

| TIER | GROUP | RO K/A Category Points | | | | | | | | | | | SRO-Only Points | | | | | |
|---|-------------|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|-----------------|---|---|-----|---|-------|
| | | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | TOTAL | K | A | A 2 | G | TOTAL |
| 1. Emergency & Abnormal Plant Evolutions | 1. | 3 | 3 | 3 | | | | 3 | 3 | | | 3 | 18 | 0 | 0 | 5 | 2 | 7 |
| | 2. | 1 | 2 | 2 | | | | 1 | 1 | | | 2 | 9 | 0 | 0 | 4 | 1 | 5 |
| | Tier Totals | 4 | 5 | 5 | | | | 4 | 4 | | | 5 | 27 | 0 | 0 | 9 | 3 | 12 |
| 2. Plant Systems | 1. | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 28 | 0 | 0 | 0 | 4 | 4 |
| | 2. | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 10 | 0 | 0 | 0 | 2 | 2 |
| | Tier Totals | 4 | 3 | 4 | 3 | 4 | 2 | 4 | 4 | 3 | 4 | 3 | 38 | 0 | 0 | 0 | 6 | 6 |
| 3. Generic Knowledge and Abilities Categories | | | | | 1 | | 2 | | 3 | | 4 | | 10 | 1 | 2 | 3 | 4 | 7 |
| | | | | | 3 | | 2 | | 3 | | 2 | | | 2 | 2 | 2 | 1 | |

Notes:

1. Ensure that at least two topics from every K/A category are sampled within each tier of the RO outline (i.e., the “Tier Totals” in each K/A category shall not be less than two). Refer to Section D.1.c for additional guidance regarding SRO sampling.
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. Select topics from many systems and evolutions; avoid selecting more than two K/A topics from a given system or evolution unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
6. 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. The SRO K/As must also be linked to 10 CFR 55.43 or an SRO-level learning objective.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) 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; summarize all the SRO-only knowledge and non-A2 ability categories in the columns labeled “K” and “A.” Use duplicate pages for RO and SRO-only exams.
8. For Tier 3, enter the K/A numbers, descriptions, importance ratings, and point totals on Form ES-401-3.
9. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.

| ES-401 | PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1 | | | | | | Form ES-401-2 | | |
|--|---|--------|--------|--------|--------|---|--|-----|-----|
| E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | IR | # |
| 000007 Reactor Trip - Stabilization – Recovery / 1 | | | | | | S | EA2.04: Ability to determine and interpret the following as they apply to a reactor trip: If reactor should have tripped but has not done so, manually trip the reactor and carry out actions in ATWS EOP | 4.4 | 0/1 |
| 000008 Pressurizer Vapor Space Accident / 3 | | | | | | R | AA2.20: Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: The effect of an open PORV on code safety, based on observation of plant parameters | 3.4 | 1/0 |
| 000009 Small Break LOCA / 3 | | | | | | R | EA2.14: Ability to determine and interpret the following as they apply to a small break LOCA: Actions to be taken if PTS limits are violated | 3.8 | 1/0 |
| 000011 Large Break LOCA / 3 | | | R | | | S | EK3.15: Knowledge of the reasons for the following responses as they apply to the Large Break LOCA: Criteria for shifting to recirculation mode (SRO) EA2.02: Ability to determine and interpret the following as they apply to a Large Break LOCA: Consequences to RHR of not resetting safety injection | 4.3 | 1/1 |
| 000015/17 RCP Malfunctions / 4 | | R | | | | | AK2.08: Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions and the following: CCWS | 2.6 | 1/0 |
| 000022 Loss of Rx Coolant Makeup / 2 | R | | | | | | AK1.02: Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Pump Makeup: Relationship of charging flow to pressure differential between charging and RCS | 2.7 | 1/0 |
| 000025 Loss of RHR System / 4 | R | | | | | | AK1.01: Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System: Loss of RHRS during all modes of operation | 3.9 | 1/0 |
| 000026 Loss of Component Cooling Water / 8 | | | | | | | | | |
| 000027 Pressurizer Pressure Control System Malfunction / 3 | | | R | | | S | AK3.03: Knowledge of the reasons for the following responses as they apply to the Pressurizer Pressure Control Malfunctions: Actions contained in EOP for PZR PCS malfunction (SRO) 2.4.30: Emergency Procedures/Plan: Knowledge of which events related to system operations/status should be reported to outside agencies. (Pressurizer Pressure Control Malfunction) | 3.7 | 1/1 |
| | | | | | | | | 3.6 | |

