

Facility: Calvert Cliffs Nuclear Power Plant

Date of Exam: 08/13/2012

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	2	1	2				1	1				9	2	2	4	
	Tier Totals	5	5	4				5	4				4	27	5	5	10
2. Plant Systems	1	2	2	3	3	3	2	2	3	2	3	3	28	3	2	5	
	2	1	1	1	1	1	1	1	0	1	1	1	10	1	1	3	
	Tier Totals	3	3	4	4	4	3	3	3	3	4	4	38	5	3	8	
3. Generic Knowledge & Abilities Categories					1	2	3	4	10				1	2	3	4	7
					3	3	2	2					2	2	1	2	

- Note:
- 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).
  - 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  $\pm 1$  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.
  - 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.
  - 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.
  - 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.
  - Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
  - \* 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.
  - 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.
  - 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 Reactor Trip - Stabilization - Recovery / 1	X						<b>EK1 - Knowledge of the operational implications of the following concepts as they apply to the reactor trip:</b> EK1.04 - Decrease in reactor power following reactor trip (prompt drop and subsequent decay)	3.6	1
008 Pressurizer Vapor Space Accident / 3		X					<b>AK2 - Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following:</b> AK2.01 - Valves	2.7	1
009 Small Break LOCA / 3			X				<b>EK3 - Knowledge of the reasons for the following responses as they apply to the small break LOCA:</b> EK3.24 - ECCS throttling or termination criteria	4.1	1
011 Large Break LOCA / 3					X		<b>EA2 - Ability to determine or interpret the following as they apply to a Large Break LOCA:</b> EA2.13 - Difference between overcooling and LOCA indications	3.7	1
022 Loss of Rx Coolant Makeup / 2			X				<b>AK3 - Knowledge of the reasons for the following responses as they apply to the Loss of Reactor Coolant Makeup:</b> AK3.02 - Actions contained in SOPs and EOPs for RCPs, loss of makeup, loss of charging, and abnormal charging	3.5	1
025 Loss of RHR System / 4		X					<b>AK2 - Knowledge of the interrelations between the Loss of Residual Heat Removal System and the following:</b> AK2.03 - Service water or closed cooling water pumps	2.7	1
026 Loss of Component Cooling Water / 8			X				<b>AK3 - Knowledge of the reasons for the following responses as they apply to the Loss of Component Cooling Water:</b> AK3.04 - Effect on the CCW flow header of a loss of CCW	3.5	1
027 Pressurizer Pressure Control System Malfunction / 3		X					<b>AK2 - Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following:</b> AK2.03 - Controllers and positioners	2.6	1
029 ATWS / 1						X	<b>2.4 - Emergency Procedures / Plan</b> 2.4.45 - Ability to prioritize and interpret the significance of each annunciator / alarm.	4.1	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
038 Steam Gen. Tube Rupture / 3					X		<b>EA2 - Ability to determine or interpret the following as they apply to a SGTR:</b> EA2.10 - Flowpath for charging and letdown flows	3.1	1
040 Steam Line Rupture - Excessive Heat Transfer / 4	X						<b>AK1 - Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture:</b> AK1.03 - RCS shrink and consequent depressurization	3.8	1
055 Station Blackout / 6				X			<b>EA1 - Ability to operate and monitor the following as they apply to a SBO:</b> EA1.01 - In-core thermocouple temperatures	3.7	1
056 Loss of Off-site Power / 6						X	<b>2.2 - Equipment Control</b> 2.2.3 - Knowledge of the design, procedural, and operational differences between units.	3.8	1
058 Loss of DC Power / 6				X			<b>AA1 - Ability to operate and / or monitor the following as they apply to the Loss of DC Power:</b> AA1.03 – Vital and battery bus components	3.1	1
062 Loss of Nuclear Svc Water / 4					X		<b>AA2 - Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water:</b> AA2.03 - The valve lineups necessary to restart the SWS while bypassing the portion of the system causing the abnormal condition	2.6	1
065 Loss of Instrument Air / 8				X			<b>AA1- Ability to operate and / or monitor the following as they apply to the Loss of Instrument Air:</b> AA1.04- Emergency Air Compressor	3.5	1
077 Generator Voltage and Electric Grid Disturbances / 6						X	<b>2.1- Conduct of Operations</b> 2.1.23 - Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.3	1
CE/E06 Loss of Main Feedwater / 4	X						<b>EK1. Knowledge of the operational implications of the following concepts as they apply to the (Loss of Feedwater)</b> EK1.2 - Normal, abnormal and emergency operating procedures associated with (Loss of Feedwater)	3.2	1
<b>K/A Category Totals:</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>Group Point Total:</b>	<b>18</b>	

