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Constellation Energy EDF
CALVERT CLIFFS
NUCLEAR POWER PLANT

To: Dave Silk, NRC Region 1 Chief Examiner
From: Jeff Heiska, Principal Operations Training Specialist
Subj: 2014 Initial Licensed Operator Exam Material
Date: June 10th, 2014

Please find enclosed materials supporting administration of the 2014 Initial Licensed Operator Exam at Calvert Cliffs Nuclear Power Plant.

The following documents are enclosed as per our telephone conversation and as specified on Form ES-201-1:

1. Form ES-201-2, Examination Outline Quality Checklist
2. Form ES-201-3, Examination Security Agreement (Copy of)
3. Form ES-301-1, Administrative Topics Outline (RO, SROI & SROU)
4. Form ES-301-2, Control Room/In-Plant Systems Outline (RO, SROI & SROU)
5. JPM Description Document
6. Form ES-301-5, Transient and Event Checklist
7. Form ES-D-1, Scenario Outline (Scenarios 1, 2, 3 & 4)
8. Form ES-401-2, PWR Examination Outline for RO and SRO Exams
9. Form ES-401-3, Generic Knowledge and Abilities Outline for RO and SRO Exams
10. Form ES-401-4, Record of Rejected K/As

The PWR Examination Outline for RO and SRO Exams and the Generic Knowledge and Abilities Outline for RO and SRO Exams were developed using NKEG (NRC KA Exam Generator) software developed by Westinghouse Electric Company, LLC.

The Enclosed materials must be withheld from public disclosure for a period of two years after the examinations are complete. Administration of the exam will take place beginning August 25th, 2014 and conclude on or about September 5th, 2014.

Principal Operations Training Specialist _____ 6/9/14
Signature Date

Facility: Calvert Cliffs Nuclear Power Plant Date of Exam: 08/25/2014

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

Note:

