Facility: **CALVERT CLIFFS NUCLEAR POWER PLANT** Date of Exam: **06/13/2016**

| Tier | Group | RO Category K/A 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 | 3 | N/A | | | 3 | 3 | N/A | | 3 | 18 | 3 | | 3 | | 6 |
| | 2 | 1 | 2 | 1 | | | | 2 | 2 | | | 1 | 9 | 2 | | 2 | | 4 |
| | Tier Totals | 4 | 5 | 4 | | | | 5 | 5 | | | 4 | 27 | 5 | | 5 | | 10 |
| 2. Plant Systems | 1 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 28 | 3 | | 2 | | 5 |
| | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 10 | 0 | 2 | 1 | | 3 |
| | Tier Totals | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 38 | 5 | | 3 | | 8 |
| 3. Generic Knowledge & Abilities Categories | | 1 | | | 2 | | | 3 | | | 4 | | 10 | 1 | 2 | 3 | 4 | 7 |
| | | 2 | | | 3 | | | 2 | | | 3 | | | 2 | 1 | 2 | 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.

Emergency & Abnormal Plant Evolutions – Tier 1 / Group 1 – **REACTOR OPERATOR**

| E/APE #/Name/Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | KA Topic | Imp | Pts |
|---|---|---|---|---|---|---|---|---|---|
| 007 Rx Trip - Stabilization - Recovery (1) | | | | | X | | **EA2 - Ability to determine or interpret the following as they apply to a reactor trip:** EA2.06 - Occurrence of a reactor trip | 4.3 | 1 |
| 008 Pressurizer Vapor Space Accident (3) | | | | | | X | **2.1- Conduct of Operations** 2.1.28 - Knowledge of the purpose and function of major system components and controls. | 4.1 | 1 |
| 009 Small Break LOCA (3) | X | | | | | | **EK1 - Knowledge of the operational implications of the following concepts as they apply to the small break LOCA:** EK1.01 - Natural circulation and cooling, including reflux boiling | 4.2 | 1 |
| 000015/000017 RCP Malfunctions (4) | | X | | | | | **AK2 - Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions (Loss of RC Flow) and the following:** AK2.07 - RCP seals | 2.9 | 1 |
| 022 Loss of Rx Coolant Makeup (2) | | | X | | | | **AK3 - Knowledge of the reasons for the following responses as they apply to the Loss of Reactor Coolant Makeup:** AK3.04 – Isolating letdown | 3.2 | 1 |
| 025 Loss of RHR System (4) | | X | | | | | **AK2 - Knowledge of the interrelations between the Loss of Residual Heat Removal System and the following:** AK2.05 - Reactor building sump | 2.6 | 1 |
| 026 Loss of Component Cooling Water (8) | | | | X | | | **AA1 - Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water:** AA1.07 - Flow rates to the components and systems that are serviced by the CCWS; interactions among the components | 2.9 | 1 |
| 027 Pzr Press Control Sys Malfunction (3) | | X | | | | | **AK2 - Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following:** AK2.03 - Controllers and positioners | 2.6 | 1 |
| 029 ATWS (1) | | | | | X | | **EA2- Ability to determine or interpret the following as they apply to a ATWS:** EA2.01 - Reactor nuclear instrumentation | 4.4 | 1 |
| 038 Steam Gen. Tube Rupture (3) | X | | | | | | **EK1 - Knowledge of the operational implications of the following concepts as they apply to the SGTR:** EK1.01 - Use of steam tables | 3.1 | 1 |