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
001 Continuous Rod Withdrawal / 1					X		<b>AA2 - Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal:</b> AA2.04 - Reactor power and its trend	4.2	1
003 Dropped Control Rod / 1	X						<b>AK1 - Knowledge of the operational implications of the following concepts as they apply to Dropped Control Rod:</b> AK1.16 - MTC	2.9	1
059 Accidental Liquid RadWaste Rel. / 9		X					<b>AK2 - Knowledge of the interrelations between the Accidental Liquid Radwaste Release and the following:</b> AK2.01 - Radioactive-liquid monitors	2.7	1
061 ARM System Alarms / 7				X			<b>AA1 - Ability to operate and / or monitor the following as they apply to the Area Radiation Monitoring (ARM) System Alarms:</b> AA1.01 - Automatic actuation	3.6	1
067 Plant Fire On-site / 9			X				<b>AK3. Knowledge of the reasons for the following responses as they apply to the Plant Fire on Site:</b> AK3.04 - Actions contained in EOP for plant fire on site	3.3	1
069 Loss of CTMT Integrity / 5				X			<b>AA1. Ability to operate and / or monitor the following as they apply to the Loss of Containment Integrity:</b> AA1.03 - Fluid systems penetrating containment	2.8	1
076 High Reactor Coolant Activity / 9		X					<b>AK2. Knowledge of the interrelations between the High Reactor Coolant Activity and the following:</b> AK2.01 - Process radiation monitors	2.6	1
CE/A16 Excess RCS Leakage / 2						X	<b>2.1 Conduct of Operations</b> 2.1.20 - Ability to interpret and execute procedure steps.	4.6	1
CE/E09 Functional Recovery	X						<b>EK1. Knowledge of the operational implications of the following concepts as they apply to the (Functional Recovery)</b> EK1.2 - Normal, abnormal and emergency operating procedures associated with (Functional Recovery)	3.2	1
<b>K/A Category Totals:</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>Group Point Total:</b>	<b>9</b>	

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						<b>K6 - Knowledge of the effect of a loss or malfunction on the following will have on the RCPS:</b> K6.14 - Starting requirements	2.6	1
003 Reactor Coolant Pump										X		<b>A4 - Ability to manually operate and/or monitor in the Control Room:</b> A4.04 - RCP seal differential pressure instrumentation	3.1	1
004 Chemical and Volume Control						X						<b>K6 - Knowledge of the effect of a loss or malfunction on the following CVCS components:</b> K6.13 - Purpose and function of the boration/dilution batch controller	3.1	1
004 Chemical and Volume Control											X	<b>2.4 - Emergency Procedures / Plan</b> 2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.6	1
005 Residual Heat Removal					X							<b>K5 - Knowledge of the operational implications of the following concepts as they apply the RHRS:</b> K5.03 - Reactivity effects of RHR fill water	2.9	1
005 Residual Heat Removal										X		<b>A4 - Ability to manually operate and/or monitor in the control room:</b> A4.02 - Heat exchanger bypass flow control	3.4	1
006 Emergency Core Cooling					X							<b>K5 - Knowledge of the operational implications of the following concepts as they apply to ECCS:</b> K5.07 - Expected temperature levels in various locations of the RCS due to various plant conditions	2.7	1
007 Pressurizer Relief/Quench Tank	X											<b>K1 - Knowledge of the physical connections and/or cause/effect relationships between the PRTS and the following systems:</b> K1.03 - RCS	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
007 Pressurizer Relief/Quench Tank										X		<b>A4 - Ability to manually operate and/or monitor in the control room:</b> A4.01 - PRT spray supply valve	2.7	1
008 Component Cooling Water				X								<b>K4 - Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following:</b> K4.09 - The "standby" feature for the CCW pumps	2.7	1
008 Component Cooling Water								X				<b>A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations</b> A2.03 - High/low CCW temperature	3.5	1
010 Pressurizer Pressure Control		X										<b>K2 - Knowledge of bus power supplies to the following:</b> K2.01 - Pzr Heaters	3.0	1
012 Reactor Protection			X									<b>K3 - Knowledge of the effect that a loss or malfunction of the RPS will have on the following:</b> K3.01 - CRDS	3.9	1
012 Reactor Protection										X		<b>2.4 - Emergency Procedures / Plan</b> 2.4.31 - Knowledge of annunciator alarms, indications, or response procedures.	4.2	1
013 ESFAS					X							<b>K5 - Knowledge of the operational implications of the following concepts as they apply to the ESFAS:</b> K5.02 - Safety system logic and reliability	2.9	1
013 ESFAS									X			<b>A3 - Ability to monitor automatic operation of the ESFAS including:</b> A3.01 - Input channels and logic	3.7	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
022 Containment Cooling							X					A1 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCS controls including: A1.01 - Containment temperature	3.6	1
026 Containment Spray									X			A3 - Ability to monitor automatic operation of the CSS, including: A3.02 - Verification that cooling water is supplied to the cntmt spray heat exchanger	3.9	1
026 Containment Spray											X	2.1 - Conduct of Operations 2.1.28 - Knowledge of the purpose and function of major system components and controls.	4.1	1
039 Main and Reheat Steam			X									K3 Knowledge of the effect that a loss or malfunction of the MRSS will have on the following: K3.06 - SDS	2.8	1
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: A2.03 - Overfeeding event	2.7	1
061 Auxiliary/Emergency Feedwater								X				A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the AFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: A2.07 - Air or MOV failure	3.4	1
062 AC Electrical Distribution			X									K3 - Knowledge of the effect that a loss or malfunction of the ac distribution system will have on the following: K3.01 - Major system loads	3.5	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

