9/00 NRC EXAM DEVELOPMENT

TO: L. D. Briggs, Chief Examiner, NRC Region 1
FROM: W. P. Birney, Facility Representative
SUBJ: 9/00 Initial License Operator Exam Outlines
DATE: June 28, 2000

I have attached the required outlines for the 9/00 Initial License Operator Examinations at Calvert Cliffs Nuclear Power Plant per Nureg 1021 Revision 8, ES 201.

Additional information is attached which includes the Random Selection method used for the Written exam development and a proposed exam week schedule.

Calvert Cliffs has volunteered to use the information contained in draft supplement to Nureg 1021 as guidance for the development of exam materials.

In accordance with Attachment 1 of ES 201, the enclosed materials "SHALL BE WITHHELD FROM PUBLIC DISCLOSURE UNTIL EXAMINATIONS ARE COMPLETE".

I have included form ES 201-2 with the test outlines. If you need any additional information, please call me at 410 495 2363 or R. E. Niedzielski at 410 495 6542.

Sincerely,

W. P. Birney

cc: 2000 NRC exam file

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9/00 NRC Exam Outline Random Selection Method

Overview:

The Written Exam Outlines were developed per NUREG 1021 ES-401 D.1 and Attachment 1. Numbered tokens were used as described in the attachment 1 to develop the RO Written Test Outline. The Outline were developed on October 1999 and reevaluated with Nureg 1021 draft supplemental guidance on May 2000. The SRO level questions were adjusted based on the guidance in the supplement to Nureg 1021.

Specific steps:

1. The RO and SRO Written Exam outlines were made site-specific before any random selection was performed.
2. The RO Written Exam outline was randomly selected by use of number tokens as described in attachment 1 of ES 401.
3. After the RO Written test K/As were identified, the SRO Written Exam outline was initially filled in with RO Written Exam K/As (83 RO outline K/As were transferred on the SRO Outline).
4. Eight RO K/As were removed from the SRO Written Exam outline by use of tokens. This left 75 RO outline K/As on the SRO Outline
5. The 25 remaining K/As for the SRO Exam Outline were randomly selected by use of tokens as described in the Attachment 1.
6. The final SRO Written Test Outline was adjusted by use of tokens to ensure at least 2 K/As in each category in each tier.
7. The exam outlines provide for a 25% question overlap between SRO and RO Written Exams (first outline development 10/99).
8. In May 2000, the SRO Outline was reviewed per the Nureg 1021 draft supplemental guidance for SRO level questions. An adjustment was made to have the following number of SRO level questions:

Tier 1	9 (All A2 category w/ 10CFR 55.43 linked)
Tier 2	7 (All A2 category w/ 10 CFR 55.43 linked)
Ter 3	10 (all 10 CFR 55.43 linked or SRO learning objectives)
Total	26 SRO level

   (Since the initial randomally selected outline had a large number of A2 K/A topics, these were used to systematically select the SRO level questions)
9. Identified all SRO level questions on SRO Outline with "SRO" in first column on each group page. Noted "See RO Outline" on each SRO K/A topic for easier exam overlap identification.

Facility: Calvert Cliffs Unit 1 and 2					Date of Exam: 9/22/00								Exam Level:SRO
					K/A Category Points								
Tier	Group	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	Point Total
1	1	2	3	6				2	8			3	24
Emergency &	2	2	3	3				2	4			2	16
Abnormal	3	0	2	0				0	0			1	3
Plant Evolutions	Tier Totals	4	8	9				4	12			6	43
2	1	3	1	1	1	1	0	0	5	1	4	2	19
Plant	2	0	1	2	1	2	2	2	1	3	3	0	17
Systems	3	2	0	0	1	0	0	0	1	0	0	0	4
	Tier Totals	5	2	3	3	3	2	2	7	4	7	2	40
3. Generic Knowledge and					Cat 1		Cat 2		Cat 3		Cat 4		
Abilities						5		4		4		4	17

Note: 1. Ensure that at least two topics from every K/A category are sampled within each tier (I.e., the "Tier Totals" in each K/A category shall not be less than two).
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
6. The generic K/A's 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.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the SRO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.

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Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topics	Imp.	Points
000001 Continuous Rod Withdrawl / 1		8					See RO Outline	3	1
000003 Dropped Control Rod / 1			4				See RO Outline	4.1	1
000005 Inoperable/Stuck Control Rod / 1 (SRO)					3		Determine actions for more than 1 stuck or inoperable CEA	4.4	1
000011 Large Break LOCA / 3 (SRO)					10		Determine adequate core cooling during event	4.7	1
000015/17 RCP Malfunctions / 4			2				See RO Outline	3.1	1
CE/A13 Natural Circ. / 4	2						See RO Outline	3.5	1
000024 Emergency Boration / 1 (SRO)					6		Determine when boron dilution event is occurring	3.7	1
000026 Loss of Component Cooling Water / 8					3		See RO Outline	2.9	1
000029 ATWS / 1						31	G2.1 See RO Outline	3.9	1
000040 CE/E05 Stm Line Rupture/EHT / 4			3				Knowledge of manipulation of controls during ESD event	4	1
CE/A11 RCS Overcooling - PTS / 4				2			See RO Outline	3.4	1
000051 Loss of Condenser Vacuum / 4						32	G2.1 See RO Outline	3.8	1
000055 Station Blackout / 6 (SRO)					3		Determine actions to restore power	4.7	1
000057 Loss of Vital AC Elec. Inst. Bus / 6			1				See RO Outline	4.4	1
000059 Accidental Liq Waste Release / 9		1					See RO Outline	2.8	1
000062 Loss of Nuclear Service Water (SW) / 4				2			See RO Outline	3.3	1
000067 Plant Fire On-site / 9 (SRO)					16		Determine vital equipment to be maintained during a fire	4	1
000068 Control Room Evac. / 8 (SRO)					5		Determine availability of heat sink during CR evacuation	4.3	1
000069 Loss of CTMT Integrity / 5			1				See RO Outline	4.2	1
000074 Inad. Core Cooling / 4						3	G2.2 See RO Outline	3.3	1
000076 High Reactor Coolant Activity / 9			6				See RO Outline	3.8	1
000003 Dropped Rod	7						Effect of Dropped Rod on Shutdown Margin	3.9	1
00024 Emergency Boration		1					Knowledge on the interelationship with valves	2.7	1
00076 High RCS Coolant Activity (SRO)					2		Determine and interpret the corrective actions for Hi activity	3.4	1

K/A Category Point Totals:	2	3	6	2	8	3	Group Point Total:		24

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Emergency and Abnormal Plant Evolutions - Tier 1/Group 2

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topics	Imp.	Points
000007 CE/EO2 Reactor Trip Stable/Recovery / 1		2					See RO Outline	4	1
000008 Pressurizer Vapor Space Accident / 3(SRO)					25		Determine expected leak rate from open PORV/Safety valve	3.4	1
000009 Small Break LOCA / 3			23				See RO Outline	4.3	1
000022 Loss of Reactor Coolant Makeup / 2					1		See RO Outline	3.8	1
000025 Loss of SDC (RHR) / 4 (SRO)					4		Determine location and isolability of leaks	3.6	1
000027 Pressurizer Press Control Sys Malf / 3						32	G2.1 See RO Outline	3.8	1
000032 Loss of Source Range NI / 8				1			See RO Outline	3.4*	1
000033 Loss of Wide Range NI / 7	1						See RO Outline	3	1
000037 Steam Generator Tube Leak / 3			7				See RO Outline	4.4	1
000038 Steam Generator Tube Rupture / 3		2					See RO Outline	2.5	1
000054 (CE/E06) Loss of Main Feedwater / 4				2			See RO Outline	4	1
000058 Loss of DC Power / 6	1						See RO Outline	3.1*	1
000060 Accidental Gaseous Radwaste Rel. / 9			3				See RO Outline	4.2	1
000061 ARM System Alarms / 7						50	G2.4 See RO Outline	3.3	1
000065 Loss of Instrument Air / 8					8		See RO Outline	3.3	1
CE/E09 Functional Recovery		1					See RO Outline	3.9	1
K/A Category Point Totals:	2	3	3	2	4	2	Group Point Total:		16

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Emergency and Abnormal Plant Evolutions - Tier 1/Group 3

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topics	Imp.	Points
000028 Pressurizer Level Malfunction / 2									
000036 Fuel Handling Accident / 8		1					Interelationship between rad monitor and event	3.9	1
000056 Loss of Off-site Power / 6						20	Operational implications of EOP warnings, cautions and notes	4	1
CE/A16 Excess RCS Leakage / 2		2					Interelationship between event and heat removal system	3.3	1
K/A Category Point Totals:	0	2	0	0	0	1	Group Point Total:		3

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System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topics	Imp.	Points
001 Control Rod Drive											27	G2.1 See RO Outline	2.9	
003 Reactor Coolant Pump		1										See RO Outline	3.1	
004 Chemical and Volume Control										17		See RO Outline	2.7	
013 ESF Actuation (SRO)								4				Predict impact of loss of inst bus on sys	4.2	
014 Rod Position Indication											12	G2.1 See RO Outline	4	
015 Nuclear Instrumentation	1											See RO Outline	4.2	
017 In-core Temperature Monitoring (SRO)								2				Using CETs to mitigate core damage	4.1	
022 Containment Cooling										1		See RO Outline	3.6	
026 Containment Spray			1									See RO Outline	4.1	
056 Condensate (SRO)								4				Predict impact of loss of condensate pps	2.8*	
059 Main Feedwater (SRO)								11				Predict impact of FW control failure	3.3*	
061 Auxiliary/Emergency Feedwater					1							See RO Outline	3.9	
063 DC Electrical Distribution (SRO)								1				Predict impact of grounds on DC system	3.2*	
068 Liquid Radwaste				1								See RO Outline	4.1	
071 Waste Gas Disposal										29		See RO Outline	3.6*	
072 Area Radiation Monitoring	4											See RO Outline	3.5*	
022 Containment Cooling	1											See RO Outline	3.7	
059 Main Feedwater										3		See RO Outline	2.9	
013 ESFAS									2			See RO Outline	4.2	
K/A Category Point Totals:	3	1	1	1	1	0	0	5	1	4	2	Group Point Total:		19

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System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topics	Imp.	Points
002 Reactor Coolant					19							See RO Outline	2.9	1
006 Emergency Core Cooling										8		See RO Outline	4.3	1
010 Pressurizer Pressure Control										3		See RO Outline	3.8	1
011 Pressurizer Level Control			2									See RO Outline	3.7	1
012 Reactor Protection														
016 Non-nuclear Instrumentation (SRO)								1				Predict impact of detector failure on sys	3.1*	1
027 Containment Iodine Removal														
028 H2 Recombiner and Purge Control						1						See RO Outline	3.1	1
029 Containment Purge									1			See RO Outline	4	1
033 Spent Fuel Pool Cooling							1					See RO Outline	3.3	1
034 Fuel Handling Equipment									2			See RO Outline	3.1	1
035 Steam Generator									1			See RO Outline	3.9	1
039 Main and Reheat Steam							9					See RO Outline	2.7*	1
055 Condenser Air Removal			1									See RO Outline	2.7	1
062 AC Electrical Distribution														
064 Emergency Diesel Generator		3										See RO Outline	3.6	1
073 Process Radiation Monitoring					1							See RO Outline	3	1
075 Circulating Water														
079 Station Air										1		See RO Outline	2.7	1
086 Fire Protection						4						See RO Outline	2.9	1
103 Containment				4								Design features of access hatches	3.2	1
K/A Category Point Totals:	0	1	2	1	2	2	2	1	3	3	0	Group Point Total:		17

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System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topics	Imp.	Points
005 Residual Heat Removal / SDC														
007 Pressurizer Relief/Quench Tank				1								See RO Outline	2.9	1
008 Component Cooling Water (SRO)								9				Predict impact of letdown temp on IXs	2.8	1
041 Steam Dump/Turbine Bypass Control	5											See RO Outline	3.6	1
045 Main Turbine Generator	20											See RO Outline	3.6	1
076 Service Water														
078 Instrument Air														
K/A Category Point Totals:	2	0	0	1	0	0	0	1	0	0	0	Group Point Total:		4

Plant Specific Priorities														
System/Topic	Recommended Relacement for:											Reason		
Plant Specific Priority Total: (limit 10)														

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y: CCNPP Units 1 & 2		Date of Exam 9/22/00	Exam Level:SRO	
Category	K/A #	Topic	Imp	Points
	2.1.2	Knowledge of operator responsibilities in all Modes	4	1
	2.1.3	See RO Outline	3.4	1
Conduct of	2.1.10	Knowledge of conditions and limitations of License	3.9	1
Operations	2.1.13	Knowledge of CCNPP requirements for vital areas	2.9	1
	2.1.29	Knowledge of conduct and verification of valve lineups	3.3	1
	2.1.			
	Total			5
	2.2.3	Design, procedure or operational difference between Units	3.3	1
	2.2.13	See RO Outline	3.8	1
Equipment	2.2.22	Knowledge of LCOs and Safety Limits	4.1	1
Control	2.2.28	See RO Outline	3.5	1
	2.2.			
	2.2.			
	Total			4
	2.3.2	Knowledge of ALARA Program	2.9	1
	2.3.4	See RO Outline	3.1	1
	2.3.6	Knowledge of requirements for approving release permits	3.1	1
Radiation	2.3.9	See RO Outline	3.4	1
Control	2.3.			
	2.3.			
	Total			4
	2.4.1	Knowledge of EOP entry conditions and steps	4.6	1
Emergency	2.4.11	See RO Outline	3.6	1
Procedures	2.4.15	See RO Outline	3.5	1
and Plan	2.4.40	Knowledge of SRO responsibility in ERPIP	4	1
	2.4.			
	2.4.			
	Total			4
Tier 3 Target Point Total (SRO)				17

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Facility: Calvert Cliffs Unit 1 and 2					Date of Exam: 9/22/00								Exam Level:RO
					K/A Category Points								
Tier	Group	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	Point Total
1	1	1	0	4				2	6			3	16
Emergency &	2	3	4	4				2	2			2	17
Abnormal	3	0	1	0				0	1			1	3
Plant Evolutions	Tier Totals	4	5	8				4	9			6	36
2	1	6	1	0	2	1	0	1	6	1	3	2	23
Plant	2	2	1	3	1	2	1	2	2	2	3	1	20
Systems	3	3	1	0	1	0	1	1	0	1	0	0	8
	Tier Totals	11	3	3	4	3	2	4	8	4	6	3	51
3. Generic Knowledge and					Cat 1		Cat 2		Cat 3		Cat 4		
Abilities						3		3		3		4	13

Note: 1. Ensure that at least two topics from every K/A category are sampled within each tier (I.e., the "Tier Totals" in each K/A category shall not be less than two).
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
6. The generic K/A's 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.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.

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Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topics	Imp.	Points
000005 Inoperable/Stuck Control Rod / 1					3		Determine actions with >1 CEA inoperable	3.5	1
000015/17 RCP Malfunctions / 4			2				Knowledge of CCW lineup to RCPs	3	1
CE/A13 Natural Circ. / 4	2						Abnormal/Emergency procedure associated with event	3.2	1
000024 Emergency Boration / 1					6		Determine boron dilution event	3.6	1
000026 Loss of Component Cooling Water / 8					3		Valve lineup necessary to restart CC system	2.6	1
000027 Prz Pressure Control Sys malfunction / 3						32	G2.1- Apply system limits and precautions during event	3.4	1
000040 CE/E05 Stm Line Rupture/EHT / 4					2		Adherence to procedure and operation within facility license	3.4	1
CE/A11 RCS Overcooling - PTS / 4				2			Ability to monitor operating characteristics during event	3.2	1
000051 Loss of Condenser Vacuum / 4						32	G2.1- Apply system limits and precautions during event	3.4	1
000055 Station Blackout / 6					3		Determine actions required to restore power during event	3.9	1
000057 Loss of Vital AC Elec. Inst. Bus / 6			1				Actions in AOP for loss of vital AC instrument bus	4.1	1
000062 Loss of Nuclear Service Water (SW) / 4				6			Ability to operate/monitor component flow rates during event	2.9	1
000067 Plant Fire On-site / 9									
000068 Control Room Evac. / 8					5		Determine availibility of RCS heat sink during evacuation	4.2	1
000069 Loss of CTMT Integrity / 5			1				Knowledge of steps contained in AOP 4 (Loss of Cont Integrity)	3.8*	1
000074 Inad. Core Cooling / 4						3	G2.2- Knowledge of operational differences between Units	3.1	1
000076 High Reactor Coolant Activity / 9			6				Reasons for actions in AOP 6 (Hi RCS Activity)	3.2	1
K/A Category Point Totals:	1	0	4	2	6	3	Group Point Total:		16

PWR RO Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topics	Imp.	Points
000001 Continuous Rod Withdrawl / 1		8					Interelationship between event and CEA indication	3.1	1
000003 Dropped Control Rod / 1			4				Reasons for actions in AOP 1B (CEA Malfunctions)	3.8*	1
000007 CE/EO2 Reactor Trip Stable/Recovery / 1		2					Interelationship between event and heat removal systems	3.5	1
000008 Pressurizer Vapor Space Accident/ 3	1						Operational implications of open or leaking SV or ERV	3.2	1
000009 Small Break LOCA / 3			23				Reasons for RCP Trip strategy during SBLOCA event	4.2	1
000011 Large Break LOCA / 3					10		Determine adequate core cooling during LBLOCA event	4.5	1
000022 Loss of Reactor Coolant Makeup / 2					1		Determine existence of Charging line leak	3.2	1
000025 Loss of SDC (RHR) / 4	1						Implications of loss of SDC during all modes of operation	3.9	1
000029 ATWS / 1						31	G2.1- Determine correct switch lineup during event	4.2	1
000032 Loss of Source Range NI / 8				1			Operate/monitor restoration of power to Nis.	3.1*	1
000033 Loss of Wide Range NI / 7	1						Operational implications of voltage change effects	2.7	1
000037 Steam Generator Tube Leak / 3			7				Actions in AOP 10 for SG leakage	4.2	1
000038 Steam Generator Tube Rupture / 3				1			Monitor for abnormal increases in SG levels during event	4.5	1
000054 (CE/E06) Loss of Main Feedwater / 4									
000058 Loss of DC Power / 6									
000059 Accidental Liq Waste Release / 9		1					Interelationship between accidental release and monitor	2.7	1
000060 Accidental Gaseous Radwaste Rel. / 9			3				Actions in AOP 6C during accidental Radioactive gas release	3.8	1
000061 ARM System Alarms / 7						50	G2.4- Verify setpoints and operate per Alarm Manual	3.3	1
CE/E09 Functional Recovery		1					Interelationship between EOP 8 and reactivity control	3.6	1
K/A Category Point Totals:	3	4	4	2	2	2	Group Point Total:		17

PWR RO Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1/Group 3

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topics	Imp.	Points
000028 Pressurizer Level Malfunction / 2									
000036 Fuel Handling Accident / 8						27	G2.2- Knowledge of Refueling process	2.6	1
000056 Loss of Off-site Power / 6									
000065 Loss of Inst Air / 8					8		Determine failure modes of air-operated valves during event	2.9*	1
CE/A16 Excess RCS Leakage / 2		1					Interelationship between RCS leakage and control function	3.2	1
K/A Category Point Totals:		1			1	1	Group Point Total:		3

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topics	Imp.	Points
001 Control Rod Drive											27	G2.1- Knowledge of system function	2.8	1
003 Reactor Coolant Pump		1										Knowledge of bus power supplies	3.1	1
004 Chemical and Volume Control										17		Monitor deborating IX operation	2.7	1
013 Engineered Safety Features Actuation								4				Determine impact of loss of inst bus	3.6	1
015 Nuclear Instrumentation	1											Cause/effect between Nis and RPS	4.1	1
017 In-core Temperature Monitoring								2				Using CETs to mitigate core damage	3.6	1
022 Containment Cooling										1		Monitor CAC operation	3.6	1
056 Condensate								4				Predict impact of loss of cond. pump(s)	2.6	1
059 Main Feedwater								11				Predict effect of DFWCS failure	3.0*	1
061 Auxiliary/Emergency Feedwater					1							Interrelationship between AFW and RCS	3.6	1
068 Liquid Radwaste											11	G2.3- Ability to control Radiation release	2.7	1
071 Waste Gas Disposal	4											Relationship between WG and ventilation	2.7	1
072 Area Radiation Monitoring								2				Impact of detector failure	2.8	1
068 Liquid Radwaste				1								Design features of Misc Waste System	3.4	1
013 Engineered Safety Features Actuation									2			Monitor auto operation of ESF equip	4.1	1
072 Area Radiation Monitoring	4											Cause/effect on CR ventilation system	3.3*	1
015 Nuclear Instrumentation								3				Predict impact of Xe oscillation	3.2	1
003 Reactor Coolant Pump	13											Cause/effect of RCP Oil-lift pump	2.5	1
061 Auxiliary Feedwater	7											Cause/effect of water source on system	3.6	1
056 Condensate	3											Cause/effect of MFW on Condensate sys	2.6*	1
004 Chemical and Volume Control							11					Monitor L/D and Charging design flows	3	1
071 Waste Gas Disposal										29		O2, N2 or H2 Limits of WGDT	3.0*	1
001 Control Rod Drive				23								Design features of CMI	3.9	1
K/A Category Point Totals:	6	1	0	2	1	0	1	6	1	3	2	Group Point Total:		23

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topics	Imp.	Points
002 Reactor Coolant					19							Implications of neutron embrittlement	2.6	1
006 Emergency Core Cooling										8		Manually operate ESF (including RESET)	4.2	1
010 Pressurizer Pressure Control										3		Monitor PORV and Block Valves	4	1
011 Pressurizer Level Control			2									Cause/effect of Malfunction on RCS	3.5	1
012 Reactor Protection	6											Relationship between RPS and Main Turb	3.1*	1
014 Rod Position Indication											12	G2.1- Apply TRM requyirements to RPI	2.9	1
016 Non-nuclear Instrumentation								1				Predict RRS NI detector failure effects	3.0*	1
026 Containment Spray			1									Effect of malfunction of CS on Cont Clg	3.9	1
029 Containment Purge									1			Monitor auto isolation of Cont Purge	3.8	1
033 Spent Fuel Pool Cooling							1					Monitor SFP water level for design limit	2.7	1
035 Steam Generator									1			Monitor auto water level control	4	1
039 Main and Reheat Steam							9					Predict effect/monitor MS Rad Monitor	2.5*	1
055 Condenser Air Removal			1									CAR malf effect on Main Condenser	2.5	1
062 AC Electrical Distribution				5								Interlocks of synchscope (paralleling)	2.7*	1
063 DC Electrical Distribution								1				Impact of ground on DC system	2.5	1
064 Emergency Diesel Generator		3										Knowledge of control power supplies	3.2*	1
073 Process Radiation Monitoring					1							Operational implications of source (crud)	2.5	1
075 Circulating Water	2											Cause/effect of CW on liquid release	2.9	1
079 Station Air										1		Monitor PA to IA CV X-connect op	2.7	1
086 Fire Protection						4						Effect of malf of fire detector on system	2.6	1
K/A Category Point Totals:	2	1	3	1	2	1	2	2	2	3	1	Group Point Total:		20

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topics	Imp.	Points
005 Residual Heat Removal / SDC														
007 Pressurizer Relief/Quench Tank				1								Design features for Quench Tk cooling	2.6	1
008 Component Cooling Water														
027 Containment Iodine Removal	1											Cause/effect of Iodine and CS systems	3.4*	1
028 H2 Recombiner and Purge Control						1						Effect of malf on Hydrogen Recombiners	2.6	1
034 Fuel Handling Equipment									2			Monitor auto operation of load limits	2.5*	1
041 Steam Dump/Turbine Bypass Control	5											Cause/effect of Stm Dump on RCS	3.5	1
045 Main Turbine Generator	20											Cause/effect between MT and protection	3.4	1
076 Service Water							2					Predict effect of temp changes on loads	2.6*	1
078 Instrument Air		2										Knowledge of power supply for SWACs	3.3*	1
103 Containment														
K/A Category Point Totals:	3	1	0	1	0	1	1	0	1	0	0	Group Point Total:		8

Plant Specific Priorities System/ topic	Recommended Replacement for:											Reason		Points
Plant Specific Priority total: (limit 10)														

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Facility: CCNPP 1 & 2		Date of Exam 9/22/00	Exam Level: RO	
Category	K/A #	Topic	Imp	Points
	2.1.2	Knowledge of Operator responsibilities in all Modes	3	1
	2.1.3	Knowledge of Shift Turnover practices	3	1
Conduct of	2.1.10	Knowledge of conditions and limitations of license	2.7	1
Operations	2.1.			
	2.1.			
	2.1.			
	Total			3
	2.2.3	Design, procedure or operational difference between Units	3.1	1
	2.2.13	Knowledge of Safety Tagging procedures	3.6	1
Equipment	2.2.28	Knowledge of new and spent fuel procedures	2.6	1
Control	2.2.			
	2.2.			
	2.2.			
	Total			3
	2.3.2	Knowledge of ALARA program	2.5	1
	2.3.4	Knowledge of radiation exposure limits	2.5	1
Radiation	2.3.9	Knowledge of performing a Containment Purge	2.5	1
Control	2.3.			
	2.3.			
	2.3.			
	Total			3
	2.4.1	Knowledge of EOP entry conditions and steps	4.3	1
Emergency	2.4.11	Knowledge of AOP implementation	3.4	1
Procedures	2.4.15	Knowledge of communications for EOP implementation	3	1
and Plan	2.4.39	Knowledge of RO responsibilities in ERPIP	3.3	1
	2.4.			
	2.4.			
	Total			4
Tier 3 Target Point Total (RO)				13

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ES-301 Control Room and Facility Walk-Through Test Outline Form ES-301-2

Facility: **Calvert Cliffs Units 1 & 2** Date of Examination: **9/25/00**

Exam Level (circle one): **RO/SRO(I)**/SRO(U) Operating Test No: 1

B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. AC Electrical / Emergency start 0C DG	N / S	6
b. Shutdown Cooling / Respond to a loss of SDC with RCS pressurization possible	M / A / S / L	4 (Primary)
c. Component Cooling / Shifting CC Heat Exchangers and pumps	M / A / S	8
d. CVCS / Respond to inadvertent dilution while critical using Fast Boration	M / A / S	1
e. ESFAS / Respond to RAS actuation	M / A / S	2
f. Condensate / Respond to a condensate system rupture	N / S	4 (Secondary)
g. Reactor Protection / NI calibration	N / S	7
B.2 Facility Walk-Through		
Instrument Air / Align IA compressors for Fire Main cooling	D	8
b. AC Electrical / Take local control of 1A DG	D	6
c. Containment / verify containment integrity	N / A / R	5

*Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrolroom, (S)imulator, (L)ow-Power, (R)CA

ES-301 Control Room and Facility Walk-Through Test Outline Form ES-301-2

Facility: **Calvert Cliffs Units 1 & 2** Date of Examination: **9/25/00**

Exam Level (circle one): RO/SRO(I)/**SRO(U)** Operating Test No: 1

B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. ESFAS / Respond to RAS actuation	M / A / S	2
b. Shutdown Cooling / Respond to a loss of SDC with RCS pressurization possible	M / A / S / L	4 (Primary)
c. CEDS and CVCS / Respond to inadvertent dilution while critical	M / A / S	1
d.		
e.		
f.		
g.		
B.2 Facility Walk-Through		
a. Containment / Verify Containment Integrity	N / A / R	5
b. AC Electrical / Take local control of 1A DG	D	6
c.		

*Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrolroom, (S)imulator, (L)ow-Power, (R)CA

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ES-301	Administrative Topics Outline	Form ES-301-1
Facility: **Calvert Cliffs 1 and 2**	Date of Examination:	**9/25/00**
Examination Level (circle one): RO / **SRO**	Operating Test Number:	**1**

Administrative Topic/Subject Description		Describe method of evaluation: 3. ONE Administrative JPM, OR 4. TWO Administrative Questions
A.1	Mode Change	JPM K/A 2.1.33 // 4.0 Ability to recognize entry level conditions for Technical Specifications
	Risk assessment	JPM K/A 2.1.20 // 4.2 Ability to execute procedure steps
A.2	Post Maintenance Testing	JPM K/A 2.2.21 // 3.5 Demonstrate knowledge of Post Maintenance operability requirements
A.3	Radiation Control	K/A 2.3.4 // 3.1 Knowledge of radiation exposure limits and control
		K/A 2.3.1 // 3.0 Knowledge of 10CFR20 and related facility radiation control requirements
A.4	Event Classification	JPM K/A 2.2.44 // 4.0 Demonstrate knowledge of emergency plan protective action recommendations

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ES-301	Administrative Topics Outline	Form ES-301-1
Facility: **Calvert Cliffs 1 and 2**	Date of Examination:	**9/25/00**
Examination Level (circle one): **RO** / SRO	Operating Test Number:	**1**

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Overtime limits	K/A 2.1.1 //3.7 Knowledge of overtime limits per admin procedure SE 1-101 "Use of Overtime"
		K/A 2.1.1 // 3.7 Knowledge of approval authority for overtime authorization
	Reactor Startup requirements	JPM K/A 2.1.20 // 4.3 Ability to execute procedure steps for Shut Down Margin Determination
A.2	Surveillance Testing	JPM K/A 2.2.1 // 3.7 Ability to perform pre-startup procedures (STP O-63-1 Remote Shutdown Instrumentation)
A.3	Radiation Control	K/A 2.3.4 // 2.5 Knowledge of radiation exposure limits and control
		K/A 2.3.1 // 2.6 Knowledge of 10CFR20 and related facility radiation control requirements
A.4	ERPIP	JPM K/A 2.4.43 // 2.8 demonstrate knowledge of emergency communications systems

Simulation Facility: Calvert Cliffs | Scenario No.: 1 | Op Test No.: 1

Examiners: _____ Operators: _____ SRO

_____ _____ RO

_____ _____ BOP

Objectives: To evaluate the applicants' ability to conduct a unit power increase, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including failure of 11 SW Pp, the Condenser Hotwell Lvl Controller, a PRZR ref. line failure including associated instruments and small RCS leak. Once the leak is determined to be in CNMNT a loss of 1Y03 occurs. The reactor is tripped and EOP-0 entered. After EOP-0 is entered, the RCS leak grows to ≈ 300 gpm. 11 FRV will fail as is causing an overfeed of 11 SG. When the SIAS setpoint is reached it will fail to actuate and will have to be actuated manually. In EOP-5, when C/D is commenced, the ADVs will not operate from the control Room.

Initial Conditions: The plant is at ≈95% Power, MOC

11 AFW Pp is OOS

TBV-3940 is isolated due to failing open last shift

12 Main CPU is failed for 12 SG DFWCS

11 SGFP Oil Cooler SRW flow is being controlled manually using 1-SRW-446, CV-1622 bypass valve

Turnover: Present plant conditions: ≈95% power, MOC; Unit 2 is in MODE 5.

Power history: 100% power for previous 94 days. Reduced to 95% last shift to clean waterboxes.

Equipment out of service:

1) 11 AFW Pp failed to develop adequate discharge head for STP. It is disassembled, expected to be returned to service in 2 days.

2) TBV-3940 failed open last shift. Valve is currently isolated and E & C is investigating.

3) 12 Main CPU is failed for 12 SG DFWCS. System engineer is investigating.

4) 11 SGFP Oil Cooler SRW flow is being controlled manually using 1-SRW-446, CV-1622 bypass valve.

Surveillances due: None

Instructions for shift:

1) Waterbox cleaning is complete, waterbox is back in service. The crew is to return power to 100%.

Event No.	Malf. No.	Event Type*		Event Description
Preload	AFW001_01 FW001_03 ESFA001_01 ESFA001_02 Panel Override			11 AFW Pp OOS. 12 Main CPU on 12 SG DFWCS OOS. SIAS fails to actuate automatically. Panel Override TBV-3940 to indicate open (use RF to shut TBV-3940 local isolation).
1	N/A	R N	RO BOP	The Crew commences a power increase to 100% per OP-3.
2	SW002_01	C	CRO	After power has been raised ≈5%, 11 SW Pp trips. The CRO should acknowledge the alarms, determine 11 SW Pp has tripped, refer to the ARM and inform the CRS. The CRS will implement AOP-7A. 13 SW Pp will be aligned to 11 header (may also be electrically aligned). If not electrically aligned the CRS should recognize they are in a T.S. action. The CRS should contact the OWC or the electricians for assistance.
3	CD002 (high)	I	CRO	Several minutes after the SW Pp failure, the Hotwell level Cont. (4405) fails high, dumping fully to the CST. The CRO will receive the Hotwell level low alarm, will inform the CRS and refer to the ARM. The CRO should determine 4405 has failed high, take manual control and restore hotwell level. The OWC should be contacted for assistance.
4	RCS026_01 (high)	I	RO	About 3 minutes after the crew has taken manual control of hotwell level, PRZR level contr. (110X) fails high. The RO should acknowledge the alarms, inform the CRS and refer to the ARM. Level control should be shifted to channel Y and the OWC notified.
5	RCS024_02 (low) RCS023_01 (low) RCS002 (5-50 gpm over 5 min)	C	RO	About 2 minutes after 110X fails, 100X and 102B pressure channels fail low and an RCS leak begins to ramp in. The crew should refer to the ARM, select channel Y for control and bypass TM/LP and hi pressure trip units for RPS channel B. The CRS should recognize entrance into T.S. 3.3.1 and 3.3.4. The crew should also bypass SIAS, Block and DSS on ESFAS for 102B. The crew should recognize an RCS leak is taking place and implement AOP-2A.
6	120v003_03 RCS002 (300 gpm) FW006_01 (≈70%)	M	ALL	After the leak is determined to be in CNMNT a loss of 1Y03 will occur. If 102B has not been bypassed a reactor trip will result. If bypassed the crew should diagnose a loss of 1Y03. The CRS should direct a reactor trip due to RCS leakage. The crew should implement EOP-0, recognize when a SIAS is necessary, that it has not occurred and manually initiate SIAS.
7	Panel Override ADV Controller to Auto	M	ALL	On the reactor trip 11 FRV fails as is (≈70%) causing an over feed of 11 S/G. The crew should recognize the overfeed condition, trip the SGFPs and shift to AFW. The crew should complete EOP-0 and implement EOP-5. AOP-7J may be implemented concurrently with the EOPs for loss of 1Y03. The crew should commence RCS cooldown and depressurization IAW EOP-5. When C/D is commenced, the ADVs will not operate from the control Room. The scenario can be terminated when cooldown and depressurization are commenced and Safety injection flow is throttled.

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

SCENARIO 1 OVERVIEW

The candidates will take the shift at ≈95% power with instructions to raise power 100%.

The Crew begins to raise power to 100%. The crew will use OP-3 and conduct a normal power increase per the OP.

After power has been raised ≈5%, 11 SW Pp trips. The CRO should acknowledge the alarms, determine 11 SW Pp has tripped, refer to the ARM and inform the CRS. The CRS will implement AOP-7A. 13 SW Pp will be aligned to 11 header (may also be electrically aligned). If not electrically aligned the CRS should recognize they are in a T.S. action. The CRS should contact the OWC or the electricians for assistance.

Several minutes after the SW Pp failure, the Hotwell level Cont. (4405) fails high, dumping fully to the CST. The CRO will receive the Hotwell level low alarm, inform the CRS and refer to the ARM. The CRO should determine 4405 has failed high, take manual control and restore hotwell level. The OWC should be contacted for assistance.

About 3 minutes after the crew has taken manual control of hotwell level, PRZR level contr. (110X) fails high. The RO should acknowledge the alarm, inform the CRS and refer to the ARM. Level control should be shifted to channel Y and the OWC notified.

About 2 minutes after 110X fails, 100X and 102B pressure channels fail low and a small RCS leak begins to ramp in over 5 minutes. The crew should refer to the ARM, select channel Y for the control channel and bypass the TM/LP and hi pressure trip units for RPS channel B. The CRS should recognize entrance into T.S. 3.3.1 and 3.3.4. The crew should also bypass SIAS low pressure and block and DSS on ESFAS for 102B. The crew should recognize an RCS leak is taking place and implement AOP-2A.

After the leak is determined to be in CNMNT a loss of 1Y03 occurs. If 102B has not been bypassed a reactor trip will result. If bypassed the crew should diagnose a loss of 1Y03. The CRS should direct a reactor trip due to the RCS leakage. The crew should implement EOP-0, recognize when a SIAS is necessary, that it has not occurred and manually initiate SIAS.

On the reactor trip, 11 FRV fails as is (≈70%) causing an overfeed of 11 S/G. The crew should recognize the overfeed condition, trip the SGFPs and shift to AFW. The crew should complete EOP-0 and implement EOP-5. AOP-7J may be implemented concurrently with the EOPs for loss of 1Y03. The crew should commence RCS cooldown and depressurization IAW EOP-5. When C/D is commenced, the ADVs will not operate from the control Room. The scenario can be terminated when cooldown and depressurization are commenced and safety injection flow is throttled.

Simulation Facility	Calvert Cliffs	Scenario No.: 2	Op Test No.:	1
Examiners:	_____	Operators:	_____	SRO
	_____		_____	RO
	_____		_____	BOP

Objectives: To evaluate the applicants' ability to conduct a unit power reduction, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including an erratic failure of the TBV input pressure signal, a PRZR press. control failure, and increasing vibration on the main turbine (AOP-7E). Next, a CCW Pp trips and on the start of the backup pump a CCW leak in CNMNT begins (AOP-7C). 12B RCP trips initiating a reactor trip signal but the reactor fails to trip (ATWS). The RO takes actions for an ATWS and EOP-0 is implemented. A steamline break in the Turbine Building begins on the trip and 11 MSIV fails to shut. The crew transitions to EOP-4 and while in EOP-4, 11 SRW and 13 AFW pumps trip due to steam in the SRW Pp Rm.

Initial Conditions: The plant is at 100% Power, MOC.

13 SRW Pp is OOS.

1B DG is OOS.

12B RCP vibration has increased from 1.5 to 3.2 mils over last 24 hours.

Turnover: Present plant conditions: 100% power, MOC; Unit 2 is in MODE 5.

Power history: 100% power for previous 60 days.

Equipment out of service:

1) 13 SRW Pp motor is grounded. The motor is currently being removed from the SRW Pp Rm so the room doors are open. Doors will be closed within 2 hours and pump returned to service tomorrow.

2) 12 CCW Pp is OOS due to severe packing leak. Currently being repacked, expected back in 4 hours.

3) 1B DG is OOS for fuel rack inspection.

4) 12B RCP vibration increased from 1.5 to 3.2 mils over the last 24 hours. System Engineer evaluating.

Surveillances due: None

Instructions for shift:

1) Maintain power at 100%.

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Event No.	Malf. No.	Event Type*	Event Description
Preload	SRW003_03 DG001_02 RPS005 RPS006 CCW002_02 MS017_01 Panel Override		13 SRW Pp is OOS. 1B DG start failure. ATWS. 12 CCW Pp is OOS. 11 MSIV fails to close on SGIS. 11 MSIV HS to open.
1	System Lineup - Y2K-4056	I CRO	After the Crew assumes the watch, the TBVs begin to cycle partially open and shut due to an erratic pressure input signal. The CRO and RO should note the changing plant parameters and inform the CRS. The crew should diagnose the TBV controller problem and the CRS should direct the controller be placed in manual. The unit should be stabilized and the OWC contacted for assistance.
2	RCS023_01 (high)	I RO	After power has been stabilized, PRZR press ch. 100X fails high. The RO should acknowledge the alarms, inform the CRS and refer to the ARM. The RO should note the lowering RCS pressure and the open spray valves. Pressure control should be shifted to channel Y and the spray valves verified shut. The CRS should contact the OWC for assistance.
3	TG017 (ramp 5 to 8.5 mils over 5 min)	R RO N CRO	Following the spray valve problem, Main Turb. Vibs. begin to rise. The CRO will acknowledge the alarm, inform the CRS and refer to the ARM. When turbine vibs are >8 mils the crew reduces power per AOP-7E in an attempt to reduce turbine vibration to < 8 mils. The CRS should contact the OWC, GS-NPO and system engineer.
4	CCW002_01 CCW003 (1-2 % over2 min)	C CRO	Shortly after the crew has stabilized the turbine vibration, 11 CCW Pp trips. The CRO will acknowledge the alarm, inform the CRS and refer to the ARM. The crew will check for common mode failure and direct the CRO to start 13 CCW Pp. The CCW leak will start when 13 CCW Pp is started. The CRS should refer to AOP-7C and T.S. The CRS should contact the OWC for assistance. The crew notes the CNMNT sump alarm and eventually determines a CCW leak in CNMNT exists and takes action for the leak per AOP-7C.
5	RCS015_04 RCS006-04	C RO	After the leak in CNMNT is diagnosed, 12B RCP high vib. alarm is received followed quickly by a trip of 12B RCP. The RO should acknowledge the alarms, inform the CRS and determine a reactor trip is required and an ATWS is occurring. The CRS directs the RO to take actions for an ATWS and implementation of EOP-0.
6	MS011-01 (10%) SRW003_01 AFW005	M ALL	On the reactor trip, a steamline rupture starts in the Turbine Bldg. The CRS should direct the CRO to shut the MSIVs. The CRO should note 11 MSIV fails to shut. The crew will perform the actions of EOP-0 and transition to EOP-4. In EOP-4, since the SRW Pp Rm doors are open, fire alarms occur and 11 SRW Pp and 13 AFW Pp trip due to ground fault. The crew should ensure AFW via the steam driven pumps and recognize the effects of steam in the SRW Pp Rm. The scenario can be terminated when the cooldown due to 11 SG and subcooling are controlled and AFW is being supplied via 11 or 12 AFW pump.

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

SCENARIO 2 OVERVIEW

The candidates will take the shift at 100% power with instructions to maintain power.

After the Crew assumes the watch, the TBVs begin to cycle partially open and shut due to an erratic pressure input signal. The CRO and RO should note the changing plant parameters and inform the CRS. The crew should diagnose the TBV controller problem and the CRS should direct the controller be placed in manual. The unit should be stabilized and the OWC contacted for assistance.

After power has been stabilized, PRZR press ch. 100X fails high. The RO should acknowledge the alarms, inform the CRS and refer to the ARM. The RO should note the lowering RCS pressure and the open spray valves. Pressure control should be shifted to channel Y and the spray valves verified shut. The CRS should contact the OWC for assistance.

Following the spray valve problem, Main Turb. Vibs. begin to rise. The CRO will acknowledge the alarm, inform the CRS and refer to the ARM. When turbine vibs are >8 mils the crew reduces power per AOP-7E in an attempt to reduce turbine vibration to < 8 mils. The CRS should contact the OWC, GS-NPO and system engineer.

Shortly after the crew has stabilized the turbine vibration, 11 CCW Pp trips. The CRO will acknowledge the alarm, inform the CRS and refer to the ARM. The crew will check for common mode failure and direct the CRO to start 13 CCW Pp. The CCW leak will start when 13 CCW Pp is started. The CRS should refer to AOP-7C and T.S. The CRS should contact the OWC for assistance. The crew notes the CNMNT sump alarm and eventually determines a CCW leak in CNMNT exists and takes action for the leak per AOP-7C.

After the leak in CNMNT is diagnosed, 12B RCP high vib. alarm is received followed quickly by a trip of 12B RCP. The RO should acknowledge the alarms, inform the CRS and determine a reactor trip is required and an ATWS is occurring. The CRS directs the RO to take actions for an ATWS and implementation of EOP-0.

On the reactor trip, a steamline rupture starts in the Turbine Bldg. The CRS should direct the CRO to shut the MSIVs. The CRO should note 11 MSIV fails to shut. The crew will perform the actions of EOP-0 and transition to EOP-4. In EOP-4, since the SRW Pp Rm doors are open, fire alarms occur and 11 SRW Pp and 13 AFW Pp trip due to ground fault. The crew should ensure AFW via the steam driven pumps and recognize the effects of steam in the SRW Pp Rm. The scenario can be terminated when the cooldown due to 11 SG and subcooling are controlled and AFW is being supplied via 11 or 12 AFW pump.

Simulation Facility	Calvert Cliffs	Scenario No.: 3	Op Test No.:	1
Examiners:	_____	Operators:	_____	SRO
	_____		_____	RO
	_____		_____	BOP

Objectives: To evaluate the applicants' ability to conduct a unit power reduction, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including failure of the SRW Controller for the Main Gen H2 cooler, a PRZR level control failure (110X), a loss of 11 Charging Pp and a loss of 14B 480V bus. After the bus loss is addressed, a SG tube leak begins. The crew takes action per AOP-2A to bring the unit offline. The reactor fails to trip(ATWS), the CEDM MG sets are deenergized and EOP-0 implemented. EOP-6 will be implemented. When the SGIS block permitted alarm is received, SGIS A will not block and SGIS will actuate. When 11 SG is isolated, the safety that was wisping lifts and does not reseat. The crew should transition to EOP-8.

Initial Conditions: The plant is at 100% Power, MOC

11 AFW Pp is OOS

13 CAR is OOS

One 11 SG Safety is wisping steam

PT-102A is failed low

Turnover: Present plant conditions: 100% power, MOC; Unit 2 is in MODE 5.

Power history: 100% power for previous 94 days.

Equipment out of service:

1) 11 AFW Pp failed to develop adequate discharge head for STP. It is disassembled, expected to be returned to service in 2 days.

2) 1-RV-3993, 11 SG Safety is wisping steam, still considered operable.

3) 13 CAR is OOS for bearing replacement. Expected return in 6 hours.

4) 1-PT-102A has failed low. OOS since 0410 this morning. IAS for T.S. 3.3.1 and 3.3.4. RPS and ESFAS trip units bypassed. E&C investigating.

Surveillances due: 1B DG STP-O-8 due today. SM will bring STP to CR when ready.

Instructions for shift:

1) Maintain 100% power. Perform 1B DG STP-O-8 when directed by SM.

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Event No.	Malf. No.	Event Type*	Event Description
Preload	AFW001_01 RCS024_01 RPS005 RPS006 PANEL OVRD – SGIS B BLK KEYSWCH		11 AFW Pp OOS. 1-PT-102A failed low. ATWS. SGIS B Block Failure
1	RCS026_01 (low)	I RO	About 3 minutes after the crew has taken the watch, PRZR level contr. (110X) fails low. The RO should acknowledge the alarm, inform the CRS and refer to the ARM. Level control should be shifted to channel Y and the OWC notified.
2	TG030_01 (closed)	I CRO	After the 110X failure, the SRW controller for the Main Generator H2 cooler fails the valve shut. When the high temperature alarm is received, the CRO should acknowledge the alarm, inform the CRS and refer to the ARM. The CRO should determine TIC-1608 has failed low causing the CV to go shut and take manual control and restore H2 temperature. The OWC should be contacted for assistance.
3	CVCS023_01	C RO	After the crew has taken manual control of 1-SRW-1608, 11 Charging Pp trips. The RO should acknowledge the alarms, diagnose the loss of pump, inform the CRS and refer to the ARM. The crew should check for common mode failure and the CRS should direct starting of a backup pump. The OWC and/or maintenance should be notified.
4	480v001_08	C CRO	After the backup charging pump is started, a loss of 14B 480V Bus occurs. The crew should determine a reactor trip is not required, monitor the primary and diagnose a loss of 14B bus. The crew should also recognize a second charging pump is lost and ensure charging is in service. The CRS should implement AOP-7I and address T.S. for the electrical subsystem and loss of charging pumps.
5	MS001_01 (20-100 gpm over 3 minutes)	R RO N CRO	After the crew has addressed the loss of bus, a SG tube leak begins. The crew will note the N-16 alarm and determine a tube leak is taking place. The CRS should implement AOP-2A and commence a downpower to PRZR level <101 inches or Tave <537°F. When the trip criteria are reached the CRS should direct a reactor trip. The reactor will fail to trip and the RO should take actions for an ATWS. The crew should implement EOP-0.
6	MS016_02	M ALL	The crew will perform the actions of EOP-0 and transition to EOP-6. In EOP-6 the crew will commence a rapid cooldown to <515°F Th. When SGIS Block Permitted alarm is received, SGIS B will fail to block and SGIS will actuate. After 11 SG is isolated, the safety that was wisping steam on 11 SG lifts. The crew should then recognize two events are taking place and transition to EOP-8.
7	N/A	M ALL	11 SG cools down and depressurizes due to the safety lifting. The crew will determine the correct success paths for EOP-8 and the hierarchy in which they should be performed. The scenario can be terminated when the success paths of EOP-8 are being performed

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

SCENARIO 3 OVERVIEW

The candidates will take the shift at 100% power.

After the crew has assumed the watch, PRZR level contr. (110X) fails low. The RO should acknowledge the alarm, inform the CRS and refer to the ARM. Level control should be shifted to channel Y. The CRS should contact the OWC for assistance.

After the 110X failure, the SRW controller for the main generator H2 cooler fails causing the CV to shut. When the high temperature alarm is received, the CRO should acknowledge the alarm, inform the CRS and refer to the ARM. The CRO should determine 1608 has failed low causing the CV to go shut, take manual control and restore H2 temperature. The OWC should be contacted for assistance.

After the crew has taken manual control of 1-SRW-1608, 11 Charging Pp trips. The RO should acknowledge the alarms, diagnose the loss of pump, inform the CRS and refer to the ARM. The crew should check for common mode failure and the CRS should direct starting of a backup pump. The OWC and/or maintenance should be notified.

After the backup charging pump is started, a loss of 14B 480V Bus occurs. The crew should determine a reactor trip is not required, monitor the primary and diagnose the loss of 14B bus. The crew should also recognize a second charging pump is lost and ensure charging is in service. The CRS should implement AOP-7I and address the T.S. for the electrical subsystem and loss of charging pumps.

After the crew has addressed the loss of bus, a SG tube leak begins. The crew will note the N-16 alarm and determine a tube leak is taking place. The CRS should implement AOP-2A and commence a downpower til PRZR level is <101 inches or Tave is <537°F. When the trip criteria are reached, the CRS should direct a reactor trip. The reactor will fail to trip and the RO should take actions for an ATWS. The crew should implement EOP-0.

The crew will perform the actions of EOP-0 and transition to EOP-6. In EOP-6, the crew will commence a rapid cooldown to <515°F Th. When SGIS Block Permitted alarm is received, SGIS B will fail to block and SGIS will actuate. After 11 SG is isolated, the safety that was wisping steam on 11 SG lifts. The crew should then recognize two events are taking place and transition to EOP-8.

11 SG cools down and depressurizes due to the safety lifting. The crew will determine the correct success paths for EOP-8 and the hierarchy in which they should be performed. The scenario can be terminated when the success paths of EOP-8 are being performed

Simulation Facility	Calvert Cliffs	Scenario No.: 4	Op Test No.:	1
Examiners:	_____	Operators:	_____	SRO
	_____		_____	RO
	_____		_____	BOP

Objectives: To evaluate the applicants' ability to conduct a unit power reduction, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including a rapid downpower as requested by ESO due to transformer problems, failure of a SG FRV controller and failure of the VCT level transmitter. PORV-402 starts to leak, and will be isolated. 12 SRW Pp trips and AOP-7B is implemented. When 13 SRW Pp is started, a SRW leak begins in the Aux. Bldg. on the supply line to 1B DG. After 1B DG is isolated, a CEA drops. AOP-1B is implemented. When the CEA is being recovered a second CEA drops. The CRS should direct the reactor be tripped and EOP-0 implemented. In EOP-0, offsite power will be lost. The 1A DG will fail to start and 12 AFW Pp will seize. The crew should recognize a loss of feed exists along with a station blackout and go to EOP-8.

Initial Conditions: The plant is at 100% Power, MOC

11 AFW Pp is OOS

11 CBP is OOS

0C DG is OOS

PRZR level Ch. 110X is OOS

Turnover: Present plant conditions: 100% power, MOC; Unit 2 is in MODE 5.

Power history: 100% power for previous 94 days.

Equipment out of service:

1) 11 AFW Pp failed to develop adequate discharge head for STP. It is disassembled, expected to be returned to service in 2 days.

2) 0C DG is OOS for lube oil pressure switch replacement, expected back in 4 hours.

3) 11 CBP is OOS for bearing replacement. Expected return in 6 hours.

4) 1-LT-110X has failed high. OOS since 0625 this morning. E&C investigating.

Surveillances due: None.

Instructions for shift:

1) Maintain 100% power. PE on 0C DG when returned to service.

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Event No.	Malf. No.	Event Type*	Event Description
Preload	AFW001_01 RCS026_01 DG002_01 DG002_02 CD005_01		11 AFW Pp OOS. 1-LT-110X failed high. 0C DG OOS. 1A DG Start failure. 11 CBP OOS.
1	N/A	R RO N CRO	After the crew has assumed the watch, the ESO calls and requests Unit 1 load be reduced to 650 MWe within the next 15 minutes due to a transformer fire at Waugh Chapel. The crew will commence a rapid downpower per OP-3 and stabilize the unit at 650 MWe.
2	FW018_02 (LO)	I CRO	After the unit is stabilized, 12 SG FRV Controller fails. The CRO should acknowledge the alarm and inform the CRS. The CRS should direct the CRO to maintain SG level and implement AOP-3G. The CRS should direct the CRO to place the controller switch in the Main PDI Fail position. The CRS should direct the OWC to contact the System Engineer for assistance.
3	CVCS009 (LO)	I RO	After AOP-3G actions have been taken, VCT Level transmitter LT-227 fails low. This causes Ch. Pp suction to shift to the RWT. The RO should inform the CRS. The CRS should direct the RO to shift Ch. Pp suction back to the VCT. The OWC should be contacted for assistance.
4	RCS021 (5%)	C RO	Next PORV-402 starts to leak. The RO should acknowledge the Quench Tank alarm and note on the acoustic monitor the indicated leakage. The ARM will be referenced and the CRS will direct the PORV Block valve, RC-403 to be closed. The CRS will refer to T. S. 3.4.11. The OWC will be conducted for assistance.
5	SRW003_02 SRW001_02 (2%)	C CRO	Approximately 3 minutes after the block valve is ordered closed, 12 SRW Pump trips. The ARM is referenced and a check is made for common mode failure. 13 SRW Pump will be started and AOP-7B implemented. When 13 SRW Pp is started, the transient causes a leak on the supply line to 1B DG. The leak will be located and isolated and starting air isolated to 1B DG per AOP-7B. The OWC should be contacted for assistance.
6	CEDS012_29 CEDS012_31	M,R ALL	After 1B DG starting air is isolated, CEA 29 drops. The RO should acknowledge the alarms, inform the CRS and refer to the ARM. The CRS should implement AOP-1B and address T.S. 3.1.4. The primary will be stabilized and realignment time determined. After notifying maintenance and correcting the cause, realignment will be commenced. When CEA 29 withdrawl is begun, CEA 31 drops. The CRS should direct a reactor trip. The crew should implement EOP-0.
7	SWYD002 AFW001_02	M ALL	After the initial safety functions verification, a loss of offsite power occurs. 1A DG does not start and after reactivity is complete, 12 AFW Pp trips. The crew will recognize a station blackout exists along with a loss of feed. The crew will implement EOP-8 and restore power via the 1A DG which will also restore AFW. The crew can then transition to EOP-2. The scenario can be terminated once power and AFW are restored.

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

SCENARIO 4 OVERVIEW

The candidates will take the shift at 100% power.

After the crew has assumed the watch, the ESO calls and requests Unit 1 load be reduced to 650 MWe within the next 15 minutes due to a transformer fire at Waugh Chapel. The crew will commence a rapid downpower per OP-3 and stabilize the unit at 650 MWe.

After the unit is stabilized, 12 SG FRV Controller fails. The CRO should acknowledge the alarm and inform the CRS. The CRS should direct the CRO to maintain SG level and implement AOP-3G. The CRS should direct the CRO to place the controller in the Main PDI Fail position. The CRS should direct the OWC to contact the System Engineer for assistance.

After AOP-3G actions have been taken, VCT Level transmitter LT-227 fails low. This causes Ch. Pp suction to shift to the RWT. The RO should inform the CRS. The CRS should direct the RO to shift Ch. Pp suction back to the VCT. The OWC should be contacted for assistance.

Next PORV-402 starts to leak. The RO should acknowledge the Quench Tank alarm and note on the acoustic monitor the indicated leakage. The ARM will be referenced and the CRS will direct the PORV Block valve, RC-403 to be closed. The CRS will refer to T. S. 3.4.11. The OWC will be conducted for assistance.

Next, 12 SRW pump trips off. The CRO acknowledges the alarm, informs the CRS and refers to the ARM. The CRS should direct starting of 13 SRW Pp after checking for common mode failure. AOP-7B is implemented. When 13 SRW Pp is started, the transient causes a leak on the supply line to 1B DG. The CRS should evaluate T.S. 3.8.1 for the DG being OOS. The leak will be located and isolated and starting air isolated to 1B DG. The OWC should be contacted for assistance.

After 1B DG starting air is isolated, CEA 29 drops. The RO should acknowledge the alarms, inform the CRS and refer to the ARM. The CRS should implement AOP-1B and address T.S. 3.1.4. The primary will be stabilized and realignment time determined. After notifying maintenance and correcting the cause, realignment will be commenced. When CEA 29 withdrawl is begun, CEA 31 drops. The CRS should direct a reactor trip. The crew should implement EOP-0.

After the initial safety function verification, a loss of offsite power occurs. 1A DG does not start and after reactivity is complete, 12 AFW Pp trips. The crew will recognize a station blackout exists along with a loss of feed. The crew will implement EOP-8 and restore power via the 1A DG which will also restore AFW. The crew can then transition to EOP-2. The scenario can be terminated once power and AFW are restored.

Simulation Facility	Calvert Cliffs	Scenario No.: **5** **(Spare)**	Op Test No.:	**1**
Examiners:	_____	Operators:	_____	SRO
	_____		_____	RO
	_____		_____	BOP

Objectives: To evaluate the applicants' ability to conduct a unit power increase, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including a severe oil leak on a SGFP, a PRZR press. Cont. failure, failure of the ADV Controller, and a dropped CEA. When the dropped CEA is being recovered, a loss of offsite power occurs and only the 1B DG starts. The reactor trips and EOP-0 entered. After EOP-0 is entered, 12 MSIV will fail to shut and have to be shut locally. In EOP-2, 12 AFW pump will trip and a loss of all FW results. The crew should transition to EOP-3 and restore AFW from Unit 2.

Initial Conditions: The plant is at ≈80% Power, MOC

11 AFW Pp is OOS

One Safety on 11 SG is wisping steam

0C DG is OOS

Turnover: Present plant conditions: ≈80% power, MOC; Unit 2 is in MODE 4.

Power history: 100% power for previous 60 days. Reduced to 70% and removed 11 SGFP from service to repair a control oil leak.

Equipment out of service:

1) 11 AFW Pp failed to develop adequate discharge head for STP. It is disassembled, expected to be returned to service in 2 days.

2) 1-RV-3993, 11 SG Safety is wisping steam, still operable, just monitor.

3) 0C DG is OOS, for fuel rack inspection.

Surveillances due: None

Instructions for shift:

1) Oil leak on 11 SGFP has been repaired and pump is now in parallel, raise power to 100% per OP-3.

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Event No.	Malf. No.	Event Type*	Event Description
Preload	AFW001_01 DG002_02 DG002_01 MS017_02 Panel Override		11 AFW Pp OOS. 1A DG start failure. 0C DG start failure. 12 MSIV fails to close on SGIS or CSAS. 12 MSIV HS to open.
1	FW004_01	R RO N BOP C BOP	The Crew commences a power increase to 100% per OP-3. As the crew begins the power increase, the TBO reports the Control Oil leak on 11 SGFP is back and worse than before and the SGFP needs to be shutdown quickly. The crew should commence a rapid downpower to take 11 SGFP offline. When power is ≈70%, 11 SGFP trips. The crew should reduce power to a power level for 1 SGFP and implement AOP-3G. The OWC and system engineer should be contacted for support.
2	RCS023_01 (high)	I RO	After power has been stabilized, PRZR press ch. 100X fails high. The RO should acknowledge the alarms, inform the CRS and refer to the ARM. The RO should note the lowering RCS pressure and the open spray valves. Pressure control should be shifted to channel Y and the spray valves verified shut. The CRS should contact the OWC for assistance.
3	MS015 (high)	I CRO	Several minutes after the 100X failure, the ADV press. input fails high causing the ADVs to open. The CRO will inform the CRS. The CRS should direct the CRO to take manual control of the ADVs and shut them. The RO should maintain Tc and reactor power. The CRS should contact the OWC for assistance.
4	CEDS012_34	C RO	About 3 minutes after the crew has taken manual control of the ADVs, CEA 34 drops. The RO should acknowledge the alarms, inform the CRS and refer to the ARM. The CRS should implement AOP-1B and address T.S. 3.1.4. The primary will be stabilized and realignment time determined. After notifying maintenance and correcting the cause, realignment will be commenced.
5	SWYD002	M ALL	After CEA realignment has begun, a loss of offsite power occurs. The reactor trips and 1A DG fails to start. The crew implements EOP-0. As RCS temperature lowers and SG pressure approaches 800#, the CRO attempts to close the MSIVs. 12 MSIV will fail to close. The crew should direct the MSIV be closed locally. The crew may go to EOP-2 or based on the cooldown from the MSIV and 2nd stage source valves decide to go to EOP-4. (During the second pass through EOP-0, the MSIV or 2nd stage source valves will be closed locally, if directed previously.)
6	AFW001_02	M ALL	After the optimal EOP is entered, a loss of 12 AFW Pp occurs. This results in a loss of all FW. The crew should transition to EOP-3 or EOP-8. In EOP-3, or 8, AFW will be restored from Unit 2 via the crossconnect. The scenario can be terminated once AFW is restored via unit 2.

Same as #2

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

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SCENARIO 5 (Spare) OVERVIEW

The candidates will take the shift at ≈80% power with instructions to raise power to 100%.

The Crew begins to raise power to 100% using OP-3.

After the power increase has begun, the TBO reports the Control Oil leak on 11 SGFP is back and worse than before and the SGFP needs to be shutdown quickly. The crew should commence a rapid downpower to take 11 SGFP offline. When power is ≈70%, 11 SGFP trips. The crew should reduce power to a power level for 1 SGFP and implement AOP-3G. The OWC and system engineer should be contacted for support.

After power has been stabilized, PRZR press ch. 100X fails high. The RO should acknowledge the alarms, inform the CRS and refer to the ARM. The RO should note the lowering RCS pressure and the open spray valves. Pressure control should be shifted to channel Y and the spray valves verified shut. The CRS should contact the OWC for assistance.

Several minutes after the 100X failure, the ADV press. input fails high causing the ADVs to open. The CRO will inform the CRS. The CRS should direct the CRO to take manual control of the ADVs and shut them. The RO should maintain Tc and reactor power. The CRS should contact the OWC for assistance.

About 3 minutes after the crew has taken manual control of the ADVs, CEA 34 drops. The RO should acknowledge the alarms, inform the CRS and refer to the ARM. The CRS should implement AOP-1B and address T.S. 3.1.4. The primary will be stabilized and realignment time determined. After notifying maintenance and correcting the cause, realignment will be commenced.

After CEA realignment has begun, a loss of offsite power occurs. The reactor trips and 1A DG fails to start. The crew implements EOP-0. As RCS temperature lowers and SG pressure approaches 800#, the CRO attempts to close the MSIVs. 12 MSIV will fail to close. The crew should direct the MSIV be closed locally. The crew may go to EOP-2 or based on the cooldown from the MSIV and 2nd stage source valves decide to go to EOP-4. (During the second pass through EOP-0, the MSIV or 2nd stage source valves will be closed locally, if directed previously.)

After the optimal EOP is entered, a loss of 12 AFW Pp occurs. This results in a loss of all FW. The crew should transition to EOP-3 or EOP-8. In EOP-3, or 8, AFW will be restored from Unit 2 via the crossconnect. The scenario can be terminated once AFW is restored via unit 2.