

Facility: Indian Point Unit 2

Printed: 08/16/2011

Date Of Exam: 02/06/2012

| 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 | 1 | N/A | | | 2 | 2 | N/A | | | 0 | 9 | 2 | 2 | 4 |
| | Tier Totals | 5 | 5 | 4 | N/A | | | 5 | 5 | N/A | | | 3 | 27 | 5 | 5 | 10 |
| 2. Plant Systems | 1 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 28 | 3 | 2 | 5 | |
| | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 10 | 1 | 2 | 3 | |
| | Tier Totals | 4 | 3 | 4 | 4 | 4 | 3 | 3 | 4 | 3 | 3 | 3 | 38 | 6 | 2 | 8 | |
| 3. Generic Knowledge And Abilities Categories | | | | 1 | | 2 | | 3 | | 4 | | 10 | 1 | 2 | 3 | 4 | 7 |
| | | | | 3 | | 2 | | 3 | | 2 | | | 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 | | | | EK3.01 | Knowledge of the reasons for the following responses as they apply to the reactor trip: - Actions contained in EOP for reactor trip | 4.0 | 1 |
| 000008 Pressurizer Vapor Space Accident / 3 | | | X | | | | AK3.02 | Knowledge of the reasons for the following responses as they apply to the Pressurizer Vapor Space Accident: - Why PORV or code safety exit temperature is below RCS or PZR temperature | 3.6 | 2 |
| 000009 Small Break LOCA / 3 | | | | X | | | EA1.11 | Ability to operate and/or monitor the following as they apply to a small break LOCA: - AFW/MFW | 4.1 | 3 |
| 000011 Large Break LOCA / 3 | | X | | | | | EK2.02 | Knowledge of the interrelations between the Large Break LOCA and the following: - Pumps | 2.6 | 4 |
| 000015/000017 RCP Malfunctions / 4 | | | | | | | 2.1.7 | Conduct of Operations - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. | 4.4 | 5 |
| 000022 Loss of Rx Coolant Makeup / 2 | | | | | X | | AA2.02 | Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Makeup: - Charging pump problems | 3.7 | 76 |
| 000022K101 Loss of Reactor Coolant Makeup / 2 | X | | | | | | AK1.01 | Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Makeup: - Consequences of thermal shock to RCP seals | 2.8 | 7 |
| 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 |

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# |
|--|----|----|----|----|----|---|--------|--|------|----|
| 000027 Pressurizer Pressure Control System Malfunction / 3 | | | | X | | | AA1.01 | Ability to operate and/or monitor the following as they apply to the Pressurizer Pressure Control Malfunctions: - PZR heaters, sprays, and PORVs | 4.0 | 13 |
| 000029 ATWS / 1 | X | | | | | | EK1.05 | Knowledge of the operational implications of the following concepts as they apply to the ATWS: - definition of negative temperature coefficient as applied to large PWR coolant systems | 2.8 | 8 |
| 000038 Steam Gen. Tube Rupture / 3 | | | X | | | | EK3.04 | Knowledge of the reasons for the following responses as they apply to the SGTR: - Automatic actions provided by each PRM | 3.9 | 9 |
| 000038 Steam Gen. Tube Rupture / 3 | | | | | | X | 2.4.41 | Emergency Procedures/Plan - Knowledge of the emergency action level thresholds and classifications. | 4.6 | 77 |
| 000055 Station Blackout / 6 | | | | | | | EA2.02 | Ability to determine and interpret the following as they apply to a Station Blackout: - RCS core cooling through natural circulation cooling to S/G cooling | 4.4 | 10 |
| 000056 Loss of Off-site Power / 6 | | | | | | X | 2.1.43 | Conduct of Operations - Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc. | 4.3 | 78 |
| 000057 Loss of Vital AC Inst. Bus / 6 | | | | | | X | 2.1.20 | Conduct of Operations - Ability to interpret and execute procedure steps. | 4.6 | 11 |
| 000058 Loss of DC Power / 6 | | | | | X | | AA2.03 | Ability to determine and interpret the following as they apply to the Loss of DC Power: - DC loads lost; impact on to operate and monitor plant systems | 3.5 | 12 |

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# |
|--|----|----|----|----|----|---|--------|--|------|----|
| 000065 Loss of Instrument Air / 8 | | | | X | | | AA1.02 | Ability to operate and/or monitor the following as they apply to the Loss of Instrument Air: - Components served by instrument air to minimize drain on system | 2.6 | 14 |
| 000065 Loss of Instrument Air / 8 | | | | | | X | 2.1.7 | Conduct of Operations - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. | 4.7 | 79 |
| 000077 Generator Voltage and Electric Grid Disturbances / 6 | | X | | | | | AK2.01 | Knowledge of the interrelations between Generator Voltage and Electrical Grid Disturbances and the following: - Motors | 3.1 | 15 |
| W/E04 LOCA Outside Containment / 3 | | | | | | | EA2.2 | Ability to determine and interpret the following as they apply to the LOCA Outside Containment: - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments | 3.6 | 16 |
| W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4 | X | | | | | | EK1.1 | Knowledge of the operational implications of the following concepts as they apply to the Loss of Secondary Heat Sink: - Components, capacity, and function of emergency systems | 3.8 | 17 |
| W/E11 Loss of Emergency Coolant Recirc. / 4 | | | | | | X | 2.1.27 | Conduct of Operations - Knowledge of system purpose and or function. | 3.9 | 18 |
| W/E11 Loss of Emergency Coolant Recirc. / 4 | | | | | X | | EA2.2 | Ability to determine and interpret the following as they apply to the Loss of Emergency Coolant Recirculation: - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments | 4.2 | 80 |

