

Facility Name: Quad Cities

Date of Exam: 4/18/16

| Tier | Group | RO K/A Category Points | | | | | | | | | | | | SRO-Only Points | | | | | |
|--|-------------|------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-----------------|---|----|----|-------|---|
| | | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G * | Total | A2 | | G* | | Total | |
| 1. Emergency & Abnormal Plant Evolutions | 1 | 3 | 3 | 4 | N/A | | | 3 | 3 | N/A | | | 4 | 20 | 4 | | 3 | | 7 |
| | 2 | 2 | 0 | 2 | | | | 1 | 0 | | | | 2 | 7 | 2 | 1 | 3 | | |
| | Tier Totals | 5 | 3 | 6 | | | | 4 | 3 | | | | 6 | 27 | 6 | 4 | 10 | | |
| 2. Plant Systems | 1 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 1 | 3 | 2 | 1 | 26 | 2 | | 3 | | 5 | |
| | 2 | 1 | 0 | 2 | 1 | 1 | 2 | 2 | 1 | 0 | 1 | 1 | 12 | 0 | 2 | 1 | | 3 | |
| | Tier Totals | 4 | 2 | 5 | 4 | 4 | 5 | 4 | 2 | 3 | 3 | 2 | 38 | 4 | | 4 | | 8 | |
| 3. Generic Knowledge and Abilities Categories | | | | | 1 | | 2 | | 3 | | 4 | | 10 | 1 | 2 | 3 | 4 | 7 | |
| | | | | | 2 | | 3 | | 2 | | 3 | | | 2 | 2 | 1 | 2 | | |

- Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two). (One Tier 3 Radiation Control K/A is allowed if the K/A is replaced by a K/A from another Tier 3 Category).
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 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.
- G* Generic K/As

| ES-401 | | BWR Examination Outline | | | | | | | Form ES-401-1 | |
|--|--------|-------------------------|--------|--------|--------|-----------|---|-----|---------------|----|
| Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO) | | | | | | | | | | |
| E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | IR | # | |
| 295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4 | | | | 0 5 | | | Ability to operate and/or monitor the following as they apply to Partial or Complete Loss of Forced Core Flow Circulation: Recirculation flow control system | 3.3 | 1 | |
| 295003 Partial or Complete Loss of AC / 6 | | 0 3 | | | | | Knowledge of the interrelations between Partial or Complete Loss of AC and the following: A.C. electrical distribution system | 3.7 | 1 | |
| 295004 Partial or Total Loss of DC Pwr / 6 | | | 0 1 | | | | Knowledge of the reasons for the following responses as they apply to Partial or Total Loss of DC Pwr: Load shedding: Plant-Specific | 2.6 | 1 | |
| 295005 Main Turbine Generator Trip / 3 | 0 1 | | | | | | Knowledge of the operational implications of the following concepts as they apply to Main Turbine Generator Trip: Pressure effects on reactor power | 4.0 | 1 | |
| 295006 SCRAM / 1 | | 0 7 | | | | | Knowledge of the interrelations between SCRAM and the following: Reactor pressure control | 4.0 | 1 | |
| 295016 Control Room Abandonment / 7 | | | | | | 01. 31 | Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup. | 4.6 | 1 | |
| 295018 Partial or Total Loss of CCW / 8 | | | | 0 2 | | | Ability to operate and/or monitor the following as they apply to Partial or Total Loss of CCW: System loads | 3.3 | 1 | |
| 295019 Partial or Total Loss of Inst. Air / 8 | | | | 0 3 | | | Ability to operate and/or monitor the following as they apply to Partial or Total Loss of Inst. Air: Instrument air compressor power supplies | 3.0 | 1 | |
| 295021 Loss of Shutdown Cooling / 4 | 0 2 | | | | | | Knowledge of the operational implications of the following concepts as they apply to Loss of Shutdown Cooling: Thermal stratification | 3.3 | 1 | |
| 295023 Refueling Acc / 8 | | | | | 0 2 | | Ability to determine and/or interpret the following as they apply to Refueling Accidents: Fuel pool level | 3.4 | 1 | |
| 295024 High Drywell Pressure / 5 | | | | | 0 3 | | Ability to determine and/or interpret the following as they apply to High Drywell Pressure: Suppression pool level | 3.8 | 1 | |
| 295025 High Reactor Pressure / 3 | | | | | | 01. 23 | Ability to perform specific system and integrated plant procedures during all modes of plant operation. | 4.3 | 1 | |
| 295026 Suppression Pool High Water Temp. / 5 | | | 0 5 | | | | Knowledge of the reasons for the following responses as they apply to Suppression Pool High Water Temp.: Reactor SCRAM | 3.9 | 1 | |
| 295027 High Containment Temperature / 5 | | | | | | | | | 0 | |
| 295028 High Drywell Temperature / 5 | | | | | | 04. 45 | Ability to prioritize and interpret the significance of each annunciator or alarm. | 4.1 | 1 | |
| 295030 Low Suppression Pool Wtr Lvl / 5 | | | | | 0 2 | | Ability to determine and/or interpret the following as they apply to Low Suppression Pool Wtr Lvl: Suppression pool temperature | 3.9 | 1 | |
| 295031 Reactor Low Water Level / 2 | | | | | | 04. 02 | Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions. | 4.5 | 1 | |
| 295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1 | 0 1 | | | | | | Knowledge of the operational implications of the following concepts as they apply to SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown: Reactor pressure effects on reactor power | 4.1 | 1 | |
| 295038 High Off-site Release Rate / 9 | | | 0 4 | | | | Knowledge of the reasons for the following responses as they apply to High Off-site Release Rate: Emergency depressurization | 3.6 | 1 | |
| 600000 Plant Fire On Site / 8 | | | 0 4 | | | | Knowledge of the reasons for the following responses as they apply to Plant Fire On Site: Actions contained in the abnormal procedure for plant fire on site | 2.8 | 1 | |
| 700000 Generator Voltage and Electric Grid Disturbances / 6 | | 0 3 | | | | | Knowledge of the interrelations between Generator Voltage and Electric Grid Disturbances and the following: Sensors, detectors, indicators | 3.0 | 1 | |
| K/A Category Totals: | 3 | 3 | 4 | 3 | 3 | 4 | Group Point Total: | | | 20 |

