

Facility: Callaway														Date of Exam: March 25, 2013				
Tier	Group	RO K/A Category 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	1	2				2	2			1	9	2	2	4		
	Tier Totals	4	4	5				5	5			4	27	5	5	10		
2. Plant Systems	1	3	2	3	2	2	2	2	3	3	3	3	28	3	2	5		
	2	1	1	1	1	1	1	0	1	1	1	1	10	1	1	3		
	Tier Totals	4	3	4	3	3	3	2	4	4	4	4	38	5	3	8		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4	7
					3		3		2		2			2	2	1	2	
<p>Note:</p> <ol style="list-style-type: none"> 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. 																		

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO)						Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1							Not Selected		
000008 Pressurizer Vapor Space Accident / 3			X				AK3.04	4.2	1
000009 Small Break LOCA / 3	X						EK1.02	3.5	2
000011 Large Break LOCA / 3				X			EA1.11	4.2	3
000015/17 RCP Malfunctions / 4	X						AK1.05	2.7	4
000022 Loss of Rx Coolant Makeup / 2							Not Selected		
000025 Loss of RHR System / 4						X	2.1.32	3.8	5
000026 Loss of Component Cooling Water / 8					X		AA2.01	2.9	6
000027 Pressurizer Pressure Control System Malfunction / 3		X					AK2.03	2.6	7
000029 ATWS / 1			X				EK3.11	4.2	8
000038 Steam Gen. Tube Rupture / 3						X	2.2.42	3.9	9

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO)							Form ES-401-2	
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4					X			EA1.1	3.8	10
000054 (CE/E06) Loss of Main Feedwater / 4								Not Selected		
000055 Station Blackout / 6					X			EA2.06	3.7	11
000056 Loss of Off-site Power / 6					X			AA1.21	3.3	12
000057 Loss of Vital AC Inst. Bus / 6				X				AK3.01	4.1	13
000058 Loss of DC Power / 6	X							AK1.01	2.8	14
000062 Loss of Nuclear Svc Water / 4							X	2.4.6	3.7	15
000065 Loss of Instrument Air / 8								Not Selected		
W/E04 LOCA Outside Containment / 3								Not Selected		
W/E11 Loss of Emergency Coolant Recirc. / 4			X					EK2.1	3.6	16
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4			X					EK2.2	3.9	17
000077 Generator Voltage and Electric Grid Disturbances / 6					X			AA2.10	3.6	18
K/A Category Totals:	3	3	3	3	3	3		Group Point Total:		18

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)						Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1	X						AK1.21	2.9	19
000003 Dropped Control Rod / 1							Not Selected		
000005 Inoperable/Stuck Control Rod / 1							Not Selected		
000024 Emergency Boration / 1				X			AA1.26	3.3	20
000028 Pressurizer Level Malfunction / 2							Not Selected		
000032 Loss of Source Range NI / 7							Not Selected		
000033 Loss of Intermediate Range NI / 7							Not Selected		
000036 (BW/A08) Fuel Handling Accident / 8					X		AA2.02	3.4	21
000037 Steam Generator Tube Leak / 3					X		AA2.16	4.1	22
000051 Loss of Condenser Vacuum / 4							Not Selected		
000059 Accidental Liquid RadWaste Rel. / 9							Not Selected		
000060 Accidental Gaseous Radwaste Rel. / 9							Not Selected		
000061 ARM System Alarms / 7							Not Selected		
000067 Plant Fire On-site / 8						X	2.4.46	4.2	23

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)						Form ES-401-2	
000068 (BW/A06) Control Room Evac. / 8			X				AK3.12	4.1	24
000069 (W/E14) Loss of CTMT Integrity / 5		X					EK2.1	3.4	25
000074 (W/E06&E07) Inad. Core Cooling / 4							Not Selected		
000076 High Reactor Coolant Activity / 9							Not Selected		
W/E01 & E02 Rediagnosis & SI Termination / 3			X				EA1.1 (E01)	3.7	26
W/E13 Steam Generator Over-pressure / 4							Not Selected		
W/E15 Containment Flooding / 5							Not Selected		
W/E16 High Containment Radiation / 9							Not Selected		
BW/A01 Plant Runback / 1							Not Applicable		
BW/A02&A03 Loss of NNI-X/Y / 7							Not Applicable		
BW/A04 Turbine Trip / 4							Not Applicable		
BW/A05 Emergency Diesel Actuation / 6							Not Applicable		
BW/A07 Flooding / 8							Not Applicable		
BW/E03 Inadequate Subcooling Margin / 4							Not Applicable		
BW/E08; W/E03 LOCA Cooldown - Depress. / 4							Not Selected		
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4			X				EK3.3 (E09)	3.5	27
BW/E13&E14 EOP Rules and Enclosures							Not Applicable		
CE/A11; W/E08 RCS Overcooling - PTS / 4							Not Selected		