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|---|---|--------|--------|--------|--------|-----|---|----------------|-----|
| E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | IR | # |
| 000029 ATWS / 1 | | R | | | | | EK2.06: Knowledge of the interrelations between the ATWS and the following: Breakers, relays, and disconnects | 2.9 | 1/0 |
| 000038 Steam Gen. Tube Rupture / 3 | | | | R | | | EA1.27: Ability to operate and/or monitor the following as they apply to a SGTR: Steam dump valve status lights and indicators | 3.9 | 1/0 |
| 000040 and W/E12 Steam Line Rupture - Excessive Heat Transfer / 4 | | | | | | R | 2.4.31: Emergency Procedures/Plan: Knowledge of annunciators alarms and indications, and use of the response instructions. (Steam Line Rupture) | 3.3 | 1/0 |
| 000054 Loss of Main Feedwater / 4 | | | R | | | S | AK3.01: Knowledge of the reasons for the following responses as they apply to the Loss of Main Feedwater (MFW): Reactor and/or turbine trip, manual and automatic (SRO) AA2.01: Ability to determine and interpret the following as they apply to the Loss of Main Feedwater (MFW): Occurrence of reactor and/or turbine trip | 4.1 4.4 | 1/1 |
| 000055 Station Blackout / 6 | | | | | | S R | 2.2.25: Equipment Control: Knowledge of bases in technical specification for limiting conditions for operation and safety limits. (Station Blackout) (SRO) 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 | 2.5 4.6 | 1/1 |
| 000056 Loss of Off-site Power / 6 | | | | R | | | AA1.37 :Ability to operate and/or monitor the following as they apply to the Loss of Offsite Power: Instrument air | 3.4 | 1/0 |
| 000057 Loss of Vital AC Inst. Bus / 6 | | | | | | R S | AA2.12: Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: PZR level controller, instrumentation, and heater indications (SRO) 2.2.25: Equipment Control: Knowledge of bases in technical specifications for limiting conditions for operations and safety limits. (Loss of Vital AC Instrument Bus) | 3.5 3.7 | 1/1 |
| 000058 Loss of DC Power / 6 | | | | | | R | 2.1.32: Conduct of Operations: Ability to explain and apply all system limits and precautions. (Loss of DC Power) | 3.4 | 1/0 |
| 000062 Loss of Nuclear Svc Water / 4 | | | | | | | | | |

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|--|---|--------|--------|--------|--------|---|--|----------------|------|
| E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | IR | # |
| 000065 Loss of Instrument Air / 8 | | | | R | | | AA1.05: Ability to operate and/or monitor the following as they apply to the Loss of Instrument Air: RPS | 3.3 | 1/0 |
| W/E04 LOCA Outside Containment / 3 | | | | | | | | | |
| W/E11 Loss of Emergency Coolant Recirc. / 4 | | R | | | S | | EK2.2: Knowledge of the interrelations between the Loss of Emergency Coolant Recirculation and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility (SRO) EA2.1: Ability to determine and interpret the following as they apply to Loss of Emergency Coolant Recirculation: Facility conditions and selection of appropriate procedures during abnormal and emergency operations. | 3.9 4.2 | 1/1 |
| W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4 | | R | | | | | EK1.3: Knowledge of the operational implications of the following concepts as they apply to the Loss of Secondary Heat Sink: Annunciators and conditions indicating signals, and remedial actions associated with the Loss of Secondary Heat Sink | 3.9 | 1/0 |
| K/A Category Totals | RO | 3 | 3 | 3 | 3 | 3 | Group Point Total | | 18/7 |
| | SRO | -- | -- | -- | -- | 5 | | | |