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|---|--------|-------------------------|--------|--------|--------|-----------|---|-----|---------------|--|
| Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO) | | | | | | | | | | |
| E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | IR | # | |
| 295002 Loss of Main Condenser Vac / 3 | | | | | | | | | 0 | |
| 295007 High Reactor Pressure / 3 | | | | | | 04. 49 | Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. | 4.6 | 1 | |
| 295008 High Reactor Water Level / 2 | | | | | | | | | 0 | |
| 295009 Low Reactor Water Level / 2 | | | 0 1 | | | | Knowledge of the reasons for the following responses as they apply to Low Reactor Water Level: Recirculation pump run back; Plant-Specific | 3.2 | 1 | |
| 295010 High Drywell Pressure / 5 | | | | | | | | | 0 | |
| 295011 High Containment Temp / 5 | | | | | | | | | 0 | |
| 295012 High Drywell Temperature / 5 | | | | | | | | | 0 | |
| 295013 High Suppression Pool Temp. / 5 | | | | | | | | | 0 | |
| 295014 Inadvertent Reactivity Addition / 1 | 0 2 | | | | | | Knowledge of the operational implications of the following concepts as they apply to Inadvertent Reactivity Addition: Reactivity anomaly | 3.3 | 1 | |
| 295015 Incomplete SCRAM / 1 | | | | | | | | | 0 | |
| 295017 High Off-site Release Rate / 9 | | | | | | | | | 0 | |
| 295020 Inadvertent Cont. Isolation / 5 & 7 | | | | | | | | | 0 | |
| 295022 Loss of CRD Pumps / 1 | | | | 0 1 | | | Ability to operate and/or monitor the following as they apply to Loss of CRD Pumps: CRD hydraulic system | 3.1 | 1 | |
| 295029 High Suppression Pool Wtr Lvl / 5 | | | | | | 04. 45 | Ability to prioritize and interpret the significance of each annunciator or alarm. | 4.1 | 1 | |
| 295032 High Secondary Containment Area Temperature / 5 | | | | | | | | | 0 | |
| 295033 High Secondary Containment Area Radiation Levels / 9 | 0 3 | | | | | | Knowledge of the operational implications of the following concepts as they apply to High Secondary Containment Area Radiation Levels: Radiation releases | 3.9 | 1 | |
| 295034 Secondary Containment Ventilation High Radiation / 9 | | | | | | | | | 0 | |
| 295035 Secondary Containment High Differential Pressure / 5 | | | | | | | | | 0 | |
| 295036 Secondary Containment High Sump/Area Water Level / 5 | | | 0 3 | | | | Knowledge of the reasons for the following responses as they apply to Secondary Containment High Sump / Area Water Level: Isolating affected systems | 3.5 | 1 | |
| 500000 High CTMT Hydrogen Conc. / 5 | | | | | | | | | 0 | |
| K/A Category Totals: | 2 | 0 | 2 | 1 | 0 | 2 | Group Point Total: | | 7 | |