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)						Form ES-401-2	
CE/A16 Excess RCS Leakage / 2							Not Applicable		
CE/E09 Functional Recovery							Not Applicable		
K/A Category Point Totals:	1	1	2	2	2	1	Group Point Total:	9	

ES-401													PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO)		Form ES-401-2	
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 Topic(s)	IR	#		
003 Reactor Coolant Pump			X									K3.03	2.8	28		
004 Chemical and Volume Control						X	X					K6.17	4.4	29		
												A1.04	3.9	30		
005 Residual Heat Removal		X										K2.03	2.7	31		
006 Emergency Core Cooling					X							K5.06	3.5	32		
007 Pressurizer Relief/Quench Tank										X		A4.10	3.6	33		
008 Component Cooling Water	X								X			K1.01	3.1	34		
												A3.02	3.2	35		
010 Pressurizer Pressure Control						X						K6.01	2.7	36		
012 Reactor Protection		X						X				K2.01 (JAN2011)	3.3	37		
												A2.06	4.4	38		
013 Engineered Safety Features Actuation	X											K1.12	4.1	39		
022 Containment Cooling										X		A4.05	3.8	40		

ES-401														PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO)				Form ES-401-2	
025 Ice Condenser														Not Applicable					
026 Containment Spray										X			X	A3.01		4.3	41		
														2.4.9		3.8	42		
039 Main and Reheat Steam				X										K4.04		2.9	43		
059 Main Feedwater			X											K3.04		3.6	44		
061 Auxiliary/Emergency Feedwater			X		X									K3.02		4.2	45		
														K5.02		3.2	46		
062 AC Electrical Distribution				X			X							K4.01		2.6	47		
														A1.01		3.4	48		
063 DC Electrical Distribution											X			A4.03		3.0	49		
064 Emergency Diesel Generator									X				X	A2.02		2.7	50		
														2.4.45		4.1	51		
073 Process Radiation Monitoring													X	2.1.30		4.4	52		
076 Service Water	X													K1.01		3.4	53		
078 Instrument Air										X				A3.01		3.1	54		
103 Containment									X					A2.05		2.9	55		
K/A Category Point Totals:	3	2	3	2	2	2	2	3	3	3	3			Group Point Total:			28		

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO)											Form ES-401-2	
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 Topic(s)	IR	#
001 Control Rod Drive												Not Selected		
002 Reactor Coolant											X	2.4.11	4.0	56
011 Pressurizer Level Control		X										K2.01	3.1	57
014 Rod Position Indication					X							K5.01	2.7	58
015 Nuclear Instrumentation												Not Selected		
016 Non-nuclear Instrumentation			X									K3.12	3.4	59
017 In-core Temperature Monitor												Not Selected		
027 Containment Iodine Removal												Not Selected		
028 Hydrogen Recombiner and Purge Control												Not Selected		
029 Containment Purge												Not Selected		
033 Spent Fuel Pool Cooling				X								K4.05	3.1	61
034 Fuel Handling Equipment										X		A4.02	3.5	62
035 Steam Generator						X						K6.01	3.2	62

ES-401														PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO)		Form ES-401-2	
041 Steam Dump/Turbine Bypass Control										X				A3.05		2.9	63
045 Main Turbine Generator	X													K1.18		3.6	64
055 Condenser Air Removal														Not Selected			
056 Condensate														Not Selected			
068 Liquid Radwaste														Not Selected			
071 Waste Gas Disposal														Not Selected			
072 Area Radiation Monitoring														Not Selected			
075 Circulating Water														Not Selected			
079 Station Air														Not Selected			
086 Fire Protection										X				A2.02		3.0	65
K/A Category Point Totals:	1	1	1	1	1	1	0	1	1	1	1			Group Point Total:			10