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

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				**EK3 - Knowledge of the reasons for the following as they apply to the reactor trip:** EK3.01 – Actions contained in EOP for reactor trip	4.0	1
008 Pressurizer Vapor Space Accident / 3		X					**AK2 - Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following:** AK2.03 – Controllers and positioners	2.5	1
009 Small Break LOCA / 3					X		**EA2 - Ability to determine or interpret the following as they apply to a Small Break LOCA:** EA2.13 - Charging pump flow indication	3.4	1
011 Large Break LOCA / 3			X				**EK3 - Knowledge of the reasons for the following responses as they apply to the Large Break LOCA:** EK3.09 – Maintaining D/G's available to provide standby power	4.2	1
000015/000017 RCP Malfunctions / 4	X						**AK1 - 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
025 Loss of RHR System / 4						X	**2.1 – Conduct of Operations** 2.1.20 - Ability to interpret and execute procedure steps.	4.6	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 Pressurizer Pressure Control System Malfunction / 3	X						**AK1 - Knowledge of the operational implications of the following concepts as they apply to Pressurizer Pressure Control Malfunctions:** AK1.02 - Expansion of liquids as temperature increases	2.8	1
029 ATWS / 1		X					**EK2 – Knowledge of the interrelations between the and the following an ATWS:** EK2.06 - Breakers, relays, and disconnects	2.9*	1
038 Steam Gen. Tube Rupture / 3					X		**EA2 - Ability to determine or interpret the following as they apply to a SGTR:** EA2.11 – Local radiation readings on main steam lines	3.7*	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
054 Loss of Main Feedwater / 4			X				**AK3 - Knowledge of the reasons for the following responses as they apply to the Loss of Main Feedwater (MFW):** AK3.05 - HPI/PORV cycling upon total feedwater loss	4.6	1
055 Station Blackout / 6					X		**EA2 - Ability to determine or interpret the following as they apply to a Station Blackout:** EA2.01 – Existing valve positioning on a loss of instrument air system	3.4	1
056 Loss of Off-site Power / 6						X	**2.2 - Equipment Control** 2.2.3 - Knowledge of the design, procedural, and operational differences between units.	3.8	1
057 Loss of Vital AC Inst. Bus / 6						X	**2.1 – Conduct of Operations** 2.1.28 - Knowledge of the purpose and function of major system components and controls.	4.1	1
058 Loss of DC Power / 6	X						**AK1 - 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			**AA1- Ability to operate and / or monitor the following as they apply to the Loss of Instrument Air:** AA1.01- Remote Manual Loaders	2.7*	1
077 Generator Voltage and Electric Grid Disturbances / 6				X			**AA1 - Ability to operate and/or monitor the following as they apply to Generator Voltage and Electric Grid Disturbances:** AA1.02 - Turbine / generator controls	3.8	1
CE/E05 Steam Line Rupture - Excessive Heat Transfer / 4		X					**EK2 - Knowledge of the interrelations between the (Excess Steam Demand) and the following:** EK2.2 - Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	3.7	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
032 Loss of Source Range NI / 7		X					**AK2 - 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 Accident / 8	X						**AK1 - Knowledge of the operational implications of the following concepts as they apply to Fuel Handling Incidents :** AK1.02 - SDM	3.4	1
060 Accidental Gaseous RadWaste Rel. / 9					X		**AA2 - Ability to determine and interpret the following as they apply to the Accidental Gaseous Radwaste:** AA2.06 - Valve lineup for release of radioactive gases	3.6*	1
061 ARM System Alarms / 7						X	**2.1 – Conduct of Operations** 2.1.27 – Knowledge of system purpose and/or function	3.9	1
067 Plant Fire On-site / 9					X		**AA2 - Ability to determine and interpret the following as they apply to the Plant Fire on Site:** AA2.14 - Equipment that will be affected by fire suppression activities in each zone	3.2	1
068 Control Room Evac. / 8		X					**AK2 - Knowledge of the interrelations between the Control Room Evacuation and the following:** AK2.07 – ED/G	3.3	1
069 Loss of CTMT Integrity / 5						X	**2.4 – Emergency Procedures / Plan** 2.4.41 – Knowledge of the emergency action level thresholds and classifications	2.9	1
076 High Reactor Coolant Activity / 9				X			**AA1 - Ability to operate and / or monitor the following as they apply to the High Reactor Coolant Activity:** AA1.04 – Failed fuel-monitoring equipment	3.2	1
CE/A11 RCS Overcooling - PTS / 4			X				**AK3 - Knowledge of the reasons for the following responses as they apply to the (RCS Overcooling)** AK3.3 - Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations	3.1	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				X								**K4 - Knowledge of RCPS design feature(s) and/or interlock(s) which provide for the following:** K4.04 - Adequate cooling of RCP motor and seals	2.8	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						**K6 - Knowledge of the effect of a loss or malfunction on the following CVCS components:** K6.26 - Methods of pressure control of solid plant (PZR relief and water inventory)	3.8	1
004 Chemical and Volume Control										X		**A4 - Ability to manually operate and/or monitor in the control room:** A4.09 - PZR spray and heater controls	3.5	1
005 Residual Heat Removal											X	**2.4 1 - Emergency Procedures / Plan** 2.4.3 - Ability to identify post-accident instrumentation	3.7	1
005 Residual Heat Removal					X							**K5 - Knowledge of the operational implications of the following concepts as they apply the RHRS:** K5.03 - Reactivity effects of RHR fill water	2.9*	1
006 Emergency Core Cooling								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:** A2.13 - Inadvertent SIS actuation	3.9	1
007 Pressurizer Relief/Quench Tank					X							**K5 - 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											X	**2.4 – Emergency Procedures / Plan** 2.4.6 – Knowledge of EOP mitigation strategies.	3.7	1
008 Component Cooling Water							X					**A1 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCWS controls including:** A1.04 – Surge tank level	3.1	1
010 Pressurizer Pressure Control			X									**K3 - Knowledge of the effect that a loss or malfunction of the PZR PCS will have on the following:** K3.01 – RCS	3.8	1
010 Pressurizer Pressure Control									X			**A3 – Ability to monitor automatic operation of the PZR PCS, including:** A3.02 – PZR pressure	3.6	1
012 Reactor Protection				X								**K4 - Knowledge of RPS design feature(s) and/or interlock(s) which provide for the following:** K4.08 – Logic matrix testing	2.8*	1
013 Engineered Safety Features Actuation (ESFAS)						X						**K6 - 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									X			**A3 - Ability to monitor automatic operation of the CCS, including:** A3.01 – Initiation of safeguards mode of operation	4.1	1
022 Containment Cooling							X					**A1 - Ability to monitor automatic operation of the CCS, including:** A1.02 - Containment pressure	3.6	1
026 Containment Spray	X											**K1 - Knowledge of the physical connections and/or cause-effect relationships between the CSS and the following systems:** K1.02 – Cooling water	4.1	1
039 Main and Reheat Steam	X											**K1 - Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems:** K1.02- Atmospheric relief dump valves	3.3	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				
059 Main Feedwater							X					**A1 - 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				X								**K4 - Knowledge of AFW design feature(s) and/or interlock(s) which provide for the following:** K4.13 – Initiation of cooling water and lube oil	2.7	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:** K3.02 – ED/G	4.1	1
063 DC Electrical Distribution									X			**A3 - Ability to monitor automatic operation of the DC electrical system, including:** A3.01 - Meters, annunciators, dials, recorders, and indicating lights	2.7	1
064 Emergency Diesel Generator		X										**K2 - Knowledge of bus power supplies to the following:** K2.02 – Fuel oil pumps	2.8*	1
073 Process Radiation Monitoring										X		**A4 - Ability to manually operate and/or monitor in the control room:** A4.01 – Effluent release	3.9	1
073 Process Radiation Monitoring								X				**A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the PRM system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** A2.02 – Detector failure	2.7	1
076 Service Water	X											**K1 - Knowledge of the physical connections and/or cause- effect relationships between the SWS and the following systems:** K1.08 – RHR system	3.5*	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
078 Instrument Air		X										**K2 - Knowledge bus power supplies to the following:** K2.02 – Emergency Air compressor	3.3*	1
103 Containment			X									**K3 - Knowledge of the effect that a loss or malfunction of the containment system will have on the following:** K3.02 – Loss of containment integrity under normal operations	3.8	1
K/A Category Totals:	**3**	**2**	**3**	**3**	**2**	**2**	**3**	**2**	**3**	**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
001 Control Rod Drive	X											**K1 - Knowledge of the physical connections and/or cause-effect relationships between the CRDS and the following systems:** K1.05 – NIS and RPS	4.5	1
002 - RCS							X					**A1 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RCS controls including:** A1.05 - RCS flow	4.0	1
011 Pressurizer Level Control System						X						**K6 - Knowledge of the effect of a loss or malfunction on the following will have on the PZR LCS:** K6.04 – Operation of PZR level controllers	3.1	1
027 Containment Iodine Removal		X										**K2 – Knowledge of bus power supplies to the following:** K2.01 - Fans	3.1*	1
028 Hydrogen Recombiner and Purge Control					X							**K5 - Knowledge of the operational implications of the following concepts as they apply to the HRPS:** K5.02 – Flammable hydrogen concentration	3.4	1
029 Containment Purge									X			**A3 – Ability to monitor automatic operation of the Containment Purge System including:** A3.01 – CPS isolation	3.8	1
035 Steam Generator System											X	**2.4 – Emergency Procedures / Plan** 2.4.45 – Ability to prioritize and interpret the significance of each annunciator alarm	4.1	1
041 Steam Dump/Turbine Bypass Control			X									**K3 - Knowledge of the effect that a loss or malfunction of the SDS will have on the following:** K3.02 - RCS	3.8	1
045 Main Turbine Generator				X								**K4 - Knowledge of MT/G system design feature(s) and/or interlock (s) which provide for the following:** K4.01 - Programmed controller for relationship between steam pressure at T/G inlet (impulse, first stage) and plant power level	2.7	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		**A4 - Ability to manually operate and/or monitor in the control room:** A4.02 – Remote radwaste release	3.2*	1
K/A Category Totals:	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**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
022 Loss of Rx Coolant Makeup / 2					X		**AA2 - Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Makeup:** AA2.03 - Failures of flow control valve or controller	3.6	1
040 Steam Line Rupture – Excessive Heat Transfer / 4						X	**2.4 - Emergency Procedures / Plan:** 2.4.1 - Knowledge of EOP entry conditions and immediate action steps.	4.8	1
055 Station Blackout / 6						X	**2.1 - Conduct of Operations:** 2.1.23 - Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.4	1
062 Loss of Nuclear Service Water / 4					X		**AA2 - Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water:** AA2.03 – The valve lineups necessary to restart the SWS while bypassing the portion of the system causing the abnormal condition	2.9	1
CE/E02 Reactor Trip - Stabilization - Recovery / 1						X	**2.4 - Emergency Procedures / Plan:** 2.4.31 - Knowledge of annunciator alarms, indications, or response procedures.	4.1	1
CE/E06 Loss of Feedwater / 4					X		**EA2 - Ability to determine and interpret the following as they apply to the (Loss of Feedwater):** EA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	3.9	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
003 Dropped Control Rod / 1					X		**AA2 - Ability to determine and interpret the following as they apply to the Dropped Control Rod:** AA2.03 - Dropped rod, using in-core/ ex-core instrumentation, in-core or loop temperature measurements.	3.8	1
024 Emergency Boration / 1						X	**2.2 – Equipment Control:** 2.2.40 – apply Technical Specifications for a system.	4.7	1
037 Steam Generator Tube Leak / 3					X		**AA2 - Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak:** AA2.16 - Pressure at which to maintain RCS during S/G cooldown.	4.3	1
CE/E09 Functional Recovery						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
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
026 Containment Spray								X				**A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the CSS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** A2.07 - Loss of containment spray pump suction when in recirculation mode, possibly caused by clogged sump screen, pump inlet high temperature exceeded cavitation, voiding), or sump level below cutoff (interlock) limit.	3.9	1
039 Main Steam and Reheat (MRSS)								X				**A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the MRSS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** A2.03 - Indications and alarms for main steam and area radiation monitors (during SGTR)	3.7	1
061 Auxiliary/Emergency Feedwater											X	**2.4 - Emergency Procedures / Plan** 2.4.6 - Knowledge of EOP mitigation strategies.	4.7	1
064 Emergency Diesel Generator (ED/G)											X	**2.4 - Emergency Procedures / Plan** 2.4.41 - Knowledge of the EAL thresholds and classifications.	4.6	1
078 Instrument Air (IAS)								X				**A2 - 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 - Air dryer and filter malfunctions	2.9	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
015 Nuclear Instrumentation (NIS)											X	**2.1 – Conduct of Operations** 2.1.7 - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.7	1
056 – Condensate System								X				**A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the Condensate System; and (b) based on those predictions or mitigate the consequences of those malfunctions or operations:** A2.05 – Condenser Tube Leakage	2.5*	1
072 Area Radiation Monitoring (ARM)								X				**A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the ARM; and (b) based on those predictions or mitigate the consequences of those malfunctions or operations:** A2.01 – Erratic or failed power supply	2.9	1
K/A Category Totals:	**1**	**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: 08/25/2014

