

Facility: Calvert Cliffs Nuclear Power Plant	Date of Exam: 08/02/2010
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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	N/A			1	2	N/A			2	9	2	2	4
	Tier Totals	4	5	4	N/A			4	5	N/A			5	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	0	1	1	1	1	1	1	10	2	1	3	
	Tier Totals	3	3	4	4	3	3	3	4	3	4	4	38	5	3	8	
3. Generic Knowledge & Abilities Categories				1	2	3	4	10					1	2	3	4	7
				3	2	2	3						2	2	2	1	

- 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 Reactor Trip – Stabilization – Recovery / 1		X					Knowledge of the interrelations between a reactor trip and the following: EK2.02 - Breakers, relays and disconnects	2.6	1
008 Pressurizer Vapor Space Accident / 2				X			Ability to operate and / or monitor the following as they apply to the Pressurizer Vapor Space Accident: AA1.06 - Control of PZR level	3.6	1
009 Small Break LOCA / 3					X		Ability to determine or interpret the following as they apply to a small break LOCA: EA2.29 - CVCS pump indicating lights for determining pump status	3.2	1
011 Large Break LOCA / 3		X					Knowledge of the interrelations between the and the following Large Break LOCA: EK2.02 - Pumps	2.6	1
015/017 RCP Malfunction / 4	X						Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow): AK1.04 - Basic steady state thermodynamic relationship between RCS loops and S/Gs resulting from unbalanced RCS flow	2.9	1
022 Loss of Reactor Coolant Makeup / 2					X		Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Makeup: AA2.01- Whether charging line leak exists	3.2	1
025 Loss of RHR System / 4				X			Ability to operate and / or monitor the following as they apply to the Loss of Residual Heat Removal System: AA1.08 - RHR cooler inlet and outlet temperature indicators	2.9	1
026 Loss of Component Cooling Water / 8				X			Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: AA1.05 - The CCWS surge tank, including level control and level alarms, and radiation alarm	3.1	1
027 Pressurizer Pressure Control System Malfunction / 3		X					Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following: AK2.03 - Controllers and positioners	2.6	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
029 ATWS / 1			X				Knowledge of the reasons for the following responses as they apply to the ATWS: EK3.01- Verifying a reactor trip; methods	4.2	1
038 Steam Generator Tube Rupture / 3						X	2.1.14 - Knowledge of criteria or conditions that require plant-wide announcements, such as pump starts, reactor trips, mode changes, etc.	3.1	1
040 Steam Line Rupture – Excessive Heat Transfer / 4	X						Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture: AK1.04 - Nil ductility temperature	3.2	1
054 (CE/E06) Loss of Main Feedwater / 4			X				Knowledge of the reasons for the following responses as they apply to the (Loss of Feedwater) EK3.2 - Normal, abnormal and emergency operating procedures associated with (Loss of Feedwater).	3.2	1
055 Station Blackout / 6					X		Ability to determine or interpret the following as they apply to a Station Blackout: EA2.04 - Instruments and controls operable with only dc battery power available	3.7	1
056 Loss of Offsite Power / 6						X	2.1.25 - Ability to interpret reference materials, such as graphs, curves, tables, etc.	3.9	1
057 Loss of Vital AC Inst. Bus / 6			X				Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: AK3.01- Actions contained in EOP for loss of vital ac electrical instrument bus	4.1	1
058 Loss of DC Power / 6	X						Knowledge of the operational implications of the following concepts as they apply to Loss of DC Power: AK1.01 - Battery charger equipment and instrumentation	2.8	1
065 Loss of Instrument Air / 8						X	2.4.45 - Ability to prioritize and interpret the significance of each annunciator or alarm.	4.1	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
024 Emergency Boration / 1			X				Knowledge of the reasons for the following responses as they apply to Emergency Boration: AK3.01 - When emergency boration is required	4.1	1
028 Pressurizer (PZR) Level Control Malfunction / 2						X	2.4.6 - Knowledge of EOP Mitigation Strategies	3.7	1
032 Loss of Source Range Nuclear Instrumentation / 7		X					Knowledge of the interrelations between the Loss of Source Range Nuclear Instrumentation and the following: AK2.01 - Power supplies, including proper switch positions	2.7	1
036 Fuel Handling Incidents / 8				X			Ability to operate and / or monitor the following as they apply to the Fuel Handling Incidents: AA1.01 - Reactor building containment purge ventilation system	3.3	1
037 Steam Generator Tube Leak / 3						X	2.2.40 - Ability to apply Technical Specifications for a system	3.4	1
051 Loss of Condenser Vacuum / 4					X		Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum: AA2.02 - Conditions requiring reactor and/or turbine trip	3.9	1
061 Area Radiation Monitoring (ARM) System Alarms / 7	X						Knowledge of the operational implications of the following concepts as they apply to Area Radiation Monitoring (ARM) System Alarms: AK1.01- Detector limitations	2.5	1
076 High Reactor Coolant Activity / 9					X		Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: AA2.02 - Corrective actions required for high fission product activity in RCS	2.8	1
CE/A16 Excess RCS Leakage / 2		X					Knowledge of the interrelations between the (Excess RCS Leakage) and the following: AK2.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.2	1
K/A Category Totals:	1	2	1	1	2	2	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 System											X	2.1.30 - Ability to locate and operate components, including local controls.	4.4	1
003 Reactor Coolant Pump System	X											Knowledge of the physical connections and/or cause-effect relationships between the RCPS and the following systems: K1.03 - RCP seal system	3.3	1
004 Chemical and Volume Control System			X									Knowledge of the effect that a loss or malfunction of the CVCS will have on the following: K3.06 - RCS temperature and pressure	3.4	1
004 Chemical and Volume Control System										X		Ability to manually operate and/or monitor in the control room: A4.10 - Boric acid pumps	3.6	1
005 Residual Heat Removal System (RHRS)					X							Knowledge of the operational implications of the following concepts as they apply the RHRS: K5.09 - Dilution and boration considerations	3.2	1
006 Emergency Core Cooling System								X				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: A2.02 - Loss of flow path	3.9	1
007 Pressurizer Relief Tank/Quench Tank System					X							Knowledge of the operational implications of the following concepts as the apply to PRTS: K5.02 - Method of forming a steam bubble in the PZR	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
008 Component Cooling Water System								X				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: A2.05 - Effect of loss of instrument and control air on the position of the CCW valves that are air operated	3.3	1
010 Pressurizer Pressure Control System		X										Knowledge of bus power supplies to the following: K2.02 - Controller for PZR spray valve	2.5	1
010 Pressurizer Pressure Control System										X		2.2.2 - Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	4.6	1
012 Reactor Protection System			X									Knowledge of the effect that a loss or malfunction of the RPS will have on the following: K3.02 - T/G	3.2	1
012 Reactor Protection System									X			Ability to monitor automatic operation of the RPS, including: A3.01- Individual channel	3.8	1
013 Engineered Safety Features Actuation System						X						Knowledge of the effect of a loss or malfunction on the following will have on the ESFAS: K6.01 - Sensors and detectors	2.7	1
022 Containment Cooling System (CCS)									X			Ability to monitor automatic operation of the CCS, including: A3.01 - Initiation of safeguards mode of operation	4.1	1
System/Evolution #/Name	K	K	K	K	K	K	A	A	A	A	G	KA Topic	Imp	Pts