## 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
064 Emergency Diesel Generator	X											<b>K1 - Knowledge of the physical connections and/or cause/effect relationships between the ED/G system and the following systems:</b> K1.04 - DC distribution system	3.6	1
073 Process Radiation Monitoring				X								<b>K4 - Knowledge of PRM system design feature(s) and/or interlock(s) which provide for the following:</b> K4.01 - Release termination when radiation exceeds setpoint	4.0	1
076 Service Water		X										<b>K2 - Knowledge of bus power supplies to the following:</b> K2.01 - Service water	2.7	1
078 Instrument Air				X								<b>K4 - Knowledge of IAS design feature(s) and/or interlock(s) which provide for the following:</b> K4.03 - Securing of SAS upon loss of cooling water	3.1	1
<b>K/A Category Totals:</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>Group Point Total:</b>	<b>28</b>	



## 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
001 Control Rod Drive				X								K4 - Knowledge of CRDS design feature(s) and/or interlock(s) which provide for the following: K4.23 - Rod motion inhibit	3.4	1
002 Reactor Coolant	X											K1 - Knowledge of the physical connections and/or cause-effect relationships between the RCS and the following systems: K1.06 - CVCS	3.7	1
011 Pressurizer Level Control System							X					A1 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PZR LCS controls including: A1.01 – PZR level and pressure	3.5	1
015 Nuclear Instrumentation									X			A3 - Ability to monitor automatic operation of the NIS, including: A3.02 - Annunciator and alarm signals	3.7	1
017 In-core Temperature Monitor						X						K6 - Knowledge of the effect of a loss or malfunction of the following ITM system components: K6.01 - Sensors and detectors	2.7	1
027 Containment Iodine Removal										X		A4 - Ability to manually operate and/or monitor in the control room: A4.01 - CIRS controls	3.3	1
028 Hydrogen Recombiner and Purge Control		X										K2 - Knowledge of bus power supplies to the following: K2.01 - Hydrogen recombiners	2.5	1
035 Steam Generator System			X									K3 - Knowledge of the effect that a loss or malfunction of the S/GS will have on the following: K3.01 - RCS	4.4	
045 Main Turbine Generator					X							K5 - Knowledge of the operational implications of the following concepts as they apply to the MT/B System: K5.17 - Relationship between moderator temperature coefficient and boron concentration in RCS as T/G load increases	2.5	1

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
075 Circulating Water											X	2.1 - Conduct of Operations 2.1.32 - Ability to explain and apply system limits and precautions.	3.8	1
<b>K/A Category Totals:</b>	1	1	1	1	1	1	1	0	1	1	1	<b>Group Point Total:</b>		<b>10</b>

## Emergency &amp; 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
015/017 RCP Malfunctions / 4						X	<b>2.4 - Emergency Procedures / Plan</b> 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
038 Steam Gen. Tube Rupture / 3						X	<b>2.1 - Conduct of Operations</b> 2.1.19 - Ability to use plant computers to evaluate system or component status.	3.8	1
054 Loss of Main Feedwater / 4					X		<b>AA2 - Ability to determine and interpret the following as they apply to the Loss of Main Feedwater (MFW):</b> AA2.03 - Conditions and reasons for AFW pump startup	4.2	1
057 Loss of Vital AC Inst. Bus / 6					X		<b>AA2 - Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus:</b> AA2.03 - RPS panel alarm annunciators and trip indicators	3.9	1
CE/E02 Reactor Trip - Stabilization - Recovery / 1						X	<b>2.2 - Equipment Control</b> 2.2.42 - Ability to recognize system parameters that are entry-level conditions for Technical Specifications.	4.6	1
CE/E05 Steam Line Rupture - Excessive Heat Transfer / 4					X		<b>EA2 - Ability to determine and interpret the following as they apply to the (Excess Steam Demand)</b> EA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	4.0	1
<b>K/A Category Totals:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>Group Point Total:</b>		<b>6</b>

## Emergency &amp; 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	<b>2.4 - Emergency Procedures / Plan</b> 2.4.9 - Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.	4.2	1
024 Emergency Boration / 1					X		<b>AA2 - Ability to determine and interpret the following as they apply to the Emergency Boration:</b> AA2.05 - Amount of boron to add to achieve required SDM	3.9	1
028 Pressurizer Level Malfunction / 2					X		<b>AA2 - Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions:</b> AA2.08 - PZR level as a function of power level	3.5	1
037 Steam Generator Tube Leak / 3						X	<b>2.4 - Emergency Procedures / Plan</b> 2.4.18 - Knowledge of the specific bases for EOPs.	4.0	1
<b>K/A Category Totals:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>Group Point Total:</b>	<b>4</b>	

## 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
003 Reactor Coolant Pump System								X				A2 - - Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: A2.01 – Problems with RCP seals, especially rates of seal leak-off	3.9	1
004 CVCS								X				A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: A2.17 - Low PZR pressure	3.7	1
006 ECCS								X				A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: A2.11 - Rupture of ECCS header	4.4	1
059 Main Feedwater											X	2.4 - Emergency Procedures / Plan  2.4.4 - Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.	4.6	1
063 DC Electrical Distribution											X	2.2 - Equipment Control  2.2.42 - Ability to recognize system parameters that are entry-level conditions for Technical Specifications.	4.6	1
<b>K/A Category Totals:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>Group Point Total:</b>	<b>5</b>	

## 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
029 Containment Purge											X	<b>2.2 - Equipment Control</b> 2.2.37 - Ability to determine operability and/or availability of safety related equipment.	4.6	1
034 Fuel Handling Equipment	X											<b>K1 - Knowledge of the physical connections and/or cause-effect relationships between the Fuel Handling System and the following systems:</b> K1.04 - NIS	3.5	1
041 Steam Dump/Turbine Bypass Control								X				<b>A2 Ability to (a) predict the impacts of the following malfunctions or operations on the SDS; and (b) based on those predictions or mitigate the consequences of those malfunctions or operations:</b> A2.03 - Loss of IAS	3.1	1
<b>K/A Category Totals:</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>Group Point Total:</b>		<b>3</b>

## Tier 3 Generic Knowledge &amp; Abilities Outline - RO &amp; SRO

Facility: Calvert Cliffs Nuclear Power Plant			Date of Exam: 08/13/2012			
Category	K/A #	Topic	RO		SRO	
			IR	#	IR	#
Conduct of Operations	2.1.3	Knowledge of shift or short-term relief turnover practices.	3.7	1		
	2.1.23	Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.3	1		
	2.1.43	Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc.	4.1	1		
	2.1.20	Ability to interpret and execute procedure steps.			4.6	1
	2.1.35	Knowledge of the fuel-handling responsibilities of SROs.			3.9	1
	Subtotal			3		2
Equipment Control	2.2.4	(multi-unit license) Ability to explain the variations in control board/control room layouts, systems, instrumentation and procedural actions between units at a facility.	3.6	1		
	2.2.42	Ability to recognize system parameters that are entry-level conditions for Technical Specifications.	3.9	1		
	2.2.43	Knowledge of the process used to track inoperable alarms.	3.0	1		
	2.2.18	Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.			3.9	1
	Subtotal			3		1
Radiation Control	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	3.2	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
	2.3.11	Ability to control radiation releases.			4.3	1
	Subtotal			2		2
Emergency Procedures/Plan	2.4.14	Knowledge of general guidelines for EOP usage.	3.8	1		
	2.4.29	Knowledge of the emergency plan.	3.1	1		
	2.4.1	Knowledge of EOP entry conditions and immediate action steps.			4.8	1
	2.4.11	Knowledge of abnormal condition procedures.			4.2	1
	Subtotal			2		2
Tier 3 Total(s)				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO-1/1	008 Pressurizer Vapor Space Accident AK2.02	During exam review, noted question developed for this K/A provided answer to another question . There is not enough subject matter to author another question using original K/A. Kept system and replaced with K/A AK2.01 which was randomly selected, using numbered poker chips.
RO-1/1	022 Loss of Reactor Coolant Makeup AK3.03	During NRC review, question does not match selected K/A. This K/A is not applicable to plant. Kept system and replaced with K/A AK3.02 which was randomly selected, using numbered poker chips.
RO - 1/1	056 Loss of Off-site Pwr, K/A 2.2.2	ES-401 contains guidance, in the form of a list, on generic K/As for use with Tiers 1 & 2. The randomly selected K/A is not on the ES-401 list. Replaced with <b>K/A 2.2.3</b> , which was randomly drawn, using numbered poker chips.
RO-1/1	058 Loss of DC Power AA1.01	During NRC review question selected did not match K/A. Determined K/A not applicable to plant. Kept system and replaced with K/A AA1.03 which was randomly selected, using numbered poker chips.
RO-1/1	065 Loss of Instrument Air K/A AA1.05	During exam review, noted question developed for this K/A provided answer to another test question . Kept system and replaced with K/A AA1.04 which was randomly selected, using numbered poker chips.
RO - 1/1	077 Generator Voltage & Grid Disturbances, K/A 2.1.26	ES-401 contains guidance, in the form of a list, on generic K/As for use with Tiers 1 & 2. The randomly selected K/A is not on the ES-401 list. Replaced with <b>K/A 2.1.23</b> , which was randomly drawn, using numbered poker chips.
RO - 1/2	CE/A16 Excess RCS Lkg, K/A 2.1.26	ES-401 contains guidance, in the form of a list, on generic K/As for use with Tiers 1 & 2. The randomly selected K/A is not on the ES-401 list. Replaced with <b>K/A 2.1.20</b> , which was randomly drawn, using numbered poker chips.
RO - 2/1	010 Pressurizer Pressure Control K2.04	Spent several unsuccessful hours attempting to develop a question for this combination of system/K/A. Kept system 010 and replaced K/A with one that had not been sampled. K/A K2.01 was randomly selected, using numbered poker chips.
RO - 2/1	012 Reactor Protection, K/A 2.4.42	ES-401 contains guidance, in the form of a list, on generic K/As for use with Tiers 1 & 2. The randomly selected K/A is not on the ES-401 list. Replaced with <b>K/A 2.4.31</b> , which was randomly drawn, using numbered poker chips.
RO - 2/1	026 Containment Spray, K/A 2.1.21	ES-401 contains guidance, in the form of a list, on generic K/As for use with Tiers 1 & 2. The randomly selected K/A is not on the ES-401 list. Replaced with <b>K/A 2.1.28</b> , which was randomly drawn, using numbered poker chips.
RO - 2/1	103 Containment A2.03	Spent several unsuccessful hours attempting to develop a question for this combination of system/K/A. Kept K/A A2.03 and replaced system with one that had only been sampled once. System 008 - Component Cooling Water System was randomly selected, using numbered poker chips.



Tier / Group	Randomly Selected K/A	Reason for Rejection
RO - 2/1	073 Process Radiation Monitoring, K/A 2.4.49	Spent several unsuccessful hours attempting to develop a question for this combination of system/K/A. Kept K/A 2.4.49 and replaced system with one that had only been sampled once. System 004 - CVCS was randomly selected, using numbered poker chips.
RO - 2/2	015 – Nuclear Instrumentation K/A A3.05	Spent several unsuccessful hours attempting to develop a question for this combination of system/K/A. Kept system and replaced K/A with another one in the same system. K/A 3.02 was randomly selected, using numbered poker chips.
RO - 2/2	072 - Area Radiation Monitoring	Spent several unsuccessful hours attempting to develop a question for this combination of system/K/A. Kept K/A 1.01 and replaced system with one that had not been sampled. System 011 - Pressurizer Level Control System, was randomly selected, using numbered poker chips.
RO - 2/2	075 Circulating Water, K/A 2.1.1	ES-401 contains guidance, in the form of a list, on generic K/As for use with Tiers 1 & 2. The randomly selected K/A is not on the ES-401 list. Replaced with K/A 2.1.32, which was randomly drawn, using numbered poker chips.
RO - 2/2	086 Fire Protection, K/A 3.01	Spent several unsuccessful hours attempting to develop a question for this combination of system/K/A. Kept K/A 3.01 and replaced system with one that had not been sampled. System 035 - Steam Generator, was randomly selected, using numbered poker chips.
SRO - 1/1	015/017 RCP Malfs, K/A 2.4.5	ES-401 contains guidance, in the form of a list, on generic K/As for use with Tiers 1 & 2. The randomly selected K/A is not on the ES-401 list. Replaced with K/A 2.4.21, which was randomly drawn, using numbered poker chips.
SRO - 1/1	057 Loss of Vital AC Inst. Bus, K/A AA2.01	Site procedures do NOT specifically address this condition. Spent approximately 2 hours trying to formulate question. Replaced with K/A AA2.03, which was randomly drawn, using numbered poker chips.
SRO – 2/1	059 Main Feedwater, K/A 2.4.44	ES-401 contains guidance, in the form of a list, on generic K/As for use with Tiers 1 & 2. The randomly selected K/A is not on the ES-401 list. Replaced with K/A 2.4.4, which was randomly drawn, using numbered poker chips.
SRO – 2/1	103 Containment System A2.01	Spent several unsuccessful hours attempting to develop a question for this combination of system/K/A. Kept K/A 2.01 and replaced system with one that had not been sampled. System 003 – Reactor Coolant Pump System was randomly selected, using numbered poker chips.
SRO - 2/2	029 Containment Purge, K/A 2.2.18	ES-401 contains guidance, in the form of a list, on generic K/As for use with Tiers 1 & 2. The randomly selected K/A is not on the ES-401 list. Replaced with K/A 2.2.37, which was randomly drawn, using numbered poker chips.

Tier / Group	Randomly Selected K/A	Reason for Rejection
3/RO	Generic 2.3.5	Spent several unsuccessful hours attempting to develop a question for this K/A. K/A 2.2.43 was randomly selected, using numbered poker chips.
3/RO	Generic 2.4.5	Spent several unsuccessful hours attempting to develop a question for this K/A. K/A 2.4.14 was randomly selected, using numbered poker chips.
3/SRO	Generic 2.3.6	Spent several unsuccessful hours attempting to develop a question that has not appeared on last two NRC exams for this K/A. K/A 2.2.36 was randomly selected, using numbered poker chips.

Facility: <b>Calvert Cliffs Nuclear Power Plant</b> Exam Level: RO / SRO-I / SRO-U		Date of Examination: <b>8/3/12 thru 8/23/12</b> Operating Test #: <b>2012</b>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, S	Determine Status of Safety Functions for the FRP (SRO-ADMIN-1) 2.1.20 - Ability to interpret and execute procedure steps (4.6, 4.6)
Conduct of Operations	R, M	Evaluate the need for plant cooldown. (SRO-ADMIN-2) 2.1.25 - Ability to interpret reference materials, such as graphs, curves, tables, etc. (3.9, 4.2).
Equipment Control	D, P, R	Monitor Azimuthal Power Tilt (Tq) using Excore Nuclear Instrumentation (SRO-ADMIN-3) 2.2.42 - Ability to recognize system parameters that are entry-level conditions for Technical Specifications (3.9, 4.6)
Radiation Control	M, R	Respond to a contaminated injured person (SRO-ADMIN-4) 2.3.14 - Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities. (3.4, 3.8)
Emergency Procedures / Plan	D, R	Determine the appropriate emergency response actions per the ERPIP while maintaining an overview of plant conditions. (SRO-ADMIN-5) 2.4.41 - Knowledge of the emergency action level thresholds and classifications (2.9, 4.6).
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.		
* Type Codes & Criteria: <ul style="list-style-type: none"> <li>(C)ontrol room, (S)imulator, or Class(R)oom</li> <li>(D)irect from bank (<math>\leq 3</math> for ROs; <math>\leq 4</math> for SROs &amp; RO retakes)</li> <li>(N)ew or (M)odified from bank (<math>\geq 1</math>)</li> <li>(P)revious 2 exams (<math>\leq 1</math>; randomly selected)</li> </ul>		

Facility: <b>Calvert Cliffs Nuclear Power Plant</b> Exam Level: RO / SRO-I / <b>SRO-U</b>		Date of Examination: <b>8/3/12 thru 8/23/12</b> Operating Test #: <b>2012</b>	
Control Room Systems <sup>@</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)			
System / JPM Title		Type Code*	Safety Function
a. SIM-3, Respond to a FRV or FRV controller malfunction		D, E, S	4 (secondary)
b. SIM-4, Verify Recirculation Actuation Signal		A, E, EN, L, P, S	2
c. SIM-5, Verify the Containment Environment Safety Function is satisfied.		A, E, L, M, S	5
In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
a. PLT-1, Obtain Safe Shutdown Equipment then Strip MCC-114R		D, E, L, R	6
b. PLT-2, Isolate Di Water And Condensate Makeup To The Service Water And Component Cooling Head Tanks		E, L, N	8
All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.			
* Type Codes		Criteria for RO / SRO-I / <b>SRO-U</b>	
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator		4-6 / 4-6 / <b>2-3</b>  $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / $\geq 1$ (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$	

Facility: **Calvert Cliffs Nuclear Power Plant**  
Exam Level: RO / **SRO-I** / SRO-U

Date of Examination: **8/3/12 thru 8/23/12**  
Operating Test #: **2012**

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, S	Determine Status of Safety Functions for the FRP (SRO-ADMIN-1) 2.1.20 - Ability to interpret and execute procedure steps (4.6, 4.6)
Conduct of Operations	R, M	Evaluate the need for plant cooldown. (SRO-ADMIN-2) 2.1.25 - Ability to interpret reference materials, such as graphs, curves, tables, etc. (3.9, 4.2).
Equipment Control	D, P, R	Monitor Azimuthal Power Tilt (Tq) using Excore Nuclear Instrumentation (SRO-ADMIN-3) 2.2.42 - Ability to recognize system parameters that are entry-level conditions for Technical Specifications (3.9, 4.6)
Radiation Control	M, R	Respond to a contaminated injured person (SRO-ADMIN-4) 2.3.14 - Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities. (3.4, 3.8)
Emergency Procedures / Plan	D, R	Determine the appropriate emergency response actions per the ERPIP while maintaining an overview of plant conditions. (SRO-ADMIN-5) 2.4.41 - Knowledge of the emergency action level thresholds and classifications (2.9, 4.6).
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.		

\* Type Codes & Criteria:

- (C)ontrol room, (S)imulator, or Class(R)oom
- (D)irect from bank ( $\leq 3$  for ROs;  $\leq 4$  for SROs & RO retakes)
- (N)ew or (M)odified from bank ( $\geq 1$ )
- (P)revious 2 exams ( $\leq 1$ ; randomly selected)

Facility: <b>Calvert Cliffs Nuclear Power Plant</b>		Date of Examination: <b>8/3/12 thru 8/23/12</b>
Exam Level: <b>RO / SRO-I / SRO-U</b>		Operating Test #: <b>2012</b>
Control Room Systems <sup>@</sup> (8 for RO); (7 for <b>SRO-I</b> ); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. SIM-1, Respond to a Loss of SDC with the RCS Open	A, L, P, S	4 (primary)
b. SIM-2, Respond to a Pressurizer Spray Valve Failure	A, P, S	3
c. SIM-3, Respond to a FRV or FRV controller malfunction	D, S	4 (secondary)
d. SIM-4, Verify Recirculation Actuation Signal	A, EN, L, P, S	2
e. SIM-5, Verify the Containment Environment Safety Function is satisfied.	A, M, S	5
f. SIM-6, Null NI Pots to DeltaT Pots	D, S	7
g. SIM-8, Unload and shutdown the 0C DG	D, S	6
In-Plant Systems <sup>@</sup> (3 for RO); (3 for <b>SRO-I</b> ); (3 or 2 for SRO-U)		
a. PLT-1, Obtain Safe Shutdown Equipment then Strip MCC-114R	D, E, L, R	6
b. PLT-2, Isolate Di Water And Condensate Makeup To The Service Water And Component Cooling Head Tanks	E, L, N	8
c. PLT-3, Align AFW Pump Speed Control to 1C43	A, E, L, M	4 (secondary)
All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		
* Type Codes	Criteria for RO / <b>SRO-I</b> / SRO-U	
(A)lternate path	4-6 / <b>4-6</b> / 2-3	
(C)ontrol room		
(D)irect from bank	$\leq 9 / \leq 8 / \leq 4$	
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$	
(EN)gineered safety feature	- / - / $\geq 1$ (control room system)	
(L)ow-Power / Shutdown	$\geq 1 / \geq 1 / \geq 1$	
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$	
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)	
(R)CA	$\geq 1 / \geq 1 / \geq 1$	
(S)imulator		

Facility: <b>Calvert Cliffs Nuclear Power Plant</b> Exam Level: <b>RO / SRO-I / SRO-U</b>		Date of Examination: <b>8/3/12 thru 8/23/12</b> Operating Test #: <b>2012</b>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R, M	Estimate Time to Boiling and Core Uncovery (RO-Admin-1) 2.1.20 - Ability to interpret and execute procedure steps (4.6, 4.6).
Conduct of Operations	R, N	Calculate BAST volume required to raise RWT to refueling boron concentration (RO-Admin-2) 2.1.25 - Ability to interpret reference materials, such as graphs, curves, tables, etc. (3.9, 4.2)
Equipment Control		
Radiation Control	M, R	Determine protective clothing and limits associated with performance of a task in the RCA (RO-Admin-3) 2.3.7 - Ability to comply with radiation work permit requirements during normal or abnormal conditions. (3.5, 3.6)
Emergency Procedures / Plan	D, S	Perform an Independent Assessment of an Event Using the EOP-0 Diagnostic Flowchart and Recommend the Correct Recovery Procedure. (RO-ADMIN-4) 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. (4.0, 4.6)
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.		
* Type Codes & Criteria: (C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank ( $\leq 3$ for ROs; $\leq 4$ for SROs & RO retakes) (N)ew or (M)odified from bank ( $\geq 1$ ) (P)revious 2 exams ( $\leq 1$ ; randomly selected)		

Facility: <b>Calvert Cliffs Nuclear Power Plant</b>		Date of Examination: <b>8/3/12 thru 8/23/12</b>
Exam Level: <b>RO / SRO-I / SRO-U</b>		Operating Test #: <b>2012</b>
Control Room Systems: <b>(8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)</b>		
System / JPM Title	Type Code*	Safety Function
a. SIM-1, Respond to a Loss of SDC with the RCS Open	A, L, P, S	4 (primary)
b. SIM-2, Respond to a Pressurizer Spray Valve Failure	A, P, S	3
c. SIM-3, Respond to a FRV or FRV controller malfunction	D, S	4 (secondary)
d. SIM-4, Verify Recirculation Actuation Signal	A, EN, L, P, S	2
e. SIM-5, Verify the Containment Environment Safety Function is satisfied.	A, M, S	5
f. SIM-6, Null NI Pots to DeltaT Pots	D, S	7
g. SIM-7, Respond to Inadvertent Dilution During Reactor Startup	D, L, S	1
h. SIM-8, Unload and shutdown the OC DG	D, S	6
In-Plant Systems <sup>@</sup> <b>(3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)</b>		
a. PLT-1, Obtain Safe Shutdown Equipment then Strip MCC-114R	D, E, L, R	6
b. PLT-2, Isolate Di Water And Condensate Makeup To The Service Water And Component Cooling Head Tanks	E, L, N	8
c. PLT-3, Align AFW Pump Speed Control to 1C43	A, E, L, M	4 (secondary)
All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		
* Type Codes	Criteria for <b>RO / SRO-I / SRO-U</b>	
(A)lternate path	<b>4-6 / 4-6 / 2-3</b>	
(C)ontrol room		
(D)irect from bank	$\leq 9 / \leq 8 / \leq 4$	
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$	
(EN)gineered safety feature	- / - / $\geq 1$ (control room system)	
(L)ow-Power / Shutdown	$\geq 1 / \geq 1 / \geq 1$	
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$	
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)	
(R)CA	$\geq 1 / \geq 1 / \geq 1$	
(S)imulator		



Facility: **Calvert Cliffs Nuclear Power Plant**      Scenario #:1      OP-Test #: **CCNPP 2012**

Examiners:

Operators:

Initial Conditions: **Unit-1 is at 65% Power with a core burnup of 10,885 MWD/MTU. Unit-2 is in Mode 5. 12 CS pump is OOS for repairs. 23 Auxiliary Feedwater Pump is out of service for overhaul of the coupling (expected back in three shifts).**

Turnover: **Place 12 SGFP in parallel operation with 11 SGFP and return power to 100%.**

Event #	Malfunction #	Event Type*	Event Description
1	None	N - BOP/SRO	Aligns 12 SGFP for parallel operation w/11 SGFP
2	rcs026_01	I - ATC T - SRO	Failure of LT-110X
3	None	R - ATC N - BOP/SRO	Commences power escalation
4	srw003_01	C - BOP/SRO T - SRO	11 Service Water Pump Bkr Failure
5	cd005_01	C - BOP/SRO	Condensate Booster Pump trip
6	cd008, rps005, rps006	M - ALL	Condensate Booster Pump discharge header rupture (25%). Reactor will not trip automatically or with Rx Trip pushbuttons. CEDM MG Sets must be de-energized to trip the reactor.
7	Various	C - ALL	Loss of All Feedwater / Once-Thru-Cooling
*      (N)ormal      (R)eactivity      (I)nstrument      (C)omponent      (M)ajor      (T)ech Spec			

**Critical Tasks: (shaded)**

1. Deenergizes CEDM MG sets within 1 minute of an existing Reactor Trip Condition. Reports Reactivity Control complete (report not critical). N/A if RPS setpoint not reached.
2. Trip **all** RCPs prior to commencing RCS cooldown.
3. Initiates OTCC when both S/G levels are < -350" or T<sub>COLD</sub> rises > 5°F uncontrollably (must be commenced prior to CET temperatures reaching 560°F)

Facility: **Calvert Cliffs Nuclear Power Plant**      Scenario #: **2**      OP-Test #: **CCNPP 2012**

Examiners:

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Operators:

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Initial Conditions: **Unit-1 is at 100% power. Core Burnup is 17,885 MWD/MTU. Unit-2 is in Mode 5.**

Turnover: **12 AFW Pump is OOS due to a governor problem (has been OOS for 3 hours and is due back by end of shift). The SMECO tie breaker is open. 14 CAR is OOS due to a failed motor bearing. The 2A DG was removed from service yesterday for scheduled maintenance. 11 ADV is wisping a small amount of steam. Instructions to the crew are to maintain full power.**

Event #	Malfunction #	Event Type*	Event Description
1	cvcs003_01	C - ATC/SRO	11 Charging Pump coupling failure
2	rcs023_01	I - ATC	PT-100X fails high
3	sw001_02	C - BOP/SRO T - SRO	Saltwater Leak
4	tg024_01	R - ATC C - BOP/SRO T - SRO	MTCV-1 Fails closed
5	swyd002	M - ALL	Loss Of Offsite Power resulting in a reactor trip
6	dg002_02	C - ALL	No 4KV SR Busses resulting in Station Blackout
7	afw004_01 afw004_02	C - ALL	AFAS "A" & "B" failure
* (N)ormal (R)eactivity (I)nstrument (C)omponent (M)ajor (T)ech Spec			

**Critical Tasks: (shaded)**

1. Stops Salt Water leak by securing 12 SW Pump or by isolating Salt Water to 12A and 12B SRW HXs prior to tripping the SRW pumps on high room level.
2. Establishes an RCS heat sink
3. Restores power to 11 or 14 4KV bus prior to 125V DC bus voltage going below 106V.

Facility: **Calvert Cliffs Nuclear Power Plant**      Scenario #: **3**      OP-Test #: **CCNPP 2012**

Examiners:

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Operators:

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Initial Conditions: **Unit-1 is at 100% with a core burnup of 10,885 MWD/MTU. Unit-2 is in Mode 5.**

Turnover: **11 4 KV Bus alternate feed is tagged out for breaker PMs. The crew is instructed to maintain 100% power.**

Event #	Malfunction #	Event Type*	Event Description
1	rcs027_01	C - ATC T - SRO	PORV-402 leakby
2	cntm001_01	C - BOP/SRO T - SRO	11 Containment Air Cooler (CAC) trips
3	ms015	I - ALL	ADV Controller, 1-HIC-4056, fails in automatic
4	ms001_02 Downpower	R - ATC C - BOP/SRO T - SRO	11 S/G Tube leak (0 – 65 GPM over 2 minutes) Reduce T <sub>AVE</sub> to less than 537°F
5	ms002_02	M - ALL	11 S/G Tube Rupture - one tube
6	afw001_01	C - BOP/SRO	11 AFW Pump trip/11 4KV Bus loss
*      (N)ormal    (R)eactivity    (I)nstrument    (C)omponent    (M)ajor    (T)ech Spec			

**Critical Tasks: (shaded)**

1. Maintains RCP trip strategy. Trips 11A and 12B or 11B and 12A RCPs when RCS pressure < 1725 PSIA.
2. Aligns 12 AFW pump or restores power to 11 4KV bus and starts 13 AFW pump.
1. Isolates 12 S/G when it has been identified as the most affected S/G and T<sub>HOT</sub> is < 515° F.