Emergency & Abnormal Plant Evolutions – Tier 1 / Group 1 – **REACTOR OPERATOR**

| E/APE #/Name/Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | KA Topic | Imp | Pts |
|---|---|---|---|---|---|---|---|---|---|
| 000054 Loss of Main Feedwater (4) | | | X | | | | **AK3 - Knowledge of the reasons for the following responses as they apply to the Loss of Main Feedwater:** AK3.02 - Matching of feedwater and steam flows | 3.4* | 1 |
| 055 Station Blackout (6) | | | | | X | | **EA2 - Ability to determine or interpret the following as they apply to a SBO:** EA2.03 - Actions necessary to restore power | 3.9 | 1 |
| 057 Loss of Vital AC Instrument Bus (6) | | | | | | X | **2.4 - Emergency Procedures / Plan** 2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. | 4.6 | 1 |
| 058 Loss of DC Power (6) | | | | | | X | **2.4 - Emergency Procedures / Plan** 2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. | 4.6 | 1 |
| 062 Loss of Nuclear Service Water (4) | | | | X | | | **AA1 - Ability to operate and/or monitor the following as they apply to the Loss of Nuclear Service Water):** AA1.02 - Loads on the SWS in the control room | 3.2 | 1 |
| 065 Loss of Instrument Air (8) | | | | X | | | **AA1- Ability to operate and / or monitor the following as they apply to the Loss of Instrument Air:** AA1.04- Emergency Air Compressor | 3.5* | 1 |
| 077 Generator Voltage and Electric Grid Disturbances (6) | X | | | | | | **AK1 - Knowledge of the operational implications of the following concepts as they apply to Generator Voltage and Electric Grid Disturbances:** AK1.02 - Over-excitation | 3.3 | 1 |
| CE/E05 Excess Steam Demand (4) | | | X | | | | **EK3 - Knowledge of the reasons for the following responses as they apply to the (Excess Steam Demand)** EK3.3 - Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations | 3.8 | 1 |
| **K/A Category Totals:** | 3 | 3 | 3 | 3 | 3 | 3 | **Group Point Total:** | | 18 |

Emergency & Abnormal Plant Evolutions – Tier 1 / Group 2 - **REACTOR OPERATOR**

| E/APE #/Name/Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | KA Topic | Imp | Pts |
|---|---|---|---|---|---|---|---|---|---|
| 003 Dropped Control Rod (1) | | X | | | | | **AK2 - Knowledge of the interrelations between the Dropped Control Rod and the following:** AK2.05 - Control rod drive power supplies and logic circuits | 2.5 | 1 |
| 024 Emergency Boration (1) | | | | | X | | **AA2 - Ability to determine and interpret the following as they apply to the Emergency Boration:** AA2.06 – When boron dilution is taking place | 3.6 | 1 |
| 028 Pressurizer Level Malfunction (2) | X | | | | | | **AK1 - Knowledge of the operational implications of the following concepts as they apply to Pressurizer Level Control Malfunctions:** AK1.01 - PZR reference leak abnormalities | 2.8 | 1 |
| 061 ARM System Alarms (7) | | | | X | | | **AA1 - Ability to operate and / or monitor the following as they apply to Area Radiation Monitoring System Alarms:** AA1.01 - Automatic actuation | 3.6 | 1 |
| 068 Control Room Evacuation (8) | | | | | | X | **2.1- Conduct of Operations** 2.1.20 - Ability to interpret and execute procedure steps. | 4.6 | 1 |
| 074 Inadequate Core Cooling (4) | | X | | | | | **EK2 - Knowledge of the interrelations between Inadequate Core Cooling and the following:** EK2.04 - HPI pumps | 3.9 | 1 |
| CE/A11 RCS Overcooling (4) | | | X | | | | **AK3 - Knowledge of the reasons for the following responses as they apply to RCS Overcooling:** AK3.2 - Normal, abnormal and emergency operating procedures associated with (RCS Overcooling) | 2.9 | 1 |
| CE/A13 Natural Circulation (4) | | | | X | | | **AA1 - Ability to operate and / or monitor the following as they apply to Natural Circulation Operations:** AA1.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features | 3.3 | 1 |
| CE/A16 Excess RCS Leakage (2) | | | | | X | | **AA2 - Ability to determine and interpret the following as they apply to Excess RCS Leakage:** AA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments | 2.9 | 1 |
| **K/A Category Totals:** | 1 | 2 | 1 | 2 | 2 | 1 | **Group Point Total:** | | 9 |