Plant Systems – Tier 2 / Group 1 - REACTOR OPERATOR

	1	2	3	4	5	6	1	2	3	4				
026 Containment Spray System (CSS)				X								Knowledge of CSS design feature(s) and/or interlock(s) which provide for the following: K4.07 - Adequate level in containment sump for suction (interlock)	3.8	1
039 Main and Reheat Steam (MRSS)System					X							Knowledge of the operational implications of the following concepts as they apply to the MRSS: K5.05 - Bases for RCS cooldown limits	2.7	1
039 Main and Reheat Steam (MRSS)System				X								Knowledge of MRSS design feature(s) and/or interlock(s) which provide for the following: K4.02 - Utilization of Tave. program control when steam dumping through atmospheric relief/dump valves, including T-ave. limits	3.1	1
059 Main Feedwater System (MFW)							X					Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MFW controls including: A1.03 - Power level restrictions for operation of MFW pumps and valves.	2.7	1
061 Auxiliary / Emergency Feedwater System (AFW)			X									Knowledge of the effect that a loss or malfunction of the AFW will have on the following: K3.02 – S/G	4.2	1
062 A.C. Electrical Distribution		X										Knowledge of bus power supplies to the following: K2.01 - Major system loads	3.3	1
063 D.C. Electrical Distribution								X				Ability to (a) predict the impacts of the following malfunctions or operations on the DC electrical systems; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: A2.01 - Grounds	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 Generators											X	Ability to manually operate and/or monitor in the control room: A4.06 - Manual start, loading, and stopping of the ED/G	3.9	1
064 Emergency Diesel Generators						X						Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system: K6.07 - Air receivers	2.7	1
073 Process Radiation Monitoring System											X	2.4.18 - Knowledge of the specific bases for EOPs.	3.3	1
076 Service Water System (SWS)				X								Knowledge of SWS design feature(s) and/or interlock(s) which provide for the following: K4.02 - Automatic start features associated with SWS pump controls	2.9	1
078 Instrument Air System (IAS)	X											Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: K1.04 - Cooling water to compressor	2.6	1
103 Containment System							X					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
103 Containment System											X	Ability to manually operate and/or monitor in the control room: A4.06 - Operation of the containment personnel airlock door	2.7	1
K/A Category Totals:	2	2	3	3	3	2	2	3	2	3	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 System				X								Knowledge of RCS design feature(s) and/or interlock(s) which provide for the Following: K4.07 - Contraction and expansion during heatup and cooldown	3.1	1
011 Pressurizer Level Control System								X				Ability to (a) predict the impacts of the following malfunctions or operations on the PZR LCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: A2.07 - Isolation of letdown	3.0	1
015 Nuclear Instrumentation						X						Knowledge of the effect of a loss or malfunction of the following will have on the NIS: K6.01 - Sensors and detectors	2.9	1
027 Containment Iodine Removal System		X										K2 Knowledge of bus power supplies to the following: K2.01 - Fans	3.1	1
033 Spent Fuel Pool Cooling System			X									Knowledge of the effect that a loss or malfunction of the Spent Fuel Pool Cooling System will have on the following: K3.01 - Area ventilation systems	2.6	1
035 Steam Generator System									X			Ability to monitor automatic operation of the S/G including: A3.01 - S/G water level control	4.0	1
045 Main Turbine Generator System							X					Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MT/G system controls including: A1.06 - Expected response of secondary plant parameters following T/G trip	3.3	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
068 Liquid Radwaste System											X	Ability to manually operate and/or monitor in the control room: A4.04 - Automatic isolation	3.8	1
079 Station Air System	X											Knowledge of the physical connections and/or cause effect relationships between the SAS and the following systems: K1.01 - IAS	3.0	1
086 Fire Protection System											X	2.4.31- Knowledge of annunciator alarms, indications, or response procedures.	4.2	1
K/A Category Totals:	1	1	1	1	0	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	2.2.44 - 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.	4.4	1
054 Loss of Main Feedwater / 4						X	2.2.38 - Knowledge of conditions and limitations in the facility license.	4.5	1
055 Station Blackout / 6						X	2.4.40 - Knowledge of SRO responsibilities in emergency plan implementation.	4.5	1
062 Loss of Nuclear Service Water / 4					X		Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: AA2.04 - The normal values and upper limits for the temperatures of the components cooled by SWS	2.9	1
CE/EO2 Reactor Trip Recovery / 1					X		Ability to determine and interpret the following as they apply to the (Reactor Trip Recovery) EA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.7	1
CE/EO5 Excess Steam Demand / 4					X		Ability to determine and interpret the following as they apply to the (Excess Steam Demand): EA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	4.0	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	K 1	K 2	K 3	A 1	A 2	G	KA Topic	Imp	Pts