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO)						Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1							Not Selected		
000008 Pressurizer Vapor Space Accident / 3					X		AA2.30	4.3	1
000009 Small Break LOCA / 3							Not Selected		
000011 Large Break LOCA / 3							Not Selected		
000015/17 RCP Malfunctions / 4							Not Selected		
000022 Loss of Rx Coolant Makeup / 2							Not Selected		
000025 Loss of RHR System / 4							Not Selected		
000026 Loss of Component Cooling Water / 8							Not Selected		
000027 Pressurizer Pressure Control System Malfunction / 3							Not Selected		
000029 ATWS / 1						X	2.4.18	4.0	2
000038 Steam Gen. Tube Rupture / 3							Not Selected		
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4							Not Selected		

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO)										Form ES-401-2	
000054 (CE/E06) Loss of Main Feedwater / 4													
000055 Station Blackout / 6						X						3.9	3
000056 Loss of Off-site Power / 6													
000057 Loss of Vital AC Inst. Bus / 6							X					4.6	4
000058 Loss of DC Power / 6													
000062 Loss of Nuclear Svc Water / 4													
000065 Loss of Instrument Air / 8													
W/E04 LOCA Outside Containment / 3													
W/E11 Loss of Emergency Coolant Recirc. / 4						X						4.2	5
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4													
000077 Generator Voltage and Electric Grid Disturbances / 6							X					4.2	6
K/A Category Totals:						3	3						6

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO)						Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1					X		AA2.03	4.5	7
000003 Dropped Control Rod / 1							Not Selected		
000005 Inoperable/Stuck Control Rod / 1							Not Selected		
000024 Emergency Boration / 1							Not Selected		
000028 Pressurizer Level Malfunction / 2							Not Selected		
000032 Loss of Source Range NI / 7							Not Selected		
000033 Loss of Intermediate Range NI / 7							Not Selected		
000036 (BW/A08) Fuel Handling Accident / 8							Not Selected		
000037 Steam Generator Tube Leak / 3							Not Selected		
000051 Loss of Condenser Vacuum / 4							Not Selected		
000059 Accidental Liquid RadWaste Rel. / 9							Not Selected		
000060 Accidental Gaseous Radwaste Rel. / 9							Not Selected		
000061 ARM System Alarms / 7							Not Selected		
000067 Plant Fire On-site / 8						X	2.1.28	4.1	8

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO)						Form ES-401-2	
000068 (BW/A06) Control Room Evac. / 8							Not Selected		
000069 (W/E14) Loss of CTMT Integrity / 5						X	2.4.41	4.6	9
000074 (W/E06&E07) Inad. Core Cooling / 4							Not Selected		
000076 High Reactor Coolant Activity / 9							Not Selected		
W/E01 & E02 Rediagnosis & SI Termination / 3						X	EA2.1 (E01)	4.0	10
W/E13 Steam Generator Over-pressure / 4							Not Selected		
W/E15 Containment Flooding / 5							Not Selected		
W/E16 High Containment Radiation / 9							Not Selected		
BW/A01 Plant Runback / 1							Not Applicable		
BW/A02&A03 Loss of NNI-X/Y / 7							Not Applicable		
BW/A04 Turbine Trip / 4							Not Applicable		
BW/A05 Emergency Diesel Actuation / 6							Not Applicable		
BW/A07 Flooding / 8							Not Applicable		
BW/E03 Inadequate Subcooling Margin / 4							Not Applicable		
BW/E08; W/E03 LOCA Cooldown - Depress. / 4							Not Applicable		
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4							Not Selected		
BW/E13&E14 EOP Rules and Enclosures							Not Applicable		
CE/A11; W/E08 RCS Overcooling - PTS / 4							Not Selected		
CE/A16 Excess RCS Leakage / 2							Not Applicable		

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO)										Form ES-401-2
CE/E09 Functional Recovery								Not Applicable			
K/A Category Point Totals:					2	2	Group Point Total:				4

PWR Examination Outline Plant Systems - Tier 2/Group 1 (SRO)													Form ES-401-2	
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 Topic(s)	IR	#
003 Reactor Coolant Pump												Not Selected		
004 Chemical and Volume Control												Not Selected		
005 Residual Heat Removal												Not Selected		
006 Emergency Core Cooling												Not Selected		
007 Pressurizer Relief/Quench Tank												Not Selected		
008 Component Cooling Water												Not Selected		
010 Pressurizer Pressure Control												Not Selected		
012 Reactor Protection								X				A2.03	3.7	11
013 Engineered Safety Features Actuation												Not Selected		
022 Containment Cooling												Not Selected		
025 Ice Condenser												Not Applicable		
026 Containment Spray												Not Selected		
039 Main and Reheat Steam												Not Selected		
059 Main Feedwater												Not Selected		

