INITIAL SUBMITTAL

BROWNS FERRY EXAM 50-259, 260, 296/2001-301

SEPTEMBER 17-21, 2001

INITIAL SUBMITTAL

INITIAL OUTLINE SUBMITTALS NRC SUBMITTED/WRITTEN OUTLINES

| Facility: | Date of Exam: | | Exam l | Level: | | | | | | | | | |
|----------------------------|-----------------|----------|--------|--------|----|--------|--------|--------|------------|------|------------|------|----------------|
| | | | | | | K/A Ca | tegory | Points | | | | | . |
| Tier | Group | K1 | K2 | КЗ | K4 | K5 | K6 | A1 | A 2 | А3 | A 4 | G | Point Total |
| 1. | 1 | 3 | 2 | 1 | | | | 5 | 1 | | | 1 | 13 |
| Emergency & Abnormal Plant | 2 | 3 | 6_ | 2 | | | | 4 | 2 | | | 2 | 19 |
| Evolutions | 3 | | 1 | 1 | | | | 1 | | | | 1 | 4 |
| | Tier Totals | 6 | 9 | 4 | | | | 10 | 3 | | | 4 | 36 |
| | 1 | 4 | 2 | 3 | 3 | 2 | 3 | 3 | 1 | 3 | 2_ | 2 | 28 |
| 2. Plant | 2 | 3 | 1 | 2 | 3 | 2 | 3 | 1 | 1 | 1_ | 1 | 1 | 19 |
| Systems | 3 | | | 1 | | | 1 | 1 | 1 | | | | 4 |
| | Tier Totals | 7 | 3 | 6 | 6 | 4 | 6 | 5 | 4 | 4_ | 3 | 3_ | 51 |
| 3. Generic | : Knowledge and | Abilitie | s | | Cé | at 1 | Ca | at 2 | Cá | at 3 | Ca | nt 4 | |
| | | | | | | 4 | | 2 | | 2 | | 5 | 13 |

Note:

- Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" 1. in each K/A category shall not be less than two).
- Actual point totals must match those specified in the table. 2.
- Select topics from many systems; avoid selecting more than two or three K/A topics from a given system 3. unless they relate to plant-specific priorities.

 Systems/evolutions within each group are identified on the associated outline.
- 4.
- The shaded areas are not applicable to the category/tier.
- The generic K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must 6.* be relevant to the applicable evolution or system.
- On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance 7. 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 | | E | merge | ncy an | BWR I | RO Examir ormal Plant | nation Outline Evolutions - Tier 1/Group 1 | Form | ES-401-2 |
|---|----|----|-------|--------|----------|--------------------------|--|--------------------|----------|
| E/APE # / Name / Safety Function | K1 | K2 | кз | A1 | A2 | G | K/A Topic(s) | lmp. | Points |
| 295005 Main Turbine Generator Trip / 3 | 01 | | | | | | Pressure effects on reactor power | 4.0/4.1 | 1 |
| 295006 SCRAM / 1 | 01 | | | | | | Decay heat generation and removal | 3.7/3.9 | 1 |
| 295007 High Reactor Pressure / 3 | | | | 05 | | | Reactor/turbine pressure regulating system | 3.7/3.8 | 1 |
| 295009 Low Reactor Water Level / 2 | | | | 04 | | | Reactor Water Cleanup | 2.7/2.7 | 1 |
| 295010 High Drywell Pressure / 5 | | 01 | | | | | Suppression pool level | 3.2/3.3 | 1 |
| 295014 Inadvertent Reactivity Addition / 1 | 03 | | | | | | Localized heating RO ONLY | 3.0/3.3 | 1 |
| 295015 Incomplete SCRAM / 1 | | | | 01 | | | CRD hydraulics | 3.8/3.9 | 1 |
| 295024 High Drywell Pressure / 5 | | | | 04 | | | RHR/LPCI | 4.1/3.9 | 1 |
| 295025 High Reactor Pressure / 3 | | | | | | 2.1.28 | Knowledge of the purpose and function of major system components and controls. | 3.2/3.3 | 1 |
| 295031 Reactor Low Water Level / 2 | | | 05 | | | | Emergency depressurization | 4.2/4.3 | 1 |
| 295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1 | | 01 | | | 01 | | RPS Reactor power | 4.2/4.3 4.2/4.3 | 1 |
| 500000 High Containment Hydrogen Conc. / 5 | | | | 05 | | | Wetwell sprays | 3.3/3.3 | 1 |
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| | | | | | | | | | |
| K/A Category Totals: | 3 | 2 | 1 | 5 | 1 | 1 | Group Point Total: | | 13 |

| ES-401 | | Eı | merge | ncy an | BWR d Abno | RO Examina ormal Plant | ation Outline Evolutions - Tier 1/Group 2 | Form | n ES-401- |
|--|----------|----|----------|------------|-----------------|---------------------------|---|---------|-----------|
| E/APE # / Name / Safety Function | K1 | K2 | кз | A 1 | A2 | G | K/A Topic(s) | lmp. | Points |
| 295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4 | | | | 01 | | | Recirculation system | 3.5/3.6 | 1 |
| 295002 Loss of Main Condenser Vacuum / 3 | <u> </u> | | 03 | | | | Turbine Trip | 3.4/3.4 | 1 |
| 295003 Partial or Complete Loss of AC Pwr / 6 | 01 | | | | | | Effect of battery discharge rate on capacity | 2.7/2.9 | 1 |
| 295004 Partial or Total Loss of DC Pwr / 6 | | 03 | | | | | D.C. bus loads | 3.3/3.3 | 1 |
| 295008 High Reactor Water Level / 2 | | 02 | | | | | Reactor feedwater system | 3.6/3.8 | 1 |
| 295011 High CTMT Temperature / 5 | | | | | | | | | |
| 295012 High Drywell Temperature / 5 | <u>.</u> | | | | | 2.1.2 | Knowledge of operator responsibilities during all modes of plant operation.(CFR: 41.10 / 45.13) RO ONLY | 3.0/4.0 | 1 |
| 295013 High Suppression Pool Temp. / 5 | | | 01 | | | | Suppression pool cooling operation | 3.6/3.8 | 11 |
| 295016 Control Room Abandonment / 7 | | | | 02 | | | Reactor/turbine pressure regulating system | 2.9/3.1 | 1 |
| 295017 High Off-site Release Rate / 9 | | | | | | | | | |
| 295018 Partial or Complete Loss of CCW / 8 | | 02 | | | | | Plant Operations (CFR: 41.5 / 45.6) RO ONLY | 3.4/3.6 | 1 |
| 295019 Partial or Total Loss of Inst. Air / 8 | | | | 01 | | | Backup air supply | 3.5/3.3 | 1 |
| 295020 Inadvertent Cont. Isolation / 5 & 7 | | 03 | | | | | Drywell/containment ventilation/cooling: Plant- Specific | 3.1/3.3 | 1 |
| 295022 Loss of CRD Pumps / 1 | 02 | | | | | | Reactivity Control (CFR: 41.8 to 41.10) RO ONLY | 3.6/3.7 | 1 |
| 295026 High Suppression Pool Water Temp. / 5 | | 01 | | | | | Suppression pool cooling RO ONLY | 3.9/4.0 | 1 1 |
| 295027 High Containment Temperature / 5 | | | | | | | | | |
| 295028 High Drywell Temperature / 5 | 02 | | | | | | Equipment environmental qualification | 2.9/3.1 | 1 |
| 295029 High Suppression Pool Water Level / 5 | | | | | 01 | | Suppression pool water level RO ONLY | 3.9/3.9 | 1 |
| 295030 Low Suppression Pool Water Level / 5 | | | ļ | <u> </u> | | | | | |
| 295033 High Sec. Cont. Area Rad. Levels / 9 | | | | 04 | $oxed{igspace}$ | | SBGT | 4.2/4.2 | 1 |
| 295034 Sec. Cont. Ventilation High Rad. / 9 | | 02 | <u> </u> | <u> </u> | <u> </u> | | Area radiation monitoring system | 3.8/3.9 | 1 |
| 295038 High Off-site Release Rate / 9 | | ļ | | | 01 | | Off site | 3.3/4.3 | 1_ |
| 600000 Plant Fire On Site / 8 | | | <u> </u> | | | 2.1.27 | Knowledge system purpose and or function | 2.8/2.9 | 1 |
| K/A Category Point Totals: | 3 | 6 | 2 | 4 | 2 | 2 | Group Point Total: | ··· | 19 |

| | ES-401 | BWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 3 | Form ES-401-2 |
|---|--------|---|---------------|
| 1 | | | |

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| | | <u>E</u> r | nerger | ncy and | d Abno | rmal Plant | Evolutions - Tier 1/Group 3 | | |
|---|--|------------|----------|----------|--------------|------------|--|----------|--------------|
| E/APE # / Name / Safety Function | K1 | К2 | кз | A1 | A2 | G | K/A Topic(s) | lmp. | Point |
| 295021 Loss of Shutdown Cooling / 4 | ļ | | | 03 | | | Adequate core cooling | 3.9/3.9 | 1 |
| 295023 Refueling Accidents / 8 | | | | <u> </u> | | 2.1.1 | Knowledge of conduct of operations requirements. RO ONLY | 3.7/3.8 | 1 |
| 295032 High Secondary Containment Area Temperature / 5 | | | 03 | | | | Isolating affected systems | 3.8/3.9 | 1 |
| 295035 Secondary Containment High Differential Pressure / 5 | | | | | | | Radwaste | 3.1/3.4 | 1 |
| 295036 Secondary Containment High Sump/Area Water Level / 5 | | 01 | | | | | equipment and floor drain system. RO ONLY | 3.1/3.2 | |
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| K/A Category Point Totals: | | 1 | 1 | 1 | | 1 | Group Point Total: | | 4 |

| ES-401 | | | | | B\ Pla | VR RO | Exan | nination - Tier 2 | n Outli /Grou | ne p 1 | <u></u> | | Form | ES-401-2 |
|---|----|----|----|----|-----------|-------|------------|----------------------|------------------|-----------|---------|---|--------------------|----------|
| System # / Name | K1 | K2 | КЗ | K4 | K5 | K6 | A 1 | A2 | A3_ | A4 | G | K/A Topic(s) | imp. | Points |
| 201001 CRD Hydraulic | | | | | | | | | | 04 | | CRD pumps Drive water header pressure control valve | 3.1/3.0 | 1 |
| 201002 RMCS | 05 | | | | | | | | | | | Rod worth minimizer RO ONLY | 3.4/3.5 | 1 |
| 202002 Recirculation Flow Control | | | | 02 | | | | | | | 2.4.3 | Recirculation pump speed control identify post-accident instrumentation. | 3.0/3.0 3.5/3.8 | 1 |
| 203000 RHR/LPCI: Injection Mode | | | 02 | | | | | | | | | Suppression pool level | 3.5/3.5 | 1 |
| 206000 HPCI | | | | | | | 03 | | | | | Condensate storage tank level | 3.5/3.6 | 1 |
| 209001 LPCS | | 03 | | | | | <u> </u> | | | | | Initiation logic | 2.9/3.1 | 1 |
| 211000 SLC | | | | | | 03 | | | | | | A.C. power | 3.2/3.3 | 1 |
| 212000 RPS | | | | 07 | | | <u> </u> | | | | | Manual System Activation | 4.1/4.1 | 1 |
| 215003 IRM | | | 01 | | | | | <u> </u> | | | | RPS | 3.9/4.0 | 1 |
| 215004 SRM | | | | | | 02 | | | | | | 24/48 volt D.C. power | 3.1/3.2 | 1 |
| 215005 APRM / LPRM | | : | | | | | | 03 | | | | Inoperative trip (all causes) | 3.6/3.8 | 1 |
| 216000 Nuclear Boiler Instrumentation | | 01 | | | | : | ŧ | | | 01 | | Analog trip system: Plant-Specific RO ONLY Recorders | 2.8/2.8 3.3/3.1 | 1 |
| 217000 RCIC | | | | | 02 | | | | 04 | | | Flow indication system flow | 3.1/3.1 3.6/3.5 | 1 |
| 218000 ADS | | | | | 01 | | | | | | 2.3.2 | ADS logic operation Knowledge of ALARARO ONLY | 3.8/3.8 2.5/2.9 | 1 |
| 223001 Primary CTMT and Auxiliaries | | | 03 | | | | | | 04 | | | Contain/drywell pressure: Plant-Specific Contain/drywell hydrogen concentration RO ONLY | 3.4/3.5 3.5/3.6 | 1 |
| 223002 PCIS/Nuclear Steam Supply Shutoff | 07 | | | | | | | | | | | Reactor core isolation cooling; | 3.4/3.6 | 1 |
| 239002 SRVs | | | į | | | | | | 08_ | | | Tail pipe temperatures | 3.6/3.6 | 1 |
| 241000 Reactor/Turbine Pressure Regulator | 27 | | | | | | | | | | | Condenser vacuum | 3.1/3.1 | 1 |
| 259001 Reactor Feedwater | | | | | | | 06 | | | | | Feedwater heater level | 2.7/2.7 | 1 |
| 259002 Reactor Water Level Control | 04 | | E | | | | 01 | | | | | Reactor feedwater flow Reactor water level | 3.5/3.6 3.8/3.8 | 1 |
| 261000 SGTS | | | | | | 09 | | | | | | Primary containment high pressure | 3.1/3.3 | 1 |
| 264000 EDGs | | | | 01 | | | | | <u> </u> | | | Emergency generator trips (normal) | 3.5/3.7 | 1 |
| K/A Category Point Totals: | 4 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | Group Point Total: | | 28 |

| ES-401 | | | | | | | | | n Outli 2/Grou | | | | Form | ES-401-2 |
|--|----------|--------------|----|----|----------|----------|----------|---------|-------------------|----------|-------|--|----------|----------|
| System # / Name | K1 | К2 | Кз | К4 | K5 | K6 | A1 | A2 | АЗ | A4 | G | K/A Topic(s) | lmp. | Points |
| 201003 Control Rod and Drive Mechanism | 02 | | | | | | | | | | | Reactor Water | 2.9/3.0 | 1 |
| 201004 RSCS | | | | | | 03 | | | | | | Rod movement information | 3.2/3.2 | 1 |
| 201006 RWM | | | | | | | | | | | | | | |
| 202001 Recirculation | | | | | | | 07 | | | | | Recirculation pump speed | 2.7/2.8 | 1 |
| 204000 RWCU | | | | | | | | | | 05 | | System Pressure RO ONLY | 2.9/2.8 | 1 |
| 205000 Shutdown Cooling | <u> </u> | | | | • | 08 | | | | | | RHR service water: Plant-Specific RO ONLY | 3.5/3.7 | 1 |
| 214000 RPIS | | | | | | | | | | | | | | |
| 215002 RBM | 01 | | | | | | | | | | | APRM RO ONLY | 2.9/3.0 | 1 |
| 219000 RHR/LPCI: Torus/Pool Cooling Mode | ļ | | | | | | | | | | | | <u> </u> | |
| 226001 RHR/LPCI: CTMT Spray Mode | | | 02 | | | | | | | | | Contt/drywell/suppression chamber temp | 3.5/3.5 | 1 |
| 230000 RHR/LPCI: Torus/Pool Spray Mode | | | | | | | | 05 | | | | A.C. electrical failures | 3.3/3.6 | 1 |
| 239001 Main and Reheat Steam | | | | | | | | | | | | | | |
| 245000 Main Turbine Gen. and Auxiliaries | | | 04 | | | | | | | | | Reactor feedwater system | 3.3/3.5 | 1 |
| 256000 Reactor Condensate | <u>.</u> | 01 | | | | | | | | | | System pumps | 2.7/2.8 | 1 |
| 262001 AC Electrical Distribution | | | | | | | | | | | | | | |
| 262002 UPS (AC/DC) | | | | 01 | | | | | | | | Transfer from preferred power to alternate power supplies RO ONLY | 3.1/3.4 | 1 |
| 263000 DC Electrical Distribution | <u> </u> | | | | | 01 | | | | | | A.C. electrical distribution | 3.2/3.5 | 1 |
| 271000 Offgas | | | | | 06 | | | | | | | Catalytic recombination | 2.7/2.7 | 1 |
| 272000 Radiation Monitoring | | | | | | | | | | | 2.3.1 | Knowledge of 10 CFR: 20 and related facility radiation control requirements. | 2.6/3.0 | 1 |
| 286000 Fire Protection | | | | 02 | | | | | | | | Pumps Automatic system initiation | 3.3/3.5 | 1 |
| 290001 Secondary CTMT | | | | | | | | | 01 | | | Secondary containment isolation | 3.9/4.0 | 1 |
| 290003 Control Room HVAC | | | | 01 | | | | | | <u> </u> | | System initiations/reconfiguration | 3.1/3.2 | 1 |
| 300000 Instrument Air | | $oxed{oxed}$ | | | 01 | | | | | | | Air compressors RO ONLY | 2.5/2.5 | 1 |
| 400000 Component Cooling Water | 01 | | | | <u> </u> | <u> </u> | <u> </u> | <u></u> | | | | Service water system RO ONLY | 3.2/3.3 | 1 |
| K/A Category Point Totals: | 3 | 1 | 2 | 3 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | Group Point Total: | | 19 |

| ES-401 | | | | | B\ Pla | WR RO | D Exam stems | ninatio - Tier 2 | n Outli 2/Grou | ne o 3 | | | Form | ES-401-2 |
|---|----|----------|----------|----|------------|-------|-----------------|---------------------|-------------------|-----------|-----|--------------------------------|------------|------------|
| System # / Name | K1 | K2 | КЗ | K4 | K 5 | K6 | A1 | A2_ | АЗ | A4 | G | K/A Topic(s) | Imp. | Points |
| 215001 Traversing In-core Probe | | | | | | | 03 | | | | | Valve status: Mark-I&II | 2.6/2.8 | 1 |
| 233000 Fuel Pool Cooling and Cleanup | | | 01 | | | | | | | | | Fuel pool temperature | 3.2/3.4 | 1 |
| 234000 Fuel Handling Equipment | _ | | <u> </u> | | | | | | | | | | | |
| 239003 MSIV Leakage Control | | <u> </u> | | | | 03 | | | | | | Nuclear boiler instrumentation | 2.6/2.9 | 1 |
| 268000 Radwaste | | | | | | | | | | | | | | |
| 288000 Plant Ventilation | | | | _ | | | | | | | | | | <u>-</u> - |
| 290002 Reactor Vessel Internals | | | | | | | | 01 | | | | LOCA RO ONLY | 3.7/4.0 | 1 |
| | | | | | | | | | | | | | | |
| K/A Category Point Totals: | | | 1 | | | 1 | 1 | 1 | | | | Group Point Total: | | 4 |
| | | | | | | Plan | t-Spec | ific Pri | orities | | | | | |
| System / Topic_ | | | | · | | Rec | omme | nded F | Replac | ement | for | Reason | | Points |
| | | | | | | | | | | | | | | |
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| Plant-Specific Priority Total: (limit 10) | | | | | | | | | | | | | | |

| Facility: BF | N | Date of Exam: | Exam L | evel:RO |
|--------------------------|-----------|--|---------|---------|
| Category | K/A # | Topic | lmp. | Points |
| | 2.1.7 | Ability to evaluate plant performance based on operating characteristic RO ONLY | 3.7/4.0 | 1 |
| Conduct of | 2.1.27 | Knowledge of system purpose or function (CFR: 41.7) RO ONLY | 2.8/2.9 | |
| Operations | 2.1.28 | Knowledge of the purpose and function of major system components and controls. (CFR: 41.7) | 3.2/3.3 | 1 |
| | 2.1.29 | Knowledge of how to conduct and verify valve lineups.(CFR: 41.10 / 45.1 / 45.12) RO ONLY | 3.4/3.3 | 1 |
| | Total | | | 4 |
| | 2.2.3 | (multi-unit) Knowledge of the design / procedural / and operational differences between units.(CFR: 41 / 43 / 45) RO ONLY | 3.1/3.3 | 1 |
| Equipment | 2.2.13 | Knowledge of tagging and clearance procedures.(CFR: 41.10 / 45.13) RO ONLY | 3.6/3.8 | 1 |
| Control | Total | | | 2 |
| | 2.3.1 | Knowledge of 10 CFR: 20 and related facility radiation control requirements. (CFR: 41.12 / 43.4. 45.9 / 45.10) | 2.6/3.0 | 1 |
| Radiation | 2.3.2 | Knowledge of facility ALARA program. (CFR: 41.12 / 43.4 / 45.9 / 45.10) | 2.5/2.9 | 1 |
| Control | Total | | | 2 |
| | 2.4.2 | Knowledge of system set points / interlocks and automatic actions associated with EOP entry conditions.(CFR: 41.7 / 45.7 / 45.8) RO ONLY | 3.9/4.1 | 1 |
| Emergency Procedures/ | 2.4.3 | Ability to identify post-accident instrumentation. (CFR: 41.6 / 45.4) | 3.5/3.8 | 1 |
| Plan | 2.4.12 | Knowledge of general operating crew responsibilities during emergency operations. (CFR: 41.10 / 45.12) | 3.4/3.9 | 1 |
| | 2.4.17 | Knowledge of EOP terms and definitions.(CFR: 41.10 / 45.13) | 3.1/3.8 | 1 |
| | 2.4.27 | Knowledge of fire in the plant procedures (CFR 41.10/43.5/45.13) RO ONLY | 3.0/3.5 | 1 |
| L | Total | | | 5 |
| Tier 3 Point To | otal (RO) | | | 13 |

| Facility: | Date | of Ex | am: | | E: | xam | Leve | l: | | | | | |
|----------------------|----------------|--------|---------|--------|--------|--------|--------|--------|--------|--|--------|--------|----------------|
| | | | | | K/A | \ Cat | egor | y Poi | nts | | | | |
| Tier | Group | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G * | Point Total |
| 1. | 1 | 2 | 2 | 2 | | | | 6 | 7 | | | 7 | 26 |
| Emergency & Abnormal | 2 | 2 | 5 | 2 | | | | 4 | 2 | | | 2 | 17 |
| Plant Evolutions | Tier Totals | 4 | 7 | 4 | | | | 10 | 9 | · 100 100 100 100 100 100 100 100 100 10 | | 9 | 43 |
| | 1 | 3 | 1 | 3 | 3 | 2 | 3 | 2 | 1 | 3 | 1 | 1 | 23 |
| 2. Plant | 2 | | | 2 | 2 | 1 | 3 | 2 | 1 | | 1 | 1 | 13 |
| Systems | 3 | 1 | 1 | 1 | | | | 1 | | | | | 4 |
| | Tier Totals | 4 | 2 | 6 | 5 | 3 | 6 | 5 | 2 | 3 | 2 | 2 | 40 |
| 3. Generic K | nowledge ai | nd Ab | ilities | 3 | Ca | ıt 1 | Ca | at 2 | Ca | at 3 | Са | t 4 | - 11 |
| | | | | | 4 | | | 5 | | 3 | í | 5 | 17 |

- 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 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 | | E | merge | ncy an | BWR S | BRO Exami ormal Plant | ination Outline t Evolutions - Tier 1/Group 1 | Form | ES-401- |
|---|----------|----|-------|--------|------------|--------------------------|---|--------------------|---------|
| E/APE # / Name / Safety Function | K1 | K2 | КЗ | ΑI | A 2 | G | K/A Topic(s) | Imp. | Points |
| 295003 Partial or Complete Loss of AC Pwr / 6 | 01 | | | • | | 2.4.16 | Effect of battery discharge rate on capacity Knowledge of EOP implementation hierarchy and coordination with other support procedures. SRO ONLY | 2.7/2.9 3.0/4.0 | 1 |
| 295006 SCRAM / 1 | 01 | | | | | | Decay heat generation and removal | 3.7/3.9 | 1 |
| 295007 High Reactor Pressure / 3 | | | | 05 | 02 | | Reactor/turbine pressure regulating system Reactor power SRO ONLY | 3.7/3.8 4.1/4.1 | 1 |
| 295009 Low Reactor Water Level / 2 | <u> </u> | | | 04 | <u> </u> | | Reactor water cleanup | 2.7/2.7 | 1 |
| 295010 High Drywell Pressure / 5 | | 01 | | | | 2.4.4 | Suppression pool level are entry-level conditions for emergency and abnormal operating procedures .SRO ONLY | 3.2/3.3 4.0/4.3 | 1 |
| 295013 High Suppression Pool Temp. / 5 | | | 01 | | | | Suppression pool cooling operation | 3.6/3.8 | 1 |
| 295014 Inadvertent Reactivity Addition / 1 | | | | | 03 | | Cause of reactivity addition. SRO ONLY | 4.0/4.3 | 1 |
| 295015 Incomplete SCRAM / 1 | | | | 01 | | | CRD hydraulics | 3.8/3.9 | 1 |
| 295016 Control Room Abandonment / 7 | | | | 02 | 06 | | Reactor/turbine pressure regulating system Cooldown rate SRO ONLY | 2.9/3.1 3.3/3.5 | 1 |
| 295017 High Off-site Release Rate / 9 | | | | | <u> </u> | | | | |
| 295023 Refueling Accidents Cooling Mode / 8 | | | | | 05 | | Entry conditions of emergency plan SRO ONLY | 3.2/4.6 | 1 |
| 295024 High Drywell Pressure / 5 | | | | 04 | | | RHR/LPCI | 4.1/3.9 | 1 |
| 295025 High Reactor Pressure / 3 | | | | | | 2.1.28 | Knowledge of the purpose and function of major system components and controls. | 3.2/3.3 | 1 |
| 295026 Suppression Pool High Water Temp. / 5 | | | | | 01 | | Suppression pool temperature. SRO ONLY | 3.8/4.0 | 1 |
| 295027 High Containment Temperature / 5 | <u> </u> | | | | | 2.4.11 | Knowledge of abnormal condition procedures. SRO ONLY | 3.4/3.6 | 1 |
| 295030 Low Suppression Pool Water Level / 5 | | | | | 01 | 2.1.32 | Suppression pool level (SRO Exam ONLY - not SRO level only) Ability to explain and apply system limits and precautions. SRO ONLY | 4.1/4.2 3.4/3.8 | 1 |
| 295031 Reactor Low Water Level / 2 | | | 05 | | | | Emergency depressurization | 4.2/4.3 | 1 |
| 295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1 | | 01 | | | 01 | | RPS Reactor power | 4.2/4.3 4.2/4.3 | 1 |
| 295038 High Off-site Release Rate / 9 | | | | | 01 | 2.4.7 | Off site Knowledge of event based EOP mitigation strategies. SRO ONLY | 3.3/4.3 3.1/3.8 | 1 1 |
| 500000 High Containment Hydrogen Conc. / 5 | | | | 05 | | | Wetwell sprays | 3.3/3.3 | 1 |
| K/A Category Totals: | 2 | 2 | 3 | 5 | 7 | | Group Point Total: | <u></u> | 26 |

| ES-401 | | Eı | mergei | ncy an | SWR S | RO Exami ormal Plant | nation Outline Evolutions - Tier 1/Group 2 | Form | ES-401-1 |
|--|----------|----|--------|--------|-----------|-------------------------|--|--------------------|----------|
| E/APE # / Name / Safety Function | K1 | K2 | КЗ | A1 | A2 | G | K/A Topic(s) | lmp. | Points |
| 295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4 | | | | 01 | | | Recirculation system | 3.5/3.6 | 1 |
| 295002 Loss of Main Condenser Vacuum / 3 | | | 03 | | | | Turbine Trip | 3.4/3.4 | 1 |
| 295004 Partial or Total Loss of DC Pwr / 6 | | 03 | | | | | D.C. bus loads | 3.3/3.3 | 1 |
| 295005 Main Turbine Generator Trip / 3 | 01 | | | | | | Pressure effects on reactor power | 4.0/4.1 | 1 |
| 295008 High Reactor Water Level / 2 | | 02 | | | | | Reactor feedwater system | 3.6/3.8 | 1 |
| 295011 High Containment Temperature / 5 | | | | | | | | <u> </u> | |
| 295012 High Drywell Temperature / 5 | | | | | | | | <u> </u> | |
| 295018 Partial or Total Loss of CCW / 8 | | | | | 04 | | System Flow. SRO ONLY | 2.9/2.9 | 1 |
| 295019 Partial or Total Loss of Inst. Air / 8 | | | | 01 | | | Backup air supply | 3.5/3.3 | 1 |
| 295020 Inadvertent Cont. Isolation / 5 & 7 | <u> </u> | 03 | | | | | Drywell/containment ventilation/cooling: Plant- Specific | 3.1/3.3 | 1 |
| 295021 Loss of Shutdown Cooling / 4 | | | | 03 | | 2.2.6 | Adequate core cooling Knowledge of the process for making changes in procedures as described in the safety analysis report. SRO ONLY | 3.9/3.9 2.3/3.3 | 1 |
| 295022 Loss of CRD Pumps / 1 | | | | | 01 | | Accumulator pressure. SRO ONLY | 3.5/3.6 | 1 |
| 295028 High Drywell Temperature / 5 | 02 | | | | | | Equipment environmental qualification | 2.9/3.1 | 1 |
| 295029 High Suppression Pool Water Level / 5 | | | | | | | | | |
| 295032 High Secondary Containment Area Temperature / 5 | | | 03 | | | | Isolating affected systems | 3.8/3.9 | 1 |
| 295033 High Sec. Cont. Area Rad. Levels / 9 | | | | 04 | | | SBGT | 4.2/4.2 | 1 |
| 295034 Sec. Cont. Ventilation High Rad. / 9 | | 02 | | | | | Area radiation monitoring system | 3.8/3.9 | 1_ |
| 295035 Secondary Containment High Differential Pressure / 5 | | 01 | | į | | | Radwaste | 3.1/3.4 | 1 |
| 295036 Secondary Containment High Sump/Area Water Level / 5 | | | | | | - | | | |
| 600000 Plant Fire On Site / 8 | | | | | | 2.1.27 | Knowledge system purpose and or function | 2.8/2.9 | <u> </u> |
| K/A Category Point Totals: | 2 | 5 | 2 | 4 | 2 | 2 | Group Point Total: | | 17 |

| ES-401 BWR SRO Examination Outline Plant Systems - Tier 2/Group 1 | | | | | | | | | Form ES | 3-401-1 | | | | |
|---|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--|--------------------|----------|
| System # / Name | K1 | К2 | КЗ | K4 | K5 | K6 | Α1 | A2 | А3 | A4 | G | K/A Topic(s) | lmp. | Pts_ |
| 201005 RCIS | | • | | | | | | | | | | | ļ <u>-</u> | |
| 202002 Recirculation Flow Control | | | | 02 | | | | | | | 2.4.3 | Recirculation pump speed control identify post-accident instrumentation. | 3.0/3.0 3.5/3.8 | 1 |
| 203000 RHR/LPCI: Injection Mode | | | 02 | | | | | | | | | Suppression pool level | 3.5/3.5 | 1 |
| 206000 HPCI | | | | | | | 03 | | | | | Condensate storage tank level | 3.5/3.6 | 1 |
| 207000 Isolation (Emergency) Condenser | | | | | | | | | | | | | | |
| 209001 LPCS | ļ | 03 | | | | | | | | | | Initiation logic | 2,9/3.1 | 1 |
| 209002 HPCS | | | | | | | | | | | ļ | | | |
| 211000 SLC | <u> </u> | | | | | 03 | | | | | | A.C. power | 3.2/3.3 | 1 |
| 212000 RPS | | | | 07 | | | , | | | _ | | Manual System Activation | 4.1/4.1 | 1 |
| 215004 SRM | | | | | | 02 | | | | | | 24/48 volt D.C. power | 3.1/3.2 | 1 |
| 215005 APRM / LPRM | | | | | | | | 03 | | | ļ | Inoperative trip (all causes) | 3.6/3.8 | 1 |
| 216000 Nuclear Boiler Instrumentation | | | | | | | ļ | | | 01 | <u> </u> | Recorders | 3.3/3.1 | 1 |
| 217000 RCIC | | | | ! | 02 | | | | 04 | | | Flow indication System Flow | 3.1/3.1 3.6/3.5 | 1 |
| 218000 ADS | | | | | 01 | | | | | | | ADS logic operation | 3.8/3.8 | 1 |
| 223001 Primary CTMT and Auxiliaries | | | 03 | | | <u> </u> | | | | | <u> </u> | Contain/drywell pressure: Plant-Specific | 3.4/3.5 | 1 |
| 223002 PCIS/Nuclear Steam Supply Shutoff | 07 | | <u>.</u> | | | | | <u> </u> | <u> </u> | | | Reactor core isolation cooling; | 3.4/3.6 | 1 |
| 226001 RHR/LPCI: CTMT Spray Mode | | <u> </u> | 02 | | | | | | | <u> </u> | | Contt/drywell/suppression chamber temp | 3.5/3.5 | 1 |
| 239002 SRVs | <u> </u> | | <u> </u> | | | ļ | | ļ | 08 | | | Tail pipe temperatures | 3.6/3.6 | 1 |
| 241000 Reactor/Turbine Pressure Regulator | 27 | <u> </u> | | <u> </u> | ļ | <u> </u> | | | | | | Condenser vacuum | 3.1/3.1 | 1 |
| 259002 Reactor Water Level Control | 04 | | | | | | 01 | | | | | Reactor feedwater flow Reactor water level | 3.5/3.6 3.8/3.8 | 1 |
| 261000 SGTS | | | | | | 09 | | | | | | Primary containment high pressure | 3.1/3.3 | 1 |
| 262001 AC Electrical Distribution | | <u> </u> | | | <u> </u> | | <u> </u> | | | | | | | <u> </u> |
| 264000 EDGs | | | | 01 | | | | | <u> </u> | | | Emergency generator trips (normal) | 3.5/3.7 | 1 |
| 290001 Secondary CTMT | | | | | <u></u> | <u> </u> | | | 01 | | <u> </u> | Secondary containment isolation | 3 9/4 0 | 1 |

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|----------------------------|-------|---|---|---|---|---|---|------------|---|-----|--------------------|----|
| | | | | | | | | L | | l . | 1 | 22 |
| K/A Category Point Totals: | 3 1 | 3 | 3 | 2 | 3 | 1 | 2 | <u> 3</u> | 1 | 1 | Group Point Total: | |
| | | | | | | _ | | - | | | | ·- |

| ES-401 | BWR SRO Examination Outline Plant Systems - Tier 2/Group 2 | | | | | | | | | | Form ES-401-1 | | | |
|--|--|----------|----------|----------|----|----------|-----|----------|------------|----------|---------------|--|--------------|--|
| System # / Name | K1 | K2 | КЗ | K4 | K5 | K6 | A1_ | A2 | A 3 | A4 | G | K/A Topic(s) | lmp. | Pts |
| 201001 CRD Hydraulic | | | | | | | | | | 04 | | CRD pumps Drive water header pressure control valve | 3.1/3.0 | 1 |
| 201002 RMCS | | | | | | | | | | | | | | — |
| 201004 RSCS | | | | | | 03 | | | | | | Rod movement information | 3.2/3.2 | 1 |
| 201006 RWM | | | | | | | | | | | | | | |
| 202001 Recirculation | | _ | | | | <u> </u> | 07 | | <u> </u> | | | Recirculation pump speed | 2.7/2.8 | 1 |
| 204000 RWCU | <u> </u> | | _ | | | | _ | | | ļ | | | <u> </u> | |
| 205000 Shutdown Cooling | | ļ | | | | | | | | | | | <u> </u> | ├ |
| 214000 RPIS | <u> </u> | <u> </u> | _ | | | | | | | | | | <u> </u> | |
| 215002 RBM | <u> </u> | ļ | | | | | | | | | | | | ├─ |
| 215003 IRM | | <u> </u> | 01 | | | | | | | | | RPS | 3.9/4.0 | 1 |
| 219000 RHR/LPCI: Torus/Pool Cooling Mode | ļ | <u> </u> | <u> </u> | _ | | | | <u> </u> | <u> </u> | ļ | | | - | ├ |
| 230000 RHR/LPCI: Torus/Pool Spray Mode | <u> </u> | | ļ | | | | | 05 | ļ | <u> </u> | | A.C. electrical failures | 3.3/3.6 | 1 |
| 234000 Fuel Handling Equipment | | | _ | | | | | | <u> </u> | <u> </u> | _ | | | |
| 239003 MSIV Leakage Control | | | | <u>.</u> | | 03 | | | <u> </u> | _ | | Nuclear boiler instrumentation | 2.6/2.9 | 1 |
| 245000 Main Turbine Gen, and Auxiliaries | | | 04 | ļ | | <u> </u> | ļ | <u> </u> | | <u> </u> | | Reactor feedwater system | 3.3/3.5 | 1 |
| 259001 Reactor Feedwater | <u> </u> | | | | | _ | 06 | _ | | <u> </u> | | Feedwater heater level | 2.7/2.7 | 1 |
| 262002 UPS (AC/DC) | | <u> </u> | | <u> </u> | ļ | <u> </u> | | _ | | <u> </u> | <u> </u> | | - | |
| 263000 DC Electrical Distribution | | <u> </u> | | <u> </u> | | 01 | | | | | | A.C. electrical distribution | 3.2/3.5 | 1 |
| 271000 Offgas | | | | | 06 | | | | | | ! | Catalytic recombination | 2.7/2.7 | 1_ |
| 272000 Radiation Monitoring | į | | 3 | | i | | | | | | 2.3.1 | Knowledge of 10 CFR: 20 and related facility radiation control requirements. | 2.6/3.0 | 1 |
| 286000 Fire Protection | | | | 02 | | | | | | | | Pumps Automatic system initiation | 3.3/3.5 | 1 |
| 290003 Control Room HVAC | | | | 01 | | | | | | | | System initiations/reconfiguration | 3.1/3.2 | 1 |
| 300000 Instrument Air | | | | | | | | | | | | | | <u> </u> |
| 400000 Component Cooling Water | | | | | | | | | | <u> </u> | | | | |

| K/A Category Point Totals: | 0_ | 0 | 2 | 2 | 1 | 3 | 2 | 1 0 | 1 | 1 | | Group Point Total: | | 13 |
|---|----|----|----|----|----------|------|------------------------------------|-----------|----------|----------|-------------------------------|-------------------------|---------|--------|
| | | | | | | | | | | | | | | |
| ES-401 BWR SRO Examination Outline Form ES Plant Systems - Tier 2/Group 3 | | | | | | | | | | | | ES-401-1 | | |
| System # / Name | K1 | K2 | кз | K4 | К5 | K6 | A1 | A2 | АЗ | A4 | G | K/A Topic(s) | Imp. | Points |
| 201003 Control Rod and Drive Mechanism | 02 | | | | | | | _ | | | | Reactor Water | 2.9/3.0 | 1 |
| 215001 Traversing In-core Probe | | | | | | | 03 | | <u>.</u> | | | Valve status: Mark-1&II | 2.6/2.8 | 1 |
| 233000 Fuel Pool Cooling and Cleanup | | | 01 | | | | | ļ | | | igspace | Fuel pool temperature | 3.2/3.4 | 1 |
| 239001 Main and Reheat Steam | | | | _ | | | | | | | | | | |
| 256000 Reactor Condensate | | 01 | | | | | | <u> </u> | | | ļ., | System pumps | 2.7/2.8 | 1 |
| 268000 Radwaste | | | | | | | | <u> </u> | | | <u> </u> | | _ | |
| 288000 Plant Ventilation | | | | | | | | | _ | <u> </u> | $oldsymbol{oldsymbol{\perp}}$ | | | |
| 290002 Reactor Vessel Internals | | | | | <u> </u> | | | | | ļ | _ | | | |
| K/A Category Point Totals: | 1 | 1 | 1_ | | | | 1_ | | <u> </u> | | <u> </u> | Group Point Total: | | 4 |
| | | | | | | Plan | t-Specifi | c Priorit | ies | | | | | |
| System / Topic | _ | | | | · | R | Recommended Replacement for Reason | | | | | | | Points |
| Оуоколт торко | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | |
| Plant-Specific Priority Total (limit 10): | | | | | | | | · | | | | | | |

| Facility: BFN | | Date of Exam: | Exam Lev | el: SRO |
|---|---|---|----------|---------|
| Category | K/A # | Topic | Imp. | Points |
| | 2.1.6 | Ability to supervise and assume a management role during plant transients and upset conditions. (CFR: 43.5 / 45.12 / 45.13) SRO ONLY | 2.1/4.3 | 1 |
| Conduct of Operations 2.1.10 Kr lic 2.1.26 Kr ecc | 2.1.10 | Knowledge of conditions and limitations in the facility license.(CFR: 43.1 / 45.13) SRO ONLY | 2.7/3.9 | 1 |
| | Knowledge of non-nuclear safety procedures (e.g. rotating equipment / electrical / high temperature / high pressure / caustic / chlorine / oxygen and hydrogen).(CFR: 41.10 / 45.12) SRO ONLY | 2.2/2.6 | 1 | |
| | 2.1.28 | Knowledge of the purpose and function of major system components and controls. (CFR: 41.7) | 3.2/3.3 | 1 |
| | Total | | | 4 |
| | 2.2.5 | Knowledge of the process for making changes in the facility as described in the safety analysis report.(CFR: 43.3 / 45.13) SRO ONLY | 1.6/2.7 | 1 |
| Equipment Control | 2.2.22 | Knowledge of limiting condition for operations and safety limits.(CFR: 43.2 / 45.2) SRO ONLY | 3.4/4.1 | 1 |
| 2.2.26 Ki 43 2.2.29 Ki 43 2.2.33 Ki | 2.2.26 | Knowledge of refueling adminstrative requirements.(CFR: 43.5 / 45.13) SRO ONLY | 2.5/3.7 | 1 |
| | Knowledge of SRO fuel handling responsibilities. (CFR: 43.6 / 45.12) SRO ONLY | 1.6/3.8 | 1 | |
| | Knowledge of control rod programming. (CFR: 43.6) SRO ONLY | 2.5/2.9 | 1 | |
| | Total | | | 5 |
| | 2.3.1 | Knowledge of 10 CFR: 20 and related facility radiation control requirements. (CFR: 41.12 / 43.4. 45.9 / 45.10) | 2.6/3.0 | 1 |
| Radiation | 2.3.2 | Knowledge of facility ALARA program. (CFR: 41.12 / 43.4 / 45.9 / 45.10) | 2.5/2.9 | 1 |
| Control | Radiation | Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.(CFR: 43.4 / 45.10) SRO ONLY | 2.9/3.3 | 1 |
| | Total | | | 3 |
| | 2.4.1 | Knowledge of EOP entry conditions and immediate action steps.(CFR: 41.10 / 43.5 / 45.13) SRO ONLY | 4.3/4.6 | 1 |
| Emergency Procedures/ | 2.4.3 | Ability to identify post-accident instrumentation. (CFR: 41.6 / 45.4) | 3.5/3.8 | 1 |
| Plan | 2.4.12 | Knowledge of general operating crew responsibilities during emergency operations. (CFR: 41.10 / 45.12) | 3.4/3.9 | 1 |
| | 2.4.17 | Knowledge of EOP terms and definitions.(CFR: 41.10 / 45.13) | 3.1/3.8 | 1 |
| | 2.4.29 | Knowledge of the Emergency Plan (CFR 43.5/45.11) SRO ONLY | 2.6/4.0 | 1 |
| | Total | | | 5 |
| Tier 3 Point Tota | al (SRO) | | | 17 |