| BWR Examination Outline | | | | | | | | | | | | | Form ES-401-1 | |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------|---|---------------|---|
| Plant Systems - Tier 2/Group 1 (RO) | | | | | | | | | | | | | | |
| 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 | # |
| 203000 RHR/LPCI: Injection Mode | | | | | | 0 9 | | | | | | Knowledge of the effect that a loss or malfunction of the following will have on the RHR/LPCI: Injection Mode: Nuclear boiler instrumentation | 3.4 | 1 |
| 205000 Shutdown Cooling | | 0 1 | | 0 5 | | | | | | | | Knowledge of electrical power supplies to the following: Pump motors; Knowledge of Shutdown Cooling design feature(s) and/or interlocks which provide for the following: Reactor cooldown rate | 3.1; 3.6 | 2 |
| 206000 HPCI | | | | | | | | 0 4 | | | | Ability to (a) predict the impacts of the following on the HPCI; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A.C. failures: BWR- | 2.7 | 1 |
| 207000 Isolation (Emergency) Condenser | | | | | | | | | | | | | | 0 |
| 209001 LPCS | | | | | 0 1 | | | | | | | Knowledge of the operational implications of the following concepts as they apply to LPCS: Indications of pump cavitation | 2.6 | 1 |
| 209002 HPCS | | | | | | | | | | | | | | 0 |
| 211000 SLC | | | 0 1 | | | | | | | | | Knowledge of the effect that a loss or malfunction of the SLC will have on following: Ability to shutdown the reactor in certain conditions | 4.3 | 1 |
| 212000 RPS | | | | | | 0 1 | | | | | | Knowledge of the effect that a loss or malfunction of the following will have on the RPS: A.C. electrical distribution | 3.6 | 1 |
| 215003 IRM | | | | | 0 3 | 0 3 | | | | | | Knowledge of the operational implications of the following concepts as they apply to IRM: Changing detector position; Knowledge of the effect that a loss or malfunction of the following will have on the IRM: Detector drive motor | 3; 2.8 | 2 |
| 215004 Source Range Monitor | | | | | | | | | | 0 1 | 01. 30 | Ability to manually operate and/or monitor in the control room: SRM count rate and period; Ability to locate and operate components, including local controls. | 3.9; 4.4 | 2 |
| 215005 APRM / LPRM | | | 0 7 | | | | | | | | | Knowledge of the effect that a loss or malfunction of the APRM / LPRM will have on following: Rod block monitor: Plant-Specific | 3.2 | 1 |
| 217000 RCIC | 0 7 | | | | | | | | 0 2 | | | Knowledge of the physical connections and/or cause-effect relationships between RCIC and the following: Leak detection; Ability to monitor automatic operations of the RCIC including: Turbine startup | 3.1; 3.6 | 2 |
| 218000 ADS | 0 6 | | | | | | | | | | | Knowledge of the physical connections and/or cause-effect relationships between ADS and the following: Safety/relief valves | 3.9 | 1 |
| 223002 PCIS/Nuclear Steam Supply Shutoff | | | | 0 8 | | | | | | | | Knowledge of PCIS/Nuclear Steam Supply Shutoff design feature(s) and/or interlocks which provide for the following: Manual defeating of selected isolations during specified emergency conditions | 3.3 | 1 |
| 239002 SRVs | | | | | | | | | 0 9 | | | Ability to monitor automatic operations of the SRVs including: Low low set logic: Plant-Specific | 3.9 | 1 |
| 259002 Reactor Water Level Control | | | 0 4 | | | | | | | | | Knowledge of the effect that a loss or malfunction of the Reactor Water Level Control will have on following: Recirculation system: Plant-Specific | 2.9 | 1 |
| 261000 SGTS | | | | | | | | | | 0 7 | | Ability to manually operate and/or monitor in the control room: System flow | 3.1 | 1 |
| 262001 AC Electrical Distribution | | | | | | | 0 2 | | | | | Ability to predict and/or monitor changes in parameters associated with operating the AC Electrical Distribution controls including: Effects of loads when energizing a bus | 3.1 | 1 |
| 262002 UPS (AC/DC) | | | | 0 1 | | | | | | | | Knowledge of UPS (AC/DC) design feature(s) and/or interlocks which provide for the following: Transfer from preferred power to alternate power supplies | 3.1 | 1 |
| 263000 DC Electrical Distribution | | 0 1 | | | | | | | | | | Knowledge of electrical power supplies to the following: Major D.C. loads | 3.1 | 1 |
| 264000 EDGs | | | | | | | | | 0 2 | | | Ability to monitor automatic operations of the EDGs including: Minimum time for load pick up | 3.1 | 1 |
| 300000 Instrument Air | | | | | 0 1 | | | | | | | Knowledge of the operational implications of the following concepts as they apply to Instrument Air : Air compressors | 2.5 | 1 |
| 400000 Component Cooling Water | | | | | | | 0 2 | | | | | Ability to predict and/or monitor changes in parameters associated with operating the Component Cooling Water controls including: CCW temperature | 2.8 | 1 |
| 217000 SSMP | 0 2 | | | | | | | | | | | Knowledge of the physical connections and/or cause-effect relationships between REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) and the following: Nuclear Boiler System. | 3.5 | 1 |
| K/A Category Totals: | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 1 | 3 | 2 | 1 | Group Point Total: | 26 | |