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/E12 Steam Line Rupture – Excessive Heat Transfer / 4 | | | | | X | | EA2.1 | Ability to determine and interpret the following as they apply to the Uncontrolled Depressurization of all Steam Generators: - Facility conditions and selection of appropriate procedures during abnormal and emergency operations | 4.0 | 81 |

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# |
|--|-----------|-----------|-----------|-----------|-----------|----------|---------------|---|-------------|-----------|
| 000001 Continuous Rod Withdrawal / 1 | X | | | | | | AK1.02 | Knowledge of the operational implications of the following concepts as they apply to Continuous Rod Withdrawal: - SUR | 3.6 | 19 |
| 000003 Dropped Control Rod / 1 | | | | | X | | AA2.01 | Ability to determine and interpret the following as they apply to the Dropped Control Rod: - Rod position indication to actual rod position | 3.9 | 82 |
| 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 | 83 |
| 000028 Pressurizer Level Malfunction / 2 | | X | | | | | AK2.02 | Knowledge of the interrelations between the Pressurizer Level Control Malfunctions and the following: - Sensors and detectors | 2.6 | 20 |
| 000032 Loss of Source Range NI / 7 | | | | X | | | AA1.01 | Ability to operate and/or monitor the following as they apply to the Loss of Source Range Nuclear Instrumentation: - Manual restoration of power | 3.1 | 21 |
| 000037 Steam Generator Tube Leak / 3 | | | | | | X | 2.4.8 | Emergency Procedures/Plan - Knowledge of how abnormal operating procedures are used in conjunction with EOPs. | 4.5 | 84 |
| 000067 Plant Fire On-site / 9 | | | | X | | | AA1.06 | Ability to operate and/or monitor the following as they apply to the Plant Fire on Site: - Fire alarm | 3.5 | 22 |
| 000074 Inadequate Core Cooling / 4 | | X | | | | | EK2.01 | Knowledge of the interrelations between the Inadequate Core Cooling and the following: - RCP | 3.6 | 23 |
| 000076 High Reactor Coolant Activity / 9 | | | | | | | 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 | 24 |

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 | | | | EK3.2 | Knowledge of the reasons for the following responses as they apply to the LOCA Cooldown and Depressurization: - Normal, abnormal and emergency operating procedures associated with LOCA Cooldown and Depressurization | 3.4 | 25 |
| W/E09 Natural Circ / 4 | | | | | | X | 2.4.6 | Emergency Procedures/Plan – Knowledge of EOP mitigation strategies | 4.7 | 85 |
| W/E10 Natural Circ. / 4 | | | | | | | EA2.2 | Ability to determine and interpret the following as they apply to the Natural Circulation with Steam Void in Vessel with/without RVLIS: - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments | 3.4 | 26 |
| W/E14 Loss of Containment Integrity / 5 | X | | | | | | EK1.3 | Knowledge of the operational implications of the following concepts as they apply to the High Containment Pressure: - Annunciators and conditions indicating signals, and remedial actions associated with the High Containment Pressure | 3.3 | 27 |

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 | A5 | Number | K/A Topic | Imp | Q# |
|---------------------------------|----|----|----|----|----|----|----|----|----|----|----|--------|---|-----|----|
| 003 Reactor Coolant Pump | | X | | | | | | | | | | K2.01 | Knowledge of bus power supplies to the following: - RCPS | 3.1 | 28 |
| 003 Reactor Coolant Pump | | | | | | | | | | X | | A4.04 | Ability to manually operate and/or monitor in the control room: - RCP seal differential pressure instrumentation | 3.1 | 29 |
| 004 Chemical and Volume Control | | | | | | | | | X | | | A3.11 | Ability to monitor automatic operation of the CVCS, including: - Charging/letdown | 3.6 | 30 |
| 004 Chemical and Volume Control | | | | | | | | | | | | A2.35 | Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Reactor trip | 3.3 | 31 |
| 005 Residual Heat Removal | | X | | | | | | | | | | K2.03 | Knowledge of bus power supplies to the following: - RCS pressure boundary motor-operated valves | 2.7 | 32 |
| 005 Residual Heat Removal | | | | | | | | | | 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 | 86 |
| 006 Emergency Core Cooling | | | | | X | | | | | | | K5.01 | Knowledge of the operational implications of the following concepts as they apply to the ECCS: - Effects of temperatures on water level indications | 2.8 | 33 |