003 Dropped Control Rod / 1						X	2.2.23 - Ability to track Technical Specification limiting conditions for operations.	4.6	1
069 Loss of Containment Integrity / 5						X	2.2.39 - Knowledge of less than or equal to one hour Technical Specification action statements for systems.	4.5	1
CE/A13 Natural Circulation Operations /4					X		Ability to determine and interpret the following as they apply to the (Natural Circulation Operations): AA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.7	1
CE/E09 Functional Recovery					X		Ability to determine and interpret the following as they apply to the (Functional Recovery): EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	4.0	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 System											X	2.1.23 - Ability to perform specific system and integrated plant procedures during all modes of plant operation..	4.4	1
006 Emergency Core Cooling											X	2.2.22 - Knowledge of limiting conditions for operations and safety limits.	4.7	1
039 Main and Reheat Steam System								X				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 System								X				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	3.5	1
062 AC Electrical Distribution								X				Ability to (a) predict the impacts of the following malfunctions or operations on the IAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: A2.01 - Types of loads that, if de-energized, would degrade or hinder plant operation	3.9	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
014 Rod Position Indication System											X	2.4.30 - Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator.	4.1	1
041 Steam Dump System and Turbine Bypass Control								X				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: A2.03 - Loss of IAS	3.1	1
071 Waste Gas Disposal System (WGDS)								X				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: A2.09 - Stuck-open relief valve	3.5	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: 08/02/2010			
Category	K/A #	Topic	RO		SRO	
			IR	#	IR	#
Conduct of Operations	2.1.20	Ability to interpret and execute procedure steps.	4.6	1		
	2.1.21	Ability to verify the controlled procedure copy.	3.5	1		
	2.1.25	Ability to interpret reference materials, such as graphs, curves, tables, etc.	3.9	1		
	2.1.32	Ability to explain and apply system limits and precautions.			4.0	1
	2.1.42	Knowledge of new and spent fuel movement procedures.			3.4	1
	Subtotal				3	
Equipment Control	2.2.13	Knowledge of tagging and clearance procedures.	4.1	1		
	2.2.37	Ability to determine operability and/or availability of safety related equipment.	3.6	1		
	2.2.5	Knowledge of the process for making design or operating changes to the facility.			3.2	1
	2.2.36	Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.			4.2	1
	Subtotal				2	
Radiation Control	2.3.11	Ability to control radiation releases.	3.8	1		
	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.	3.4	1		
	2.3.5	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.			2.9	1
	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.			3.8	1
	Subtotal				2	
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.	4.5	1		
	2.4.14	Knowledge of general guidelines for EOP usage.	3.8	1		
	2.4.23	Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations.	3.4	1		
	2.4.26	Knowledge of facility protection requirements, including fire brigade and portable firefighting equipment usage.			3.6	1
	Subtotal				3	
Tier 3 Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO - 1/1	System 029, EK3.03	Not applicable at CCNPP. There is no link between ATWS and the operation of BIT inlet or outlet valves. Replaced with randomly drawn (using numbered poker chips) 029 EK3.01
RO - 1/1	System 056, Generic 2.3.4	K/A mismatch for E/APE. Radiation exposure limits with respect to LOOP? Replaced with randomly drawn (using numbered poker chips) Generic K/A 2.1.25
RO - 1/1	System 077, EK2.07	Could not generate a suitable question. First attempt was rejected by validators. Replaced with randomly drawn system # 011 and K/A EK2 (using numbered poker chips). Used K/A # EK2.02 (only K/A with RO importance rating of > 2.5)
RO - 1/2	System 001, AK3.01	CCNPP procedural direction is to trip the reactor if placing CEDS in off does not terminate the event. Replaced with randomly drawn system # 024 (using numbered poker chips). Used same K/A #.
RO-1/2	System 033, AA2.02	CCNPP does not have an Intermediate Range NI System. Replaced with randomly drawn system # 076 (using numbered poker chips). Used same K/A#.
RO - 1/2	System 059, 2.2.40	Could not generate a question after several hours effort. Replaced with randomly drawn system # 037 (using numbered poker chips). Used same K/A #.
RO - 1/2	System 060, AK2.01	Radiation release/detection oversampled throughout outline. Replaced with randomly drawn CE/A16, AK2.1. Other items sampled for this exam include: <ul style="list-style-type: none"> • O61, AK1.01 (RO) • 073, 2.4.18 (RO) • 068, A4.04 (RO) • 2.3.11 (RO) • 2.3.13 (RO) • 071, A2.09 (SRO) • 2.3.5 (SRO) • 2.3.14 (SRO)
RO - 2/1	System 010, 2.2.1	K/A not a good match for the system selected. Replaced with randomly drawn K/A 2.2.2
RO - 2/1	System 064, A4.07	A JPM was previously selected that covered the exact same subject matter. Replaced with randomly drawn (using numbered poker chips) K/A, A4.06