| BWR Examination Outline | | | | | | | | | | | | | Form ES-401-1 | |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------|---|---------------|----|
| Plant Systems - Tier 2/Group 2 (RO) | | | | | | | | | | | | | | |
| 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 | # |
| 201001 CRD Hydraulic | | | | | | | | | | | | | | 0 |
| 201002 RMCS | | | 0 1 | | | | | | | | | Knowledge of the effect that a loss or malfunction of the RMCS will have on following: Ability to move control rods | 3.4 | 1 |
| 201003 Control Rod and Drive Mechanism | 0 5 | | | | | | | | | | | Knowledge of the physical connections and/or cause-effect relationships between Control Rod and Drive Mechanism and the following: CRD mechanism | 2.6 | 1 |
| 201004 RSCS | | | | | | | | | | | | | | 0 |
| 201005 RCIS | | | | | | | | | | | | | | 0 |
| 201006 RWM | | | | | | | | | | | | | | 0 |
| 202001 Recirculation | | | | | | | | | | | | | | 0 |
| 202002 Recirculation Flow Control | | | | | | | 0 5 | | | | | Ability to predict and/or monitor changes in parameters associated with operating the Recirculation Flow Control controls including: Reactor power | 3.6 | 1 |
| 204000 RWCU | | | | | | | | | | | | | | 0 |
| 214000 RPIS | | | 0 1 | | | | | | | | | Knowledge of RPIS design feature(s) and/or interlocks which provide for the following: Reed switch locations | 3.0 | 1 |
| 215001 Traversing In-core Probe | | | | | | | | | 0 3 | | | Ability to manually operate and/or monitor in the control room: Isolation valves: Mark-I&II(Not-BWR1) | 3.0 | 1 |
| 215002 RBM | | | | | | 0 3 | | | | | | Knowledge of the effect that a loss or malfunction of the following will have on the RBM: Essential power: Plant-Specific | 2.5 | 1 |
| 216000 Nuclear Boiler Inst. | | | | | | | | | | | | | | 0 |
| 219000 RHR/LPCI: Torus/Pool Cooling Mode | | | | | | | | | | | | | | 0 |
| 223001 Primary CTMT and Aux. | | | | | | | | | | | | | | 0 |
| 226001 RHR/LPCI: CTMT Spray Mode | | | 0 3 | | | | | | | | | Knowledge of the effect that a loss or malfunction of the RHR/LPCI: CTMT Spray Mode will have on following: Containment/drywell/suppression chamber | 2.9 | 1 |
| 230000 RHR/LPCI: Torus/Pool Spray Mode | | | | | | | | | | | | | | 0 |
| 233000 Fuel Pool Cooling/Cleanup | | | | | | | | | | | 04. 18 | Knowledge of the specific bases for EOPs. | 3.3 | 1 |
| 234000 Fuel Handling Equipment | | | | | | | | | | | | | | 0 |
| 239001 Main and Reheat Steam | | | | | | | | | | | | | | 0 |
| 239003 MSIV Leakage Control | | | | | | | | | | | | | | 0 |
| 241000 Reactor/Turbine Pressure Regulator | | | | | | | | | | | | | | 0 |
| 245000 Main Turbine Gen. / Aux. | | | | | | | 0 4 | | | | | Ability to (a) predict the impacts of the following on the Main Turbine Gen. / Aux.; and (b) based on those predictions, use procedures to correct, control, or | 3.7 | 1 |
| 256000 Reactor Condensate | | | | | | | | | | | | | | 0 |
| 259001 Reactor Feedwater | | | | | | | | | | | | | | 0 |
| 268000 Radwaste | | | | | | | | | | | | | | 0 |
| 271000 Offgas | | | | | | | | | | | | | | 0 |
| 272000 Radiation Monitoring | | | | | | | | | | | | | | 0 |
| 286000 Fire Protection | | | | | | 0 4 | | | | | | Knowledge of the effect that a loss or malfunction of the following will have on the Fire Protection: Diesel fuel transfer system: Plant-Specific | 2.8 | 1 |
| 288000 Plant Ventilation | | | | | 0 2 | | | | | | | Knowledge of the operational implications of the following concepts as they apply to Plant Ventilation : Differential pressure control | 3.2 | 1 |
| 290001 Secondary CTMT | | | | | | | | | | | | | | 0 |
| 290003 Control Room HVAC | | | | | | 0 4 | | | | | | Ability to predict and/or monitor changes in parameters associated with operating the Control Room HVAC controls including: Control room pressure | 2.5 | 1 |
| 290002 Reactor Vessel Internals | | | | | | | | | | | | | | 0 |
| K/A Category Totals: | 1 | 0 | 2 | 1 | 1 | 2 | 2 | 1 | 0 | 1 | 1 | Group Point Total: | | 12 |