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 | Number | K/A Topic | Imp | Q# | |
|------------------------------------|----|----|----|----|----|----|----|----|----|----|--------|-----------|--|-----|----|
| 006 Emergency Core Cooling | | | | | | | | X | | | | A2.08 | Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Effect of electric power loss on valve position | 3.3 | 89 |
| 007 Pressurizer Relief/Quench Tank | | | | | | | | | | X | | A4.10 | Ability to manually operate and/or monitor in the control room: - Recognition of leaking PORV/code safety | 3.6 | 34 |
| 007 Pressurizer Relief/Quench Tank | | | | | | | X | | | | | A1.02 | Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: - Maintaining quench tank pressure | 2.7 | 35 |
| 008 Component Cooling Water | | | | X | | | | | | | | K4.09 | Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following: - The "standby" feature for the CCW pumps | 2.7 | 36 |
| 010 Pressurizer Pressure Control | | | | | | | | | | | | A2.02 | Ability to (a) predict the impacts of the following malfunctions or operations on the PZR PCS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Spray valve failures | 3.9 | 37 |
| 010 Pressurizer Pressure Control | | | | | | | | | | X | | 2.2.22 | Equipment Control - Knowledge of limiting conditions for operations and safety limits. | 4.7 | 87 |
| 012 Reactor Protection | | | | | | X | | | | | | K6.04 | Knowledge of the effect of a loss or malfunction of the following will have on the RPS: - Bypass-block circuits | 3.3 | 38 |
| 012 Reactor Protection | | | | X | | | | | | | | K5.01 | Knowledge of the operational implications of the following concepts as they apply to the RPS: - DNB | 3.3 | 41 |

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 | Number | K/A Topic | Imp | Q# |
|--|----|----|----|----|----|----|----|----|----|----|--------|--|-----|----|
| 012 Reactor Protection | | | | | | | X | | | | A2.01 | Ability to (a) predict the impacts of the following malfunctions or operations on the RPS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Faulty bistable operation | 3.6 | 88 |
| 013 Engineered Safety Features Actuation | | | X | | | | | | | | K3.02 | Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: - RCS | 4.3 | 39 |
| 013 Engineered Safety Features Actuation | | | | | | | X | | | | A2.05 | Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Loss of dc control power | 4.2 | 90 |
| 022 Containment Cooling | X | | | | | | | | | | K1.01 | Knowledge of the physical connections and/or cause-effect relationships between the CCS and the following systems: - SWS/cooling system | 3.5 | 40 |
| 026 Containment Spray | | | | | | | | | | | 2.4.14 | Emergency Procedures/Plan - Knowledge of general guidelines for EOP usage. | 3.8 | 42 |
| 039 Main and Reheat Steam | | | | | | | | | | | A2.04 | Ability to (a) predict the impacts of the following malfunctions or operations on the MRSS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Malfunctioning steam dump | 3.4 | 43 |
| 059 Main Feedwater | X | | | | | | | | | | K1.05 | Knowledge of the physical connections and/or cause-effect relationships between the MFW System and the following systems: - RCS | 3.1 | 44 |

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 | A5 | Number | K/A Topic | Imp | Q# |
|---------------------------------------|----|----|----|----|----|----|----|----|----|----|----|--------|---|-----|----|
| 061 Auxiliary/ Emergency Feedwater | | | | | | X | | | | | | K6.01 | Knowledge of the effect of a loss or malfunction of the following will have on the AFW System components: - Controllers and positioners | 2.5 | 46 |
| 062 AC Electrical Distribution | | | | | | | | | | | | 2.4.27 | Emergency Procedures/Plan – Knowledge of fire in the plant procedure. | 3.4 | 45 |
| 062 AC Electrical Distribution | | | X | | | | | | | | | K3.03 | Knowledge of the effect that a loss or malfunction of the A.C. Distribution System will have on the following: - DC system | 3.7 | 47 |
| 063 DC Electrical Distribution | | | | X | | | | | | | | K4.02 | Knowledge of D.C. Electrical System design feature(s) and/or interlock(s) which provide for the following: - Breaker interlocks, permissives, bypasses and cross-ties | 2.9 | 48 |
| 064 Emergency Diesel Generator | | | | | | | | | | | | 2.4.34 | Emergency Procedures/Plan – Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects. | 4.2 | 49 |
| 064 Emergency Diesel Generator | | | | | | | X | | | | | A1.08 | Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ED/G System controls including: - Maintaining minimum load on ED/G (to prevent reverse power) | 3.1 | 50 |
| 073 Process Radiation Monitoring | | | | | X | | | | | | | K5.01 | Knowledge of the operational implications of the following concepts as they apply to the PRM System: - Radiation theory, including sources, types, units, and effects | 2.5 | 51 |
| 076 Service Water | | | | | | | | | X | | | A3.02 | Ability to monitor automatic operation of the SWS, including: - Emergency heat loads | 3.7 | 52 |