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO - 2/1	System 073, K4.02	Not applicable at CCNPP. Replaced with randomly drawn system 039 (using numbered poker chips) using same K/A (K4.02). Selected new system because the remaining System 073, K4 essentially mirrors the Tier 2 / Group 2 System 068 K/A that was sampled.
RO - 2/1	System 076, K4.03	Not applicable at CCNPP. There are no automatic opening features associated with the SWS isolation valves to CCW. Replaced with randomly drawn (using numbered poker chips) K4.02
RO - 2/2	System 017, K6.01	Could not generate a suitable question. First attempt was rejected by validators. Replaced with randomly drawn system # 015 (using numbered poker chips). Used original K/A #.
RO - 2/2	System 028, K2.01	H2 Recombiners no longer SR @ CCNPP. Replaced with randomly drawn system # 027 (using numbered poker chips). Used original K/A #.
RO - 2/2	System 035, A3.02	Selected new K/A. This K/A essentially mirrors the Tier 2 / Group 1 System 039 K/A that was sampled. Replaced with remaining System 35 K/A, A3.01, having an importance rating of ≥ 2.5 .
RO - 2/2	System 086, G 2.4.49	K/A Not applicable at CCNPP. There are no from memory "immediate actions" associated with the Fire Protection System. Replaced with randomly drawn (using numbered poker chips) K/A G 2.4.31
SRO - 1/1	System 065, 2.4.40	Discussed with Peter Presby. K/A mismatch for E/APE. Replaced with randomly drawn System (using numbered poker chips) 055, using original K/A.
SRO - 1/2	System 068, 2.2.23	Discussed with Peter Presby. K/A mismatch for E/APE. Replaced with randomly drawn System 003 (using numbered poker chips), using original K/A.
SRO - 1/2	CE/A13, AA2.2	Could not generate a suitable question. First attempt was rejected by validators. Replaced with remaining AA2 K/A, AA2.1.
SRO - 2/1	System 005, G2.1.39	K/A not one of group specified for random sampling in ES-401. Replaced with randomly drawn (using numbered poker chips) K/A G2.1.23.