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| Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO) | | | | | | | | | | |
| E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | IR | # | |
| 295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4 | | | | | | | | | 0 | |
| 295003 Partial or Complete Loss of AC / 6 | | | | | | 02. 22 | Knowledge of limiting conditions for operations and safety limits. | 4.7 | 1 | |
| 295004 Partial or Total Loss of DC Pwr / 6 | | | | | 0 2 | | Ability to determine and/or interpret the following as they apply to Partial or Total Loss of DC Pwr: Extent of partial or complete loss of D.C. power | 3.9 | 1 | |
| 295005 Main Turbine Generator Trip / 3 | | | | | | | | | 0 | |
| 295006 SCRAM / 1 | | | | | | | | | 0 | |
| 295016 Control Room Abandonment / 7 | | | | | | | | | 0 | |
| 295018 Partial or Total Loss of CCW / 8 | | | | | 0 2 | | Ability to determine and/or interpret the following as they apply to Partial or Total Loss of CCW: Cooling water temperature | 3.2 | 1 | |
| 295019 Partial or Total Loss of Inst. Air / 8 | | | | | | 02. 37 | Ability to determine operability and/or availability of safety related equipment. | 4.6 | 1 | |
| 295021 Loss of Shutdown Cooling / 4 | | | | | 0 5 | | Ability to determine and/or interpret the following as they apply to Loss of Shutdown Cooling: Reactor vessel metal temperature | 3.5 | 1 | |
| 295023 Refueling Acc / 8 | | | | | | | | | 0 | |
| 295024 High Drywell Pressure / 5 | | | | | | 04. 46 | Ability to verify that the alarms are consistent with the plant conditions. | 4.2 | 1 | |
| 295025 High Reactor Pressure / 3 | | | | | | | | | 0 | |
| 295026 Suppression Pool High Water Temp. / 5 | | | | | | | | | 0 | |
| 295027 High Containment Temperature / 5 | | | | | | | | | 0 | |
| 295028 High Drywell Temperature / 5 | | | | | 0 1 | | Ability to determine and/or interpret the following as they apply to High Drywell Temperature: Drywell temperature | 4.1 | 1 | |
| 295030 Low Suppression Pool Wtr Lvl / 5 | | | | | | | | | 0 | |
| 295031 Reactor Low Water Level / 2 | | | | | | | | | 0 | |
| 295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1 | | | | | | | | | 0 | |
| 295038 High Off-site Release Rate / 9 | | | | | | | | | 0 | |
| 600000 Plant Fire On Site / 8 | | | | | | | | | 0 | |
| 700000 Generator Voltage and Electric Grid Disturbances / 6 | | | | | | | | | 0 | |
| K/A Category Totals: | 0 | 0 | 0 | 0 | 4 | 3 | Group Point Total: | | 7 | |

