# Outline Submittal

FOR THE QUAD CITIES INITIAL EXAM - AUG 2001

Contains the following:

| | |
|---|---|
| ES-201-1 | Examination Preparation Checklist |
| ES-201-2 | Examination Outline Quality Checklist |
| ES-301-1 | Administrative Topics Outline (RO) |
| ES-301-1 | Administrative Topics Outline (SRO) |
| ES-301-2 | Control Room and Facility Walk-Through Test Outline (RO/SROI) |
| ES-301-2 | Control Room and Facility Walk-Through Test Outline (SROU) |
| D-1 | Dynamic Simulator Scenario Outline for 2 scenarios |
| ES-401-1 | BWR SRO Examination Outline |
| ES-401-5 | Generic Knowledge and Abilities Outline (Tier 3) (SRO) |
| ES-401-2 | BWR RO Examination Outline |
| ES-401-5 | Generic Knowledge and Abilities Outline (Tier 3) (RO) |
| ES-301-5 | TRANSIENT AND EVENT Checklist |

Facility: Quad Cities Nuclear Power Station Date of Examination: 08/06/2001

Examinations Developed by: Facility / (NRC) (circle one)

| Target Date* | Task Description / Reference | Chief Examiner's Initials |
|---|---|---|
| -180 | 1. Examination administration date confirmed (C.1.a; C.2.a & b) | drm |
| -120 | 2. NRC examiners and facility contact assigned (C.1.d; C.2.e) | drm |
| -120 | 3. Facility contact briefed on security & other requirements (C.2.c) | drm |
| -120 | 4. Corporate notification letter sent (C.2.d) | drm |
| [-90] | [5. Reference material due (C.1.e; C.3.c)] | drm |
| -75 | 6. Integrated examination outline(s) due (C.1.e & f; C.3.d) | drm |
| -70 | 7. Examination outline(s) reviewed by NRC and feedback provided to facility licensee (C.2.h; C.3.e) | n/a |
| -45 | 8. Proposed examinations, supporting documentation, and reference materials due (C.1.e, f, g & h; C.3.d) | drm |
| -30 | 9. Preliminary license applications due (C.1.l; C.2.g; ES-202) | drm |
| -14 | 10. Final license applications due and assignment sheet prepared (C.1.l; C.2.g; ES-202) | drm |
| -14 | 11. Examination approved by NRC supervisor for facility licensee review (C.2.h; C.3.f) | drm |
| -14 | 12. Examinations reviewed with facility licensee (C.1.j; C.2.f & h; C.3.g) | drm |
| -7 | 13. Written examinations and operating tests approved by NRC supervisor (C.2.i; C.3.h) | drm |
| -7 | 14. Final applications reviewed; assignment sheet updated; waiver letters sent (C.2.g, ES-204) | drm |
| -7 | 15. Proctoring/written exam administration guidelines reviewed with facility licensee and authorization granted to give written exams (if applicable) (C.3.k) | drm |
| -7 | 16. Approved scenarios, job performance measures, and questions distributed to NRC examiners (C.3.i) | drm |

* Target dates are keyed to the examination date identified in the corporate notification letter. They are for planning purposes and may be adjusted on a case-by-case basis in coordination with the facility licensee.

[ ] Applies only to examinations prepared by the NRC.

Facility: Quad Cities Nuclear Power Station | Date of Examination: 08/06/2001

| Item | Task Description | Initials a | Initials b | Initials c |
|---|---|---|---|---|
| 1. WRITTEN | a. Verify that the outline(s) fit(s) the appropriate model per ES-401. | BBP | [signature] | [signature] |
| | b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 and whether all K/A categories are appropriately sampled. | BBP | [signature] | [signature] |
| | c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics. | BBP | [signature] | [signature] |
| | d. Assess whether the justifications for deselected or rejected K/A statements are appropriate. | BBP | [signature] | N/A |
| 2. SIM | a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, and major transients. | BBP | MFB | [signature] |
| | b. Assess whether there are enough scenario sets (and spares) to test the projected number and mix of applicants in accordance with the expected crew composition and rotation schedule without compromising exam integrity; ensure each applicant can be tested using at least one new or significantly modified scenario, that no scenarios are duplicated from the applicants' audit test(s)*, and scenarios will not be repeated over successive days. | BBP | MFB | [signature] |
| | c. To the extent possible, assess whether the outline(s) conform(s) with the qualitative and quantitative criteria specified on Form ES-301-4 and described in Appendix D. | BBP | MFB | [signature] |
| 3. W / T | a. Verify that:<br>(1) the outline(s) contain(s) the required number of control room and in-plant tasks,<br>(2) no more than 30% of the test material is repeated from the last NRC examination,<br>(3)* no tasks are duplicated from the applicants' audit test(s), and<br>(4) no more than 80% of any operating test is taken directly from the licensee's exam banks. | BBP | MFB | [signature] |
| | b. Verify that:<br>(1) the tasks are distributed among the safety function groupings as specified in ES-301,<br>(2) one task is conducted in a low-power or shutdown condition,<br>(3) 40% of the tasks require the applicant to implement an alternate path procedure,<br>(4) one in-plant task tests the applicant's response to an emergency or abnormal condition, and<br>(5) the in-plant walk-through requires the applicant to enter the RCA. | BBP | MFB | [signature] |
| | c. Verify that the required administrative topics are covered, with emphasis on performance-based activities. | BBP | MFB | [signature] |
| | d. Determine if there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on successive days. | BBP | MFB | [signature] |
| 4. GENERAL | a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam section. | BBP | MFB | [signature] |
| | b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate. | BBP | MFB | [signature] |
| | c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5. | BBP | MFB | [signature] |
| | d. Check for duplication and overlap among exam sections. | BBP | MFB | [signature] |
| | e. Check the entire exam for balance of coverage. | BBP | MFB | [signature] |
| | f. Assess whether the exam fits the appropriate job level (RO or SRO). | BBP | MFB | [signature] |

| | Printed Name / Signature | Date |
|---|---|---|
| a. Author in Training | BRUCE PALAGI / Bruce Palagi | 7-5-01 |
| b. Author of Record | Michael E. Bielby / Michael E. Bielby DAVID L. PERRY | 7/9/01 |
| c. NRC Chief Examiner | Perl R. McNeil / Perl R. McNeil | 7/5/01 |
| d. NRC Supervisor | David E. Hills / David E. Hills | 7/9/01 |