| ES-401 | PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2 | | | | | | Form ES-401-2 | | |
|---|---|--------|--------|--------|--------|---|--|-----|-----|
| E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | IR | # |
| 000001 Continuous Rod Withdrawal / 1 | | | | | | R | AA2.02: Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal: Position of emergency boration valve | 4.2 | 1/0 |
| 000003 Dropped Control Rod / 1 | | | | | | S | AA2.03: Ability to determine and interpret the following as they apply to the Dropped Control Rod: Dropped rod using in-core/ex-core instrumentation, in-core or loop temperature measurements | 3.8 | 0/1 |
| 000005 Inoperable Stuck Control Rod / 1 | | | | | | | | | |
| 000024 Emergency Boration / 1 | | | | | | S | AA2.01: Ability to determine and interpret the following as they apply to the Emergency Boration: Whether boron flow and/or MOVs are malfunctioning, from plant conditions | 4.1 | 0/1 |
| 000028 Pressurizer Level Malfunction / 2 | | | | | | | | | |
| 000032 Loss of Source Range NI / 7 | | | | | | | | | |
| 000033 Loss of Intermediate Range NI / 7 | | R | | | | | AK1.01: Knowledge of the operational implications of the following concepts as they apply to Loss of Intermediate Range Nuclear Instrumentation: Effects of voltage changes on performance | 2.7 | 1/0 |
| 000036 Fuel Handling Accident / 8 | | | | | | | | | |
| 000037 Steam Generator Tube Leak / 3 | | | | | | | | | |
| 000051 Loss of Condenser Vacuum / 4 | | | | | | | | | |
| 000059 Accidental Liquid RadWaste Rel. / 9 | | | | | | | | | |
| 000060 Accidental Gaseous Radwaste Rel. / 9 | | | | | | | | | |
| 000061 ARM System Alarms / 7 | | | | | | | | | |
| 000067 Plant Fire On-site / 8 | | | | | | | | | |
| 000068 Control Room Evac. / 8 | | | R | | | | AK3.18: Knowledge of the reasons for the following responses as they apply to the control room evacuation: Actions contained in EOP for control room evacuation emergency task | 4.2 | 1/0 |
| 000069 and W/E14 Loss of CTMT Integrity / 5 | | R | | | | | EK2.1: Knowledge of the interrelations between the High Containment Pressure and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features | 3.4 | 1/0 |

| ES-401 | PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2 | | | | | | | Form ES-401-2 | |
|--|---|--------|--------|--------|--------|-----|---|-------------------|-----|
| E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | IR | # |
| 000074 (W/E06 & 07) Inad. Core Cooling / 4 | | R | | | | S | EK2.1: Knowledge of the interrelations between the Saturated Core Cooling and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features (SRO) 2.2.25: Equipment Control: Knowledge of bases in technical specifications for limiting conditions for operations and safety limits. (Inadequate Core Cooling) | 3.2 3.7 | 1/1 |
| 000076 High Reactor Coolant Activity / 9 | | | R | | | | AK3.06: Knowledge of the reasons for the following responses as they apply to the High Reactor Coolant Activity: Actions contained in EOP for high reactor coolant activity | 3.2 | 1/0 |
| W/E01 and W/E02 Rediagnosis & SI Termination / 3 | | | | R | | | EA1.2: Ability to operate and/or monitor the following as they apply to the SI Termination: Operating behavior characteristics of the facility | 3.6 | 1/0 |
| W/E13 Steam Generator Over-pressure / 4 | | | | | | S R | 2.1.23: Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation. (Steam Generator Overpressure) (SRO) EA2.2: Ability to determine and interpret the following as they apply to the Steam Generator Overpressure: Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments | 3.9 3.4 | 1/1 |
| W/E15 Containment Flooding / 5 | | | | | | | | | |
| W/E16 High Containment Radiation / 9 | | | | | | | | | |
| W/E03 LOCA Cooldown - Depress. / 4 | | | | | | | | | |
| W/E09 and W/E10 Natural Circ. / 4 | | | | | | S | 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 | 3.9 | 1/0 |
| W/E08 RCS Overcooling – PTS / 4 | | | | | | R | 2.1.23: Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation. (Pressurized Thermal Shock) | 3.9 | 1/0 |
| K/A Category Totals | RO | 1 | 2 | 2 | 1 | 1 | 2 | Group Point Total | |
| | SRO | -- | -- | -- | -- | 4 | 1 | | |
| | | | | | | | | | 9/5 |