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|--|--------|-------------------------|--------|--------|--------|-----------|--|-----|---------------|--|
| Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO) | | | | | | | | | | |
| E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | IR | # | |
| 295002 Loss of Main Condenser Vac / 3 | | | | | | 04. 35 | Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects. | 4.0 | 1 | |
| 295007 High Reactor Pressure / 3 | | | | | | | | | 0 | |
| 295008 High Reactor Water Level / 2 | | | | | 0 1 | | Ability to determine and/or interpret the following as they apply to High Reactor Water Level: Reactor water level | 3.9 | 1 | |
| 295009 Low Reactor Water Level / 2 | | | | | | | | | 0 | |
| 295010 High Drywell Pressure / 5 | | | | | 0 2 | | Ability to determine and/or interpret the following as they apply to High Drywell Pressure: Drywell pressure | 3.9 | 1 | |
| 295011 High Containment Temp / 5 | | | | | | | | | 0 | |
| 295012 High Drywell Temperature / 5 | | | | | | | | | 0 | |
| 295013 High Suppression Pool Temp. / 5 | | | | | | | | | 0 | |
| 295014 Inadvertent Reactivity Addition / 1 | | | | | | | | | 0 | |
| 295015 Incomplete SCRAM / 1 | | | | | | | | | 0 | |
| 295017 High Off-site Release Rate / 9 | | | | | | | | | 0 | |
| 295020 Inadvertent Cont. Isolation / 5 & 7 | | | | | | | | | 0 | |
| 295022 Loss of CRD Pumps / 1 | | | | | | | | | 0 | |
| 295029 High Suppression Pool Wtr Lvl / 5 | | | | | | | | | 0 | |
| 295032 High Secondary Containment Area Temperature / 5 | | | | | | | | | 0 | |
| 295033 High Secondary Containment Area Radiation Levels / 9 | | | | | | | | | 0 | |
| 295034 Secondary Containment Ventilation High Radiation / 9 | | | | | | | | | 0 | |
| 295035 Secondary Containment High Differential Pressure / 5 | | | | | | | | | 0 | |
| 295036 Secondary Containment High Sump/Area Water Level / 5 | | | | | | | | | 0 | |
| 500000 High CTMT Hydrogen Conc. / 5 | | | | | | | | | 0 | |
| K/A Category Totals: | 0 | 0 | 0 | 0 | 2 | 1 | Group Point Total: | | 3 | |

| BWR Examination Outline | | | | | | | | | | | | Form ES-401-1 | | |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------|--|-----|---|
| Plant Systems - Tier 2/Group 1 (SRO) | | | | | | | | | | | | | | |
| 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 | # |
| 203000 RHR/LPCI: Injection | | | | | | | | | | | | | | 0 |
| 205000 Shutdown Cooling Mode | | | | | | | | | | | | | | 0 |
| 206000 HPCI | | | | | | | | | | | | | | 0 |
| 207000 Isolation (Emergency) Condenser | | | | | | | | | | | | | | 0 |
| 209001 LPCS | | | | | | | | 0 7 | | | | Ability to (a) predict the impacts of the following on the LPCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of room cooling | 2.8 | 1 |
| 209002 HPCS | | | | | | | | | | | | | | 0 |
| 211000 SLC | | | | | | | | | | | | | | 0 |
| 212000 RPS | | | | | | | | | | | 04. 30 | Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator. | 4.1 | 1 |
| 215003 IRM | | | | | | | | | | | | | | 0 |
| 215004 Source Range Monitor | | | | | | | | | | | | | | 0 |
| 215005 APRM / LPRM | | | | | | | | | | | | | | 0 |
| 217000 RCIC | | | | | | | | | | | | | | 0 |
| 218000 ADS | | | | | | | | | | | | | | 0 |
| 223002 PCIS/Nuclear Steam Supply Shutoff | | | | | | | | | | | | | | 0 |
| 239002 SRVs | | | | | | | | | | | 02. 22 | Knowledge of limiting conditions for operations and safety limits. | 4.7 | 1 |
| 259002 Reactor Water Level Control | | | | | | | | | | | | | | 0 |
| 261000 SGTS | | | | | | | | 1 1 | | | | Ability to (a) predict the impacts of the following on the SGTS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: High containment | 3.3 | 1 |
| 262001 AC Electrical Distribution | | | | | | | | | | | | | | 0 |
| 262002 UPS (AC/DC) | | | | | | | | | | | 02. 40 | Ability to apply Technical Specifications for a system. | 4.7 | 1 |
| 263000 DC Electrical Distribution | | | | | | | | | | | | | | 0 |
| 264000 EDGs | | | | | | | | | | | | | | 0 |
| 300000 Instrument Air | | | | | | | | | | | | | | 0 |
| 400000 Component Cooling Water | | | | | | | | | | | | | | 0 |
| | | | | | | | | | | | | | | |
| K/A Category Totals: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 3 | Group Point Total: | | 5 |