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 2

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

Form ES-401-2

ES-401

| System #/Name | K1 | K2 | K3 | K4 | K5 | K6 | A1 | A2 | A3 | A4 | A5 | Number | K/A Topic | Imp | Q# |
|--------------------|----|----|----|----|----|----|----|----|----|----|----|--------|---|-----|----|
| 076 Service Water | | | X | | | | | | | | | K3.02 | Knowledge of the effect that a loss or malfunction of the SWS will have on the following: - Secondary closed cooling water | 2.5 | 53 |
| 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 | 54 |
| 103 Containment | X | | | | | | | | | | | K1.08 | Knowledge of the physical connections and/or cause-effect relationships between the Containment System and the following systems: - SIS, including action of safety injection reset | 3.6 | 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 | A5 | Number | K/A Topic | Imp | Q# |
|---|----|----|----|----|----|----|----|----|----|----|----|--------|--|-----|----|
| 002 Reactor Coolant | | | | | | | | | | | | A2.02 | Ability to (a) predict the impacts of the following malfunctions or operations on the RCS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Loss of coolant pressure | 4.2 | 57 |
| 011 Pressurizer Level Control | | | | | | X | | | | | | K6.01 | Knowledge of the effect of a loss or malfunction of the following will have on the PZR LCS: - Reasons for starting charging pump while increasing letdown flow rate | 2.8 | 58 |
| 014 Rod Position Indication System (RPIS) | | | X | | | | | | | | | K3.02 | Knowledge of the effect that a loss or malfunction of the RPIS will have on the following: - Plant computer | 2.5 | 59 |
| 015 Nuclear Instrumentation | X | | | | | | | | | | | K1.01 | Knowledge of the physical connections and/or cause-effect relationships between the NIS and the following systems: - RPS | 4.1 | 60 |
| 016 Non-nuclear Instrumentation | | | | | | | | | X | | | A3.01 | Ability to monitor automatic operation of the NNIS, including: - Automatic selection of NNIS inputs to control systems | 2.9 | 61 |
| 017 In-core Temperature Monitoring | | | | X | | | | | | | | K4.03 | Knowledge of ITM System design feature(s) and/or interlock(s) which provide for the following: - Range of temperature indication | 3.1 | 62 |

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 | Number | K/A Topic | Imp | Q# |
|--|----|----|----|----|----|----|----|----|----|----|--------|---|-----|----|
| 017 In-core Temperature Monitoring | | | | | | | 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 | 4.1 | 91 |
| 033 Spent Fuel Pool Cooling System (SFPCS) | | | | | | | X | | | | A2.01 | Ability to (a) predict the impacts of the following malfunctions or operations on the Spent Fuel Pool Cooling System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Inadequate SDM | 3.5 | 92 |
| 034 Fuel Handling Equipment | | | | | | | | | X | | A3.02 | Ability to monitor automatic operation of the Fuel Handling System, including: - Load limits | 3.1 | 93 |
| 035 Steam Generator | | | | | | | | | | X | A4.01 | Ability to manually operate and/or monitor in the control room: - Shift of S/G controls between manual and automatic control, by bumpless transfer | 3.7 | 63 |
| 041 Steam Dump System (SDS)/Turbine Bypass Control | | | | | | | X | | | | A1.02 | Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the SDS controls including: - Steam pressure | 3.1 | 64 |
| 045 Main Turbine Generator (MT/G) System | | | | | X | | | | | | K5.23 | Knowledge of the operational implications of the following concepts as they apply to the MT/G System: - Relationship between rod control and RCS boron concentration during T/G load increases | 2.7 | 56 |
| 075 Circulating Water | | X | | | | | | | | | K2.03 | Knowledge of bus power supplies to the following: - Emergency/essential SWS pumps | 2.6 | 65 |

| Facility | Indian Point Unit 2 | | Date of Exam | | 7/12/2010 | |
|--------------------------|---------------------|---|--------------|----|-----------|----|
| Category | K/A # | Topic | RO | | SRO-Only | |
| | | | IR | Q# | IR | Q# |
| 1. Conduct of Operations | 2.1.3 | Knowledge of shift or short-term relief turnover practices. | 3.7 | 66 | | |
| | 2.1.20 | Ability to interpret and execute procedure steps. | 4.6 | 67 | | |
| | 2.1.42 | Knowledge of new and spent fuel movement procedures. | 2.5 | 68 | | |
| | 2.1.32 | Conduct of Operations - Ability to explain and apply all system limits and precautions. | | | 3.8 | 94 |
| | 2.1.45 | Ability to identify and interpret diverse indications to validate the response of another indication | | | 4.3 | 95 |
| | Subtotal | | | | 3 | |
| 2. Equipment Control | 2.2.2 | Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels | 4.6 | 69 | | |
| | 2.2.39 | Knowledge of less than or equal to one hour Technical Specification action statements for systems | 3.9 | 70 | | |
| | 2.2.6 | Knowledge of the process for making changes to procedures | | | 3.6 | 96 |
| | 2.2.37 | Ability to determine operability and/or availability of safety related equipment. | | | 4.6 | 97 |
| | Subtotal | | | | 2 | |