Plant Systems – Tier 2 / Group 1 - **REACTOR OPERATOR**

| System/Evolution #/Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | KA Topic | Imp | Pts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 003 Reactor Coolant Pump | | X | | | | | | | | | | **K2 - Knowledge of bus power supplies to the following:** K2.01 - RCPS | 3.1 | 1 |
| 003 Reactor Coolant Pump | | | | | | | | | | | X | **2.2 - Equipment Control** 2.2.12 - Knowledge of surveillance procedures. | 3.7 | 1 |
| 004 Chemical and Volume Control | | | | | X | | | | | | | **K5 - Knowledge of the operational implications of the following concepts as they apply to the CVCS:** K5.16 - Source of TAVE. and TREF signals to control and RPS | 3.2 | 1 |
| 005 Residual Heat Removal | | | X | | | | | | | | | **K3 - Knowledge of the effect that a loss or malfunction of the RHRS will have on the following:** K3.06 - CSS | 3.1* | 1 |
| 006 Emergency Core Cooling | | | | | | X | | | | | | **K6 - Knowledge of the effect of a loss or malfunction on the following will have on the ECCS:** K6.13 - Pumps | 4.2 | 1 |
| 006 Emergency Core Cooling | | | | | | | | | | | X | **2.4 - Emergency Procedures/Plan** 2.4.31 - Knowledge of annunciator alarms, indications, or response procedures. | 3.4 | 1 |
| 007 Pressurizer Quench Tank | X | | | | | | | | | | | **K1 - Knowledge of the physical connections and/or cause-effect relationships between the PRTS and the following systems:** K1.03 - RCS | 3.0 | 1 |
| 008 Component Cooling Water | X | | | | | | | | | | | **K1 - Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following systems:** K1.05 - Sources of makeup water | 3.0 | 1 |
| 008 Component Cooling Water | | | | | | | | | | X | | **A4 - Ability to manually operate and/or monitor in the control room:** A4.06 - Remote operation of hand-operated throttle valves to regulate CCW flow rate | 2.5* | 1 |
| 010 Pressurizer Pressure Control | | X | | | | | | | | | | **K2 - Knowledge of bus power supplies to the following:** K2.01 – PZR heaters | 3.0 | 1 |

Plant Systems – Tier 2 / Group 1 - **REACTOR OPERATOR**

| System/Evolution #/Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | KA Topic | Imp | Pts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 010 Pressurizer Pressure Control | | | | | | | | | | | X | **2.4 - Emergency Procedures/Plan** 2.4.18 - Knowledge of the specific bases for EOPs. | 3.3 | 1 |
| 012 Reactor Protection | | | | X | | | | | | | | **K4 - Knowledge of RPS design feature(s) and/or interlock(s) which provide for the following:** K4.02 - Automatic reactor trip when RPS setpoints are exceeded for each RPS function; basis for each | 3.9 | 1 |
| 013 ESFAS | | | | X | | | | | | | | **K4 - Knowledge of ESFAS design feature(s) and/or interlock( s) which provide for the following:** K4.04 - Auxiliary feed actuation signal | 4.3* | 1 |
| 022 Containment Cooling | | | | | | | | X | | | | **A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the CCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** A2.03 - Fan motor thermal overload/high-speed operation | 2.6 | 1 |
| 026 Containment Spray | | | | | | | X | | | | | **A1 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including:** A1.06 - Containment spray pump cooling | 2.7 | 1 |
| 039 Main and Reheat Steam | | | | X | | | | | | | | **K4 - Knowledge of MRSS design feature(s) and/or interlock(s) which provide for the following:** K4.05 - Automatic isolation of steam line | 3.7 | 1 |
| 059 Main Feedwater | | | | | | | | | | X | | **A4 - Ability to manually operate and monitor in the control room:** A4.01 - SGFPT trip indication | 3.1* | 1 |

Plant Systems – Tier 2 / Group 1 - **REACTOR OPERATOR**

| System/Evolution #/Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | KA Topic | Imp | Pts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 059 Main Feedwater | | | | | | | | X | | | | **A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the MFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** A2.04 - Feeding a dry S/G | 2.9* | 1 |
| 061 Auxiliary/Emergency Feedwater | | | | | | X | | | | | | **K6 - Knowledge of the effect of a loss or malfunction of the following will have on the AFW components:** K6.01 - Controllers and positioners | 2.5 | 1 |
| 062 AC Electrical Distribution | X | | | | | | | | | | | **K1 - Knowledge of the physical connections and/or cause-effect relationships between the ac distribution system and the following systems:** K1.04 - Off-site power sources | 3.7 | 1 |
| 063 DC Electrical Distribution | | | | | | | X | | | | | **A1 - Ability to predict and/or monitor changes in parameters associated with operating the DC electrical system controls including:** A1.01 - Battery capacity as it is affected by discharge rate | 2.5 | 1 |
| 064 EDG | | | | | | | | | X | | | **A3 – Ability to monitor automatic operation of the ED/G system, including:** A3.10 - Function of ED/G megawatt load controller | 2.8 | 1 |
| 064 EDG | | | | | | | | X | | | | **A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the ED/G system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** A2.14 - Effects (verification) of stopping ED/G under load on isolated bus | 2.7 | 1 |

Plant Systems – Tier 2 / Group 1 - **REACTOR OPERATOR**

| System/Evolution #/Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | KA Topic | Imp | Pts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 073 Process Radiation Monitoring | | | | | X | | | | | | | **K5 - Knowledge of the operational implications as they apply to concepts as they apply to the PRM system:** K5.01 - Radiation theory, including sources, types, units, and effects | 2.5 | 1 |
| 076 Service Water | | | X | | | | | | | | | **K3 – Knowledge of the effect that a loss or malfunction of the SWS will have onthe following:** K3.03 - Reactor building closed cooling water | 3.5* | 1 |
| 076 Service Water | | | | | | | | | X | | | **A3 - Ability to monitor auto operation of the SWS, including:** A3.02 - Emergency heat loads | 3.7 | 1 |
| 078 Instrument Air | | | X | | | | | | | | | **K3 - Knowledge of the effect that a loss or malfunction of the IAS will have on the following:** K3.03 - Cross-tied units | 3.0 | 1 |
| 103 Containment | | | | | | | X | | | | | **A1 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the containment system controls including:** A1.01 - Containment pressure, temperature, and humidity | 3.7 | 1 |
| **K/A Category Totals:** | **3** | **2** | **3** | **3** | **2** | **2** | **3** | **3** | **2** | **2** | **3** | **Group Point Total:** | | **28** |

Plant Systems – Tier 2 / Group 2 - **REACTOR OPERATOR**

| System/Evolution #/Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | KA Topic | Imp | Pts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 002 Reactor Coolant | | | | | | | | | | X | | **A4 - Ability to manually operate and/or monitor in the control room:** A4.08 - Safety parameter display systems | 3.4* | 1 |
| 011 Pressurizer Level Control System | | X | | | | | | | | | | **K2 - Knowledge of bus power supplies to the following:** K2.01 - Charging pumps | 3.1 | 1 |
| 016 Non-nuclear Instrumentation | | | | | X | | | | | | | **K5 - Knowledge of the operational implications of the following concepts as they apply to the NNIS system:** K5.01 - Separation of control and protection circuits | 2.7* | |
| 017 In-core Temperature Monitor | | | | | | | | | X | | | **A3 - Ability to monitor automatic operation of the ITM, including:** A3.01 - Indications of normal, natural, and interrupted circulation of RCS | 3.6* | 1 |
| 029 Containment Purge | | | | | | | X | | | | | **A1 - Ability to predict and/or monitor changes in parameters to prevent exceeding design limits) associated with operating the Containment Purge System controls including:** A1.02 - Radiation levels | 3.4 | 1 |
| 035 Steam Generator | | | | | | X | | | | | | **K6 - Knowledge of the effect of a loss or malfunction on the following will have on the S/GS:** K6.03 - S/G level detector | 2.6 | 1 |
| 041 Steam Dump/Turbine Bypass Control | | | | X | | | | | | | | **K4 - Knowledge of SDS design feature(s) and/or interlock(s) which provide for the following:** K4.16 - Low main steam pressure | 2.6* | |
| 056 Condensate | | | | | | | | X | | | | **A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the Condensate System; and (b) based on those predictions, use Procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** A2.04 – Loss of condensate pumps | 2.6 | 1 |

Plant Systems – Tier 2 / Group 2 - **REACTOR OPERATOR**

| System/Evolution #/Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | KA Topic | Imp | Pts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 068 Liquid Radwaste | | | | | | | | | | | X | **2.2 – Equipment Control**<br>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. | 4.2 | 1 |
| 086 Fire Protection | | | X | | | | | | | | | **K3 – Knowledge of the effect that a loss or malfunction of the Fire Protection System will have on the following:**<br>K3.01 - Shutdown capability with redundant equipment | 2.7 | 1 |
| **K/A Category Totals:** | **0** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **Group Point Total:** | | **10** |

Emergency & Abnormal Plant Evolutions – Tier 1 / Group 1 – **Senior Reactor Operator**

| E/APE #/Name/Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | KA Topic | Imp | Pts |
|---|---|---|---|---|---|---|---|---|---|
| 011 Large Break LOCA (3) | | | | | | X | **2.4 - Emergency Procedures / Plan**<br>2.4.35 - Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects. | 4.0 | 1 |
| 040 Steam Line Rupture (4) | | | | | X | | **AA2 - Ability to determine and interpret the following as they apply to the Steam Line Rupture:**<br>AA2.02 - Conditions requiring a reactor trip | 4.7 | 1 |
| 056 Loss of Off-site Power (6) | | | | | X | | **AA2 - Ability to determine and interpret the following as they apply to the Loss of Offsite Power:**<br>AA2.32 - Transient trend of coolant temperature toward no-load $T_{AVE}$ | 4.3 | 1 |
| 062 Loss of Nuclear Service Water (4) | | | | | | X | **2.1 - Conduct of Operations**<br>2.1.23 - Ability to perform specific system and integrated plant procedures during all modes of plant operation. | 4.4 | 1 |
| CE/E02 Reactor Trip - Stabilization - Recovery (1) | | | | | X | | **EA2 - Ability to determine and interpret the following as they apply to the (Reactor Trip Recovery)**<br>EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments | 4.0 | 1 |
| CE/E06 Loss of Main Feedwater (4) | | | | | | X | **2.4 - Emergency Procedures/Plan**<br>2.4.4 - Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures. | 4.7 | 1 |
| **K/A Category Totals:** | **0** | **0** | **0** | **0** | **3** | **3** | **Group Point Total:** | | **6** |

Emergency & Abnormal Plant Evolutions – Tier 1 / Group 2 – **Senior Reactor Operator**

| E/APE #/Name/Safety Function | K1 | K2 | K3 | A1 | A2 | G | KA Topic | Imp | Pts |
|---|---|---|---|---|---|---|---|---|---|
| 005 Inoperable/Stuck Control Rod (1) | | | | | X | | **AA2 - Ability to determine and interpret the following as they apply to the** Inoperable/Stuck Control Rod**:** AA2.03 – Required actions if more than one rod is stuck or inoperable. | 4.4 | 1 |
| 032 Loss of Source Range NI (7) | | | | | | X | **2.4 - Emergency Procedures / Plan** 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. | 4.6 | 1 |
| 036 Fuel Handling Accident (8) | | | | | | X | **2.2 - Equipment Control** 2.2.39 - Knowledge of less than or equal to one hour Technical Specification action statements for systems. | 4.5 | 1 |
| 051 Loss of Condenser Vacuum (4) | | | | | X | | **AA2 - Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum:** AA2.01 - Cause for low vacuum condition | 2.7* | 1 |
| **K/A Category Totals:** | **0** | **0** | **0** | **0** | **2** | **2** | **Group Point Total:** | | **4** |

Plant Systems – Tier 2 / Group 1 – **Senior Reactor Operator**

| System/Evolution #/Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | KA Topic | Imp | Pts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 005 Residual Heat Removal | | | | | | | | X | | | | **A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** A2.03 - RHR pump/motor malfunction | 3.1 | 1 |
| 012 Reactor Protection | | | | | | | | | | | X | **2.4 - Emergency Procedures / Plan** 2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. | 4.4 | 1 |
| 022 Containment Cooling | | | | | | | | X | | | | **A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the CCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** A2.02 - Fan motor vibration | 2.6 | 1 |
| 039 Main and Reheat Steam | | | | | | | | X | | | | **A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the MRSS; and (b) based on predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** A2.01 – Flow paths of steam during a LOCA | 3.2 | 1 |
| 061 Auxiliary/Emergency Feedwater | | | | | | | | | | | X | **2.2 - Equipment Control** 2.2.38 - Knowledge of conditions and limitations in the facility license. | 4.5 | 1 |
| **K/A Category Totals:** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **2** | **Group Point Total:** | | **5** |

Plant Systems – Tier 2 / Group 2 – **Senior Reactor Operator**

| System/Evolution #/Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | KA Topic | Imp | Pts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 015 Nuclear Instrumentation | | | | | | | | | | | X | **2.2 - Equipment Control** 2.2.42 - Ability to recognize system parameters that are entry-level conditions for Technical Specifications. | 4.6 | 1 |
| 071 Waste Gas Disposal | | | | | | | | X | | | | **A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the Waste Gas Disposal System ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** A2.06 - Supply failure to the isolation valve | 2.5 | 1 |
| 075 Circulating Water | | | | | | | | X | | | | **A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the circulating water system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** A2.03 - Safety features and relationship between condenser vacuum, turbine trip, and steam dump | 2.7* | 1 |
| **K/A Category Totals:** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **1** | **Group Point Total:** | | **3** |

Tier 3 Generic Knowledge & Abilities Outline - **RO & SRO**

Facility: **CALVERT CLIFFS NUCLEAR POWER PLANT** Date of Exam: **06/13/2016**

| Category | K/A # | Topic | RO | | SRO | |
|---|---|---|---|---|---|---|
| | | | IR | Pts | IR | Pts |
| Conduct of Operations | 2.1.37 | Knowledge of procedures, guidelines, or limitations associated with reactivity management. | 4.3 | 1 | | |
| | 2.1.45 | Ability to identify and interpret diverse indications to validate the response of another indication. | 4.3 | 1 | | |
| | 2.1.23 | Ability to perform specific system and integrated plant procedures during all modes of plant operation. | | | 4.4 | 1 |
| | 2.1.40 | Knowledge of refueling administrative requirements. | | | 3.9 | 1 |
| | | **Subtotals:** | | **2** | | **2** |
| Equipment Control | 2.2.1 | Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity. | 4.5 | 1 | | |
| | 2.2.2 | Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels. | 4.6 | 1 | | |
| | 2.2.13 | Knowledge of tagging and clearance procedures. | 4.1 | 1 | | |
| | 2.2.7 | Knowledge of the process for conducting special or infrequent tests. | | | 3.6 | 1 |
| | | **Subtotals:** | | **3** | | **1** |
| Radiation Control | 2.3.11 | Ability to control radiation releases. | 3.8 | 1 | | |
| | 2.3.14 | Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities. | 3.4 | 1 | | |
| | 2.3.5 | Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personal monitoring equipment, etc. | | | 2.9 | 1 |
| | 2.3.6 | Ability to approve release permits. | | | 3.8 | 1 |
| | | **Subtotals:** | | **2** | | **2** |
| Emergency Procedures/Plan | 2.4.13 | Knowledge of crew roles and responsibilities during EOP usage. | 4.0 | 1 | | |
| | 2.4.25 | Knowledge of fire protection procedures. | 3.3 | 1 | | |
| | 2.4.43 | Knowledge of emergency communications systems and techniques. | 3.2 | 1 | | |
| | 2.4.6 | Knowledge of EOP mitigation strategies. | | | 4.7 | 1 |
| | 2.4.40 | Knowledge of SRO responsibilities in emergency plan implementation. | | | 4.5 | 1 |
| | | **Subtotals:** | | **3** | | **2** |
| | | **Tier 3 Totals** | | **10** | | **7** |

| Tier / Group | Randomly Selected K/A | Reason for Rejection |
|---|---|---|
| RO<br>1/1 | 022 Loss of Reactor Coolant Makeup<br>AK3.06 | This K/A is not applicable to plant since CCNPP utilizes Component Cooling Water to cool the thermal barrier. K/A would be applicable at a site that utilizes seal injection to help cool the barrier. Kept system and replaced K/A with one that had not been sampled. K/A AK3.04 was randomly selected using numbered poker chips. |
| RO<br>1/2 | 060 Accidental Gaseous Radwaste Rel.<br>A2.06 | Spent several unsuccessful hours attempting to develop a question for this combination of system/K/A. Randomly selected system from systems that had not been sampled, using numbered poker chips. Replaced with System 024 Emergency Boration. Kept A2 and randomly selected K/A using numbered poker chips. Replaced with A2.06. |
| RO<br>2/1 | 003 Reactor Coolant Pump<br>2.2.25 | This K/A is not applicable to the RO. Knowledge of bases in Technical Specifications is a SRO responsibility. Kept system and replaced K/A with one that had not been sampled. K/A 2.2.12 was randomly selected using numbered poker chips. |
| RO<br>2/1 | 010 Pressurizer Pressure Control<br>AK2.04 | This K/A is not applicable to plant and previously approved for suppression. Kept system and replaced K/A with one that had not been sampled. K/A AK2.01 was randomly selected using numbered poker chips. |
| RO<br>2/2 | 027 Containment Iodine Removal<br>A2.01 | This K/A is not applicable to plant since Containment Iodine Removal units are not monitored for temperature and there are no actions for the operator to perform. Replaced system since there was only one K/A choice under A2 for the Containment Iodine Removal system. Replaced with System 056 Condensate and K/A A2.04. System and K/A were randomly selected using numbered poker chips. |
| RO<br>2/2 | 068 Liquid Radwaste<br>2.2.3 | This K/A is not applicable to the Liquid Radwaste System since Liquid Radwaste is common between the two units. Kept system 068 and replaced K/A with one that had not been sampled. K/A 2.2.44 was randomly selected, using numbered poker chips. |
| RO<br>3/NA | 2.2.18 | This K/A is not applicable to the RO. Management of shutdown maintenance activities is a SRO responsibility. Replaced K/A with one that had not been sampled. K/A 2.2.1 was randomly selected, using numbered poker chips. |
| SRO<br>1/2 | 001 Continuous Rod Withdrawal (1)<br>A2.05 | Spent several unsuccessful hours attempting to develop a question for this combination of system/K/A. Randomly selected system from systems that had not been sampled, using numbered poker chips. Replaced with System 005 Inoperable/Stuck Control Rod. Kept A2 and randomly selected K/A using numbered poker chips. Replaced with A2.03. |
| SRO<br>1/2 | 032 Loss of Source Range NI (7)<br>2.4.6 | Spent several unsuccessful hours attempting to develop a question for this combination of system/K/A. Kept system 032 and replaced K/A with one that had not been sampled. K/A 2.4.21 was randomly selected, using numbered poker chips. |
| SRO<br>2/1 | 039 Main and Reheat Steam<br>A2.05 | NRC review resulted in recommendation to resample K/A. Kept system 039 and replaced K/A with one that had not been sampled. K/A A2.01 was randomly selected, using numbered poker chips. |