| ES-401 | PWR Examination Outline Plant Systems - Tier 2 / Group 1 | | | | | | | | | | | Form ES-401-2 | | | |
|--|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|--|--------------|-----|
| | System # / Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | | G | K/A Topic(s) | IR |
| 003 Reactor Coolant Pump | | R | | | | | | | | | | | K2.01: Knowledge of bus power supplies to the following: RCPS | 3.1 | 1/0 |
| 004 Chemical and Volume Control | | | | | | R | | | | | | | K5.17: Knowledge of the operational implications of the following concepts as they apply to the CVCS: Types and effects of radiation, dosimetry, and shielding-time-distance | 2.6 | 1/0 |
| 005 Residual Heat Removal | | | | | | | R | | | | | | K6.03: Knowledge of the effect of a loss or malfunction of the following will have on the RHRS: RHR heat exchanger | 2.5 | 1/0 |
| 006 Emergency Core Cooling | | | | | | R | | | | | | | K5.06: Knowledge of the operational implications of the following concepts as they apply to the ECCS: Relationship between ECCS flow and RCS pressure | 3.5 | 1/0 |
| 007 Pressurizer Relief/Quench Tank | | | | | | | | | | R | | | A3.01: Ability to monitor automatic operation of the PRTS, including: Components which discharge to the PRT | 2.7 | 1/0 |
| 008 Component Cooling Water | | | | | | | R | | | | | | A1.04: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCWS controls including: Surge tank level | 3.1 | 1/0 |
| 010 Pressurizer Pressure Control | | R | | | | | | R | | | | | K1.06: Knowledge of the physical connections and/or cause-effect relationships between the PZR PCS and the following systems: CVCS A1.01: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PZR PCS controls including: PZR and RCS boron concentrations | 2.9 2.8 | 2/0 |
| 012 Reactor Protection | | | | | | R | | | | | | S | K5.01: Knowledge of the operational implications of the following concepts as they apply to the RPS: DNB (SRO) 2.2.25: Equipment Control: Knowledge of bases in technical specifications for limiting conditions for operations and safety limits. (RPS) | 3.3 3.7 | 1/1 |
| 013 Engineered Safety Features Actuation | | | | | | | R | | | | | S | K6.01: Knowledge of the effect of a loss or malfunction of the following will have on the ESFAS: Sensors and detectors (SRO) 2.2.25: Equipment Control: Knowledge of bases in technical specifications for limiting conditions for operations and safety limits. (ESFAS) | 2.7 3.7 | 1/1 |