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 1 (SRO)										Form ES-401-2		
061 Auxiliary/Emergency Feedwater											X	2.2.22	4.7	12
062 AC Electrical Distribution												Not Selected		
063 DC Electrical Distribution											X	2.1.20	4.6	13
064 Emergency Diesel Generator									X			A2.06	3.3	14
073 Process Radiation Monitoring												Not Selected		
076 Service Water												Not Selected		
078 Instrument Air												Not Selected		
103 Containment									X			A2.05	3.9	15
K/A Category Point Totals:									3		2	Group Point Total:		5

ES-401													PWR Examination Outline Plant Systems - Tier 2/Group 2 (SRO)		Form ES-401-2	
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 Topic(s)	IR	#		
001 Control Rod Drive												Not Selected				
002 Reactor Coolant												Not Selected				
011 Pressurizer Level Control												Not Selected				
014 Rod Position Indication												Not Selected				
015 Nuclear Instrumentation												Not Selected				
016 Non-nuclear Instrumentation												Not Selected				
017 In-core Temperature Monitor												Not Selected				
027 Containment Iodine Removal												Not Applicable				
028 Hydrogen Recombiner and Purge Control												Not Selected				
029 Containment Purge												Not Selected				
033 Spent Fuel Pool Cooling												Not Selected				
034 Fuel Handling Equipment				X								K4.02	3.3	16		
035 Steam Generator												Not Selected				
041 Steam Dump/Turbine Bypass Control											X	2.1.23	4.4	17		

ES-401														PWR Examination Outline Plant Systems - Tier 2/Group 2 (SRO)										Form ES-401-2	
045 Main Turbine Generator										X				A2.17	2.9	18									
055 Condenser Air Removal														Not Selected											
056 Condensate														Not Selected											
068 Liquid Radwaste														Not Selected											
071 Waste Gas Disposal														Not Selected											
072 Area Radiation Monitoring														Not Selected											
075 Circulating Water														Not Selected											
079 Station Air														Not Selected											
086 Fire Protection														Not Selected											
K/A Category Point Totals:					1					1			1	Group Point Total:		3									

Facility: Callaway							Date of Exam: March 25, 2013		
Category	K/A #	Topic	RO		SRO-Only				
			IR	#	IR	#			
1. Conduct of Operations	2.1.14		3.1	66					
	2.1.26		3.4	67					
	2.1.44		3.9	68					
	2.1.5				3.9	19			
	2.1.23				4.4	20			
	Subtotal			3		2			
2. Equipment Control	2.2.12	(JAN2011)	3.7	69					
	2.2.13		4.1	70					
	2.2.36		3.1	71					
	2.2.7	(JUN2011)			3.6	21			
	2.2.17				3.8	22			
	Subtotal			3		2			

Facility: Callaway

Date of Exam: March 25, 2013

Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
3. Radiation Control	2.3.4		3.2	72		
	2.3.13	(JAN2011)	3.4	73		
	2.3.14				3.8	23
	Subtotal			2		1
4. Emergency Procedures / Plan	2.4.5		3.7	74		
	2.4.14		3.8	75		
	2.4.9				4.2	24
	2.4.28				4.1	25
	Subtotal			2		2
Tier 3 Point Total				10		7

[illegible]

Facility: Callaway Examination Level: RO		Date of Examination: 3/18/2013 Operating Test Number:
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
(A1) Conduct of Operations	R, N	Calculate a Shutdown Margin. 2.1.37 (4.3) Knowledge of procedures, guidelines, or limitations associated with reactivity management.
(A2) Conduct of Operations	R, N	Calculate volume of water to transfer between RWST and Spent Fuel Pool within given limits. 2.1.25 (3.9) Ability to interpret reference materials, such as graphs, curves, tables, etc.
(A3) Equipment Control	R, N	Determine amperage limits for 480 VAC safety related busses when cross-connecting for maintenance. 2.2.37 (3.6) Ability to determine operability and/or availability of safety related equipment.
Radiation Control		N/A
(A4) Emergency Procedures/Plan	R, N	Determine correct Functional Restoration Guideline (FRG) procedure implementation following a plant event. 2.4.14 (3.8) Knowledge of general guidelines for EOP usage.
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)		