| Facility | Indian Point Unit 2 | | Date of Exam | | 7/12/2010 | | |
|------------------------------|---------------------|--|--------------|-----------|-----------|----------|----------|
| Category | K/A # | Topic | RO | | SRO-Only | | |
| | | | IR | Q# | IR | Q# | |
| 3. Radiological Controls | 2.3.4 | Radiological Controls - Knowledge of radiation exposure limits under normal and emergency conditions. | 3.2 | 71 | | | |
| | 2.3.11 | Ability to control radiation releases | 3.8 | 72 | | | |
| | 2.3.15 | Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. | 2.9 | 73 | | | |
| | 2.3.11 | Ability to control radiation releases | | | 4.3 | 98 | |
| | Subtotal | | | | 3 | | 1 |
| | | | | | | | |
| 4. Emergency Procedures/plan | 2.4.45 | Ability to prioritize and interpret the significance of each annunciator or alarm. | 4.1 | 74 | | | |
| | 2.4.50 | Ability to verify system alarm setpoints and operate controls identified in the alarm response manual | 4.2 | 75 | | | |
| | 2.4.16 | Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures and severe accident management guidelines. | | | 4.4 | 99 | |
| | 2.4.25 | Knowledge of fire protection procedures. | | | 3.7 | 100 | |
| | Subtotal | | | | 2 | | 2 |
| Tier 3 Point Totals | | | | 10 | | 7 | |

Description of program used to generate IPEC Unit 2 February 2012 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 | 0000402439 Steam Line Rupture | Emergency Procedures/Plan – Knowledge of RO responsibilities in emergency plan implementation | Generic KA not applicable to Steam Line Rupture Event |
| R-1/1 | 0000542432 Loss of Min Feedwater (MFW) | Emergency Procedures/Plan – Knowledge of operator response to loss of all annunciators | Generic KA not applicable to Loss of MFW event |
| R-1/1 | 00WE11K304 Loss of Emergency Coolant Recirculation | Knowledge of the reasons for the following responses as they apply to the Loss of Emergency Coolant Recirculation: - RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated | This KA is evaluated during the Simulator/Walkthrough portion of the Exam |
| R-1/1 | 0000262140 Loss of Component Cooling Water | Conduct of Operations - Knowledge of refueling administrative requirements. | This KA rejected due to inability to write a discriminatory question for refueling administrative requirements for Loss of CCW. |
| R-1/1 | 000056K103 | Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: - Definition of subcooling: use of steam tables to determine it | This KA was rejected due to overlap with Question 10. |

| | | | |
|-------|---|---|--|
| R-1/2 | 0000052449 Inoperable/Stuck Control Rod | Emergency Procedures/Plan – Ability to perform without reference to procedures those actions that require immediate operation of system components and controls | Generic KA not applicable to Inoperable/Stuck Control Rod. There are no procedures with immediate operator actions related to this condition. |
| R-1/2 | 000037AA101 Steam Generator Tube Leak | Ability to operate and/or monitor the following as they apply to the Steam Generator Tube Leak: - Maximum controlled depressurization rate for affected S/G | This KA was rejected because, at IP2 for a Steam Generator Tube Leak, a normal cooldown and depressurization is performed NOT a maximum rate depressurization. |
| R-1/2 | 000068AA111 | Ability to operate and/or monitor the following as they apply to the Control Room Evacuation: - Emergency borate valve controls and indicators | This KA was rejected because, at IP2 for a Control Room Evacuation, the charging pump is aligned to the RWST. Emergency Boration is not identified in the procedure 2-AOP-SSD-1. |
| R-2/1 | 012000K608 Reactor Protection System | Knowledge of the effect of a loss or malfunction of the following will have on the RPS: COLSS | Equipment (COLSS) not applicable to IPEC. |
| R-2/1 | 006000K509 Emergency Core Cooling System | Knowledge of the operational implications of the following concepts as they apply to the ECCS: - Thermodynamics of water and steam, including subcooled margin, superheat, and saturation | This KA was rejected due to overlap with question 2. |
| R-2/1 | 026000A102 | Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: - Containment temperature | This KA was rejected due to overlap with question 33. |
| R-2/1 | 0590002134 Main Feedwater | Conduct of Operations – Knowledge of primary and secondary plant chemistry limits. | This KA was rejected because Chemistry Limits are no longer in any operations procedure. Unable to write a discriminatory RO level question for this KA. |

| | | | |
|-------|--|--|--|
| R-2/2 | 001000K520 | Knowledge of the operational implications of the following concepts as they apply to the CRDS: - Effects of RCS temperature on boron reactivity worth | This KA is rejected because it is a Generic Fundamentals concept with limited impact on the Control Rod Drive System. The change in temperature will have an impact on the CRDS. Unable to write a discriminatory RO level question for this KA. |
| R-2/2 | 0290002126 Containment Purge System (CPS) | Conduct of Operations – Knowledge of industrial safety procedures (such as rotating equipment, electrical, high temperature, high pressure, caustic, chlorine, oxygen and hydrogen). | Generic KA not applicable to Containment Purge System |
| R-2/2 | 072000A101 | Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ARM system controls including: - Radiation levels | Unit 2 does not have automatic actions related to the Area Radiation Monitoring System. Unable to write a discriminatory RO level question for this KA. |
| 3 | 2.1.30 | Ability to locate and operate components, including local controls | Generic KA not applicable to written examinations. This KA is evaluated during JPM Evaluation |
| 3 | 2.1.17 | Conduct of Operations – Ability to make accurate, clear and concise verbal reports. | Generic KA not applicable to written examinations. This KA is evaluated during Simulator Evaluation. |
| S-1/1 | 0000082206 Pressurizer (PZR) Vapor Space Accident (Relief Valve stuck open) | Equipment Control – Knowledge of the process for making changes to procedures. | Generic KA not applicable to Emergency Plant Evolutions |