| Facility: Quad Cities | | Date of Examination: 08/06/01 |
|---|---|---|
| Examination Level (circle one): (RO) / SRO | | Operating Test Number: 2001301 |
| Administrative Topic/Subject Description | | Describe method of evaluation:<br>1. ONE Administrative JPM, OR<br>2. TWO Administrative Questions |
| A.1 | Conduct of operation / Ability to apply Tech. Specs | Use Tech. Specs to find required action given a combination of ECCS equipment out of service. (2.1.12) |
| | | |
| | Conduct of operation / Ability to use plant computer | Perform a core limits surveilance. (2.1.19) |
| | | |
| A.2 | Equipment Control / familiarity with P&IDs | Using plant drawings verify that an Out Of Service has been correctly prepared. (2.2.13) |
| | | |
| A.3 | Radiation Control / action level | Dress out in anti contamination clothing (2.3.10) |
| | | |
| A.4 | Emergency Plan / action level classification | Use of fire in plant procedure (2.4.27) |
| | | |

| Facility: Quad Cities | | Date of Examination: 08/06/01 |
|---|---|---|
| Examination Level (circle one): RO / (SRO) | | Operating Test Number: 2001301 |
| Administrative Topic/Subject Description | | Describe method of evaluation:<br>1. ONE Administrative JPM, OR<br>2. TWO Administrative Questions |
| A.1 | Conduct of operation / Ability to apply Tech. Specs | Use Tech. Specs to find required action given a combination of ECCS equipment out of service. (2.1.12) |
| | | |
| | Conduct of operation / Ability to use plant computer | Perform a core limits surveilance. (2.1.19) |
| | | |
| A.2 | Equipment Control / familiarity with P&IDs | Using plant drawings verify that an Out Of Service has been correctly prepared. (2.2.13) |
| | | |
| A.3 | Radiation Control / exposure control | Dress out in anti contamination clothing (2.3.10) |
| | | |
| A.4 | Emergency Plan / action level classification | Classify a GESP emergency, and prepare the NARS form for offsite notification. (2.4.41) |
| | | |

Facility: Quad Cities Date of Examination: 08/06/01
Exam Level (circle one): RO / SRO(I) / SRO(U) Operating Test No.: 2001301

B.1 Control Room Systems

| System / JPM Title | Type Code* | Safety Function |
|---|---|---|
| a. Startup the standby gas treatment system, recognize & report low system flow | D, S, A, M | 9. Radioactive Release |
| b. Perform The Periodic RCIC Pump Operability Test | D, S | 2. Rx Water Inventory Control |
| c. Initiate Standby Liquid Control With Failure To Inject | D, S, A, M, L | 1. Reactivity Control |
| d. Transfer Aux Power XFMR 11 to XFMR 12 | D, S, L | 6. Electrical |
| e. Post Accident Venting Of The Primary Containment | D, S, L | 5. Containment Integrity |
| f. Shutdown cooling is on and a recirc pump trips. | N, S, A | 4. Heat Removal |
| g. HPCI started for pressure control turbine exhaust line vacuum breaker fails | N, S, A, L | 3. Rx Pressure Control |

B.2 Facility Walk-Through

| | | |
|---|---|---|
| a. Locally Start-up the safe shutdown makeup pump | D, R, L | 2. Rx Water Inventory Control |
| b. Locally emergency start of the 1(2) SBO diesel generator | D, L | 6. Electrical |
| c. Perform local actions to cool Unit 1 fuel pool by feed and bleed | N, R | 9, 8. Service System |

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

Facility: Quad Cities Date of Examination: 08/06/01
Exam Level (circle one): RO / SRO(I) / SRO(U) Operating Test No.: 2001301

B.1 Control Room Systems

| System / JPM Title | Type Code* | Safety Function |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| f. Shutdown cooling is on and a recirc pump trips. | N, S, A, L | 4. Heat Removal |
| g. HPCI started for pressure control turbine exhaust line vacuum breaker fails | N, S, A | 3. Rx Pressure Control |

B.2 Facility Walk-Through

| | | |
|---|---|---|
| a. Locally Start-up the safe shutdown makeup pump | D, R, L | 2. Rx Water Inventory Control |
| b. Locally emergency start of the 1(2) SBO diesel generator | D, L | 6. Electrical |
| c. Perform local actions to cool Unit 1 fuel pool by feed and bleed | N, R | 9 8. Service System |

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

Facility: Quad Cities Scenario No. 1 Op-Test No. 2001301

Examiners: _____ Operators: _____

Initial Conditions: 100% power. The Unit 1 DG has recently been returned to service after a 2 day OOS for maintenance.

Turnover: Run Unit 1 DG load test for PMT personnel standing by at DG. Also this shift drop Rx power to 95% at 150 Mwe per Hr, and perform MSIV 10% closure scram surveillance test.

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1 | | N | Unit 1 DG load test (BOP) |
| 2 | | R | Drop Rx power to 95% with recirc flow (RO) |
| 3 | | C | One recirc pump stops responding in master manual (RO) |
| 4 | | C | DG Room High Temperature, shutdown/trip DG (BOP) |
| 5 | | I | LPRM fails High (RO) |
| 6 | | C | Second MSIV tested goes full closed if BOP does not take action (BOP) |
| 7 | | M | Small steam line break outside containment |
| 8 | | C | MSIVs 1A and 1B fail to isolate |
| | | | |
| | | | |
| | | | |

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

Facility: Quad Cities Scenario No. 2 Op-Test No. 2001301

Examiners: _____ Operators: _____

Initial Conditions: 85% power. The APRM Scram and Rod Block are set for two pump operation. RCIC OOS (3rd day OOS). "A" loop of Suppression Pool Cooling is running, a HPCI surveillance was run last shift.

Turnover: Suppression pool now <90deg F Suppression Pool Cooling should be terminated. Pull rods to 100% flow control line, and ramp to full power at 100 Mwe/hr. Also on this shift perform flow test on "A" Core Spray pump.