| BWR Examination Outline | | | | | | | | | | | | Form ES-401-1 | | |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------|---|--------------------|---|
| Plant Systems - Tier 2/Group 2 (SRO) | | | | | | | | | | | | | | |
| 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 | # |
| 201001 CRD Hydraulic | | | | | | | | | | | | | | 0 |
| 201002 RMCS | | | | | | | | | | | | | | 0 |
| 201003 Control Rod and Drive Mechanism | | | | | | | | | | | | | | 0 |
| 201004 RSCS | | | | | | | | | | | | | | 0 |
| 201005 RCIS | | | | | | | | | | | | | | 0 |
| 201006 RWM | | | | | | | | | | | | | | 0 |
| 202001 Recirculation | | | | | | | | | | | | | | 0 |
| 202002 Recirculation Flow Control | | | | | | | | | | | | | | 0 |
| 204000 RWCU | | | | | | | | | | | 01. 23 | Ability to perform specific system and integrated plant procedures during all modes of plant operation. | 4.4 | 1 |
| 214000 RPIS | | | | | | | | | | | | | | 0 |
| 215001 Traversing In-core Probe | | | | | | | | | | | | | | 0 |
| 215002 RBM | | | | | | | | | | | | | | 0 |
| 216000 Nuclear Boiler Inst. | | | | | | | | | | | | | | 0 |
| 219000 RHR/LPCI: Torus/Pool Cooling Mode | | | | | | | | | | | | | | 0 |
| 223001 Primary CTMT and Aux. | | | | | | | | | | | | | | 0 |
| 226001 RHR/LPCI: CTMT Spray Mode | | | | | | | | | | | | | | 0 |
| 230000 RHR/LPCI: Torus/Pool Spray Mode | | | | | | | | | | | | | | 0 |
| 233000 Fuel Pool Cooling/Cleanup | | | | | | | | | | | | | | 0 |
| 234000 Fuel Handling Equipment | | | | | | | | 0 1 | | | | Ability to (a) predict the impacts of the following on the Fuel Handling Equipment; and (b) based on those predictions, use procedures to correct, | 3.7 | 1 |
| 239001 Main and Reheat Steam | | | | | | | | | | | | | | 0 |
| 239003 MSIV Leakage Control | | | | | | | | | | | | | | 0 |
| 241000 Reactor/Turbine Pressure Regulator | | | | | | | | | | | | | | 0 |
| 245000 Main Turbine Gen. / Aux. | | | | | | | | | | | | | | 0 |
| 256000 Reactor Condensate | | | | | | | | 0 5 | | | | Ability to (a) predict the impacts of the following on the Reactor Condensate; and (b) based on those predictions, use procedures to correct, control, or | 2.9 | 1 |
| 259001 Reactor Feedwater | | | | | | | | | | | | | | 0 |
| 268000 Radwaste | | | | | | | | | | | | | | 0 |
| 271000 Offgas | | | | | | | | | | | | | | 0 |
| 272000 Radiation Monitoring | | | | | | | | | | | | | | 0 |
| 286000 Fire Protection | | | | | | | | | | | | | | 0 |
| 288000 Plant Ventilation | | | | | | | | | | | | | | 0 |
| 290001 Secondary CTMT | | | | | | | | | | | | | | 0 |
| 290003 Control Room HVAC | | | | | | | | | | | | | | 0 |
| 290002 Reactor Vessel Internals | | | | | | | | | | | | | | 0 |
| | | | | | | | | | | | | | | |
| K/A Category Totals: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | Group Point Total: | 3 |

| Facility Name:Quad Cities Date of Exam:4/18/16 | | | | | | |
|---|----------|---|-----|----|----------|---|
| Category | K/A # | Topic | RO | | SRO-Only | |
| | | | IR | # | IR | # |
| 1. Conduct of Operations | 2.1. 34 | Knowledge of primary and secondary plant chemistry limits. | 2.7 | | 3.5 | 1 |
| | 2.1. 37 | Knowledge of procedures, guidelines, or limitations associated with reactivity management. | 4.3 | 1 | 4.6 | |
| | 2.1. 04 | Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license status, 10CFR55, etc. | 3.3 | 1 | 3.8 | |
| | 2.1. 35 | Knowledge of the fuel-handling responsibilities of SROs. | 2.2 | | 3.9 | 1 |
| | 2.1. | | | | | |
| | 2.1. | | | | | |
| | Subtotal | | | 2 | | 2 |
| 2. Equipment Control | 2.2. 07 | Knowledge of the process for conducting special or infrequent tests. | 2.9 | 1 | 3.6 | |
| | 2.2. 43 | Knowledge of the process used to track inoperable alarms. | 3.0 | 1 | 3.3 | |
| | 2.2. 11 | Knowledge of the process for controlling temporary design changes. | 2.3 | | 3.3 | 1 |
| | 2.2. 12 | Knowledge of surveillance procedures. | 3.7 | | 4.1 | 1 |
| | 2.2. 06 | Knowledge of the process for making changes to procedures. | 3.0 | 1 | 3.6 | |
| | 2.2. | | | | | |
| | Subtotal | | | 3 | | 2 |
| 3. Radiation Control | 2.3. 12 | Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. | 3.2 | 1 | 3.7 | |
| | 2.3. 15 | Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. | 2.9 | 1 | 3.1 | |
| | 2.3. 11 | Ability to control radiation releases. | 3.8 | | 4.3 | 1 |
| | 2.3. | | | | | |
| | 2.3. | | | | | |
| | 2.3. | | | | | |
| | Subtotal | | | 2 | | 1 |
| 4. Emergency Procedures / Plan | 2.4. 03 | Ability to identify post-accident instrumentation. | 3.7 | 1 | 3.9 | |
| | 2.4. 41 | Knowledge of the emergency action level thresholds and classifications. | 2.9 | | 4.6 | 1 |
| | 2.4. 23 | Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations. | 3.4 | 1 | 4.4 | |
| | 2.4. 11 | Knowledge of abnormal condition procedures. | 4.0 | | 4.2 | 1 |
| | 2.4. 01 | Knowledge of EOP entry conditions and immediate action steps. | 4.6 | 1 | 4.8 | |
| | 2.4. | | | | | |
| | Subtotal | | | 3 | | 2 |
| Tier 3 Point Total | | | | 10 | | 7 |

| Tier 1 Group 1 | | |
|----------------|------------------------------------|--|
| Tier / Group | Randomly Selected K/A | Reason for Rejection |
| 1/1 | 295019 AA1.04 became 295019 AA1.03 | System configuration is not applicable to Quad Cities Station |
| 1/1 | 295024 EA2.05 became 295024 EA2.03 | System monitoring point is not used during transient conditions at Quad Cities Station. Not operationally significant. |
| 1/1 | 600000 K3.01 became 600000 K3.04 | Original selection Importance Rating <2.5 |
| | | |
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| Tier 1 Group 2 | | |
|-----------------|--------------------------|----------------------|
| Tier / Group | Randomly Selected K/A | Reason for Rejection |
| | | None rejected |
| | | |
| | | |
| | | |

| Tier 2 Group 1 | | |
|----------------|--|--|
| Tier / Group | Randomly Selected K/A | Reason for Rejection |
| 2/1 | 211000 K3.02 became 211000 K3.01 | System inter-relation is not applicable to Quad Cities Station |
| 2/1 | 223002 K4.03 became 223002 K4.08 | System inter-relation is not applicable to Quad Cities Station |
| 2/1 | 261000 K4.08 became 261000 K4.07 | No valid question for this aspect of the SBGTS at Quad Cities. Replaced with another system indication (monitoring) question within the same system. |
| | | |
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| Tier 2 Group 2 | | |
|-----------------|--------------------------|----------------------|
| Tier / Group | Randomly Selected K/A | Reason for Rejection |
| | | None rejected |
| | | |
| | | |
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| Tier 3 | | |
|--------------|----------------------------------|---|
| Tier / Group | Randomly Selected K/A | Reason for Rejection |
| 3 | SG 2.4.35 became SG 2.4.03 | SG 2.4.35 used on RO test in another Tier of the test |
| 3 | SG 2.1.27 Became SG 2.1.04 | K/A is too simple for License Examination. Did not pass first validation. |
| | | |
| | | |
| | | |

| Tier 1 Group 1 | | |
|-----------------|--|----------------------------|
| Tier / Group | Randomly Selected K/A | Reason for Rejection |
| 1/1 | 295016 Generic became 295028 A2.01 | Sampled on RO Written exam |
| | | |
| | | |
| | | |
| | | |

| Tier 1 Group 2 | | |
|-----------------|--|------------------------------------|
| Tier / Group | Randomly Selected K/A | Reason for Rejection |
| 1/2 | 295008 AA2.05 became 295008 AA2.01 | Unable to write SRO level question |
| | | |
| | | |
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| Tier 2 Group 1 | | |
|----------------|---|------------------------------------|
| Tier / Group | Randomly Selected K/A | Reason for Rejection |
| 2/1 | 212000 G4.2.09 became 212000 G2.4.30 | Unable to write SRO level question |
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| Tier 2 Group 2 | | |
|----------------|------------------------------------|--|
| Tier / Group | Randomly Selected K/A | Reason for Rejection |
| 2/2 | 256000 G2.4.01 became 256000 A2.05 | System inter-relation is not applicable to Quad Cities Station |
| 2/2 | 271000 G2.4.50 became 234000 A2.01 | Oversampling on the SBGTS. The K/A is tested in a Simulator Scenario |

| Tier 3 | | |
|--------------|-------------------------------|--|
| Tier / Group | Randomly Selected K/A | Reason for Rejection |
| 3 | G 2.1.14 Became G2.1.35 | Unable to write SRO Only question on Plant Wide Announcements |
| 3 | G2.1.15 became G2.1.34 | Unable to write SRO Only question on Daily Orders, Memos, etc |
| 3 | G2.2.20 Became G2.2.12 | Unable to write SRO Only question on Management of troubleshooting activities. |