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|---------------------------|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|---|----------------|-----|
| System # / Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | K/A Topic(s) | IR | # |
| 022 Containment Cooling | | | | | | | R | | | | | A1.04: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCS controls including: Cooling water flow | 3.2 | 1/0 |
| 026 Containment Spray | | | R | | | | | R | | | | K3.01: Knowledge of the effect that a loss or malfunction of the CSS will have on the following: CCS A2.03: Ability to (a) predict the impacts of the following malfunctions or operations on the CSS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of ESF | 3.9 4.1 | 2/0 |
| 039 Main and Reheat Steam | R | | | | | | | | | | R | 2.4.49: Emergency Procedures/Plan: Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. (Main and Reheat Steam) K1.06: Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems: Condenser steam dump | 4.0 3.1 | 2/0 |
| 056 Condensate | | | | | | | | R | | | | 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 | 2.6 | 1/0 |
| 059 Main Feedwater | | | R | | | | | | | | R | K3.04: Knowledge of the effect that a loss or malfunction of the MFW System will have on the following: RCS A4.12: Ability to manually operate and/or monitor in the control room: Initiation of automatic feedwater isolation | 3.6 3.4 | 2/0 |

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|-----------------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|---|----------------|-----|
| | System # / Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | | G | K/A Topic(s) | IR |
| 061 Auxiliary/Emergency Feedwater | | R | | R | | | | | | | | | K2.02: Knowledge of bus power supplies to the following: AFW electric driven pumps K4.02: Knowledge of AFW System design feature(s) and/or interlock(s) which provide for the following: AFW automatic start upon loss of MFW pump, S/G level, blackout, or safety injection | 3.7 4.5 | 2/0 |
| 062 AC Electrical Distribution | | | | R | | | | | | | | S | K3.02: Knowledge of the effect that a loss or malfunction of the A.C. Distribution System will have on the following: ED/G (SRO) 2.4.6: Emergency Procedures/Plan: Knowledge symptom based EOP mitigation strategies. (AC Electrical Distribution) | 4.1 4.0 | 1/1 |
| 063 DC Electrical Distribution | | | | | | | | R | | | | | A2.01: Ability to (a) predict the impacts of the following malfunctions or operations on the D.C. Electrical System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Grounds | 2.5 | 1/0 |
| 064 Emergency Diesel Generator | | | | | | | | | R | | | S | A3.03: Ability to monitor automatic operation of the ED/G System, including: Indicating lights, meters, and recorders (SRO) 2.2.22: Knowledge of limiting conditions for operations and safety limits. | 3.4 2.9 | 1/1 |
| 073 Process Radiation Monitoring | | | | | | | | | | | R | | A4.03: Ability to manually operate and/or monitor in the control room: Check source for operability demonstration | 3.1 | 1/0 |
| 076 Service Water | | | | | | | | | | | R | R | 2.1.14: Conduct of Operations: Knowledge of system status criteria which require the notification of plant personnel. (Service Water System) A4.04: Ability to manually operate and/or monitor in the control room: Emergency heat loads | 2.5 3.5 | 2/0 |
| 078 Instrument Air | R | | | | | | | | | | | | K1.05: Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: MSIV air | 3.4 | 1/0 |

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|----------------------|--|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|----|---|--------------------|-----|------|--|
| System # / Name | | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | K/A Topic(s) | | IR | # | |
| 103 Containment | | | | | R | | | | | | | | K4.04: Knowledge of Containment System design feature(s) and/or interlock(s) which provide for the following: Personnel access hatch and emergency access hatch | | 2.5 | 1/0 | |
| K/A Category Totals: | | RO | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | Group Point Total: | | 28/4 | |
| | | SRO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 4 | | | | |