| | | | |
|-------|---|--|---|
| S-1/2 | 0000512225 Loss of Condenser Vacuum | Equipment Control – Knowledge of bases in technical specifications for limit conditions for operations and safety limits | Generic KA not applicable to Loss of Condenser Vacuum. |
| S-2/1 | 0260002401 Containment Spray System (CSS) | Emergency Procedures/Plan – Knowledge of EOP entry conditions and immediate actions steps | Generic KA not applicable to Containment Spray. There are no Immediate Operator Actions for the Containment Spray System. |
| S-2/1 | 061000A206 Auxiliary / Emergency Feedwater (AFW) System | Ability to (a) predict the impacts of the following malfunctions or operations on the AFW System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Back leakage of MFW | This KA was rejected because IPEC has no procedure to address this condition. Unable to write a discriminatory SRO level question |
| S-2/2 | 0140002113 Rod Position Indication System (RPIS) | Conduct of Operations – Knowledge of facility requirements for controlling vital/controlled access. | Generic KA not applicable to Rod Position Indication System. |
| S-2/2 | 0270002235 Containment Iodine Removal System (CIRS) | Equipment Control – Ability to determine Technical Specification Mode of Operation. | Generic KA unable to write a valid SRO Only question. |
| 3 | 2.1.14 | Conduct of Operations - Knowledge of criteria or conditions that require plant-wide announcements, such as pump starts, reactor trips, mode changes, etc. | Generic KA not applicable to written examinations. This KA is evaluated during Simulator Evaluation. |
| | | | |
| | | | |

| | | |
|----|---|---|
| 76 | C & D Remove NOT | Done |
| 86 | A & B Not plausible | Done Revised Distractors A & B |
| 89 | Enhance last sentence of Question | Done Revised last sentence per Joe D. |
| 93 | A & B Not plausible | Working |
| 94 | Take away number from question use Hi/Lo level | Done Revised Question |
| 9 | KA Mismatch | Done Revised question to match KA |
| 12 | OK acceptable reverse logic for KA | No action required |
| 16 | Fair for RO? | Revised pressure to 1600 |
| 23 | Fair for RO? | OK |
| 26 | Fair for RO? | OK |
| 27 | Fair for RO? | OK |
| 31 | Add bullets Don't be subtle | Done Added bullet items from Joe and rearranged |
| 34 | B Not correct for KA Accoustic Monitors? | Done Revised question |
| 36 | C seems discardable | Done |
| 41 | Didn't like C | OK Discussed Over Frequency protections |
| 42 | KA looking for general question Possible reject overlap | OK |
| 50 | Didn't like D | Revised D |
| 58 | KA looking for temperature effects on RHX | Replaced Question |
| 62 | B & D Not Plausible Make 2800 | Done |
| 64 | Replace KA | Replaced KA Replaced Question |
| 67 | Replace KA | Replaced KA Replaced Question |
| 70 | Enhance Stem What TS actions apply for this situation | Revised question per Joe D. |
| 72 | C & D Not Plausible | Replaced Question |
| 73 | Enhance Stem "What action is required..." | Done |

| Facility: <u>Indian Point Unit 2</u> | | Date of Examination: <u>February 6 2012</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 | Review an ECP by Hand 1940012137 - Conduct of Operations - Knowledge of procedures, guidelines, or limitations associated with reactivity management. SRO-4.6 |
| Conduct of Operations | N, R | Determine Isolation Boundaries for CCW Leak Using Plant Print 1940012125 - Conduct of Operations - Ability to interpret reference materials such as graphs, curves, tables etc. SRO – 4.2 |
| Equipment Control | N, R | Review a Surveillance Test 1940012212 - Equipment Control - Knowledge of surveillance procedures. SRO – 4.1 |
| Radiation Control | M, R | Review a Release Permit for Containment Pressure Relief 1940012306 - Radiological Controls - Ability to approve release permits. SRO – 3.8 |
| Emergency Procedures/Plan | M, R | Classify an Emergency Event 1940012441 - Emergency Procedures/Plan - Knowledge of the emergency action level thresholds and classifications. SRO – 4.6 |
| 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>Indian Point Unit 2</u> | | Date of Examination: <u>February 6 2012</u> | |
|--|------------|---|--|
| Exam Level: RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/> | | Operating Test No.: _____ | |
| 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. Align CVCS Makeup after Chemistry Sample(004007A4.07 RO-3.9 SRO 3.7) | N | 1 | |
| b. Align Hot Leg Recirculation 23 SIP fails to Start (000011EA1.13 RO-4.1 SRO-4.2) | A, M, EN | 2 | |
| c. Depressurize RCS during Natural Circ Cooldown and Block Low Pressure SI (WE09EA1.1 RO-3.5 SRO-3.5) | A, N, L | 3 | |
| d. NA SROs | NA | NA | |
| e. Respond to 22 SG "B" Level Channel failure High (059000A4.08 RO-3.0 SRO-2.9) | D | 7 | |
| f. Isolate a faulted SG with CST level < 2.0 feet (000040A110 RO-4.1, SRO-4.1) | A, EN, D | 4S | |
| g. Start 21 RCP during FR-C.1 (WE06EA1.01 RO3.8 SRO-3.8) | E, D | 4P | |
| h. Verify Containment Phase A Isolation Manually Close Valves (103000A3.01 RO-3.9 SRO-4.2) | EN, A, D | 5 | |
| In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U) | | | |
| i. Align 23 Charging Pump to 12FD3 (000068AA1.06 RO-4.1 SRO-4.2) | D, E | 6 | |
| j. Lineup Alternate Cooling to SIS and RHR Pumps (005000 2.4.34 RO-4.2 SRO-4.1) | D, E, R | 8 | |
| k. Align 24 Waste Gas Decay Tank for Discharge (071000 2.3.11 RO-3.8 SRO-4.1) | R, D | 9 | |
| <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 | |

