate and/or monitor in the Control Room: Rod selection control.	3.3	17
016 Non-nuclear Instrumentation			X									K3.04	Knowledge of the effect that a loss or malfunction of the NNIS will have on the following: MFW system.	2.6	85
026 Containment Spray							X					A1.01	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: Containment pressure.	3.9	18
029 Containment Purge							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	86
033 Spent Fuel Pool Cooling								X				A2.02	Ability to (a) predict the impacts of the following malfunctions or operations on the Spent Fuel Pool Cooling System; and (b) based those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of SFPCS.	2.7	19
035 Steam Generator											X	2.4.4	Emergency Procedures/Plan: Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	2.5	20

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INDIAN POINT UNITS 2 & 3  
PWR RO Examination Outline  
Plant Systems – Tier 2/Group 2

Form ES-401-4

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic(s)	Imp.	Q#
039 Main and Reheat Steam	X											K1.06	Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems: Condenser steam dump.	3.1	21
055 Condenser Air Removal			X									K3.01	Knowledge of the effect that a loss or malfunction of the CARS will have on the following: Main condenser.	2.5	22
062 AC Electrical Distribution	X											K1.03	Knowledge of the physical connections and/or cause-effect relationships between the AC distribution system and the following systems: DC Distribution	3.5	26
063 DC Electrical Distribution	X											K1.03	Knowledge of the physical connections and/or cause-effect relationships between the DC distribution system and the following systems: Battery Charger and battery	2.9	23
063 DC Electrical Distribution			X									K3.02	Knowledge of the effect that a loss or malfunction of the DC Electrical System will have on the following: Components using dc control power.	3.5	24
064 Emergency Diesel Generator			X									K3.03	Knowledge of the effect that a loss or malfunction of the ED/G system will have on the following: ED/G (manual loads).	3.6	25
073 Process Radiation Monitoring															
075 Circulating Water															
079 Station Air	X											K1.01	Knowledge of the physical connections and/or cause-effect relationships between the SAS and the following systems: IAS.	3.0	28
086 Fire Protection				X								K4.07	Knowledge of design feature(s) and/or interlock(s) which provide for the following: MT/G and T/G protection.	2.5	29
K/A Category Point Totals:	4	2	4	1	2	0	2	1	1	1	2	Group Point Total:			20

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INDIAN POINT UNITS 2 & 3  
PWR RO Examination Outline  
Plant Systems – Tier 2/Group 3

Form ES-401-4

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic(s)	Imp.	Q#
005 Residual Heat Removal								X				A2.02	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: Pressure transient protection during cold shutdown.	3.5	30
007 Pressurizer Relief/Quench Tank															
008 Component Cooling Water			X									K3.01	Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following: Loads cooled by CCWS	3.4	90
027 Containment Iodine Removal															
028 Hydrogen Recombiner and Purge Control										X		A4.02	Ability to manually operate and/or monitor in the Control Room: Location and interpretation of containment pressure indications.	3.7	31
034 Fuel Handling Equipment				X								K4.02	Knowledge of design features and/or interlocks which provide for the following: Fuel movement	2.5	32
041 Steam Dump/Turbine Bypass Control									X			A3.03	Ability to monitor automatic operation of the SDS, including: Steam flow.	2.7	33
045 Main Turbine Generator							X					A1.06	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MT/G system controls including: Expected response of secondary plant parameters following T/G trip.	3.3	88
076 Service Water		X										K2.01	Knowledge of bus power supplies to the following: Service water.	2.7	89
076 Service Water			X									K3.07	Knowledge of the effect that a loss or malfunction of Service Water will have on the following: ESF loads	3.7	87
078 Instrument Air															
103 Containment															
K/A Category Point Totals:	0	1	2	1	0	0	1	1	1	1	0	Group Point Total:			8



Plant-Specific Priorities			
System / Topic	Recommended Replacement for....	Reason	Points
APE 054 G2.4.2 (Question 65)	EPE 038EK1.04	High PRA importance; Event as well as mitigating system	1
APE 058 AA2.03 (Question 67)	APE 060AK2.01	High PRA importance; Loss of high importance system	1
EPE E05 G2.4.6 (Question 100)	APE 059AA2.02	High PRA importance; Event as well as mitigating systems	1
SYS 004 K6.17 (Question 3)	SYS 004K2.04	High PRA importance; Risk significant post-accident human error	1
APE 015/017 AA1.22 (Question 52)	APE 068 AA1.20	High PRA importance; Risk significant post-accident human error	1
EPE 038 EK3.01 (Question 69)	EPE E16 EK3.4	High PRA importance; Event as well as risk significant post-accident human error	1
SYS 008 K3.01 (Question 90)	SYS 103 A4.01	High PRA importance; Risk significant post-accident human error	1
SYS 012 Generic 2.4.12 (Question 27)	SYS 075 Generic 2.4.30	High PRA importance; Event as well as mitigating systems	1
Plant-Specific Priority Total: (limit 10)			8

Facility: Indian Point Units 2 & 3					Date of Exam: 3/8/2003	Exam Level: RO
Category	K/A #	Topic	Imp.	Q#		
Conduct of Operations	2.1.2	Knowledge of operator responsibilities during all modes of plant operation.	3.0	91		
	2.1.18	Ability to make accurate, clear and concise logs, records, status boards, and reports.	2.9	93		
	2.1.8	Ability to coordinate personnel activities outside the Control Room.	3.8	34		
	Total			3		
Equipment Control	2.2.12	Knowledge of surveillance procedures.	3.0	92		
	2.2.13	Knowledge of tagging and clearance procedures.	3.6	35		
	2.2.33	Knowledge of control rod programming.	2.5	36		
	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	4.0	37		
	Total			4		
Radiation Control	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	2.5	94		
	2.3.9	Knowledge of the process for performing a containment purge.	2.5	38		
	Total			2		
Emergency Procedures / Plan	2.4.14	Knowledge of general guidelines for EOP flowchart use.	3.0	95		
	2.4.34	Knowledge of RO tasks performed outside the main control room during emergency operations including system geography and system implications.	3.8	96		
	2.4.19	Knowledge of EOP layout, symbols, and icons.	2.7	39		
	2.4.29	Knowledge of the emergency plan.	2.6	40		
	Total			4		
Tier 3 Point Total RO				13		

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/2 (Question 72)	054 G2.2.25	No connection to 10CFR55.41 for RO. Replaced with randomly generated 032 AA2.04
2/2 (Question 23)	063 A4.03	No indication available for applicable topic in control room at facility. Replaced with randomly generated 063 K1.03.
2/1 (Question 78)	056 G2.2.22	No connection to 10CFR55.41 for RO and no TS connection to system. Replaced with randomly generated 001 A3.05
2/1 (Question 83)	071 A4.27	No indication or control available in control room. Replaced with randomly generated 056 K1.03
2/1 (Question 75)	013 K4.17	Operation not performed at facility. Replaced with randomly generated 013 A2.01
2/1 (Question 74)	004 K5.02	Potential Double Jeopardy with 071K5.04. Replaced with manually selected 004 K5.19. (Manually selected the next topic with same KA importance value)
2/2 (Question 26)	073 A1.01	Controls of PRM system are not operated in a manner that will cause change in the plant condition required by the topic. Replaced with randomly generated 062 K1.03
3 (Question 93)	2.2.6	Not RO level topic. Replaced by trading topic with SRO 2.1.18 (SRO 82)
2/1 (Question 4)	013A1.09	No suitable test item. Manually selected closest suitable KA to the selected topic (013A1.01)
1/1 (Question 41)	005 AK2.01	No suitable test item. Randomly selected topic in 005 area (005 AK1.03)
2/1 (Question 77)	017 K4.02	No suitable test item. Randomly selected topic in area (017 K1.01)
2/3 (Question 87)	007A2.06	No suitable test item. Randomly selected topic in area (076 K3.07)
2/3 (Question 32)	034 K6.02	Related item on exam. Randomly selected topic in area (034 K4.02)
2/1 (Question 82)	068 A2.04	Related item on exam. Randomly generated topic in area (068 K1.07)

Initial NRC License Examination  
Indian Point Unit 2  
Written Test Item Summary  
Reactor Operator