RO ADMIN JPM SUMMARY

- A1 This is a new JPM. The candidate will be assigned the task to calculate an at power Shutdown Margin. The plant computer is not available and the calculation must be manually performed.
- A2 This is a new JPM. The candidate will be assigned the task to calculate the amount of water required to test the Spent Fuel Pool (SFP) high level alarm. The water will come from the RWST and the candidate must determine if there is sufficient volume in the RWST to perform the SFP test without affecting the operability of the RWST.
- A3 This is a new JPM. The candidate will be assigned the task to review planned maintenance which requires load centers NG01 and NG03 to be cross-connected. The candidate will be required to determine what equipment can be started on the cross-connected load centers.
- A4 This is a new JPM. The candidate will be assigned the task to review the Critical Safety Functions (CSFs) following a plant event. Upon completion of his review he will report to the CRS that the highest priority CSF that needs to be addressed is Core Cooling and that FR-C.2, Response to Degraded Core Cooling should be implemented.

Facility: Callaway Examination Level: SRO		Date of Examination: 3/18/2013 Operating Test Number:
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
(A5) Conduct of Operations	R, M	Evaluate conditions for restarting of Refueling Preshuffle of Fuel Assemblies in the Spent Fuel Pool. 2.1.35 (3.9) Knowledge of the fuel-handling responsibilities of SROs.
(A6) Conduct of Operations	R, N	Review shift logs for completeness and correctness. 2.1.18 (3.8) Ability to make accurate, clear, and concise logs, records, status boards, and reports.
(A7) Equipment Control	R, N	Perform a risk assessment during shutdown conditions. 2.2.18 (3.9) Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.
(A8) Radiation Control	R, D	Determine estimated dose for job and make recommendation on whether to install shielding to reduce total dose. 2.3.12 (3.7) Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.
(A9) Emergency Procedures/Plan	R, D	Initiate RERP implementation to include event classification and initial offsite notification. 2.4.41 (4.6) Knowledge of the emergency action level thresholds and classification.
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)		

SRO ADMIN JPM SUMMARY

- A5 This is a bank JPM from the 2011 Turkey Point Exam. The candidate will be given a set of plant conditions and OOS equipment associated with recommencing shuffling of irradiated fuel assemblies in the Spent Fuel Pool. The candidate will be required to evaluate each item to assess whether irradiated fuel can be moved based on the given condition. Of the 10 items provided to the candidate, 4 of them would prevent the movement of irradiated fuel assemblies.
- A6 This is a new JPM. The candidate will be given 13 pages of a set of manual Control Room logs that have been taken due to the unavailability of Auto Tour. The candidate will be required to review the logs and to inform the RO of any changes or plant issues that need to be addressed based on his review. There are ten (10) issues to be identified on the logs; the candidate must identify at least 8 of the 10 issues to successfully complete this JPM.
- A7 This is a new JPM. The candidate will be required to perform a Shutdown Safety Assessment for Power Availability IAW EDP-ZZ-01129 based on a set of given conditions. After his review, the candidate will have determined that there are 5 credit points available for Power Availability and the Risk Assessment condition color is Green.
- A8 This is a bank JPM from the 2012 Ft. Calhoun Exam. The candidate will be directed to calculate the total dose for a maintenance job in the Auxiliary Building, with and without temporary shielding installed. The candidate will have to make a recommendation of whether to request temporary shielding for the job or to perform the job without temporary shielding installed. The addition of shielding reduces the total dose for the job; therefore the candidate should recommend that temporary shielding be installed.
- A9 This is a Callaway Bank JPM [SRO-RER-02-A119J (TC)]. The candidate will be given a set of plant conditions and will be required to implement the Radiological Emergency Response Plan (RERP) to classify the event within 15 minutes (Time Critical) and then make the initial notifications to offsite agencies within 15 minutes (Time Critical).

Facility: Callaway		Date of Examination: 3/18/2013	
Exam Level: RO (only) / SRO-I / SRO-U		Operating Test No.: _____	
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
S1	004 Chemical and Volume Control System Borate the Reactor Coolant System for a power change	N, S, A, E	1
S2	010 Reactor Coolant System (BB) Perform System Surveillance – BBHV8000A Stroke Test	D, S, A	3
S3	013 Engineered Safety Features Actuation System (ESFAS) Perform Attachment A of E-0	M, S, A, E, EN, L	2
S4	007 Pressurizer Relief Tank (PRTS) Drain PRT to the Containment Normal Sump	N, S	5
S5	059 Main Feedwater System Transfer 'A' MFP Speed Control / Pump Trip	D, S, A	4S
S6	062 A.C. Electrical Distribution Perform Operational Testing of the Alternate Emergency Power Source	N, S	6
S7	005 Residual Heat Removal System Place in SI Standby Lineup for Power Ascension	D, S, L	4P
S8	029 Containment Purge System Remove the Containment Mini-Purge System From Service	N, S	8
In-Plant Systems [®] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
P1	062 A.C. Electrical Distribution Shift Instrument Bus to Backup Power Supply	D	6
P2	059 Main Feedwater (MFW) System Locally Operate 'C' Main Feedwater Regulating Valve	D	4S
P3	033 Spent Fuel Pool Cooling System Place RWST in Recirculation	M, A, R	8

<p>@ 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.</p>	
* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	4-6 (5) / 4-6 (5) / 2-3 (3) (0) / (0) / (0) ≤ 9 (5) ≤ 8 (5) / ≤ 4 (2) ≥ 1 (2) / ≥ 1 (2) / ≥ 1 (2) - (1) / - (1) / ≥ 1 (1) (control room system) ≥ 1 (2) / ≥ 1 (2) / ≥ 1 (1) ≥ 2 (6) / ≥ 2 (5) / ≥ 1 (3) ≤ 3 (0) / ≤ 3 (0) / ≤ 2 (0) (randomly selected) ≥ 1 (1) / ≥ 1 (1) / ≥ 1 (1) (8) (7) (2)

JPM Summary

- S1 This is a NEW JPM. The operator will be assigned the task of borating the RCS for a plant shutdown due to a S/G tube leak IAW OTO-MA-00008, Rapid Load Reduction. Both normal boration to the VCT and emergency boration will not be successful due to equipment malfunctions. The operator will have to use the RNO option of borating from the RWST, which will be successful (ALTERNATE PATH).
- S2 This is a BANK JPM [URO-SBB05C77J (A)]. The operator will be directed to perform the stroke time test for BBHV8000A, Reactor Coolant System Pressurizer PORV Block Valve, per OSP-BB-V00001, RCS Valve Inservice Test. When the valve is stroked its closing and opening times exceeds the allowable time thus becoming an ALTERNATE PATH JPM in that the acceptance criteria is not met and the valve fails its surveillance with notification provided to the CRS.
- S3 This JPM is MODIFIED from BANK JPM URO-AEO01C184J (A). The operator will be assigned Attachment A of E-0, Reactor Trip or Safety Injection. When verifying equipment status the operator will find multiple failures of equipment that failed to properly actuate on the SI signal. This JPM was modified from the bank JPM in that it includes different equipment that must be manually started (ALTERNATE PATH).
- S4 This is a NEW JPM. The Pressurizer Relief Tank (PRT) has a high level due to valve testing with its associated high level alarm activated. The operator will be required to drain the PRT to the containment normal sump sufficiently to clear the tank high level alarm.
- S5 This is a BANK JPM repeated from the 2007 License Exam. The operator will be directed to transfer MFP control from Auto to Manual on the GE Controller. During the process of completing the transfer the pump will develop bearing problems resulting in high thrust bearing oil temperature. ALTERNATE PATH action will be required by the operator to trip the pump IAW OTA-RK-00026 annunciator response.
- S6 This is a NEW JPM. The operator will be assigned the task of performing an online test of Alternate Emergency Power Source Diesel Generator #4 from the Control Room. The diesel will be started, readings taken and then secured from the Control Room.
- S7 This is a BANK JPM (URO-SEJ2C49J). The simulator will be set up in Low Mode (Mode 4). The operator will be directed to place the Residual Heat Removal (RHR) System, Train A, into the Standby Lineup in preparation for plant heatup.

- S8 This is a NEW JPM. The containment mini-purge system is in service. The operator will be directed to remove the containment mini-purge system from service IAW OTN-GT-00001, Containment Purge System.
- P1 This is a BANK JPM (EOS-SNN30011J). In the Plant, the operator will simulate how to transfer instrument 120 VAC bus NN03 to its backup power supply, transformer XNN05. This JPM was modified to require a transfer from a different instrument 120 VAC bus to a different backup power supply.
- P2 This is a BANK JPM (URO-SAE02P055J). In the Plant, the operator will simulate taking local control of 'C' Main Feedwater Regulating Valve.
- P3 This JPM is MODIFIED from BANK JPM URO-SEC01053J. In the Plant, the operator will simulate placing the Refueling Water Storage Tank (RWST) in recirculation for Chemistry. This will be an ALTERNATE PATH JPM in that several valves will not be in their required position for recirculation and will have to be repositioned by the operator. The bank JPM was not alternate path and did not required any valves to be realigned to complete the task.

Facility: Callaway		Date of Exam: 3/18/2013		Operating Test No.: 2013301		Rev. 1												
A P P L I C A N T	E V E N T T Y P E	Scenarios													T O T A L	M I N I M U M (*)		
		1			2			3			4			R		I	U	
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION							
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P					
SROU-1	RX																	0
	NOR														0			1
	I/C						37 89	23 46 78 9							11			2
	MAJ						5	5							2			1
	TS							23							2			2
SROU-2	RX																	0
	NOR														0			1
	I/C						37 89	23 46 78 9							11			2
	MAJ						5	5							2			1
	TS							23							2			2
SROU-3	RX																	0
	NOR																	1
	I/C						37 89	23 46 78 9							8			2
	MAJ						5	5							2			1
	TS							23							2			2

Instructions:

- Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
- Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
- Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: Callaway		Date of Exam: 3/18/2013		Operating Test No.: 2013301		Rev. 1											
A P P L I C A N T	E V E N T T Y P E	Scenarios												T O T A L	M I N I M U M(*)		
		1			2			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P		R	I	U
SROI-1	RX													*0		1	
	NOR				1				1					2		1	
	I/C				2 3 4 5				2 6					6		4	
	MAJ				6				5					2		2	
	TS				2 4									2		2	
SROI-2	RX													*0		1	
	NOR				1				1					2		1	
	I/C				2 3 4 5				2 6					6		4	
	MAJ				6				5					2		2	
	TS				2 4									2		2	
SROI-3	RX													*0		1	
	NOR				1				1					2		1	
	I/C				2 3 4 5				2 6					6		4	
	MAJ				6				5					2		2	
	TS				2 4									2		2	

Instructions:

- Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
- Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
- Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: Callaway		Date of Exam: 3/18/2013		Operating Test No.: 2013301		Rev. 1												
A P P L I C A N T	E V E N T T Y P E	Scenarios													T O T A L	M I N I M U M (*)		
		1			2			3			4							
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION							
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	R		I	U	
RO-1	RX					1								1	1			
	NOR													*0	1			
	I/C					3 4 7 8				3 7 8 9				8	4			
	MAJ					6				5				2	2			
	TS													0	0			
RO-2	RX					1								1	1			
	NOR													*0	1			
	I/C					3 4 7 8				3 7 8 9				8	4			
	MAJ					6				5				2	2			
	TS													0	0			
RO-3	RX					1								1	1			
	NOR													*0	1			
	I/C					3 4 7 8				3 7 8 9				8	4			
	MAJ					6				5				2	2			
	TS													0	0			
RO-4	RX													*0	1			
	NOR								1					1	1			
	I/C						3 7 8 9		2 6					6	4			
	MAJ						5		5					2	2			
	TS														0			

Instructions:

- Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
- Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
- Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: Callaway		Date of Exam: 3/18/2013		Operating Test No.: 2013301		Rev. 1												
A P P L I C A N T	E V E N T T Y P E	Scenarios																
		1			2			3			4			T O T A L	M I N I M U M (*)			
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION							
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P		R	I	U	
RO-5	RX					1								1	1			
	NOR													*0	1			
	I/C					3 4 7 8				3 7 8 9				8	4			
	MAJ					6				5				2	2			
	TS													0	0			
SPARES	RX																	
	NOR			1								1	1					
	I/C	2 3	2 4 5 8 9	3 5 7								2 3 4	2 4 6	3 4 7				
	MAJ	6	6	6								5	5	5				
	TS	2 5										2 3 4						
<p>Instructions:</p> <p>3. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO <i>additionally</i> serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.</p> <p>4. Reactivity manipulations may be conducted under normal or <i>controlled</i> abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.</p> <p>3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.</p>																		

Tuesday 3/19/12

<u>SRO</u>	<u>ATC</u>	<u>BOP</u>	<u>Scenario #</u>
U1	I1	R1	3
U2	I2	R2	3
U3	I3	R3	3
Surrogate	R4	R5	3

Wednesday 3/20/12

<u>SRO</u>	<u>ATC</u>	<u>BOP</u>	<u>Scenario #</u>
I1	R1	U1	2
I2	R2	U2	2
I3	R3	U3	2
Surrogate	R5	R4	2

Standby scenario used as needed

Appendix D**Scenario Outline****Form ES-D-1**

Facility: Callaway	Scenario No.: 1, Rev 0	Op-Test No.: 2013301
Examiners: _____ Operators: _____		

Initial Conditions: 100% Power, Steady State Conditions		
Turnover: "B" SI Pump is tagged out of service for a breaker inspection. The "B" Emergency Diesel Generator is running fully loaded. After the completion of Shift Turnover, Unload and Shutdown the "B" Emergency Diesel Generator.		