| | |
|--|--|
| (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>Indian Point Unit 2</u> | | Date of Examination: <u>February 6 2012</u> |
|--|------------|--|
| Examination Level: RO X SRO <input type="checkbox"/> | | Operating Test Number: _____ |
| Administrative Topic (see Note) | Type Code* | Describe activity to be performed |
| Conduct of Operations | M, R | Perform an ECP by Hand 1940012137 - Conduct of Operations - Knowledge of procedures, guidelines, or limitations associated with reactivity management. RO-4.3 |
| Conduct of Operations | | NA for ROs |
| Equipment Control | N, R | Review a Surveillance Test 1940012212 - Equipment Control - Knowledge of surveillance procedures. RO – 3.7 |
| Radiation Control | M, R | Calculate a Release Permit for Containment Pressure Relief 1940012311 - Radiological Controls - Ability to control radiation releases. RO – 3.8 |
| Emergency Procedures/Plan | D, S | Perform Initial UNUSUAL EVENT Notifications 1940012439 Emergency Procedures/Plan - Knowledge of the RO's responsibilities in emergency plan implementation. RO – 3.9 |
| 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>Indian Point Unit 2</u> | | Date of Examination: <u>February 6 2012</u> | |
|--|--|---|-----------------|
| Exam Level: RO X SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/> | | Operating Test No.: _____ | |
| 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. | Align CVCS Makeup after Chemistry Sample (004007A4.07 RO-3.9 SRO 3.7) | N | 1 |
| b. | Align Hot Leg Recirculation 23 SIP fails to Start (000011EA1.13 RO-4.1 SRO-4.2) | A, M, E | 2 |
| c. | Depressurize RCS during Natural Circ Cooldown and Block Low Pressure SI (WE09EA1.1 RO-3.5 SRO-3.5) | A, N, L | 3 |
| d. | Energize 480V bus from Appendix R EDG (000055A106 RO- 4.1 SRO-4.5) | N | 6 |
| e. | Respond to 22 SG "B" Level Channel failure High (059000A4.08 RO-3.0 SRO-2.9) | D | 7 |
| f. | Isolate a faulted SG with CST level < 2.0 feet (000040A110 RO-4.1, SRO-4.1) | A, EN, D | 4S |
| g. | Start 21 RCP during FR-C.1 (WE06EA1.01 RO3.8 SRO-3.8) | E, D | 4P |
| h. | Verify Containment Phase A Isolation Manually Close Valves (103000A3.01 RO-3.9 SRO-4.2) | E, A, D | 5 |
| In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U) | | | |
| i. | Align 23 Charging Pump to 12FD3 (000068AA1.06 RO-4.1 SRO-4.2) | D | 6 |
| j. | Lineup Alternate Cooling to SIS and RHR Pumps (005000 2.4.34 RO-4.2 SRO-4.1) | D, E, R | 8 |
| k. | Align 24 Waste Gas Decay Tank for Discharge (071000 2.3.11 RO-3.8 SRO-4.1) | R, D | 9 |
| <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 | |

| | |
|--|--|
| (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: Indian Point 2 Scenario No.: 1

Op-Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions:

Reset simulator to IC-115 Load Simulator Schedule-Scenario1
 The Plant is at 30% power. 23 EDG is OOS due to a malfunctioning governor.