Question #	K/A	Source	Cognitive	Comments
1	003 A3.04	New	Higher	
2	003 K4.04	New	Higher	
3	004 K6.17	Bank	Higher	
4	013 A1.01	Bank	Memory	
5	015 K5.02	Bank	Higher	
6	017 A4.01	Bank	Higher	
7	022 A4.04	New	Memory	
8	059 K4.19	Modified	Higher	
9	059 A4.03	New	Memory	
10	061 K6.02	Bank	Higher	
11	071 K5.04	Modified	Memory	
12	072 A3.01	New	Memory	
13	006 K2.02	New	Memory	
14	010 A3.02	New	Higher	
15	011 K2.02	New	Memory	
16	012 K5.01	Bank	Memory	
17	014 A4.01	Bank	Memory	
18	026 A1.01	New	Higher	
19	033 A2.02	New	Higher	
20	035 G2.4.4	New	Higher	
21	039 K1.06	Bank	Higher	
22	055 K3.01	Bank	Higher	
23	063 K1.03	New	Memory	
24	063 K3.02	Bank	Higher	
25	064 K3.03	Modified	Higher	
26	062 K1.03	Bank	Higher	
27	012 G2.4.12	New	Memory	
28	079 K1.01	New	Memory	
29	086 K4.07	Bank	Memory	
30	005 A2.02	Modified	Higher	
31	028 A4.02	New	Memory	
32	034 K4.02	New	Memory	
33	041 A3.03	New	Higher	
34	G2.1.8	Bank	Memory	
35	G2.2.13	Bank	Memory	
36	G2.2.33	Modified	Higher	
37	G2.2.2	Modified	Higher	
38	G2.3.9	New	Memory	
39	G2.4.19	New	Memory	
40	G2.4.29	Bank	Memory	
41	005 AK1.03	Bank	Higher	
42	E09 EK3.1	Bank	Memory	
43	024 AA2.04	Bank	Higher	
44	026 AK3.03	Bank	Memory	
45	027 AA2.15	New	Higher	
46	040 AK1.06	Bank	Higher	
47	040 EA1.2	Bank	Memory	
48	051 AA1.04	Bank	Higher	
49	055 EA2.01	Bank	Higher	
50	057 AK3.01	New	Higher	

Initial NRC License Examination  
Indian Point Unit 2  
Written Test Item Summary  
Reactor Operator

51	062 AA2.01	Bank	Higher	
52	015/017 AA1.22	Bank	Higher	
53	074 EK1.05	Modified	Higher	
54	074 EK1.3	Modified	Memory	
55	075 EA1.2	Bank	Memory	
56	076 AA2.02	Bank	Memory	
57	001 AA1.05	New	Memory	
58	003 AK2.05	New	Higher	
59	008 AK2.02	Bank	Higher	
60	009 EA1.18	New	Higher	
61	011 EA1.01	Modified	Memory	
62	E01/E02 EK3.2	Bank	Memory	
63	022 AA1.08	Bank	Higher	
64	025 AA2.07	Bank	Memory	
65	054 G2.4.2	Bank	Higher	
66	065 G2.1.2	New	Memory	
67	058 AA2.03	Modified	Memory	
68	061 AA1.01	Bank	Higher	
69	038 EK3.01	Bank	Memory	
70	028 AK3.02	New	Higher	
71	036 AA2.51	New	Higher	
72	032 AA2.04	New	Higher	
73	001 K4.02	Bank	Higher	
74	004 K5.19	Modified	Higher	
75	013 A2.01	Modified	Higher	
76	015 K4.03	Bank	Memory	
77	017 K1.01	Modified	Higher	
78	001 A3.05	Bank	Higher	
79	056 G2.1.2	New	Memory	
80	061 K4.04	Bank	Memory	
81	068 A3.02	Bank	Memory	
82	068 K1.07	Bank	Memory	
83	056 K1.03	New	Memory	
84	002 K5.19	New	Memory	
85	016 K3.04	Bank	Higher	
86	029 A1.02	New	Memory	
87	076 K3.07	Bank	Higher	
88	045 A1.06	Bank	Higher	
89	076 K2.01	New	Memory	
90	008 K3.01	Modified	Higher	
91	G2.1.2	Bank	Memory	
92	G2.2.12	Bank	Memory	
93	G2.1.18	New	Memory	
94	G2.3.4	Bank	Memory	
95	G2.4.14	Bank	Higher	
96	G2.4.34	Modified	Memory	
97	E04 EK1.3	Bank	Higher	
98	E01/E02 EA2.2	Bank	Memory	
99	058 AK3.02	New	Memory	
100	E05 G2.4.6	Bank	Higher	

<b>Facility:</b> Indian Point 2		<b>Date of Examination:</b> 3/10/2003	
<b>Examination Level:</b> SRO		<b>Operating Test Number:</b> 1	
Administrative Topic/Subject Description		Describe method of evaluation:	
		1. ONE Administrative JPM, OR 2. TWO Administrative Questions	
A.1a	Conduct of Operations	2.1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. (3.7/4.4)  JPM: Review a QPTR calculation and direct appropriate actions
A.1b	Conduct of Operations	2.1.18	Ability to make accurate, clear, and concise logs, records, status boards, and reports. (2.9/3.0)  JPM: Review Control Room Log Entries
A.2	Equipment Control	2.2.17	Knowledge of the process for managing maintenance activities during power operations. (2.3/3.5)  JPM: Review (for approval) a completed surveillance for Tech Spec required equipment
A.3	Non-Emergency dose limits question	2.3.4 (3.1)	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.  QUESTION: Given the plant in a SAE and a personnel exposure history, determine the exposure limit for a Non-Emergency operation.
	Emergency Exposure Limits Question	2.3.2 (2.9)	Knowledge of facility ALARA program.  QUESTION: Given a situation requiring valve alignment verification in a radiation area, determine the waiver requirements for independent or concurrent verification of a locked valve and identify an alternate process for verification.
A.4	Emergency Plan	2.4.44	Knowledge of Emergency Plan Protective Action Recommendations. (2.1/4.0)  JPM: Perform Protective Action Recommendation

<b>Facility:</b> <u>Indian Point 2</u>		<b>Date of Examination:</b> 3/10/2003	
<b>Examination Level:</b> RO		<b>Operating Test Number:</b> 1	
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions	
A.1a	Conduct of Operations	2.1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. (3.7/4.4)  JPM: Perform QPTR Calculation
A.1b	Conduct of Operations	2.1.18	Ability to make accurate, clear, and concise logs, records, status boards, and reports. (2.9/3.0)  JPM: Perform a set of Control Room logs
A.2	Equipment Control	2.2.12	Knowledge of surveillance procedures. (3.0/3.4)  JPM: Perform the RCS Leak Rate surveillance
A.3	Radiation Exposure Control	2.3.2	Knowledge of facility ALARA program. (2.5/2.9)  JPM: Determine appropriate RWP and take action for High Area Radiation alarm
A.4	Emergency Plan	2.4.43	Knowledge of RO responsibilities in E-Plan implementation. (3.3/3.1)  Question: Duties of operations department personnel when site accountability is required
		2.4.29	Knowledge of the Emergency Plan. (2.6/4.0)  Question: Emergency Response Facilities activated in a Site Area Emergency

<b>Facility:</b>	Indian Point 2	<b>Date of Examination:</b>	3/10/2003	
<b>Exam Level:</b>	RO/SROI	<b>Operating Test No.:</b>	1	
<b>B.1: Control Room Systems</b>				
	System	JPM Description	Type Code*	Safety Function
S1	001 Rod Control	Stabilize reactor power at $10^{-8}$ amps following criticality	N,S,A,L	1
S2	006 ECCS	Fill a Safety Injection Accumulator <i>(Repeat from last NRC exam)</i>	D,S	2
S3	010 Pressurizer Pressure Control	Depressurize the RCS following a SGTR	M,S,A,E	3
S4	041 Steam Dump	Cooldown the RCS to target temperature	N,S,A,E	4S
S5	007 Pressurizer Relief Tank	Respond to PRT High Pressure	N,S,A,E	5
S6	062 AC Distribution	Restore 6.9KV Busses from off-site power.	D,S	6
S7	015 Nuclear Instrumentation	Return a Power Range Channel to service	N,S	7
<b>B.2 Facility Walk-Through</b>				
P1	004 CVCS	Align City Water Cooling to Charging pumps	R,D,E	2
P2	041 Steam Dump	Local Operation of Atmospheric Steam Dumps	D,E	4S
P3	063 DC Distribution	Startup a Battery Charger	D	6
*	<b>Type Codes:</b>	<b>(D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol Room, (S)imulator, (L)ow-Power, (R)CA, (E)OP/AB</b>		

**NOTES**

- S1      New JPM. Candidate will establish a startup rate, block source range channels above P-6, and raise power to 10-8 amps. When candidate inserts control rods to stabilize power, Bank D Group 2 rods will drop, requiring a reactor trip.
- S3      Modified JPM. Normal spray and PORVs will be unavailable. Candidate will be required to use Aux Spray
- S4      New JPM. Candidate will be required to cooldown to target temperature during an SGTR, but must use alternate method (ADV's), for cooldown.
- S5      New JPM. PRT pressure reduction will not be effective when candidate attempts to spray. Candidate will be required to vent PRT to restore parameters within limits.
- S7      New JPM. Candidate will restore channel to service. Existing JPM only removes from service



<b>Facility:</b> Indian Point 2		<b>Date of Examination:</b> 3/10/2003		
<b>Exam Level:</b> SROU		<b>Operating Test No.:</b> 1		
<b>B.1: Control Room Systems</b>				
	System	JPM Description	Type Code*	Safety Function
S1	001 Rod Control	Stabilize reactor power at $10^{-8}$ amps following criticality	N,S,A,L	1
S2				
S3	010 Pressurizer Pressure Control	Depressurize the RCS following a SGTR <i>Made non alt path</i>	M,S,A,E	3
S4				
S5	007 Pressurizer Relief Tank	Respond to PRT High Pressure	N,S,A,E	5
S6				
S7				
<b>B.2 Facility Walk-Through</b>				
P1	004 CVCS	Align City Water Cooling to Charging pumps	R,D,E	2
P2	041 Steam Dump	Local Operation of Atmospheric Steam Dumps	D,E	4S
P3				
*	<b>Type Codes:</b> (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol Room, (S)imulator, (L)ow-Power, (R)CA, (E)OP/AB			

**NOTES**

- S1 New JPM. Candidate will establish a startup rate, block source range channels above P-6, and raise power to  $10^{-8}$  amps. When candidate inserts control rods to stabilize power, Bank D Group 2 rods will drop, requiring a reactor trip.
- S3 Modified JPM. Normal spray and PORVs will be unavailable. Candidate will be required to use Aux Spray
- S5 New JPM. PRT pressure reduction will not be effective when candidate attempts to spray. Candidate will be required to vent PRT to restore parameters within limits.

*Marking*  
*Detail*  
*Comments*  
*no marks*  
*than 40%*  
*alt path*

Facility:	IP2	Scenario No.:	1	Op Test No.:	1
Examiners:	_____	Candidates:	_____	CRS	
	_____		_____	RO	
	_____		_____	PO	

Initial Conditions: 100% power EOL

21 Charging Pump OOS

21 CCW Pump OOS

Small SG Tube Leak < 25 GPD

Turnover: Reduce load to 800 MWe to remove 23 Condensate Pump from service within 60 minutes

Critical Tasks: Manual reactor trip  
Initiate Bleed and Feed Cooling

*not discriminating - Add a critical task*

Event No.	Mal. No.	Event Type*	Event Description
1		R (RO) N (BOP) N (CRS)	Reduce power
2	CNH PCS8	C (RO)	MFRV fails closed slowly
3	XMT RCS20	I (RO) I (BOP)	Pressurizer level channel fails high
4	ATS7B	C (ALL)	Feedwater Pump trip requiring rapid load decrease to 700 MWe
5	ATS7A	M (ALL)	Feedwater pump trip. Reactor trip required. — ?
6	BAT ESR.FAIL. RX.TRIP	C (RO)	Auto reactor trip failure. Manual trip required
7	ATS5C	C (BOP)	TDAFW trips
8	MOC AFW1	C (BOP)	MDAFW fails to start
9	MOT AFW1	C (BOP)	MDAFW trips

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

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Scenario Event Description  
IP2 NRC Simulator Scenario 1

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The crew assumes the shift and initiates a power reduction IAW POP-3.1. The RO will commence RCS boration and the BOP will slowly reduce generator load.

23MFRV controller fails in automatic. The controller must be placed in manual IAW AOI 28.0 and/or AOI 21.1.1, and 23 SG level restored to the normal control band. The CRS will refer to Tech Specs.

Pressurizer level channel 460 (controlling channel) will fail high. The crew will respond IAW AOI-28.0 and AOI-28.7. The RO will operate charging pumps and pressurizer heaters manually while the BOP defeats the failed channel inputs and the CRS refers to Technical Specifications.

Subsequently, 22 MBFP will trip, requiring a plant runback to <745 MWe IAW AOI-21.1.1. 23 SG level must be controlled manually and normal boration will be performed for AFD control. If Rod Insertion Limits are exceeded, the RO will commence Emergency Boration.

When the plant is stabilized, 21 MBFP will trip, requiring a reactor trip. The reactor must be tripped manually IAW AOI-21.1.1, because automatic reactor trip is not functional.

Subsequent AFW failures result in the requirement to transition to FR-H.1, and restore Heat Sink using Bleed and Feed.