Category	K/A #	Topic	RO		SRO	
			IR	#	IR	#
Conduct of Operations	2.1.8	Ability to coordinate personnel activities outside the control room.	3.4	1		
	2.1.41	Knowledge of the refueling process.	2.8	1		
	2.1.40	Knowledge of refueling administrative requirements.			3.9	1
	2.1.5	Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.			3.9	1
	Subtotal			**2**		**2**
Equipment Control	2.2.12	Knowledge of surveillance procedures.	3.7	1		
	2.2.13	Knowledge of safety and tagging clearance procedures.	4.1	1		
	2.2.14	Knowledge of the process for controlling equipment configuration or status.	3.9	1		
	2.2.17	Knowledge of the process for managing maintenance activities during power operations, such as risk assessments, work prioritization, and coordination with the transmission system operator.			3.8	1
	2.2.35	Ability to determine Technical Specification Mode of Operation			4.5	1
	Subtotal			**3**		**2**
Radiation Control	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	3.2	1		
	2.3.7	Ability to comply with radiation work permit requirements during normal or abnormal conditions.	3.5	1		
	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities	3.4	1		
	2.3.15	Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.			3.1	1
	Subtotal			**3**		**1**
Emergency Procedures/Plan	2.4.11	Knowledge of abnormal condition procedures.	4.0	1		
	2.4.25	Knowledge of fire protection procedures.	3.3	1		
	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
	2.4.40	Knowledge of SRO responsibilities in emergency plan implementation			4.5	1
	Subtotal			**2**		**2**
Tier 3 Total(s)				**10**		7