Turnover:

Return plant to 100% power at 200 MW/hr.
 21 EDG, 22 EDG, 138 KV offsite power supply and 13.8 KV offsite power supply are protected
 Tech Spec 3.8.1.B surveillance requirement last performed 3 hours ago

| Event No. | Malf. No. | Event Type* | Event Description |
|--|-------------|--------------------------------|--|
| 1 | N/A | R (ATC) N (CRS) N (BOP) | Power Escalation |
| 2 | XMT-SGN008A | I(ATC) I(BOP) TS(CRS) | 23 SG Controlling Steam Flow Transmitter Fails High |
| 3 | MAL-EPS008L | C (BOP) C (CRS) TS (CRS) | MCC-28 will trip on overcurrent. |
| 4 | MAL-EPS001 | C (ALL) | Loss of offsite power due to Loss of Station Aux Transformer. The running charging pump (21) will trip. |
| 5 | MAL SWD003A | M(ALL) | Complete loss of off site power resulting in a Reactor Trip |
| 6 | MAL-DSG007A | M(ALL) | 21 EDG will trip and team will enter ECA-0.0. |
| 7 | MAL-CVC002 | C(ALL) | 300 GPM Seal LOCA. Crew will take actions for Safety Injection. |
| 8 | N/A | C(BOP) | 22 EDG will be repaired and started. Team must start a service water pump to cool the EDG before it overheats and trips. |
| 9 | N/A | C(ATC) C(CRS) | Prior to starting a charging pump, RCP Seal Injection must be isolated. |
| * (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:
 The Plant is in a 100% normal full power lineup.

Turnover:
 21 Charging Pump and 21 CCW pump are out of service.

| Event No. | Malf. No. | Event Type* | Event Description |
|-----------|---|---|--|
| 1 | XMT RCS043A | I (ALL) TS (CRS) | RCS Loop 23 T-Hot fails high |
| 2 | CVH- CFW009B | R (ATC) N (CRS) N (BOP) | 24 MFRV will slowly drift closed due to a broken air line prompting a Rapid Load Shutdown |
| 3 | MAL CRF002AV | C (ATC) C (CRS) TS (CRS) | Control Rod P-6 "ratchets in" during rod motion. |
| 4 | MOT CVC004A | C (ATC) C (BOP) C (CRS) TS (CRS) | Loss of Letdown due to LCV-459 failing shut. Excess Letdown will be placed in service. |
| 5 | MAL SGN004A | M (ALL) | Steam Break down stream of 21 MSIV & Check Valve in Aux Boiler Feed Pump Building. |
| 6 | PLP RHR033 PLP RHR022 RLY PPL487 RLY PPL488 MOV RHR011 | M (ALL) | LOCA outside Containment in Primary Auxiliary Building (PAB) Safety Injection fails to Auto Actuate requiring Manual Actuation. RHR valve 746 will fail to auto open requiring Manual Action |

* (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 IC-117 Load Simulator Schedule Scenario 3

Turnover:

The Plant is at 90% power. 21 EDG is OOS for major PM.
 Return plant to 100% power.

| Event No. | Malf. No. | Event Type* | Event Description |
|--|-----------------------------------|-------------------------------|---|
| 1 | N/A | R (ATC) N (CRS) N (BOP) | Power Escalation |
| 2 | XMT-SGN037A | I (ALL) TS (CRS) | PT-419C (21 SG C Channel Pressure) fails high causing 21 ADV to fail open requiring manual closure. |
| 3 | MAL-RCS002A | C (ALL) TS (CRS) | 35 gpm RCS leak. |
| 4 | MOC CCW003A MOC CCW001/2 | C(CRS) C (BOP) TS (CRS) | 23 CCW Pump trips and 21 and 22 CCW Pump fail to auto start |
| 5 | MAL-RCS001A | M (ALL) | Large Break RCS LOCA. |
| 6 | MOC-RHR003/4 | C (CRS) C (BOP) | RHR pumps will not auto start and need to be started manually. |
| 7 | RLY-PPL085/090 | C (BOP) | Failure of Containment Phase A requiring manual initiation. |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | |

4

Facility: Indian Point 2 Scenario No.: 4 Op-Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions:
 Reset simulator to IC-118. Load Simulator Schedule – Scenario 4
 The Plant is in a 100% normal full power lineup. 21 AFW Pump is out of service

Turnover:
 21 AFW Pump of out of service for scheduled maintenance and is expected back within 4 hours.
 22 and 23 AFW Pumps are protected equipment
 Maintain 100% Power

| Event No. | Malf. No. | Event Type* | Event Description |
|--|--|-------------------------------|--|
| 1 | XMT CVC019A | I (ALL) | VCT Level Transmitter LT-112 fails low |
| 2 | MAL RCS014D | TS (CRS) | 6 gpm SG Tube Leak 24 SG |
| 3 | NA | R (ATC) N (CRS) N (BOP) | Rapid Load Reduction/Shutdown |
| 4 | MAL RCS014D | M (ALL) | Steam Generator Tube Rupture |
| 5 | BKR- DSG004 | C (ATC) | 23 EDG output Breaker fails as is |
| 6 | MAL SIS001 | C (BOP) | Safety Injection Pump 21 Fails to Auto Start |
| 7 | AOV RCS003A SWI RCS006B SWI RCS006C | C (CRS) C (BOP) | PORV 456 loss of control power when attempted to open |
| 8 | AOV CVC008A | C (CRS) C (BOP) | Auxiliary Spray Valve 212 will open but will failed closed resulting in a transition to ECA-3.3 SGTR With Loss of Pressure Control |
| 9 | NA | C (BOP) C (ATC) | Power is restored to bus 6A |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | |