Facility: Cooper Nuclear Station Date of Exam: February 16, 2015

| 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 | | | 4 | 3 | N/A | | 3 | 20 | 3 | 4 | 7 |
| | 2 | 1 | 1 | 1 | | | | 1 | 1 | | | 2 | 7 | 2 | 1 | 3 |
| | Tier Totals | 4 | 4 | 5 | | | | 5 | 4 | | | 5 | 27 | 5 | 5 | 10 |
| 2. Plant Systems | 1 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 26 | 3 | 2 | 5 |
| | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 12 | 0 1 | 2 | 3 |
| | Tier Totals | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 5 | 4 | 4 | 38 | 4 | 4 | 8 |
| 3. Generic Knowledge and Abilities Categories | | 1 | | | 2 | | | 3 | | | 4 | | 10 | 1 | 2 | 3 | 4 | 7 |
| | | 3 | | | 2 | | | 3 | | | 2 | | | 2 | 2 | 1 | 2 | |

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

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 | | | X | | | | Knowledge of the reasons for the following responses as they apply to partial or complete loss of forced core flow circulation:<br>(CFR: 41.5 / 45.6)<br><br>AK3.04 Reactor SCRAM | 3.4 | 1 |
| 295003 Partial or Complete Loss of AC / 6 | | | | X | | | Ability to operate and/or monitor the following as they apply to partial or complete loss of A.C. power:<br>(CFR: 41.7 / 45.6)<br><br>AA1.03 Systems necessary to assure safe plant shutdown | 4.3 | 2 |
| 295004 Partial or Total Loss of DC Pwr / 6 | | | | | X | | Ability to determine and/or interpret the following as they apply to partial or complete loss of D.C. power:<br>(CFR: 41.10 / 43.5 / 45.13)<br><br>AA2.01 Cause of partial or complete loss of D.C. power | 3.2 | 3 |
| 295005 Main Turbine Generator Trip / 3 | | | | | | X | 2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation.<br>(CFR: 41.10 / 43.5 / 45.2 / 45.6) | 4.3 | 4 |
| 295006 SCRAM / 1 | X | | | | | | Knowledge of the operational implications of the following concepts as they apply to SCRAM :<br>(CFR: 41.8 to 41.10)<br><br>AK1.01 Decay heat generation and removal | 3.7 | 5 |
| 295016 Control Room Abandonment / 7 | | X | | | | | Knowledge of the interrelations between control room abandonment and the following:<br>(CFR: 41.7 / 45.8)<br><br>~~AK2.03 Control room HVAC~~<br>AK2.01 Remote shutdown panel: Plant-Specific | ~~2.9~~<br><br>4.4 | 6 |
| 295018 Partial or Total Loss of CCW / 8 | | | X | | | | Knowledge of the reasons for the following responses as they apply to partial or complete loss of component cooling water:<br>(CFR: 41.5 / 45.6)<br><br>AK3.03 Securing individual components (prevent equipment damage) | 3.1 | 7 |
| 295019 Partial or Total Loss of Inst. Air / 8 | | | | X | | | Ability to operate and/or monitor the following as they apply to partial or complete loss of instrument air:<br>(CFR: 41.7 / 45.6)<br><br>AA1.02 Instrument air system valves: Plant-Specific | 3.3 | 8 |
| 295021 Loss of Shutdown Cooling / 4 | | | | | X | | Ability to determine and/or interpret the following as they apply to loss of shutdown cooling:<br>(CFR: 41.10 / 43.5 / 45.13)<br><br>~~AA2.07 Reactor recirculation flow~~<br>AA2.01 Reactor water heatup/cooldown rate | ~~2.9~~<br><br>3.5 | 9 |
| 295023 Refueling Acc / 8 | | | | | | X | 2.2.40 Ability to apply Technical Specifications for a system.<br>(CFR: 41.10 / 43.2 / 43.5 / 45.3) | 3.4 | 10 |
| 295024 High Drywell Pressure / 5 | X | | | | | | Knowledge of the operational implications of the following concepts as they apply to high drywell pressure:<br>(CFR: 41.8 to 41.10)<br><br>EK1.01 Drywell integrity: Plant-Specific | 4.1 | 11 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 295025 High Reactor Pressure / 3 | | X | | | | | Knowledge of the interrelations between high reactor pressure and the following:<br>(CFR: 41.7 / 45.8)<br><br>EK2.07 RCIC: Plant-Specific | 3.7 | 12 |
| 295026 Suppression Pool High Water Temp. / 5 | | | X | | | | Knowledge of the reasons for the following responses as they apply to suppression pool high water temperature:<br>(CFR: 41.5 / 45.6)<br><br>~~EK3.05 Reactor SCRAM~~<br>EK3.04 SBLC injection. | ~~3.9~~<br><br>3.7 | 13 |
| 295028 High Drywell Temperature / 5 | | | | X | | | Ability to operate and/or monitor the following as they apply to high drywell temperature:<br>(CFR: 41.7 / 45.6)<br><br>EA1.01 Drywell spray: Mark-I&II | 3.8 | 14 |
| 295030 Low Suppression Pool Wtr Lvl / 5 | | | | | X | | Ability to determine and/or interpret the following as they apply to low suppression pool water level:<br>(CFR: 41.10 / 43.5 / 45.13)<br><br>EA2.02 Suppression pool temperature | 3.9 | 15 |
| 295031 Reactor Low Water Level / 2 | | | | | | X | 2.4.2 Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.<br>(CFR: 41.7 / 45.7 / 45.8) | 4.5 | 16 |
| 295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1 | X | | | | | | Knowledge of the operational implications of the following concepts as they apply to scram condition present and reactor power above APRM downscale or unknown:<br>(CFR: 41.8 to 41.10)<br><br>EK1.05 Cold shutdown boron weight: Plant-Specific | 3.4 | 17 |
| 295038 High Off-site Release Rate / 9 | | X | | | | | Knowledge of the interrelations between high off-site release rate and the following:<br>(CFR: 41.7 / 45.8)<br><br>EK2.02 Offgas system | 3.6 | 18 |
| 600000 Plant Fire On Site / 8 | | | X | | | | Knowledge of the reasons for the following responses as they apply to plant fire on site:<br><br>AK3.04 Actions contained in the abnormal procedure for plant fire on site | 2.8 | 19 |
| 700000 Generator Voltage and Electric Grid Disturbances / 6 | | | | X | | | Ability to operate and/or monitor the following as they apply to generator voltage and electric grid disturbances:<br>(CFR: 41.5 and 41.10 / 45.5, 45.7, and 45.8 )<br><br>AA1.01 Grid frequency and voltage | 3.6 | 20 |
| K/A Category Totals: | 3 | 3 | 4 | 4 | 3 | 3 | Group Point Total: | | 20 |

| ES-401 | BWR Examination Outline<br>Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO) | | | | | | | Form ES-401-1 | |
|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | X | 2.4.50 Ability to verify system alarm setpoints and operate controls identified in \| the alarm response manual. (CFR: 41.10 / 43.5 / 45.3) | 4.2 | 21 |
| 295013 High Suppression Pool Temp. / 5 | X | | | | | | Knowledge of the operational implications of the following concepts as they apply to high suppression pool temperature: (CFR: 41.8 to 41.10)<br><br>AK1.03 Localized heating | 3.0 | 22 |
| 295022 Loss of CRD Pumps / 1 | | X | | | | | Knowledge of the interrelations between loss of CRD pumps and the following: (CFR: 41.7 / 45.8)<br><br>AK2.02 CRD mechanism | 3.1 | 23 |
| 295033 High Secondary Containment Area Radiation Levels / 9 | | | X | | | | Knowledge of the reasons for the following responses as they apply to high secondary containment area radiation levels: (CFR: 41.5 / 45.6)<br><br>EK3.02 Reactor SCRAM | 3.5 | 24 |
| 295034 Secondary Containment Ventilation High Radiation / 9 | | | | X | | | Ability to operate and/or monitor the following as they apply to secondary containment ventilation high radiation: (CFR: 41.7 / 45.6)<br><br>EA1.03 Secondary containment ventilation | 4.0 | 25 |
| 295035 Secondary Containment High Differential Pressure / 5 | | | | | X | | Ability to determine and/or interpret the following as they apply to secondary containment high differential pressure: (CFR: 41.8 to 41.10)<br><br>EA2.02 Off-site release rate: Plant-Specific | 2.8 | 26 |
| 500000 High CTMT Hydrogen Conc. / 5 | | | | | | X | ~~2.4.31 Knowledge of annunciator alarms, indications, or response procedures. (CFR: 41.10 / 45.3)~~<br>2.4.21 Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc. (CFR: 41.7 / 43.5 / 45.12) | ~~4.2~~<br><br>4.0 | 27 |
| K/A Category Point Totals: | 1 | 1 | 1 | 1 | 1 | 2 | Group Point Total: | | 7 |

| ES-401 | BWR Examination Outline<br>Plant Systems - Tier 2/Group 1 (RO) | | | | | | | | | | | Form ES-401-1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | | X | | | Ability to monitor automatic operations of the RHR/LPCI: injection mode (plant specific) including:<br>(CFR: 41.7 / 45.7)<br><br>A3.03 Pump discharge pressure | 3.7 | 28 |
| 205000 Shutdown Cooling | | | | | | | | | | X | | Ability to manually operate and/or monitor in the control room:<br>(CFR: 41.7 / 45.5 to 45.8)<br><br>A4.07 Reactor temperatures (moderator, vessel, flange) | 3.7 | 29 |
| 206000 HPCI | | | | | | | | | | | X | ~~2.2.25 Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.~~<br>~~(CFR: 41.5 / 41.7 / 43.2)~~<br>2.2.39 Knowledge of less than or equal to one hour Technical Specification action statements for systems.<br>(CFR: 41.7 / 41.10 / 43.2 / 45.13) | ~~3.2~~<br><br>3.9 | 30 |
| 209001 LPCS | X | | | | | | | | | | | Knowledge of the physical connections and/or cause-effect relationships between low pressure core spray system and the following:<br>(CFR: 41.2 to 41.9 / 45.7 to 45.8)<br><br>K1.01 Condensate storage tank: Plant-Specific | 3.1 | 31 |
| ~~209002 HPCS~~<br><br>259002 Reactor Water Level Control | | | X | | | | | | | | | ~~Knowledge of the effect that a loss or malfunction of the high pressure core spray system (HPCS) will have on following:~~<br>~~(CFR: 41.7 / 45.4)~~<br>~~K3.02 Standby liquid control system: Plant-Specific~~<br>Knowledge of the effect that a loss or malfunction of the REACTOR WATER LEVEL CONTROL SYSTEM will have on following<br>(CFR: 41.7 / 45.4)<br>(CFR: 41.7 / 45.5 to 45.8)<br><br>K3.02 Reactor feedwater system | ~~3.3~~<br><br>3.7 | 32 |
| 211000 SLC | | X | | | | | | | | | | Knowledge of electrical power supplies to the following:<br>(CFR: 41.7)<br><br>K2.02 Explosive valves | 3.1 | 33 |
| 212000 RPS | | | | X | | | | | | | | Knowledge of reactor protection system design feature(s) and/or interlocks which provide for the following:<br>(CFR: 41.7)<br><br>K4.02 The prevention of a reactor SCRAM following a single component failure | 3.5 | 34 |
| 215003 IRM | | | | | X | | | | | | | Knowledge of the operational implications of the following concepts as they apply to intermediate range monitor (IRM) system:<br>(CFR: 41.5 / 45.3)<br><br>K5.01 Detector operation | 2.6 | 35 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 215004 Source Range Monitor | | | | | | X | | | | | | Knowledge of the effect that a loss or malfunction of the following will have on the source range monitor (SRH) system :<br>(CFR: 41.7 / 45.7)<br><br>K6.01 RPS | 3.2 | 36 |
| 215005 APRM / LPRM | | | | | | | X | | | | | Ability to predict and/or monitor changes in parameters associated with operating the average power range monitor/local power range monitor system controls including:<br>(CFR: 41.5 / 45.5)<br><br>A1.03 Control rod block status | 3.6 | 37 |
| 217000 RCIC | | | | | | | | X | | | | Ability to (a) predict the impacts of the following on the reactor core isolation cooling system (RCIC) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:<br>(CFR: 41.5 / 45.6)<br><br>A2.16 Low condensate storage tank level | 3.5 | 38 |
| 218000 ADS | | | | | | | | | X | | | Ability to monitor automatic operations of the automatic depressurization system including:<br>(CFR: 41.7 / 45.7)<br><br>A3.02 ADS valve tail pipe temperatures | 3.6 | 39 |
| 223002 PCIS/Nuclear Steam Supply Shutoff | | | | | | | | | | X | | Ability to manually operate and/or monitor in the control room:<br>(CFR: 41.7 / 45.5 to 45.8)<br><br>A4.06 Confirm initiation to completion | 3.6 | 40 |
| 239002 SRVs | | | | | | | | | | | X | ~~2.1.30 Ability to locate and operate components, including local controls.~~<br>~~(CFR: 41.7 / 45.7)~~<br>~~(CFR: 41.7)~~<br>2.2.12 Knowledge of surveillance procedures.<br>(CFR:41.10 / 45.13) | ~~4.4~~<br>3.7 | 41 |
| 259002 Reactor Water Level Control | X | | | | | | | | | | | Knowledge of the physical connections and/or cause-effect relationships between reactor water level control system and the following:<br>(CFR: 41.2 to 41.9 / 45.7 to 45.8)<br><br>K1.07 Rod worth minimizer: Plant-Specific | 2.6 | 42 |
| 261000 SGTS | | | X | | | | | | | | | Knowledge of the effect that a loss or malfunction of the standby gas treatment system will have on following:<br>(CFR: 41.7 /45.6)<br><br>K3.02 Off-site release rate | 3.6 | 43 |
| 262001 AC Electrical Distribution | | X | | | | | | | | | | Knowledge of electrical power supplies to the following:<br>(CFR: 41.7)<br><br>K2.01 Off-site sources of power | 3.3 | 44 |
| 262002 UPS (AC/DC) | | | | X | | | | | | | | Knowledge of uninterruptable power supply (A.C./D.C.) design feature(s) and/or interlocks which provide for the following:<br>(CFR: 41.7)<br><br>K4.01 Transfer from preferred power to alternate power supplies | 3.1 | 45 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 263000 DC Electrical Distribution | | | | | X | | | | | | | Knowledge of the operational implications of the following concepts as they apply to D.C. electrical distribution:<br>(CFR: 41.5 / 45.3)<br><br>K5.01 Hydrogen generation during battery charging | 2.6 | 46 |
| 264000 EDGs | | | | | | X | | | | | | Knowledge of the effect that a loss or malfunction of the following will have on the emergency generators (diesel/jet):<br>(CFR: 41.7 / 45.7)<br><br>K6.03 Lube oil pumps | 3.5 | 47 |
| 300000 Instrument Air | | | | | | | | | X | | | Ability to monitor automatic operations of the instrument air system including:<br>(CFR: 41.7 / 45.7)<br><br>A3.02 Air temperature | 2.9 | 48 |
| 400000 Component Cooling Water | | | | | | | | X | | | | Ability to (a) predict the impacts of the following on the CCWS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:<br>(CFR: 41.5 / 45.6)<br><br>A2.01 Loss of CCW pump | 3.3 | 49 |
| 211000 SLC | | | | | | | X | | | | | Ability to predict and/or monitor changes in parameters associated with operating the standby liquid control system controls including:<br>(CFR: 41.5 / 45.5)<br><br>A1.07 Reactor power | 4.3 | 50 |
| 215003 IRM | | | | | | | | | | X | | Ability to manually operate and/or monitor in the control room:<br>(CFR: 41.7 / 45.5 to 45.8)<br><br>A4.03 IRM range switches | 3.6 | 51 |
| 215004 Source Range Monitor | | | | | | | | | | | X | 2.4.3 Ability to identify post-accident instrumentation.<br>(CFR: 41.6 / 45.4) | 3.7 | 52 |
| 217000 RCIC | X | | | | | | | | | | | Knowledge of the physical connections and/or cause-effect relationships between reactor core isolation cooling system (RCIC) and the following:<br>(CFR: 41.2 to 41.9 / 45.7 to 45.8)<br><br>~~K1.08 Line fill pump: Plant-Specific~~<br>K1.07 Leak Detection | ~~3.3~~<br><br>3.1 | 53 |
| K/A Category Point Totals: | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | Group Point Total: | | 26 |

| ES-401 | BWR Examination Outline<br>Plant Systems - Tier 2/Group 2 (RO) | | | | | | | | | | | | Form ES-401-1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | | X | | | Ability to monitor automatic operations of the control rod drive hydraulic system including:<br>(CFR: 41.7 / 45.7)<br><br>A3.08 Drive water flow | 3.0 | 54 |
| 201006 RWM | | | | | | | | | | X | | Ability to manually operate and/or monitor in the control room:<br>(CFR: 41.7 / 45.5 to 45.8)<br><br>A4.04 Rod withdrawal error indication | 3.3 | 55 |
| 202001 Recirculation | | | | | | | | | | | X | ~~2.2.36 Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.~~<br>~~(CFR: 41.10 / 43.2 / 45.13)~~<br>2.2.22 Knowledge of limiting conditions for operations and safety limits.<br>(CFR: 41.5 / 43.2 / 45.2) | ~~3.1~~<br><br>4.0 | 56 |
| 204000 RWCU | X | | | | | | | | | | | Knowledge of the physical connections and/or cause-effect relationships between reactor water cleanup system and the following:<br>(CFR: 41.2 to 41.9 / 45.7 to 45.8)<br><br>K1.03 Reactor feedwater system | 3.1 | 57 |
| 216000 Nuclear Boiler Inst. | | X | | | | | | | | | | Knowledge of electrical power supplies to the following:<br>(CFR: 41.7)<br><br>K2.01 Analog trip system: Plant-Specific | 2.8 | 58 |
| 226001 RHR/LPCI: CTMT Spray Mode | | | X | | | | | | | | | Knowledge of the effect that a loss or malfunction of the RHR/LPCI: containment spray system mode will have on following:<br>(CFR: 41.7 / 45.4)<br><br>K3.02 Containment/drywell/suppression chamber temperature | 3.5 | 59 |
| 230000 RHR/LPCI: Torus/Pool Spray Mode | | | | X | | | | | | | | Knowledge of RHR/LPCI: torus/suppression pool spray mode design feature(s) and/or interlocks which provide for the following:<br>(CFR: 41.7)<br><br>K4.05 Pump minimum flow protection | 2.8 | 60 |
| 241000 Reactor/Turbine Pressure Regulator | | | | | X | | | | | | | Knowledge of the operational Implications of the following concepts as they apply to reactor/turbine pressure regulating system :<br>(CFR: 41.5 / 45.3)<br><br>K5.04 Turbine inlet pressure vs. reactor pressure | 3.3 | 61 |
| 259001 Reactor Feedwater | | | | | | X | | | | | | Knowledge of the effect that a loss or malfunction of the following will have on the reactor feedwater system :<br>(CFR: 41.7 / 45.7)<br><br>K6.04 Extraction steam | 2.8 | 62 |
| ~~268000 Radwaste~~<br><br>239001 Main and Reheat Steam | | | | | | | X | | | | | ~~Ability to predict and/or monitor changes in parameters associated with operating the radwaste controls including:~~<br>~~(CFR: 41.5 / 45.5)~~<br><br>~~A1.02 Off-site release~~<br>Ability to predict and/or monitor changes in parameters associated with operating the MAIN AND REHEAT STEAM SYSTEM controls including:<br>(CFR: 41.5 / 45.5~~)~~<br>A1.08 Reactor pressure | ~~2.6~~<br><br>3.8 | 63 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 272000 Radiation Monitoring | | | | | | | | X | | | | Ability to (a) predict the impacts of the following on the radiation monitoring system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:<br>(CFR: 41.5 / 45.6)<br><br>A2.15 Maintenance operations | 2.5 | 64 |
| 288000 Plant Ventilation | | | | | | | | | X | | | Ability to monitor automatic operations of the plant ventilation systems including:<br>(CFR: 41.7 / 45.7)<br><br>A3.01 Isolation/initiation signals | 3.8 | 65 |
| K/A Category Point Totals: | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | Group Point Total: | | 12 |

| ES-401 | BWR Examination Outline<br>Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO) | | | | | | Form ES-401-1 | | |
|---|---|---|---|---|---|---|---|---|---|
| E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | IR | # |
| 295006 SCRAM / 1 | | | | | | X | ~~2.1.32 Ability to explain and apply system limits and precautions.~~<br>~~(CFR: 41.10 / 43.2 / 45.12)~~<br>2.1.6 Ability to manage control room crew during plant transients<br>(CFR: 41.10 / 43.5 / 45.12/45.13) | ~~4.0~~<br>4.8 | 76 |
| 295018 Partial or Total Loss of CCW / 8 | | | | | X | | Ability to determine and/or interpret the following as they apply to partial or complete loss of component cooling water:<br>(CFR: 41.10 / 43.5 / 45.13)<br><br>AA2.03 Cause for partial or complete loss | 3.5 | 77 |
| 295019 Partial or Total Loss of Inst. Air / 8 | | | | | | X | ~~2.4.20 Knowledge of the operational implications of EOP warnings, cautions, and notes.~~<br>~~(CFR: 41.10 / 43.5 / 45.13)~~<br>2.4.4 Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures..<br>(CFR: 41.10 / 43.2 / 45.6) | ~~4.3~~<br>4.7 | 78 |
| 295023 Refueling Acc / 8 | | | | | X | | Ability to determine and/or interpret the following as they apply to refueling accidents :<br>(CFR: 41.10 / 43.5 / 45.13)<br><br>AA2.05 Entry conditions of emergency plan | 4.6 | 79 |
| ~~295027 High Containment Temperature / 5~~<br>295028 High Drywell Temperature / 5 | | | | | | X | ~~2.4.46 Ability to verify that the alarms are consistent with the plant conditions.~~<br>~~(CFR: 41.10 / 43.5 / 45.3 / 45.12)~~<br><br>2.4.11 Knowledge of abnormal condition procedures.<br>(CFR: 41.10 / 43.5 / 45.13) | ~~4.2~~<br>4.2 | 80 |
| ~~295038 High Off-site Release Rate / 9~~<br>295005 Main Turbine Generator Trip / 3 | | | | | X | | ~~Ability to determine and/or interpret the following as they apply to high off-site release rate:~~<br>~~(CFR: 41.10 / 43.5 / 45.13)~~<br><br>~~EA2.04 Source of off-site release~~<br>Ability to determine and/or interpret the following as they apply to MAIN TURBINE GENERATOR TRIP:<br><br>AA2.08 Electrical distribution status | ~~4.5~~<br>3.3 | 81 |
| 600000 Plant Fire On Site / 8 | | | | | | X | 2.2.44 Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.<br>(CFR: 41.5 / 43.5 / 45.12) | 4.4 | 82 |
| K/A Category Totals: | | | | | 3 | 4 | Group Point Total: | | 7 |

| ES-401 | BWR Examination Outline<br>Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO) | | | | | | | Form ES-401-1 | |
|---|---|---|---|---|---|---|---|---|---|
| E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | IR | # |
| 295007 High Reactor Pressure / 3 | | | | | X | | Ability to determine and/or interpret the following as they apply to high reactor pressure:<br>(CFR: 41.10 / 43.5 / 45.13)<br><br>AA2.01 Reactor pressure | 4.1 | 83 |
| 295020 Inadvertent Cont. Isolation / 5 & 7 | | | | | | X | 2.2.14 Knowledge of the process for controlling equipment configuration or status.<br>(CFR: 41.10 / 43.3 / 45.13) | 4.3 | 84 |
| 295034 Secondary Containment Ventilation High Radiation / 9 | | | | | X | | Ability to determine and/or interpret the following as they apply to secondary containment ventilation high radiation:<br>(CFR: 41.10 / 43.5 / 45.13)<br><br>EA2.01 Ventilation radiation levels | 4.2 | 85 |
| K/A Category Point Totals: | | | | | | | Group Point Total: | | 3 |

| ES-401 | BWR Examination Outline<br>Plant Systems - Tier 2/Group 1 (SRO) | | | | | | | | | | | | Form ES-401-1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | X | | | | Ability to (a) predict the impacts of the following on the RHR/LPCI: injection mode (plant specific) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:<br>(CFR: 41.5 / 45.6)<br><br>A2.04 A.C. failures | 3.6 | 86 |
| 212000 RPS | | | | | | | | | | | X | 2.1.20 Ability to interpret and execute procedure steps.<br>(CFR: 41.10 / 43.5 / 45.12) | 4.6 | 87 |
| 215003 IRM | | | | | | | | X | | | | Ability to (a) predict the impacts of the following on the intermediate range monitor (irm) system ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:<br>(CFR: 41.5 / 45.6)<br><br>A2.05 Faulty or erratic operation of detectors/system | 3.5 | 88 |
| 259002 Reactor Water Level Control | | | | | | | | | | | X | ~~2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc.~~<br>~~(CFR: 41.10 / 43.5 / 45.12)~~<br>2.2.40 Ability to apply Technical Specifications for a system.<br>(CFR: 41.10 / 43.2 / 43.5 / 45.3) | 4.7 | 89 |
| 262001 AC Electrical Distribution | | | | | | | | X | | | | Ability to (a) predict the impacts of the following on the A.C. electrical distribution ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:<br>(CFR: 41.5 / 45.6)<br><br>~~A2.07 Energizing a dead bus~~<br>A2.06 Deenergizing a Plant Bus | ~~3.2~~<br><br>2.9 | 90 |
| K/A Category Point Totals: | | | | | | | | 3 | | | 2 | Group Point Total: | | 5 |

| ES-401 | BWR Examination Outline<br>Plant Systems - Tier 2/Group 2 (SRO) | | | | | | | | | | | | Form ES-401-1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | # |
| 201006 RWM | | | | | | | | | | | X | 2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation.<br>(CFR: 41.10 / 43.5 / 45.2 / 45.6) | 4.4 | 91 |
| 202002 Recirculation Flow Control | | | | | | | | X | | | | Ability to (a) predict the impacts of the following on the recirculation flow control system ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:<br>(CFR: 41.5 / 45.6)<br><br>~~A2.09 Recirculation flow mismatch: Plant-Specific~~<br>A2.06 Low reactor water level: Plant-Specific | ~~3.3~~<br><br>3.3 | 92 |
| 271000 Offgas | | | | | | | | | | | X | ~~2.4.18 Knowledge of the specific bases for EOPs. (CFR: 41.10 / 43.1 / 45.13)~~<br>2.4.20 Knowledge of operational implications of EOP warnings, cautions, and notes.<br>(CFR: 41.10 / 43.5 / 45.13) | ~~4.0~~<br>4.3 | 93 |
| K/A Category Point Totals: | | | | | | | | | | | | Group Point Total: | | 3 |

Facility: Cooper Nuclear Station Date of Exam: February 16, 2015

| Category | K/A # | Topic | RO | | SRO-Only | |
|---|---|---|---|---|---|---|
| | | | IR | # | IR | # |
| 1. Conduct of Operations | 2.1.8 | Ability to coordinate personnel activities outside the control room. (CFR: 41.10 / 45.5 / 45.12 / 45.13) | 3.4 | 66 | | |
| | 2.1.18 | Ability to make accurate, clear, and concise logs, records, status boards, and reports. (CFR: 41.10 / 45.12 / 45.13) | 3.6 | 67 | | |
| | 2.1.31 | Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup. (CFR: 41.10 / 45.12) | 4.6 | 68 | | |
| | 2.1.4 | Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license status, 10CFR55, etc. (CFR: 41.10 / 43.2) | | | 3.8 | 94 |
| | 2.1.41 | Knowledge of the refueling process. (CFR: 41.2 / 41.10 / 43.6 / 45.13) | | | 3.7 | 95 |
| | Subtotal | | | 3 | | 2 |
| 2. Equipment Control | 2.2.13 | Knowledge of tagging and clearance procedures. (CFR: 41.10 / 45.13) | 4.1 | 69 | | |
| | 2.2.41 | Ability to obtain and interpret station electrical and mechanical drawings. (CFR: 41.10 / 45.12 / 45.13) | 3.5 | 70 | | |
| | 2.2.11 | Knowledge of the process for controlling temporary design changes. (CFR: 41.10 / 43.3 / 45.13) | | | 3.3 | 96 |
| | 2.2.19 | Knowledge of maintenance work order requirements. (CFR: 41.10 / 43.5 / 45.13) | | | 3.4 | 97 |
| | Subtotal | | | 2 | | 2 |
| 3. Radiation Control | 2.3.4 | Knowledge of radiation exposure limits under normal or emergency conditions. (CFR: 41.12 / 43.4 / 45.10) | 3.2 | 71 | | |
| | 2.3.5 | Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. (CFR: 41.11 / 41.12 / 43.4 / 45.9) | 2.9 | 72 | | |
| | 2.3.13 | Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. (CFR: 41.12 / 43.4 / 45.9 / 45.10) | 3.4 | 73 | | |
| | 2.3.6 | 2.3.6 Ability to approve release permits. (CFR: 41.13 / 43.4 / 45.10) | | | 3.8 | 98 |
| | Subtotal | | | 3 | | 1 |
| | 2.4.45 | Ability to prioritize and interpret the significance of each annunciator or alarm. (CFR: 41.10 / 43.5 / 45.3 / 45.12) | 4.1 | 74 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 4. Emergency Procedures / Plan | 2.4.49 | Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. (CFR: 41.10 / 43.2 / 45.6) | 4.6 | 75 | | |
| | ~~2.4.34~~ | ~~Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects. (CFR: 41.10 / 43.5 / 45.13)~~ | | | ~~4.1~~ | ~~99~~ |
| | 2.4.29 | Knowledge of the Emergency Plan (CFR: 41.10 / 43.5 / 45.11) | | | 4.4 | 99 |
| | ~~2.4.50~~ | ~~Ability to verify system alarm setpoints and operate controls identified in the alarm response manual. (CFR: 41.10 / 43.5 / 45.3)~~ | | | ~~4.0~~ | ~~100~~ |
| | ~~2.4.5~~ | ~~Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions. (CFR: 41.10 / 43.5 / 45.13)~~ | | | ~~4.3~~ | ~~100~~ |
| | 2.4.28 | Knowledge of procedures relating to a security event (non-safeguards information).(CFR: 41.10 / 43.5 / 45.13) | | | 4.1 | 100 |
| | Subtotal | | | 2 | | 2 |
| Tier 3 Point Total | | | | 10 | | 7 |

| Tier / Group | Randomly Selected K/A | Reason for Rejection |
|---|---|---|
| Tier 1/Group 1 (RO) | 295016 AK2.03 | Question 6: There are no actions or interrelations at CNS for control room abandonment and the control room HVAC system. Using poker chips randomly re-selected from same system AK2.01 |
| Tier 1/Group 2 (RO) | 2.4.31 | Question 27: CNS procedures have limited procedural response to H2 concentration. Using poker chips, randomly re-selected Generic 2.4.21 from the list of Emergency Procedures / Plan Generics |
| Tier 2/Group 1 (RO) | 2.2.25 | Question 30: CNS does not require ROs to know Technical Specification bases. Using poker chips, randomly re-selected Generic 2.2.39 from the list of Equipment Control Generics |
| Tier 2/Group 1 (RO) | 209002 | Question 32: CNS design does not contain a HPCS system. Using random generator re-selected Tier 2/Group 1 system 259002 Reactor Water Level Control. Maintained the K3.02 K/A topic number. EJJ |
| Tier 2/Group 1 (RO) | 2.1.45 | Question 41: There is no local operation of SRVs, therefore, matching the K&A is not possible. Randomly re-selected Generic 2.2.12 from the list of generics in ES-401 D.1.b. EJJ |
| Tier 2/Group 1 (RO) | 217000 RCIC K1.08 | Question 53: There is no RCIC keep fill pump at CNS, using poker chips randomly re-selected from the same system K1.07 |
| Tier 1/Group 1 (SRO) | 2.4.20 | Question 78: CNS design does not tie instrument air to Generic 2.4.20 of EOP warnings, cautions, and notes. Using random generator, re-selected Generic 2.4.4 from the list of generics in ES-401 D.1.b. EJJ |
| Tier 1/Group 1 (SRO) | 295027G2.4.46 | Question 80: CNS design does not contain a Mark III containment. CNS containment is a Mark I design. Stayed with the same safety function and similar system and randomly selected 295028. Could not write an SRO level question based on drywell temperature alarms. Randomly selected 2.4.11. EJJ |
| Tier 1/Group 1 (SRO) | 295038 EA 2.04 | Question 81: Could not develop a question to match the KA where determining the source of radiation release was not above a difficulty of 1. Very basic knowledge needed to answer that question. Randomly reselected another Tier 1/Group 1 evolution, 295005 and randomly selected an associated A2 ability statement AA2.08. EJJ. |
| Tier 3 (SRO) | 2.4.39 | Question 99: Cannot write an SRO-Only question on the RO's tasks in the emergency plan as the RO is expected to know this information as well. Randomly selected 2.4.29. EJJ |
| Tier 3 (SRO) | 2.4.50 | Question 100: Cannot write an SRO-Only question to verifying alarms and use of controls, etc. Randomly selected 2.4.5. EJJ |
| Tier 1/Group 1 (SRO) | 2.1.32 | Question 76: Cannot write SRO-Only question applying system limits and precautions associated with a scram (295026). Randomly selected 2.1.6. EJJ |
| Tier 2/Group 1 (SRO) | 2.1.25 | Question 89: Cannot write an SRO-Only question that is operationally valid. Randomly selected 2.2.40. EJJ |
| Tier 2/Group 1 (SRO) | 262001 A2.07 | Question 90: Cannot write another SRO-Only question differing greatly from the previous NRC exam. Randomly selected A2.07. EJJ |
| Tier 2/Group 1 (SRO) | 202002 A2.04 | Question 92: The flow mismatch has no effect on CNS RR flow control system and is N/A to CNS. Randomly selected A2.06. EJJ |
| Tier 2/Group 2 (RO) | 268000 A1.02 | Question 63: Cannot write an operationally relevant question at the RO Level as there are no controls the RO operates in the control room . Randomly selected 239001 and maintained an A1 ability. Randomly selected A1.08.EJJ |
| Tier 1/Group 1 (RO) | EK3.05 | Question 13: After exam development completion, it has been determined, K/As related to reactor scram are over-sampled. Maintained the same K category and randomly selected EK3.04. EJJ |
| Tier 1/Group 1 (RO) | 295021 AA2.07 | Question 9: Cannot write an operationally relevant question as RR is normally secured except when starting SDC. Randomly selected AA2.01.EJJ |
| Tier 2/Group 2 (SRO) | 271000 2.4.18 | Question 93: Could not write an SRO Only level question for EOP bases and this system. Randomly selected 2.4.20. EJJ |
| Tier 2/Group 2 (RO) | 2.2.36 | Question 56: Could not write a questions without leading to cueing. Randomly reselected 2.2.22 from the list of generics in ES-401 D.1.b. EJJ |
| Tier 3 (SRO) | 2.4.5 | Question 100, Could not write an SRO Only Tier 3 question to this generic knowledge statement. Randomly selected 2.4.28. EJJ |