| ES-401 | PWR Examination Outline Plant Systems - Tier 2 / Group 2 | | | | | | | | | | | Form ES-401-2 | | | | |
|---|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------------|--|----------------|-----|---|
| | Group 2 (RO / SRO) | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | | G | K/A Topic(s) | IR | # |
| 001 Control Rod Drive | | | | | | | | | | | | | | | | |
| 002 Reactor Coolant | | | | | | | | | | R | | | A3.03: Ability to monitor automatic operation of the RCS, including: Pressure, temperatures, and flows | 4.4 | 1/0 | |
| 011 Pressurizer Level Control | | | R | | | | | | | | | S | K2.01: Knowledge of bus power supplies to the following: Charging pumps (SRO) 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.. (Pressurizer Level Control System) | 3.1 4.3 | 1/1 | |
| 014 Rod Position Indication | | | | R | | | | | | | | | K3.02: Knowledge of the effect that a loss or malfunction of the RPIS will have on the following: Plant computer | 2.5 | 1/0 | |
| 015 Nuclear Instrumentation | | | | | | | | | | | | | | | | |
| 016 Non-nuclear Instrumentation | | | | | | | | | | | | | | | | |
| 017 In-core Temperature Monitor | | | | | | | | R | | | | | A1.01: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ITM System controls including: Core exit temperature | 3.7 | 1/0 | |
| 027 Containment Iodine Removal | | | | | | | | | | | | | | | | |
| 028 Hydrogen Recombiner and Purge Control | | | | | | | | | | | | R | A4.02: Ability to manually operate and/or monitor in the control room: Location and interpretation of containment pressure indications (SRO) 2.2.25: Equipment Control: Knowledge of bases in technical specifications for limiting conditions for operations and safety limits. (Hydrogen Recombiner and Purge Control System) | 3.7 3.7 | 1/1 | |
| 029 Containment Purge | | | | | | | | | | | | | | | | |
| 033 Spent Fuel Pool Cooling | | | | | | | | | | | | | | | | |
| 034 Fuel Handling Equipment | | | | | | | | | | | | | | | | |
| 035 Steam Generator | | | | | | | | | | | | | | | | |
| 041 Steam Dump/Turbine Bypass Control | | | | | | R | | | | | | | K5.07: Knowledge of the operational implications of the following concepts as they apply to the SDS: Reactivity feedback effects | 3.1 | 1/0 | |

| ES-401 | | PWR Examination Outline Plant Systems - Tier 2 / Group 2 | | | | | | | | | | | Form ES-401-2 | | | |
|-------------------------------|--|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|----|---------------|--|-----|------|
| Group 2 (RO / SRO) | | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | K/A Topic(s) | | IR | # |
| 045 Main Turbine Generator | | | | | | | | | | | | | | | | |
| 055 Condenser Air Removal | | | | | | | | | | | | | R | 2.1.32: Conduct of Operations: Ability to explain and apply all system limits and precautions. (Condenser Air Removal System) | 3.4 | 1/0 |
| 068 Liquid Radwaste | | | | | | | | | | | | | R | A2.04: Ability to (a) predict the impacts of the following malfunctions or operations on the Liquid Radwaste System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of automatic isolation | 3.3 | 1/0 |
| 071 Waste Gas Disposal | | | | | | | | | | | | | | | | |
| 072 Area Radiation Monitoring | | | | | | | | | | | | | | | | |
| 075 Circulating Water | | | | | | | | | | | | | | | | |
| 079 Station Air | | | | | | R | | | | | | | | K4.01: Knowledge of SAS design feature(s) and/or interlock(s) which provide for the following: Cross-connect with IAS | 2.9 | 1/0 |
| 086 Fire Protection | | R | | | | | | | | | | | | K1.01: Knowledge of the physical connections and/or cause-effect relationships between the Fire Protection System and the following systems: High-pressure service water | 3.0 | 1/0 |
| K/A Category Totals: | | RO | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | Group Point Total: | | 10/2 |
| | | SRO | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 2 | | | |