Tier / Group	Randomly Selected K/A	Reason for Rejection
SRO – 2/1	System 076, G2.1.3.4	Discussed with Peter Presby. K/A Not applicable at CCNPP. Open cooling water system has no chemistry limits. Replaced with randomly drawn (using numbered poker chips) System 006, and K/A G 2.2.22.
SRO – 2/1	System 078, A2.01	Sampled in last exam written for CCNPP. Malfunctions of this component are limited in scope. Randomly sampled new system (using numbered poker chips) 062, kept same K/A
RO - Generic	K/A 2.1.9	2.1.9 is SRO responsibility. Replaced with randomly drawn (using numbered poker chips) G2.1.20.

Facility: Calvert Cliffs Nuclear Power Plant		Date of Examination: 8/2/10 – 8/11/10
Exam Level: RO / SRO-I		Operating Test No.: 2010
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, S	Estimate Time to Boiling and Core Uncovery (RO-Admin-1) 2.1.20 - Ability to interpret and execute procedure steps.
Conduct of Operations	M, R	Monitor Azimuthal Power Tilt (Tq) using Excore NIs. (RO-Admin-2) 2.1.25 - Ability to interpret reference materials, such as graphs, curves, tables, etc. (3.9, 4.2)
Equipment Control	N, R	Verify CCW System valve operability (RO-Admin-3) 2.2.21 – Knowledge of pre- and post-maintenance operability requirements. (2.9, 4.1)
Radiation Control		
Emergency Procedures / Plan	D, S	Recall the Emergency Response Organization IAW ERPIP 3.0. (RO-Admin-4) 2.4.39 - Knowledge of RO responsibilities in emergency plan implementation. (3.9, 3.8)
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 (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) (N)ew or (M)odified from bank (≥ 1) (P)revious 2 exams (≤ 1 ; randomly selected)		