Tier/Group	Randomly Selected K/A	Reason for Rejection
RO 1/1	025 - Loss of RHR System K/A 2.1.2	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 **2.1.20**, which was randomly drawn, using numbered poker chips.
RO 1/1	056 Loss of Off-site Power K/A 2.2.17	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 **2.2.3**, which was randomly drawn, using numbered poker chips.
RO 1/1	057 Loss of Vital AC Inst. Bus K/A 2.1.2	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 **2.1.28**, which was randomly drawn, using numbered poker chips.
RO 1/1	011 Large Break LOCA EK3.02	Feedwater isolation not performed on Large Break LOCA at CCNPP. Replaced with **EK3.09**, which was randomly drawn, using numbered poker chips.
RO 1/2	061 ARM System Alarms K/A 2.1.14	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 **2.1.27**, which was randomly drawn, using numbered poker chips.
RO 1/2	CE/A11 RCS Overcooling	NKEG (Westinghouse) Random Sample Generator selected EK3.3 instead of AK3.3 for this APE. Changed K/A to **AK3.3**
RO 2/1	003 Reactor Coolant Pump K4.11	There are no isolation valve interlocks for RCP's at CCNPP. Replaced with **K4.04**, which was randomly drawn, using numbered poker chips.
RO 2/1	004 Chemical and Volume Control A4.22	CCNPP does not have a Boronometer chart recorder. Replaced with **A4.09**, which was randomly drawn, using numbered poker chips.
RO 2/1	006 Emergency Core Cooling A2.07	CCNPP ECCS piping is not heat traced due to the low BA concentration in the RWT. Replaced with **A2.13**, which was randomly drawn, using numbered poker chips.
RO 2/1	008 Component Cooling System K/A 2.4.2	There are no setpoints, interlocks, or automatic action associated with EOP entry conditions for CCW at CCNPP. Replaced with **2.4.6**, which was randomly drawn, using numbered poker chips.
RO 2/1	063 DC Electrical Distribution	There are no procedure directed mitigating operator actions for grounds on a DC Bus. The remaining A2 has an importance rating of < 2.5. Replaced with **A3.01**, which was randomly drawn, using numbered poker chips.
RO 2/2	071- Waste Gas Disposal A1.06	Waste Gas related subject matter already covered by several other K/As (T1/G2, Sys 060 & T2/G1, Sys 73). Replaced with previously unsampled **System 002 - RCS, A1.05**, which was randomly drawn, using numbered poker chips.
RO 2/2	001 Control Rod Drive System K1.01	There is no physical connection between Component Cooling Water and Control Rod Drive System at CCNPP. Replaced with **K1.05** which was randomly drawn, using poker chips.

Tier/Group	Randomly Selected K/A	Reason for Rejection
RO 2/2	011- Pressurizer Level Control System K6.05	A loss of the function of Pressurizer level gauges as post-accident monitoring instrumentation has no effect on the pressurizer level control system. Replaced with **K6.04**, which was randomly drawn, using numbered poker chips.
SRO 1/1	040 - Steam Line Rupture – Excessive Heat Transfer K/A 2.3.11	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 **2.4.1**, which was randomly drawn, using numbered poker chips.
SRO 1/1	055 -Station Blackout K/A 2.1.34	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 **2.1.23**, which was randomly drawn, using numbered poker chips.
SRO 1/1	CE/E02 - Reactor Trip – Stabilization/Recovery K/A 2.3.15	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 **2.4.31**, which was randomly drawn, using numbered poker chips.
SRO 1/2	024 - Emergency Boration K/A 2.2.35	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 **2.2.40**, which was randomly drawn, using numbered poker chips.
SRO 1/2	CE/E09 Functional Recovery K/A 2.3.4	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 **2.4.21**, which was randomly drawn, using numbered poker chips.
SRO 2/1	061 Auxiliary/Emergency 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 **2.4.6**, which was randomly drawn, using numbered poker chips.
SRO 2/1	026 Containment Spray A2.09	There are no consequences to the CSS associated with the potential radiation hazard presented by the RWT. Kept same system and replaced with **A2.07**, which was randomly drawn, using numbered poker chips.
SRO 2/2	017 In Core Temperature Monitor (ITM)	Spent several hours trying to write an SRO Only question for this K/A and was unable to do so. Replaced System with **056 Condensate System** and K/A with **A2.05** which were randomly drawn, using numbered poker chips.
SRO Generic	2.1.44	The randomly selected K/A is specific to RO responsibilities. Replaced with **2.1.5** which was randomly drawn, using numbered poker chips.
SRO Generic	2.3.6	The randomly selected K/A duplicates that previously selected as the basis for one of the JPMs. Additionally, four of the nine available K/As in section 2.3 have been sampled elsewhere in the written exam. Replaced with **2.4.30** which was randomly drawn, using numbered poker chips.
SRO Generic	2.4.18	Spent several hours trying to write an SRO Only question for this K/A and was unable to do so. Replaced with **2.4.40** which was randomly drawn, using numbered poker chips.

25 total K/A changes:

- 10 procedurally driven by ES-401
- 2 due to software sampling errors
- 9 due to not being applicable at CCNPP
- 2 due to inability to write question after hours trying
- 1 due to oversampling of a system
- 1 due to duplication with selected JPM

Facility: Calvert Cliffs Nuclear Power Plant Exam Level: **RO** / SRO-I / SRO-U		Date of Examination: **8/25/14 thru 9/5/14** Operating Test #: **2014**
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations (RO Admin-1)	M, R	Ensure adequate shutdown margin exists in Mode 3
Conduct of Operations (RO Admin-2)	N, R	Determine Containment Closure requirements for performing Component Cooling Water PMT (new)
Equipment Control (RO Admin-3)	N, R	Apply Tech Specs to a transmitter failure (new)
Radiation Control (RO Admin-4)	M, R	Determine Radiological Controls associated with manipulating a valve in the RCA
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: **8/25/14 thru 9/5/14**
Exam Level: RO / **SRO-I** / SRO-U		Operating Test #: **2014**
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations (SRO-ADMIN-1)	M, R	Ensure adequate shutdown margin exists in Mode 3
Conduct of Operations (SRO-ADMIN-2)	D, P, R	Ability to implement plant procedures for a Condenser Tube Leak
Equipment Control (SRO-ADMIN-3)	D, R	Apply Tech Specs to a relay failure
Radiation Control (SRO-ADMIN-4)	M, R	Approve a Liquid Waste Discharge Permit
Emergency Procedures / Plan (SRO-ADMIN-5)	M, R	Determine appropriate Emergency Response Actions

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: **8/25/14 thru 9/5/14** Operating Test #: **2014**
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations (SRO-ADMIN-1)	M, R	Ensure adequate shutdown margin exists in Mode 3
Conduct of Operations (SRO-ADMIN-2)	D, P, R	Ability to implement plant procedures for a Condenser Tube Leak
Equipment Control (SRO-ADMIN-3)	D, R	Apply Tech Specs to a relay failure
Radiation Control (SRO-ADMIN-4)	M, R	Approve a Liquid Waste Discharge Permit
Emergency Procedures / Plan (SRO-ADMIN-5)	M, R	Determine appropriate Emergency Response Actions

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: **8/25/14 thru 9/5/14**
Exam Level: **RO** / SRO-I / SRO-U	Operating Test #: **2014**

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. SIM-1 Align a LPSI Pump for Core Flush via Hot Leg Injection	A, D, EN, S	2
b. SIM-2 Respond to CEA(s) Misaligned by 15 Inches or More	A, D, P, S	1
c. SIM-3 Attempt to Correct the Abnormal SDC Condition	A, D, L, S	4 (P)
d. SIM-4 Respond to a Failure of a Pump with Reactor Power < 5%	A, D, L, S	4 (S)
e. SIM-5 Bleed and Feed to Cool the Quench Tank	D, S	5
f. SIM-6 Verify the Vital Auxiliaries Safety Function is Satisfied	A, D, S	6
g. SIM-7 Shifting Component Cooling Heat Exchangers	D, S	8
h. SIM-8 Test Gaseous Waste Discharge RMS Channel RI-2191	N, S	9
In-Plant Systems@ (**3 for RO**); (3 for SRO-I); (3 or 2 for SRO-U)		
a. PLT-1 Align the Reserve Battery to 11 DC Bus	N	6
b. PLT-2 Locally Verify MSIVs are Shut During a Control Room Evacuation	A, E, M, R	4(S)
c. PLT-3 Instrument Air System Operation Using Fire Main for Compressor Cooling	D, L	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 / 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: **8/25/14 thru 9/5/14**
Exam Level: RO / **SRO-I** / SRO-U	Operating Test #: **2014**

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. SIM-1 Align a LPSI Pump for Core Flush via Hot Leg Injection	A, D, EN, S	2
b. SIM-2 Respond to CEA(s) Misaligned by 15 inches or more	A, D, P, S	1
c. SIM-3 Attempt to Correct the Abnormal SDC Condition	A, D, L, S	4 (P)
d. SIM-4 Respond to a Failure of a Pump with Reactor Power < 5%	A, D, L, S	4 (S)
e. SIM-5 Bleed and feed to cool the Quench Tank	D, S	5
f. SIM-6 Verify the Vital Auxiliaries Safety Function is Satisfied	A, D, S	6
g. SIM-7 Shifting Component Cooling Heat Exchangers	D, S	8
In-Plant Systems@ (3 for RO); (**3 for SRO-I**); (3 or 2 for SRO-U)		
a. PLT-1 Align the Reserve Battery to 11 DC Bus	N	6
b. PLT-2 Locally verify MSIVs are shut during a Control Room Evacuation	A, E, M, R	4(S)
c. PLT-3 Instrument Air System operation using Fire Main for Compressor Cooling	D, L	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** / 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: **8/25/14 thru 9/5/14**
Exam Level: RO / SRO-I / **SRO-U**	Operating Test #: **2014**

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. SIM-1 Align a LPSI Pump for Core Flush via Hot Leg Injection	A, D, EN, S	2
b. SIM-3 Attempt to Correct the Abnormal SDC Condition	A, D, L, S	4 (P)
c. SIM-7 Shifting Component Cooling Heat Exchangers	D, S	8

In-Plant Systems@ (3 for RO); (3 for SRO-I); (**3 or 2 for SRO-U**)

a. PLT-1 Align the Reserve Battery to 11 DC Bus	N	6
b. PLT-2 Locally verify MSIVs are shut during a Control Room Evacuation	A, E, M, R	4(S)

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** Scenario #: **1** OP-Test #: **CCNPP 2014**

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: **Unit-1 is at 100% power, MOC. Unit-2 is in Mode 1.**

Turnover: **12 MSL and N-16 Monitors, 12 AFW Pump, and the 1B DG are OOS. The 0C DG is aligned to 14 4KV Bus per OI-21B. 11 Charging Pump is the lead pump. Instructions for the crew are to maintain power at 100%**

Event #	Malfunction #	Event Type*	Event Description
1	152-1206	C - BOP/SRO	11 Heater Drain Pump trip
2	rcs026_01	I- ATC T - SRO	1-LT-110X (selected channel) fails LOW
3	srw002_02	M - ALL	12 SRW Header leak in Turbine Bldg
4	fw006_02	C - BOP/SRO	12 MFRV fails as is (mechanical binding)
5	ceds010_19 ceds010_32	R - ATC	CEAs 19 and 32 fail to insert on Reactor trip. (Boration using normal path)
6	swyd002	C - ALL	Complete Loss of Offsite Power
7	dg002_02	C - BOP/SRO T - SRO	1A DG Start Failure

* (N)ormal (R)eactivity (I)nstrument (C)omponent (M)ajor (T)ech Spec

Critical Tasks: (shaded)

1. Notes two CEAs failed to insert, commences RCS boration before exit of EOP-0.
2. Notes excessive Feed Flow, secures main feed & initiate auxiliary feed before exit of EOP-0
3. Reenergizes a 4kV Bus with the 0C D/G prior to 125 VDC voltage < 106V.

OP-Test #: **2014** **Scenario #: 1**

SCENARIO OVERVIEW

SRW LEAK IN TURBINE BLDG / LOSS OF OFFSITE POWER

Units 1 and 2 are operating at 100% power. 12 MSL and N-16 Monitors, 12 AFW Pump, and the 1B DG are OOS. The 0C DG is aligned to 14 4KV Bus per OI-21B. 11 Charging Pump is the lead pump.

First, a trip of 11 HDP occurs causing crew to implement AOP-3G. The crew should control maximize SGFP suction pressure by bypassing precoats and demins. The crew should start the 3rd Condensate Booster pump then exit AOP-3G.

Next, the selected PZR level control channel will fail LOW requiring the crew to shift channels to regain plant control.

After these actions are completed, a large SRW leak will initiate in the turbine building and the crew will have to isolate turbine building SRW and trip the reactor. Two CEAs will fail to insert on the reactor trip and 12 S/G MFRV will fail to 30% open. Approximately 2 to 3 minutes after the trip, a loss of offsite power will occur. During EOP-0 the ATC is expected to commence boration for the 2 stuck CEA's per the Reactivity Control Plaque. The BOP should recognize that 12 MFRV has failed to close and take action per the Heat Removal Plaque and secure main feed and initiate auxiliary feed.

The crew is expected to initially implement EOP-2. Upon entry into EOP-2, the 1A DG is lost requiring the crew to reenergize 14 4KV bus with the 0C DG. If unable to restore power to any 4KV bus the crew will transition to EOP-7, Station Blackout. If plant conditions degrade or the crew is unsure of the diagnosis it is acceptable for them to enter EOP-8. If EOP-8 is entered all critical tasks still apply unless individual tasks are invalidated by the exam team.

Scenario ends after 0C D/G aligned to 14 4KV bus.

Facility: **Calvert Cliffs Nuclear Power Plant** Scenario #: **2** OP-Test #: **CCNPP 2014**

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: **Unit-1 is at 100% power, EOC. Unit-2 is in Mode 5.**

Turnover: **13 Cond Booster Pump is tagged out for inspection of high vibrations (expect back at end of shift), 12 AFW Pump OOS for governor work (out for 2 hours, back in in 4 hours) Instructions for the crew are to maintain power at 100%**

Event #	Malfunction #	Event Type*	Event Description
1	Rapid Downpower	R - ATC N - BOP/SRO	Call from ESO to reduce load to 800 MWE in <15 min
2	120V003_01	C - All T - SRO	Loss of 1Y01
3	MS018_04 Low MS010_01	C - BOP/SRO T - SRO	S/G Level LT-1114-D variable leg leak in containment
4	MS010_01 .4 to 8 over 5 min	M - All	Steam line break in containment / Reactor Trip
5	ESFA004_01 ESFA004_02 ESFA012	I -All	CSAS A&B Automatic Failure SGIS A Automatic Actuation Failure
6	Emergency Airlock	T - SRO	Containment Integrity breached

* (N)ormal (R)eactivity (I)nstrument (C)omponent (M)ajor (T)ech Spec

Critical Tasks: (shaded)

1. Trips all RCP's within 6 minutes of CIS actuation (no CC flow to RCP's).
2. Determines CSAS failure and manually actuates CSAS prior to exiting EOP-0.
3. Identifies and isolates 11 S/G prior to RCS subcooling exceeding 140°F.

OP-Test #: **2014** **Scenario #: 2**

SCENARIO OVERVIEW
DOWNPOWER, 1Y01 FAILURE, S/G LEVEL INSTRUMENT FAILURE, STEAM LEAK

Initial Conditions: Unit-1 is at 100% power. Core Burnup is 17,536 MWD/MTU. Unit-2 is in Mode 5. 13 Condensate Booster Pump is tagged out for inspection of high vibrations (expected back at end of shift) and 12 AFW Pump is tagged out for governor work (expected back in 4 hours). Instructions for the crew are to maintain power at 100%.

First a call from ESO directs power reduction to ≤800 MWe in ≤ 15 minutes, crew should perform this downpower and stop effectively demonstrating good plant control.

Next, a loss of 1Y01 occurs, requiring implementation of AOP-7J. The crew is expected to determine associated T.S. LCOs. Affected RPS and ESFAS Channels will be de-energized using the appropriate Operating Instructions.

Next a small leak develops due to a crack in the weld of an instrument sensing leg tap on #11 S/G resulting in LR-1114D failing low. The crew is expected to review NO-1-200 for common tap analysis and associated T.S. LCO's. After several minutes the crack propagates to a major steam leak requiring a reactor trip.

SGIS and CSAS will fail to automatically actuate requiring the operator to manually actuate CSAS and take required actions for SGIS.

The crew is expected to implement EOP-4. If plant conditions degrade or the crew is unsure of the diagnosis it is acceptable for them to enter EOP-8. If EOP-8 is entered all critical tasks still apply unless individual tasks are invalidated by the exam team.

Scenario ends after containment pressure rapidly lowering is recognized and actions taken (EAL implications).

Facility: **Calvert Cliffs Nuclear Power Plant** Scenario #: **4** OP-Test #: **CCNPP 2014**

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: **Unit-1 is at 100% power, MOC. Unit-2 is @ 100% power.**

Turnover: **12 CS Pump OOS for last hour for pump coupling Inspection (back in 2 hours), 11 BA Pump OOS for last 6 hours (bearing seized) (back in 1 day), 1-RC-403-MOV shut due to 1-ERV-402 excessive seat leakage, 23 Aux Feed Pump is OOS for motor bearing repair. Expected back in 10 hours.**

Event #	Malfunction #	Event Type*	Event Description
1	480V002_01	C - ALL T - SRO	Loss of MCC-104 (AOP-7I)
2	MS002_01	C - BOP/SRO R - ATC T - SRO	11 S/G Tube Leak (AOP-2A)
3		M - ALL	Trip Reactor and Implement EOP-0
4	MS010_01	C - ALL	11 S/G MSLB in Cntmt (EOP-8)
5	ESFA010_01	C - BOP	CIS "A" Failure
6	1-SI-428 @ 15%	C - ATC/SRO	11 HPSI Discharge valve 15% open

* (N)ormal (R)eactivity (I)nstrument (C)omponent (M)ajor (T)ech Spec

Critical Tasks: (shaded)

1. Trips all RCP's after CIS actuates and within 10 minutes of Component Cooling isolation to containment.
2. Isolates 11 S/G when it is identified as the most affected S/G and after T_{HOT} <515°F
3. Notes insufficient flow from 11 HPSI pump and starts 12 HPSI pump prior to RVLMS 3rd light lit

OP-Test #: **2014** **Scenario #: 4**

SCENARIO OVERVIEW

Loss MCC-104, S/G Tube Leak, Steam Line Break in Containment

Initial Conditions: Unit-1 & Unit 2 are at 100% power. U-1 is MOC 10,885 MWD/MTU, U-2 is EOC 17,800 MWD/MTU. 12 CS Pump for last hour for pump coupling Inspection (back in 2 hours). 11 BA Pump OOS for last 6 hours (bearing seized, back in 1 day), 23 Aux Feed Pump is OOS for motor bearing repair (expected back in 10 hours). 12 SGFP has a small oil leak on the oil cooler return line, not threatening pump operation

First a loss of MCC 104 occurs. After the crew has stabilized the plant they should realize they have no operable BA Pumps.

A Steam Generator tube leak begins in 11 S/G. The crew should attempt to borate the unit to a Tave of <537°F using the RWT. The leak size is such that the crew may reach 537°F Tave or they may reach 101" in the PZR, either of which prompts the Reactor Trip.

The reactor will be tripped and EOP-0 implemented. During EOP-0 (approx. 6 min after trip) the steam line break into the containment manifests. CIS A fails to actuate requiring manual actuation. After the crew recognizes the CIS, all RCP's should be secured. The crew is expected to implement EOP-8.

In EOP-8 the crew should identify RLEC-2 is not met and worked immediately (which directs working HR-2). When crew works HR-2 they should isolate 11 S/G IAW HR-2. When ATC is performing PIC-4 the low flow from 11 HPSI must be recognized and 12 HPSI started.