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1 | | N | Terminate Suppression Pool Cooling. (BOP) |
| 2 | | R | Pull rods to 100% flow control line. (RO) |
| 3 | | C | When testing "A" CS pump min flow valve fails open. (BOP) |
| 4 | | C | A control rod drifts in. (RO) |
| 5 | | I | APRM fails downscale (INOP). (RO) |
| 6 | | C | Low flow to recirc pump seal on "A" recirc pump. (BOP) |
| 7 | | M | Intermediate LOCA (Liquid) |
| 8 | | C | HPCI fails |
| | | | |
| | | | |
| | | | |

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

OPERATING TEST NO.:1

| Applicant Type | Evolution Type | Minimum Number | Scenario Number | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| RO | Reactivity | 1 | 2 | 2 | | |
| | Normal | 1 | 1 | 1 | | |
| | Instrument / Component | 2 | 3,4,5, 6 | 3,4,5, 6 | | |
| | Major | 1 | 7 | 7 | | |
| AS RO | Reactivity | 1 | 2 | 2 | | |
| | Normal | 0 | 0 | 0 | | |
| | Instrument / Component | 2 | 3,5 | 4,6 | | |
| | Major | 1 | 7 | 7 | | |
| SRO-I | | | | | | |
| AS SRO | Reactivity | 0 | 2 | 2 | | |
| | Normal | 1 | 1 | 1 | | |
| | Instrument / Component | 2 | 3,4,5, 6 | 3,4,5, 6 | | |
| | Major | 1 | 7 | 7 | | |
| SRO-U | Reactivity | 0 | 2 | 2 | | |
| | Normal | 1 | 1 | 1 | | |
| | Instrument / Component | 2 | 3,4,5, 6 | 3,4,5, 6 | | |
| | Major | 1 | 7 | 7 | | |

Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for Each evolution type.

(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

(3) *Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.*

Author: Bruce Palazzi / Michael R. Bellis

Chief Examiner : Neil R. McNeil

Facility: Quad Cities Date of Exam: 08/06/01 Exam Level: SRO

| Tier | Group | K/A Category Points | | | | | | | | | | | Point Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G * | |
| 1. Emergency & Abnormal Plant Evolutions | 1 | 5 | 5 | 4 | | | | 6 | 3 | | | 3 | 26 |
| | 2 | 3 | 2 | 2 | | | | 3 | 4 | | | 3 | 17 |
| | Tier Totals | 8 | 7 | 6 | | | | 9 | 7 | | | 6 | 43 |
| 2. Plant Systems | 1 | 2 | 2 | 1 | 2 | 2 | 4 | 2 | 2 | 2 | 3 | 1 | 23 |
| | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 13 |
| | 3 | | | 1 | 1 | 1 | | | | | 1 | | 4 |
| | Tier Totals | 4 | 3 | 3 | 4 | 4 | 5 | 3 | 4 | 3 | 5 | 2 | 40 |

| 3. Generic Knowledge and Abilities | Cat 1 | Cat 2 | Cat 3 | Cat 4 | 17 |
|---|---|---|---|---|---|
| | 5 | 4 | 2 | 6 | |

Note:
1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
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 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.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the SRO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.

| ES-401 | BWR SRO Examination Outline<br>Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 | | | | | | | Form ES-401-1 |
|---|---|---|---|---|---|---|---|---|
| E/APE # / Name / Safety Function | K1 | K2 | K3 | A1 | A2 | G | K/A Topic(s) | Imp. | Points |
| 295003 Partial or Complete Loss of AC Pwr / 6 | 03 | | 02 | | | | Under volt-degraded voltage effect on loads/ Selective tripping **(SRO ONLY)** | 3.2/ 3.1 | 2 |
| 295006 SCRAM / 1 | 02 | | | 01 | | | Operational implications of SDM **(SRO ONLY)** / Ability operate-monitor RPS **(SRO ONLY)** | 3.7/ 4.2 | 2 |
| 295007 High Reactor Pressure / 3 | | | | | 02 | | Determine-interpret reactor pressure **(SRO ONLY)** | 4.1 | 1 |
| 295009 Low Reactor Water Level / 2 | | | | 04 | | | Reactor water cleanup | 2.7 | 1 |
| 295010 High Drywell Pressure / 5 | | 01 | | | | | Suppression pool level | 3.3 | 1 |
| 295013 High Suppression Pool Temp. / 5 | | 01 | | | | | Suppression pool cooling **(SRO ONLY)** | 3.7 | 1 |
| 295014 Inadvertent Reactivity Addition / 1 | | | | | 03 | | Ability to determine cause of reactivity addition **(SRO ONLY)** | 4.3 | 1 |
| 295015 Incomplete SCRAM / 1 | 02 | | | | | | Knowledge of cooldown effects on reactor power | 4.1 | 1 |
| 295016 Control Room Abandonment / 7 | | | | 08 | | | Ability to monitor reactor pressure | 4.0 | 1 |
| 295017 High Off-site Release Rate / 9 | | 12 | | 03 | | | Standby gas treatment / Ability to operate or monitor plant ventilation system **(SRO ONLY** | 3.7/ 3.4 | 2 |
| 295023 Refueling Accidents / 8 | 03 | | | | | x | Inadvertent criticality / 2.3.10 Ability to perform procedures to reduce excessive rad level **(SRO ONLY)** | 4.1/ 3.3 | 2 |
| 295024 High Drywell Pressure / 5 | | | 08 | | | | Containment spray | 4.1 | 1 |
| 295025 High Reactor Pressure / 3 | | | | | | x | 2.4.18 Knowledge of the specific bases for EOPs **(SRO ONLY)** | 3.9 | 1 |
| 295026 Suppression Pool High Water Temp. / 5 | | | 05 | | 02 | | Reactor SCRAM / Suppression pool level **(SRO ONLY)** | 4.1/ 3.9 | 2 |
| 295027 High Containment Temperature / 5 | --- | --- | --- | --- | --- | --- | --- MARK III ONLY ---------- | --- | --- |
| 295030 Low Suppression Pool Water Level / 5 | 02 | | | 02 | | | Pump NPSH **(SRO ONLY)** / RCIC | 3.8/ 3.5 | 2 |
| 295031 Reactor Low Water Level / 2 | | 06 | | | | | HPCI | 4.2 | 1 |
| 295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1 | | | | 11 | | | PCIS / NSSSS | 3.6 | 1 |
| 295038 High Off-site Release Rate / 9 | | | 02 | | | * | System isolation / 2.1.7Ability to evaluate plant and take action based on instrumentation **(SRO ONLY)** | 4.2/ 4.4 | 2 |
| 500000 High Containment Hydrogen Conc. / 5 | | 07 | | | | | Drywell vent system | 3.7 | 1 |
| | | | | | | | | | |
| K/A Category Totals: | 5 | 5 | 4 | 6 | 3 | 3 | Group Point Total: | | 26 |

| ES-401 | BWR SRO Examination Outline<br>Plant Systems - Tier 2/Group 1 | | | | | | | | | | | | Form ES-401-1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System # / Name | K1 | K2 | K3 | K4 | K5 | K6 | A1 | A2 | A3 | A4 | G | K/A Topic(s) | Imp. | Points |
| 201005 RCIS | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | —BWR6 ONLY---------- | --- | --- |
| 202002 Recirculation Flow Control | 05 | | | | | | | | | | | Recirculation MG set | 3.5 | 1 |
| 203000 RHR/LPCI: Injection Mode | | | 03 | | | | | | | | | Automatic depressurization logic | 4.3 | 1 |
| 206000 HPCI | | | | 14 | | | | | | | | Control oil to turbine speed control | 3.4 | 1 |
| 207000 Isolation (Emergency) Condenser | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | —No Iso Condenser---------- | --- | --- |
| 209001 LPCS | | 02 | | | | | | | | 04 | | Valve power / Minimal flow valves | 2.7/ 2.9 | 2 |
| 209002 HPCS | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | —No HPCS---------- | --- | --- |
| 211000 SLC | | | | 04 | | | | | | | | indication of fault in explosive valve circuit | 3.9 | 1 |
| 212000 RPS | | | | | | 01 | | | | | | effect of loss of A.C. power on RPS | 3.8 | 1 |
| 215004 Source Range Monitor | | | | | | | 04 | | | | | predict/monitor control rod block status | 3.5 | 1 |
| 215005 APRM / LPRM | 01 | 02 | | | | | | | | | | RPS / power supply to APRMs | 3.2/ 2.8 | 2 |
| 216000 Nuclear Boiler Instrumentation | | | | | | | | 10 | | | | Impact of rapid vessel depressurizations | 3.5 | 1 |
| 217000 RCIC | | | | | | | | | | 04 | | Manually initiated controls | 3.6 | 1 |
| 218000 ADS | | | | | 01 | | | | | | | ADS logic operation | 3.8 | 1 |
| 223001 Primary CTMT and Auxiliaries | | | | | | | | | 06 | | | Drywell/suppression chamber pressure | 3.4 | 1 |
| 223002 PCIS/Nuclear Steam Supply Shutoff | | | | | | 05 | | | | | | Containment instrumentation | 3.3 | 1 |
| 226001 RHR/LPCI: CTMT Spray Mode | | | | | | | 05 | | | | | System lineup | 3.4 | 1 |
| 239002 SRVs | | | | | | | | 02 | | | | Leaky SRV **(SRO ONLY)** | 3.2 | 1 |
| 241000 Reactor/Turbine Pressure Regulator | | | | | 04 | | | | | | | Turbine inlet pressure vs reactor pressure | 3.3 | 1 |
| 259002 Reactor Water Level Control | | | | | | 05 | | | | | | Reactor water level input **(SRO ONLY)** | 3.5 | 1 |
| 261000 SGTS | | | | | | | | | | 08 | | System Temperature | 2.7 | 1 |
| 262001 AC Electrical Distribution | | | | | | 02 | | | | | | Effect of loss of off-site power | 3.9 | 1 |
| 264000 EDGs | | | | | | | | | | | * | 2.1.28 Knowledge of components & controls **(SRO ONLY)** | 3.3 | 1 |
| 290001 Secondary CTMT | | | | | | | | | 01 | | | Secondary containment isolation | 4.0 | 1 |
| K/A Category Point Totals: | 2 | 2 | 1 | 2 | 2 | 4 | 2 | 2 | 2 | 3 | 1 | Group Point Total: | | 23 |

| ES-401 | BWR SRO Examination Outline<br>Plant Systems - Tier 2/Group 2 | | | | | | | | | | | | Form ES-401-1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System # / Name | K1 | K2 | K3 | K4 | K5 | K6 | A1 | A2 | A3 | A4 | G | K/A Topic(s) | Imp. | Points |
| 201001 CRD Hydraulic | 10 | | | | | | | | | | | Control rod drive mechanisms **(SRO ONLY)** | 2.8 | 1 |
| 201002 RMCS | | | | | | | | | | | | | | |
| 201004 RSCS | | | | | | | | | | | | | | |
| 201006 RWM | | | | | | | 02 | | | | | Status of control rod movement blocks | 3.5 | 1 |
| 202001 Recirculation | | | | | | | | 10 | | | | Recirc pump seal failure **(SRO ONLY)** | 3.9 | 1 |
| 204000 RWCU | | | | | | 01 | | | | | | Loss of component cooling water | 3.3 | 1 |
| 205000 Shutdown Cooling | | | | | | | | | | | | | | |
| 214000 RPIS | | | | 01 | | | | | | | | Reed switch locations | 3.1 | 1 |
| 215002 RBM | | | | | | | | | 06 | | | Null sequence control **(SRO ONLY)** | 2.5 | 1 |
| 215003 IRM | 07 | | | | | | | | | | | Knowledge of physical connection to vessel | 3.0 | 1 |
| 219000 RHR/LPCI: Torus/Pool Cooling Mode | | | | | | | | | | | | | | |
| 230000 RHR/LPCI: Torus/Pool Spray Mode | | | | | | | | | | | | | | |
| 234000 Fuel Handling Equipment | | | | | | | | | | | x | 2.2.30 RO fuel handling control room duties | 3.3 | 1 |
| 239003 MSIV Leakage Control | | | | | | | | | | | | | | |
| 245000 Main Turbine Gen. and Auxiliaries | | | | | | | | 06 | | | | Predict/control loss of extraction steam | 3.1 | 1 |
| 259001 Reactor Feedwater | | | | | | | | | | | | | | |
| 262002 UPS (AC/DC) | | | | | | | | | | | | | | |
| 263000 DC Electrical Distribution | | | | | | | | | | 01 | | Operate/monitor major breakers & fuses | 3.5 | 1 |
| 271000 Offgas | | | | | | | | | | | | | | |
| 272000 Radiation Monitoring | | | | | | | | | | | | | | |
| 286000 Fire Protection | | | | | | | | | 03 | | | Actuation of fire detectors | 3.3 | 1 |
| 290003 Control Room HVAC | | | 04 | | | | | | | | | Effect of loss of HVAC on room pressure | 2.9 | 1 |
| 300000 Instrument Air | | | | | | | | | | | | | | |
| 400000 Component Cooling Water | | 02 | | | | | | | | | | Electrical power supply CCW valves | 2.9 | 1 |
| K/A Category Point Totals: | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 1 | 1 | Group Point Total: | | 13 |

| ES-401 | BWR SRO Examination Outline<br>Plant Systems - Tier 2/Group 3 | Form ES-401-1 |
|---|---|---|

| System # / Name | K1 | K2 | K3 | K4 | K5 | K6 | A1 | A2 | A3 | A4 | G | K/A Topic(s) | Imp. | Points |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 201003 Control Rod and Drive Mechanism | | | | | | | | | | | | | | |
| 215001 Traversing In-core Probe | | | | | 01 | | | | | | | Operational implications of flux detection **(SRO ONLY)** | 2.5 | 1 |
| 233000 Fuel Pool Cooling and Cleanup | | | 02 | | | | | | | | | Effect of malfunction on fuel pool level | 3.2 | 1 |
| 239001 Main and Reheat Steam | | | | | | | | | | | | | | |
| 256000 Reactor Condensate | | | | | | | | | | | | | | |
| 268000 Radwaste | | | | | | | | | | 01 | | Ability to monitor Sump integrators | 3.6 | 1 |
| 288000 Plant Ventilation | | | | | | | | | | | | | | |
| 290002 Reactor Vessel Internals | | | | 02 | | | | | | | | Separation of flow paths in vessel | 3.1 | 1 |
| | | | | | | | | | | | | | | |
| K/A Category Point Totals: | | | 1 | 1 | 1 | | | | | 1 | | Group Point Total: | | 4 |

Plant-Specific Priorities

| System / Topic | Recommended Replacement for... | Reason | Points |
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| Plant-Specific Priority Total (limit 10): | | | |

| Facility: Quad Cities Nuclear Station Date of Exam: 08/06/01 Exam Level: SRO | | | | |
|---|---|---|---|---|
| Category | K/A # | Topic | Imp. | Points |
| Conduct of Operations | 2.1.1 | Knowledge of conduct of ops requirements. | 3.8 | 1 |
| | 2.1.11 | Knowledge of < 1hr Tech Spec actions. | 3.8 | 1* |
| | 2.1.21 | Ability to obtain & verify controlled procedures. | 3.2 | 1 |
| | 2.1.22 | Ability to determine Mode of Operation | 3.3 | 1 |
| | 2.1.33 | Ability to recognize Tech Spec entry-level conditions | 4.0 | 1* |
| | Total | | | 5 |
| Equipment Control | 2.2.5 | Knowledge of process for making changes to the facility as described in the SAR | 2.7 | 1* |
| | 2.2.11 | Knowledge of process for controlling temporary changes | 3.4 | 1* |
| | 2.2.17 | Knowledge of process for managing maintenance during power operations. | 3.5 | 1* |
| | 2.2.25 | Knowledge of bases in tech specs for LOCs and Safety Limits. | 3.7 | 1* |
| | Total | | | 4 |
| Radiation Control | 2.3.2 | Knowledge of facility ALARA program. | 2.9 | 1 |
| | 2.3.8 | Knowledge of process for performing a planned gaseous radioactive release. | 3.2 | 1* |
| | Total | | | 2 |
| Emergency Procedures/ Plan | 2.4.7 | Knowledge of event based EOP mitigation strategies. | 3.8 | 1* |
| | 2.4.12 | Knowledge of general operating crew responsibilities during emergency operations. | 3.9 | 1 |
| | 2.4.20 | Knowledge of operational implications of EOP warnings / cautions / and notes. | 4.0 | 1 |
| | 2.4.25 | Knowledge of fire protection procedures. | 3.4 | 1* |
| | 2.4.43 | Knowledge of emergency communications systems and techniques. | 3.5 | 1* |
| | 2.4.1 | Knowledge of EOP entry conditions and immediate action steps. | 4.6 | 1 |
| | Total | | | 6 |
| Tier 3 Point Total (SRO) | | | | 17 |

***(SRO ONLY)**

Facility: Quad Cities Date of Exam: 08/06/2001 Exam Level: RO

| Tier | Group | K/A Category Points | | | | | | | | | | | Point Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G * | |
| 1. Emergency & Abnormal Plant Evolutions | 1 | 2 | 3 | 2 | | | | 2 | 2 | | | 2 | 13 |
| | 2 | 3 | 3 | 4 | | | | 3 | 4 | | | 2 | 19 |
| | 3 | 1 | 1 | 0 | | | | 1 | 0 | | | 1 | 4 |
| | Tier Totals | 6 | 7 | 6 | | | | 6 | 6 | | | 5 | 36 |
| 2. Plant Systems | 1 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 28 |
| | 2 | 2 | 2 | 1 | 1 | 2 | 3 | 2 | 2 | 2 | 1 | 1 | 19 |
| | 3 | | | 1 | 1 | | | | | | 1 | 1 | 4 |
| | Tier Totals | 5 | 4 | 4 | 5 | 4 | 5 | 4 | 4 | 5 | 6 | 5 | 51 |

| 3. Generic Knowledge and Abilities | Cat 1 | Cat 2 | Cat 3 | Cat 4 | 13 |
|---|---|---|---|---|---|
| | 4 | 3 | 2 | 4 | |

Note:
1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).
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 exam must total 100 points.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
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 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.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.

| ES-401 | BWR RO Examination Outline<br>Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 | | | | | | | Form ES-401-2 | |
|---|---|---|---|---|---|---|---|---|---|
| E/APE # / Name / Safety Function | K1 | K2 | K3 | A1 | A2 | G | K/A Topic(s) | Imp. | Points |
| 295005 Main Turbine Generator Trip / 3 | 01 | | | | | | Pressure effects on reactor power | 4.0 | 1 |
| 295006 SCRAM / 1 | | | | | | x | 2.2.22 Knowledge of limiting conditions for operations and safety limits | 3.4 | 1 |
| 295007 High Reactor Pressure / 3 | | | | | 01 | | Reactor Pressure | 4.1 | 1 |
| 295009 Low Reactor Water Level / 2 | | | | 04 | | | Reactor water cleanup | 2.7 | 1 |
| 295010 High Drywell Pressure / 5 | | 01 | | | 02 | | Suppression pool level / drywell pressure | 3.2/ 3.8 | 2 |
| 295014 Inadvertent Reactivity Addition / 1 | | | | | | x | 2.1.12 Ability to apply technical specifications for a system | 2.9 | 1 |
| 295015 Incomplete SCRAM / 1 | 02 | | | | | | Cooldown effects on reactor power | 3.9 | 1 |
| 295024 High Drywell Pressure / 5 | | | 08 | | | | Containment spray | 3.7 | 1 |
| 295025 High Reactor Pressure / 3 | | | 02 | | | | Recirculation pump trip | 3.9 | 1 |
| 295031 Reactor Low Water Level / 2 | | 06 | | | | | High pressure coolant injection (HPCI) | 4.1 | 1 |
| 295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1 | | | | 11 | | | PCIS/NSSSS | 3.5 | 1 |
| 500000 High Containment Hydrogen Conc. / 5 | | 07 | | | | | Drywell vent system | 3.2 | 1 |
| | | | | | | | | | |
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| | | | | | | | | | |
| K/A Category Totals: | 2 | 3 | 2 | 2 | 2 | 2 | Group Point Total: | | 13 |

| ES-401 | BWR RO Examination Outline<br>Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 | | | | | | | Form ES-401-2 |
|---|---|---|---|---|---|---|---|---|
| E/APE # / Name / Safety Function | K1 | K2 | K3 | A1 | A2 | G | K/A Topic(s) | Imp. | Points |
| 295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4 | | | | | 04 | | Individual Jet Pump flows | 3.0 | 1 |
| 295002 Loss of Main Condenser Vacuum / 3 | 03 | | | | | | Loss of heat sink | 3.6 | 1 |
| 295003 Partial or Complete Loss of AC Pwr / 6 | 03 | | | | | | Under voltage-degraded voltage effects | 2.9 | 1 |
| 295004 Partial or Complete Loss of DC Pwr / 6 | | | | 02 | | | Systems necessary to assure safe plant shutdown | 3.8 | 1 |
| 295008 High Reactor Water Level / 2 | | | | | | x | 2.1.28 Knowledge of the purpose & function of major system components & controls | 3.2 | 1 |
| 295011 High CTMT Temperature / 5 | | | | | | | **Mk III Only** | n/a | 0 |
| 295012 High Drywell Temperature / 5 | | 02 | | | | | Drywell cooling | 3.6 | 1 |
| 295013 High Suppression Pool Temp. / 5 | | | | | 01 | | Suppression pool temperature | 3.8 | 1 |
| 295016 Control Room Abandonment / 7 | | | | 08 | | | Ability to monitor reactor pressure | 4.0 | 1 |
| 295017 High Off-site Release Rate / 9 | | 12 | | | | | SBGT | 3.4 | 1 |
| 295018 Partial or Complete Loss of CCW / 8 | | | | | 01 | | Ability to interpret/determine component temperatures | 3.3 | 1 |
| 295019 Part. or Comp. Loss of Inst. Air / 8 | | | 01 | | | | Standby air compressor operation | 3.3 | 1 |
| 295020 Inadvertent Cont. Isolation / 5 & 7 | 04 | | | | | | Bottom head thermal stratification | 2.5 | 1 |
| 295022 Loss of CRD Pumps / 1 | | | 01 | | | | Reason for reactor scram | 3.7 | 1 |
| 295026 High Suppression Pool Water Temp. / 5 | | | 05 | | | | Reactor scram | 3.9 | 1 |
| 295027 High Containment Temperature / 5 | | | | | | | not used | n/a | 0 |
| 295028 High Drywell Temperature / 5 | | | | | | x | 2.4.20 Knowledge of EOP warnings/cautions/notes | 3.3 | 1 |
| 295029 High Suppression Pool Water Level / 5 | | 09 | | | | | RCIC | 3.1 | 1 |
| 295030 Low Suppression Pool Water Level / 5 | | | | 02 | | | RCIC | 3.4 | 1 |
| 295033 High Sec. Cont. Area Rad. Levels / 9 | | | | | | | not used | n/a | 0 |
| 295034 Sec. Cont. Ventilation High Rad. / 9 | | | | | | | not used | n/a | 0 |
| 295038 High Off-site Release Rate / 9 | | | 02 | | | | System isolation | 3.9 | 1 |
| 600000 Plant Fire On Site / 8 | | | | | 06 | | Ability to determine need for pressurizing control room (recirc mode) | 2.5 | 1 |
| K/A Category Point Totals: | 3 | 3 | 4 | 3 | 4 | 2 | Group Point Total: | | 19 |

| ES-401 | BWR RO Examination Outline<br>Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 | | | | | | | Form ES-401-2 | |
|---|---|---|---|---|---|---|---|---|---|
| E/APE # / Name / Safety Function | K1 | K2 | K3 | A1 | A2 | G | K/A Topic(s) | Imp. | Points |
| 295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4 | | | | | 04 | | Individual Jet Pump flows | 3.0 | 1 |
| 295002 Loss of Main Condenser Vacuum / 3 | 03 | | | | | | Loss of heat sink | 3.6 | 1 |
| 295003 Partial or Complete Loss of AC Pwr / 6 | 03 | | | | | | Under voltage-degraded voltage effects | 2.9 | 1 |
| 295004 Partial or Complete Loss of DC Pwr / 6 | | | | 02 | | | Systems necessary to assure safe plant shutdown | 3.8 | 1 |
| 295008 High Reactor Water Level / 2 | | | | | | x | 2.1.28 Knowledge of the purpose & function of major system components & controls | 3.2 | 1 |
| 295011 High CTMT Temperature / 5 | | | | | | | **Mk III Only** | n/a | 0 |
| 295012 High Drywell Temperature / 5 | | 02 | | | | | Drywell cooling | 3.6 | 1 |
| 295013 High Suppression Pool Temp. / 5 | | | | | 01 | | Suppression pool temperature | 3.8 | 1 |
| 295016 Control Room Abandonment / 7 | | | | 08 | | | Ability to monitor reactor pressure | 4.0 | 1 |
| 295017 High Off-site Release Rate / 9 | | 12 | | | | | SBGT | 3.4 | 1 |
| 295018 Partial or Complete Loss of CCW / 8 | | | | | 01 | | Ability to interpret/determine component temperatures | 3.3 | 1 |
| 295019 Part. or Comp. Loss of Inst. Air / 8 | | | 01 | | | | Standby air compressor operation | 3.5 | 1 |
| 295020 Inadvertent Cont. Isolation / 5 & 7 | 04 | | | | | | Bottom head thermal stratification | 2.5 | 1 |
| 295022 Loss of CRD Pumps / 1 | | | 01 | | | | Reason for reactor scram | 3.7 | 1 |
| 295026 High Suppression Pool Water Temp. / 5 | | | 05 | | | | Reactor scram | 3.9 | 1 |
| 295027 High Containment Temperature / 5 | | | | | | | not used | n/a | 0 |
| 295028 High Drywell Temperature / 5 | | | | | | x | 2.4.20 Knowledge of EOP warnings/cautions/notes | 3.3 | 1 |
| 295029 High Suppression Pool Water Level / 5 | | 09 | | | | | RCIC | 3.1 | 1 |
| 295030 Low Suppression Pool Water Level / 5 | | | | 02 | | | RCIC | 3.4 | 1 |
| 295033 High Sec. Cont. Area Rad. Levels / 9 | | | | | | | not used | n/a | 0 |
| 295034 Sec. Cont. Ventilation High Rad. / 9 | | | | | | | not used | n/a | 0 |
| 295038 High Off-site Release Rate / 9 | | | 02 | | | | System isolation | 3.9 | 1 |
| 600000 Plant Fire On Site / 8 | | | | | 06 | | Ability to determine need for pressurizing control room (recirc mode) | 2.5 | 1 |
| K/A Category Point Totals: | 3 | 3 | 4 | 3 | 4 | 2 | Group Point Total: | | 19 |

| ES-401 | BWR RO Examination Outline<br>Emergency and Abnormal Plant Evolutions - Tier 1/Group 3 | | | | | | | Form ES-401-2 |
|---|---|---|---|---|---|---|---|---|
| E/APE # / Name / Safety Function | K1 | K2 | K3 | A1 | A2 | G | K/A Topic(s) | Imp. | Points |
| 295021 Loss of Shutdown Cooling / 4 | | 01 | | | 01 | | Reactor water temperature / Reactor water heatup/cooldown rate | 3.6/ 3.5 | 2 |
| 295023 Refueling Accidents / 8 | 03 | | | | | | Inadvertent criticality | 3.7 | 1 |
| 295032 High Secondary Containment Area Temperature / 5 | | | | 03 | | | Ability to operate/monitor secondary containment ventilation | 3.7 | 1 |
| 295035 Secondary Containment High Differential Pressure / 5 | | | | | | | | | |
| 295036 Secondary Containment High Sump/Area Water Level / 5 | | | | | | | | | |
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| K/A Category Point Totals: | 1 | 1 | 0 | 1 | 1 | 0 | Group Point Total: | | 4 |

| System # / Name | K1 | K2 | K3 | K4 | K5 | K6 | A1 | A2 | A3 | A4 | G | K/A Topic(s) | Imp. | Points |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 201001 CRD Hydraulic | | | | | | | | 12 | | | x | High cooling water flow / 2.1.32 Explain & apply system limits & precautions | 2.8/ 3.4 | 2 |
| 201002 RMCS | | | | 06 | | | | | | | | Emergency In rod insertion | 3.5 | 1 |
| 201005 RCIS | | | | | | | | | | | | **BWR-6 Only** | | |
| 202002 Recirculation Flow Control | 05 | | | | | | | | | | | Recirculation MG Set | 3.5 | 1 |
| 203000 RHR/LPCI: Injection Mode | | | 03 | | | | | | | | | Automatic depressurization logic | 4.2 | 1 |
| 206000 HPCI | | | | 14 | | | | | | | x | Control oil to turbine speed control / 2.1.32 Explain & apply system limits & precautions | 3.4/ 3.4 | 2 |
| 209001 LPCS | | 02 | | | | | | | | 04 | | Valve power / Minimal flow valves | 2.5/ 2.9 | 2 |
| 209002 HPCS | | | | | | | | | | | | **No HPCS** | | |
| 211000 SLC | | | | 04 | | | | | | | | AFault in explosive valve firing circuits | 3.8 | 1 |
| 212000 RPS | | | | | | 01 | | | | | | Effect of loss of A.C. power on RPS | 3.6 | 1 |
| 215003 IRM | 07 | | | | | | | | | | | Knowledge of physical connections to vessel | 3.0 | 1 |
| 215004 SRM | | | | | | | 04 | | | | | Predict/monitor control rod block status | 3.5 | 1 |
| 215005 APRM / LPRM | 01 | 02 | | | | | | | | | | RPS / APRM Channels | 4.0/ 2.6 | 2 |
| 216000 Nuclear Boiler Instrumentation | | | | | | | | 10 | 01 | | | Rapid vessel depressurizations / Relationship between meter/recorder readings and actual parameter values | 3.3/ 3.4 | 2 |
| 217000 RCIC | | | | | | | | | | 04 | | Manually initiated controls | 3.6 | 1 |
| 218000 ADS | | | | | 01 | | | | | | | ADS logic operation | 3.8 | 1 |
| 223001 Primary CTMT and Auxiliaries | | | | | | | | | 06 | | | Drywell/suppression chamber diff pressure | 3.4 | 1 |
| 223002 PCIS/Nuclear Steam Supply Shutoff | | | | | | 05 | | | | | | Containment instrumentation | 3.0 | 1 |
| 239002 SRVs | | | | | | | | | 07 | | | Monitor reactor water level | 3.8 | 1 |
| 241000 Reactor/Turbine Pressure Regulator | | | | | 04 | | | | | | | Turbine inlet pressure vs reactor pressure | 3.3 | 1 |
| 259001 Reactor Feedwater | | | 01 | | | | | | | | | Reactor water level | 3.9 | 1 |
| 259002 Reactor Water Level Control | | | | | | | | | | 10 | | Setpoint setdown reset controls | 3.1 | 1 |
| 261000 SGTS | | | | | | | | | | 08 | | System Temperature | 3.0 | 1 |
| 264000 EDGs | | | | | | | 01 | | | | x | Lube oil temperature / 2.1.8 Coordinate activities outside the control room | 3.0/ 3.8 | 2 |
| K/A Category Point Totals: | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | Group Point Total: | | 28 |

| ES-401 | BWR RO Examination Outline<br>Plant Systems - Tier 2/Group 2 | | | | | | | | | | | | Form ES-401-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System # / Name | K1 | K2 | K3 | K4 | K5 | K6 | A1 | A2 | A3 | A4 | G | K/A Topic(s) | Imp. | Points |
| 201003 Control Rod and Drive Mechanism | | | | | | | | 01 | | | | Stuck rod | 3.4 | 1 |
| 201004 RSCS | | | | | | | | | | | | | | |
| 201006 RWM | | | | | | | 02 | | | | | Status of control rod movement blocks | 3.4 | 1 |
| 202001 Recirculation | | | | | | 04 | | | | | | Loss of DC power | 2.7 | 1 |
| 204000 RWCU | | | | | | 01 | | | | | | Loss of component cooling water | 3.1 | 1 |
| 205000 Shutdown Cooling | | | | | 02 | | | | | | | Valve operation | 2.8 | 1 |
| 214000 RPIS | | | | 01 | | | | | | | | Reed switch locations | 3.0 | 1 |
| 215002 RBM | | | | | | | | | | | | | | |
| 219000 RHR/LPCI: Torus/Pool Cooling Mode | | 02 | | | | | | | | | | Electrical power supply: Pumps | 3.1 | 1 |
| 226001 RHR/LPCI: CTMT Spray Mode | | | | | | | 05 | | | | | System lineup | 3.1 | 1 |
| 230000 RHR/LPCI: Torus/Pool Spray Mode | | | | | | | | | | | | | | |
| 239001 Main and Reheat Steam | | | | | 06 | | | | | | | Air operated MSIVs | 2.8 | 1 |
| 245000 Main Turbine Gen. and Auxiliaries | | | | | | | | 06 | | | | Loss of extraction steam | 2.9 | 1 |
| 256000 Reactor Condensate | 07 | | | | | | | | | | | SJAE condenser | 2.9 | 1 |
| 262001 AC Electrical Distribution | | | | | | 02 | | | | | | Effect of loss of off-site power | 3.6 | 1 |
| 262002 UPS (AC/DC) | | | | | | | | | | | | | | |
| 263000 DC Electrical Distribution | | | | | | | | | | 01 | | Operate/monitor major breakers & fuses | 3.3 | 1 |
| 271000 Offgas | 01 | | | | | | | | | | | Condenser air removal system | 3.1 | 1 |
| 272000 Radiation Monitoring | | | | | | | | | | | | | | |
| 286000 Fire Protection | | | | | | | | | 03 | | | Actuation of fire detectors | 3.3 | 1 |
| 290001 Secondary CTMT | | | | | | | | | 01 | | | Secondary containment isolation | 3.9 | 1 |
| 290003 Control Room HVAC | | | 04 | | | | | | | | | Effect of loss of HVAC on room pressure | 2.8 | 1 |
| 300000 Instrument Air | | | | | | | | | | | x | 2.1.28 Knowledge of purpose and function major system components and controls. | 3.2 | 1 |
| 400000 Component Cooling Water | | 02 | | | | | | | | | | Electrical power supply to CCW valves | 2.9 | 1 |
| K/A Category Point Totals: | 2 | 2 | 1 | 1 | 2 | 3 | 2 | 2 | 2 | 1 | 1 | Group Point Total: | | 19 |

| ES-401 | BWR RO Examination Outline<br>Plant Systems - Tier 2/Group 3 | | | | | | | | | | | | Form ES-401-2 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System # / Name | K1 | K2 | K3 | K4 | K5 | K6 | A1 | A2 | A3 | A4 | G | K/A Topic(s) | Imp. | Points |
| 215001 Traversing In-core Probe | | | | | | | | | | | | | | |
| 233000 Fuel Pool Cooling and Cleanup | | | 02 | | | | | | | | | Effect of malfunction on fuel pool level | 3.1 | 1 |
| 234000 Fuel Handling Equipment | | | | | | | | | | | x | 2.2.30 RO fuel handling duties in the control room | 3.5 | 1 |
| 239003 MSIV Leakage Control | | | | | | | | | | | | | | |
| 268000 Radwaste | | | | | | | | | | 01 | | Ability to monitor sump integrators | 3.4 | 1 |
| 288000 Plant Ventilation | | | | | | | | | | | | | | |
| 290002 Reactor Vessel Internals | | | | 02 | | | | | | | | Separation of flow paths in the vessel | 3.1 | 1 |
| | | | | | | | | | | | | | | |
| K/A Category Point Totals: | | | 1 | 1 | | | | | | 1 | 1 | Group Point Total: | | 4 |

| Plant-Specific Priorities | | | |
|---|---|---|---|
| System / Topic | Recommended Replacement for... | Reason | Points |
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| Plant-Specific Priority Total: (limit 10) | | | |

| Facility: Quad Cities | Date of Exam: 08/06/2001 | | Exam Level: RO | |
|---|---|---|---|---|
| Category | K/A # | Topic | Imp. | Points |
| Conduct of Operations | 2.1.1 | Knowledge of conduct of ops requirements | 3.7 | 1 |
| | 2.1.21 | Ability to obtain & verify controlled procedures | 3.1 | 1 |
| | 2.1.22 | Ability to determine Mode of Operation | 2.8 | 1 |
| | 2.1.29 | Knowledge of how to conduct and verify valve lineups. | 3.4 | 1 |
| | Total | | | 4 |
| Equipment Control | 2.2.1 | Ability to perform pre-startup procedures | 3.7 | 1 |
| | 2.2.13 | Knowledge of tagging and clearance procedure | 3.6 | 1 |
| | 2.2.33 | Knowledge of control rod programming | 2.5 | 1 |
| | 2.2. | | | |
| | 2.2. | | | |
| | 2.2 | | | |
| | Total | | | 3 |
| Radiation Control | 2.3.2 | Knowledge of facility ALARA program | 2.5 | 1 |
| | 2.3.9 | Knowledge of the process for performing a containment purge. | 2.5 | 1 |
| | 2.3. | | | |
| | 2.3. | | | |
| | 2.3. | | | |
| | 2.3. | | | |
| | Total | | | 2 |
| Emergency Procedures/ Plan | 2.4.1 | Knowledge of EOP entry conditions and immediate action steps | 4.3 | 1 |
| | 2.4.6 | Knowledge of symptom based EOP mitigation strategies | 3.1 | 1 |
| | 2.4.12 | Knowledge of general operating crew responsibilities during emergency operations | 3.4 | 1 |
| | 2.4.20 | Knowledge of operational implications of EOP warnings / cautions / and notes | 3.3 | 1 |
| | Total | | | 4 |
| Tier 3 Point Total (RO) | | | | 13 |