Facility: Calvert Cliffs Nuclear Power Plant		Date of Examination: 8/2/10 – 8/11/10	
Exam Level: RO / SRO-I / SRO-U		Operating Test No.: 2010	
Control Room Systems [@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)			
System / JPM Title		Type Code*	Safety Function
a. 001 – Respond to multiple misaligned CEAs (Sim-1)		A, N, S	1
b. 002 - Use procedures to correct Loss of Forced Circulation (Sim-2)		D, S, L	4 (primary)
c. 004 - Respond to RCS leakage exceeding one Chg Pp, Modes 1 and 2 (Sim-4)		A, D, S	2
d. 013 - Monitor RCS Depressurization (Sim-3)		A, EN, M, S	3
e. 022 - Verify the Containment Environment Safety Function is satisfied (Sim-5)		D, S	5
f. 029 - Respond to a Containment Fuel Handling Incident (Sim-6)		N,S	8
g. 059 - Recover from Automatic Feedwater Isolation (Sim-7)		A, S, D	4 (secondary)
h. 064 - Transfer 4KV Bus Loads from DG to Offsite Power Source (Sim-8)		D, S	6
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
i. 022 - Start 11 & 12 Containment Air Coolers (Plant-1)		E, P, R	5
j. 041 - Initialize and Align the ADV Controllers to 1(2)C43 (Plant-2)		D, E	4 (secondary)
k. 062 - Align the OC DG to 11 4 KV Bus (Plant-3)		D, E	6
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 / SRO-U		
(A)lternate path	4-6 / 4-6 / 2-3		
(C)ontrol room			
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4		
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1		
(EN)gineered safety feature	- / - / ≥ 1 (control room system)		
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1		
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1		
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)		
(R)CA	≥ 1 / ≥ 1 / ≥ 1		
(S)imulator			

Facility: Calvert Cliffs Nuclear Power Plant		Date of Examination: 8/2/10 – 8/11/10
Exam Level: RO / SRO-U		Operating Test No.: 2010
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, R	Ability to Implement Plant procedures for Condenser tube leak. (SRO-Admin-1) 2.1.34 - Knowledge of primary and secondary plant chemistry limits. (2.7, 3.5)
Conduct of Operations	M, R	Verify an Estimated Critical Condition calculation. (SRO-Admin-2) 2.1.25 - Ability to interpret reference materials, such as graphs, curves, tables, etc. (3.9, 4.2)
Equipment Control	D, R	Monitor Azimuthal Power Tilt (Tq) using Excore NIs. (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	Approve a Liquid Waste Discharge Permit. (SRO-Admin-4) 2.3.6 - Ability to approve release permits. (2.0, 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 (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)		
(N)ew or (M)odified from bank (≥ 1)		
(P)revious 2 exams (≤ 1 ; randomly selected)		

Facility: Calvert Cliffs Nuclear Power Plant Exam Level: RO / SRO-I / SRO-U		Date of Examination: 8/2/10 – 8/11/10 Operating Test No.: 2010	
Control Room Systems [@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)			
System / JPM Title		Type Code*	Safety Function
a. 002 - Use procedures to correct Loss of Forced Circulation (Sim-2)		D, S, L	4 (primary)
b. 004 - Respond to RCS leakage exceeding one Chg Pp, Modes 1 and 2 (Sim-4)		A, D, S	2
c. 013 - Monitor RCS Depressurization (Sim-3)		A, EN, M, S	3
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
d. 022 - Start 11 & 12 Containment Air Coolers (Plant-1)		E, P, R	5
e. 041 - Initialize and Align the ADV Controllers to 1(2)C43 (Plant-2)		D, E	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 / SRO-I / SRO-U		
(A)lternate path	4-6 / 4-6 / 2-3		
(C)ontrol room			
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4		
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1		
(EN)gineered safety feature	- / - / ≥ 1 (control room system)		
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1		
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1		
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)		
(R)CA	≥ 1 / ≥ 1 / ≥ 1		
(S)imulator			

Facility: Calvert Cliffs Nuclear Power Plant Exam Level: RO / SRO-I		Date of Examination: 8/2/10 – 8/11/10 Operating Test No.: 2010
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, R	Ability to Implement Plant procedures for Condenser tube leak. (SRO-Admin-1) 2.1.34 - Knowledge of primary and secondary plant chemistry limits. (2.7, 3.5)
Conduct of Operations	M, R	Verify an Estimated Critical Condition calculation. (SRO-Admin-2) 2.1.25 - Ability to interpret reference materials, such as graphs, curves, tables, etc. (3.9, 4.2)
Equipment Control	D, R	Monitor Azimuthal Power Tilt (Tq) using Excore NIs. (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	Approve a Liquid Waste Discharge Permit. (SRO-Admin-4) 2.3.6 - Ability to approve release permits. (2.0, 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 (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) (N)ew or (M)odified from bank (≥ 1) (P)revious 2 exams (≤ 1; randomly selected)		

Facility: Calvert Cliffs Nuclear Power Plant		Date of Examination: 8/2/10 – 8/11/10	
Exam Level: RO / SRO-I / SRO-U		Operating Test No.: 2010	
Control Room Systems [@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)			
System / JPM Title		Type Code*	Safety Function
a. 001 – Respond to multiple misaligned CEAs (Sim-1)		A, N, S	1
b. 002 - Use procedures to correct Loss of Forced Circulation (Sim-2)		D, S, L	4 (primary)
c. 004 - Respond to RCS leakage exceeding one Chg Pp, Modes 1 and 2 (Sim-4)		A, D, S	2
d. 013 - Monitor RCS Depressurization (Sim-3)		A, EN, M, S	3
e. 022 - Verify the Containment Environment Safety Function is satisfied (Sim-5)		D, S	5
f. 029 - Respond to a Containment Fuel Handling Incident (Sim-6)		N,S	8
g. 059 - Recover from Automatic Feedwater Isolation (Sim-7)		A, S, D	4 (secondary)
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
h. 022 - Start 11 & 12 Containment Air Coolers (Plant-1)		E, P, R	5
i. 041 - Initialize and Align the ADV Controllers to 1(2)C43 (Plant-2)		D, E	4 (secondary)
j. 062 - Align the OC DG to 11 4 KV Bus (Plant-3)		D, E	6
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 / SRO-U		
(A)lternate path	4-6 / 4-6 / 2-3		
(C)ontrol room			
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4		
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1		
(EN)gineered safety feature	- / - / ≥ 1 (control room system)		
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1		
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1		
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)		
(R)CA	≥ 1 / ≥ 1 / ≥ 1		
(S)imulator			

Facility: CCNPP Scenario No.: 1 Op-Test No.: 2010

Examiners: _____ Operators: _____

Initial Conditions:
U-1 is at 100% power MOC 10,885 MWD/MTU with long term steady state power history. U-2 at 100% power BOC.

Turnover:
1A D/G removed from service and tagged out for scheduled maintenance (return in 12 hours), with 0C D/G aligned to 11 kv bus (disconnect 189-1106 shut). 13 CBP is in PTL and is considered emergency use only due to high vibrations. Instructions for the shift are to maintain power @ 100%.

Event No.	Mal. No.	Event Type*	Event Description
1	RCS023_02 RCS024_03 RCS025_02 RCS026_02	I (ATC/BOP) TS (SRO)	PZR Press Xmtr 100Y fails low PZR Press Xmtr 102C fails low PZR Press Xmtr 103-1 fails low PZR level XMTR 110Y fails high
2	RCS003	C (ALL) TS (SRO)	20 gpm RCS leak
3		R (ATC/SRO) N (BOP)	Expeditious Downpower
4	HDV005_02	C (BOP/SRO)	12 Condensate Booster Pump Failure w/o auto start of standby
5	SWYD002	M (ALL)	Loss of offsite power
6	CEDS010	C (ATC)	2 Stuck CEA's
7	DG002_02	C (BOP)	1B D/G Auto Start Failure
8	4KV001_02	C (ALL) TS (SRO)	11 kv bus electrical fault
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Critical Tasks: **(bold)**

- Commence boration due to 2 stuck CEA's
- Restore 4kv vital bus power with 0C D/G

Facility: <u>CCNPP</u> Scenario No.: <u>2</u>		Op-Test No.: <u>2010</u>	
Examiners: _____		Operators: _____	
_____		_____	
_____		_____	
<p>Initial Conditions: <u>U-1 is at 100% power EOC, 15,500 MWD/MTU with long term steady state power history. U-2 at 100% power MOC</u></p> <p>Turnover: <u>11 HPSI Pump is removed from service for scheduled maintenance (return in 3 hours). 13 CCW pump is OOS for work on 3rd pump disconnect. 13 CBP is for emergency use only due to high vibrations. Instructions for the shift is to remain at 100% power.</u></p>			
Event No.	Malf. No.	Event Type*	Event Description
1	CNTM001 04	TS (SRO)	14 Containment Air Cooler failure
2	TG017	C (BOP/SRO) R (ATC)	Turbine vibration on bearing 4
3	Various	C (ATC)	1-CVC-514-MOV breaker failure
4	TG001	M (ALL)	Turbine trip
5	RPS005, RPS006 & DSS failure	C (ATC) TS (SRO)	RPS & Manual Trip Pushbutton failure
6	CCW002 01	C (BOP)	11 Component Cooling Pump failure
7	RCS022	M (ALL)	Pressurizer Safety Valve fails to reseal (leak on top of PZR)
8	ESFA001 02	I (BOP)	SIAS B failure
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Critical Tasks:

- Trip Reactor from electrical panels due to ATWS
- Trip all RCP's due to no cooling
- Manually actuate SIAS B

Facility: CCNPP Scenario No.: 4 Op-Test No.: 2010

Examiners: _____ Operators: _____

Initial Conditions:

U-1 is at 100% power MOC 10,885 MWD/MTU long term steady state. U-2 is at 100% power EOC.

Turnover:

13 4kv bus aligned to alternate feed while normal feed breaker 152-1311 is OOS for scheduled maintenance.

Event No.	Malf. No.	Event Type*	Event Description
1	MS009_01	C (SRO/BOP) R (ATC)	TBV 3940 fails open
2	480v001_04	C (SRO/BOP)	12B 480V bus failure
3	CVCS003_01	C (ATC)	11 Charging Pump coupling failure
4	ESFA009_02	I (BOP) TS (SRO)	Spurious CIS B Actuation
5	CVCS009	I (ATC)	VCT level transmitter fails high
6	CCW003	C (All)	Component Cooling leak in the containment
7	MS002_02	M (All) TS (SRO)	12 S/G tube rupture

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

Critical Tasks:

- Secure RCP's prior to exceeding temp limits.
- Isolate S/G in EOP-6
- Depressurize RCS to minimize leakage

Facility: CCNPP Scenario No.: 3 Op-Test No.: 2010

Examiners: _____ Operators: _____

Initial Conditions:

U-1 is at 65% power due to emergent leak repair to 11 SGFP. Leak repair is complete and 11 SGFP has been returned to service in parallel with 12 SGFP. Two hour confidence run is complete for 12 SGFP and return to 100% power is ready to commence. U-1 is MOC at 10,885 MWD/MTU and U-2 is at 100% BOC.

Turnover:

U-1 is aligned for Pressurizer boron equalization and CVCS is aligned for direct injection to charging pump suction. 23 AFW Pump OOS for emergent work following failure of STP-O-5A. Instructions for the shift is to increase power back to 100% IAW OP-3.

Event No.	Malf. No.	Event Type*	Event Description
1		N (SRO/BOP) R (ATC)	Raise power from 65% to 100%
2	RCS027	C (BOP/ATC) TS (SRO)	Small leak on PORV 402
3	CVCS023_01	C (SRO/ATC)	11 Charging pump failure
4	NI008_02	I (ATC/BOP) TS (SRO)	NI Channel B Upper Detector Fail
5	480V003_04	C (SRO/BOP) R (ATC)	Loss of MCC-116, down power to <8000 gpm condensate flow
6	Panel Override	M (ALL)	Breaker 252-1102 trips open (U-4000-11 supply)
7	Various	C (ALL)	Suction path failure to U-1steam driven AFW pumps

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

Critical Tasks:

- Trip all RCP's upon entry into EOP-3
- Initiate OTCC to keep core cool