| ES-401 | | Generic Knowledge and Abilities Outline (Tier 3) | | | Form ES-401-3 | |
|---|--------|--|-----|--------------------------|---------------|---|
| Facility: Prairie Island | | | | Date of Exam: 09/11/2003 | | |
| Category | K/A # | Topic | RO | | SRO | |
| | | | IR | # | IR | # |
| 1. Conduct of Operations | 2.1.18 | Ability to make accurate, clear and concise logs, records, status boards, and reports. | 2.9 | 1 | | |
| | 2.1.29 | Knowledge of how to conduct and verify valve lineups. | 3.4 | 1 | | |
| | 2.1.31 | Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup. | 4.2 | 1 | | |
| | 2.1.34 | Ability to maintain primary and secondary plant chemistry within allowable limits. | | | 2.9 | 1 |
| | 2.1.6 | Conduct of Operations: Ability to supervise and assume a management role during plant transients and upset conditions. | | | 4.3 | 1 |
| Subtotal | | | | 3 | | 2 |
| 2. Equipment Control | 2.2.1 | Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity. | 3.7 | 1 | | |
| | 2.2.4 | Ability to explain the variations in control board layouts, systems, instrumentation and procedural actions between units at a facility. (multi-unit) | 2.8 | 1 | | |
| | 2.2.25 | Knowledge of bases in technical specifications for limiting conditions for operations and safety limits. | | | 3.7 | 1 |
| | 2.2.32 | Knowledge of the effects of alterations on core configuration. | | | 3.3 | 1 |
| Subtotal | | | | 2 | | 2 |
| 3. Radiation Control | 2.3.1 | Knowledge of 10 CFR 20 and related facility radiation control requirements. | 2.6 | 1 | | |
| | 2.3.10 | Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure. | 2.9 | 1 | | |
| | 2.3.9 | Knowledge of the process for performing a containment purge. | 2.5 | 1 | | |
| | 2.3.4 | Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized. | | | 3.1 | 1 |
| | 2.3.3 | Knowledge of SRO responsibilities for auxiliary systems that are outside the control room (e.g., waste disposal and handling systems). | | | 2.9 | 1 |
| Subtotal | | | | 3 | | 2 |
| 4. Emergency Procedures / Plan | 2.4.16 | Knowledge of EOP implementation hierarchy and coordination with other support procedures. | 3.0 | 1 | | |
| | 2.4.4 | Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures. | 4.0 | 1 | | |
| | 2.4.27 | Knowledge of fire in the plant procedure. | | | 3.5 | 1 |
| Subtotal | | | | 2 | | 1 |
| Tier 3 Point Total | | | | 10 | | 7 |

| Level / Tier / Group | Randomly Selected K/A | Reason for Rejection |
|----------------------|-----------------------|---|
| RO/1/1 | 011 EK3.09 | We have no technical reference for this K/A. "Knowledge of the reasons for the following responses as they apply to the Large Break LOCA: Maintaining D/Gs available to provide standby power" |
| RO/1/1 | 022 AK1.04 | We have no technical reference for this knowledge. "Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Pump Makeup: Reason for changing from manual to automatic control of charging flow valve controller" |
| RO/1/1 | 055 2.1.30 | Very difficult to turn into a good written question. This K/A is sufficiently covered by the walkthrough. |
| SRO/1/2 | 024 2.1.33 | This generic K/A refers to T.S. LCO entry conditions which are NOT SRO-only knowledge. |
| SRO/2/2 | 011 2.4.30 | This system K/A combination was too similar to the Tier 1 K/A 000027-2.4.30. Deleted because alternate question could not be written and we did not want double jeopardy on the associated procedure. |
| SRO/1/1 | WE11 EK1.2 | The KA is not tied to 10CFR55.43. |
| SRO/1/2 | 003 AK1.03 | The KA is not tied to 10CFR55.43. |
| SRO/2/1 | 012 K3.02 | The KA is not tied to 10CFR55.43. |
| SRO/2/1 | 064 K6.07 | The KA is not tied to 10CFR55.43. |
| SRO/1/2 | 024 2.1.27 | This generic K/A refers to system function or purpose which is NOT SRO-only knowledge. |
| RO/2/1 | 078 K1.02 | This KA is a duplicate to another KA already selected 079 K4.01. |
| RO/1/2 | 068 AA2.05 | Use of this KA creates double jeopardy for the Instant SRO candidates via KA 055 EA.02. |
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