EOP flow path: E-0 – ES-0.1 – FR-H.1

Facility: IP2 Scenario No.: 2 Op Test No.: 1

Examiners: \_\_\_\_\_ Candidates: \_\_\_\_\_ CRS  
 \_\_\_\_\_ RO  
 \_\_\_\_\_ PO

Initial Conditions: 100% power EOL  
 21 Charging Pump OOS  
 21 AFW Pump OOS  
 Small SG Tube Leak < 25 GPD

Turnover: Main Condenser rupture disc is leaking. Reduce Power to 50 MWe at 200 MWe per hour and remove Main Turbine and Generator from service

Critical Tasks: Manual Turbine Trip  
 Initiate Emergency Boration

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO) N (BOP) N (CRS)	Reduce load
2	XMT MSS054A	C (BOP) C (CRS)	First Stage Shell Pressure PT-412B fails low
3	XMT SGN34	I (RO) I (CRS)	Steam Pressure transmitter 404 fails high
4	CCW1 CCW2 CCW3	C (ALL)	CCW Pump Trip. Standby trips upon starting.
5	CVC6 CCW8 RCP7A	C (BOP)	RCP TBHX leak. RCP vibration
6	RCP21 PPL3-4	M (ALL)	RCP sheared shaft; ATWS
7	TCA1-6 PPL43-48	C (RO)	Turbine Trip failure
8	CVC9	C (BOP)	Boration failure

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

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## Scenario Event Description

### IP2 Simulator Scenario 2

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The crew will assume the shift and initiate a load decrease in accordance with POP-3.1.

First Stage Shell Pressure transmitter PT-412B will fail low. The crew will place steam dumps in Pressure Control Mode and trip SI steam flow bistables IAW AOI-28.0 and AOI-28.14. The CRS will refer to Technical Specifications.

When actions are complete, Steam pressure transmitter PT-404 will fail high. The crew will respond by placing Feed Pump Speed Control and steam dumps in manual IAW AOI-28.0.

A running CCW pump will trip. The standby pump will have to be manually started, and will subsequently trip. The crew will respond IAW AOI-4.1.1. Subsequently, a TBHX leak will develop, and manual action to isolate the TBHX leak will be taken IAW AOI-4.1.2.

During the TBHX tube leak, RCP vibration will rise, eventually resulting in failure of the RCP shaft. The crew will respond using AOP-RCP-1. A reactor trip will be required, but will not automatically occur.

The RO will attempt to manually trip the reactor, but the reactor will not trip. The turbine must be manually tripped, and emergency boration will fail, requiring an alternate method for emergency boration.

EOP flow path: E-0 – FR-S.1 – E-0 – ES-0.1

Facility:	IP2	Scenario No.:	3	Op Test No.:	1
Examiners:	_____	Candidates:	_____	CRS	
	_____		_____	RO	
	_____		_____	PO	
<p><u>Initial Conditions:</u> 9% power BOL</p> <p style="padding-left: 40px;">Plant startup in progress</p> <p><u>Turnover:</u> Raise power and synchronize the Main Generator</p> <p><u>Critical Tasks:</u> Place ECCS equipment in PTL</p> <p style="padding-left: 40px;">Isolate ruptured SG</p>					

Event No.	Malfunction No.	Event Type*	Event Description
1		R (RO) N (BOP) N (CRS)	Raise reactor power. Synchronize Main Generator
2	XMT RCS036A	I (ALL)	Tcold instrument fails high
3	RCS14C	C (ALL)	Steam Generator Tube Leak
4	RCS14C	M (ALL)	SGTR
5	XMT SGN43	C (RO)	Atmospheric Dump valve on ruptured SG fails open
6	SWI PPL030B	C (BOP)	CIA fails to reset. Manual action to bypass and reset CIA

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

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## Scenario Event Description

### IP2 Simulator Scenario 3

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The crew will assume the shift to raise power and synchronize the Main Generator to the grid IAW POP-1.3 and SOP-26.4.

When the generator is on-line, a Tcold instrument will fail high. IAW AOI-28.0 and 28.1, the RO will place the running Charging Pump in manual, the BOP will trip bistables, and the CRS will refer to Technical Specifications.

When the plant is stable, a steam generator tube leak will develop, requiring action IAW AOI-1.2. Leak rate is quantified, secondary systems are isolated, and the crew will begin a plant shutdown IAW POP-3.1 based on excessive SG tube leakage. The CRS will again refer to Technical Specifications.

While the crew is shutting the plant down, the tube leak will increase in severity. The crew will determine that pressurizer level cannot be maintained, and a reactor trip will be required.

When the reactor trips, one Atmospheric Dump Valve will fail open, requiring manual action to close it to minimize the radioactive release to atmosphere. Additionally, CIA will fail to reset. The crew must bypass and manually reset CIA to provide instrument air to containment, avoiding RCS depressurization using PORVs

EOP flow path: E-0 – E-3 - ES-3.1