Event No.	Malfunction No.	Event Type*	Event Description
1	N/A	BOP (N)	Unload and shutdown the "B" Diesel Generator
2	BBLT459	SRO (I) RO (I)	Pressurizer Level Transmitter Fails Low / Restore Letdown (Tech Spec)
3	PCD01_Trip	SRO (C) BOP (C)	Main Seal Oil Pump Trips / Emergency Seal Oil Pump fails to start in Automatic
4	PBG04	SRO (C) RO (C)	Normal Charging Pump Trips, must start a Centrifugal Charging Pump
5	EBB01B	SRO (C) RO (R) BOP (C)	Steam Generator "B" Tube Leak (25 gpm) Requiring Rapid Load Reduction (Tech Spec)
6	EBB01B	SRO (M) RO (M) BOP (M)	Steam Generator "B" Tube Rupture (400 gpm) after downpower started which results in a Reactor Trip / Safety Injection (PRA)
7	SAS10XX_2	BOP (C)	Feedwater Isolation Valve Fails to close on Ruptured SG
8	PEM01A_2	RO (C)	Safety Injection Pump "A" fails to Auto Start
9	CPIS BLOCK	RO (C)	Containment Purge Isolation Signal fails to Actuate (Both Trains)

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5-8)	7
2. Malfunctions after EOP entry (1-2)	3
3. Abnormal events (2-4)	4
4. Major transients (1-2)	1
5. EOPs entered/requiring substantive actions (1-2)	1
6. EOP contingencies requiring substantive actions (0-2)	0
7. Critical tasks (2-3)	3

Scenario Event Description
Callaway 2013 NRC Scenario #1

The plant is operating at 100%, steady state power. Diesel Generator NE02 has been running fully loaded for one hour. Following turnover, the crew is directed to unload and secure NE02 in accordance OSP-NE-0001B, Standby Diesel Generator B Periodic Tests. "B" Safety Injection Pump is tagged out of service for a breaker inspection.

After NE02 has been unloaded and secured, Pressurizer Level Channel BB LT-459 fails low, resulting in a loss of letdown. The crew will respond IAW OTO-BG-00001, Pressurizer Level Control Malfunction, select an operable pressurizer level channel and restore letdown to service. Tech Spec 3.3.1 applies.

After Tech Specs have been addressed for BB LT-459, the Main Seal Oil Pump for the Main Generator trips and the Emergency Seal Oil Pump fails to start. The crew will enter OTO-MA-00002, Generator Seal Oil System Malfunction and restore generator seal oil by manually starting the Emergency Seal Oil Pump.

Once seal oil has been restored, the Normal Charging Pump will trip. The crew will re-enter OTO-BG-00001, Pressurizer Level Control Malfunction, and start a Centrifugal Charging Pump (CCP) to restore RCS charging flow.

Once the CCP has been started and pressurizer level is stable a 25 gpm tube leak develops on "B" Steam Generator. The crew should enter OTO-BB-00001, Steam Generator Tube Leak. OTO-BB-00001 will direct the crew to commence a rapid load decrease IAW OTO-MA-00008, Rapid Load Reduction, to have the unit off-line within the next 3 hours.

Once the rapid load reduction has been commenced, Steam Generator "B" tube ruptures and results in a 400 gpm primary to secondary leak. The crew should initiate a manual reactor trip and safety injection due to the loss of primary inventory.

The Main Feedwater Isolation Valve to Steam Generator "B", fails to close on the Feedwater Isolation Signal following the reactor trip and SI and must be manually closed by the crew.

Also post trip, Safety Injection Pump "A" fails to start and the Containment Purge Isolation Signal fails to actuate. The crew will start Safety Injection Pump "A" and actuate a Containment Purge Isolation Signal when completing Attachment A in E-0, Reactor Trip or Safety Injection.

The scenario can be terminated after the crew completes the initial RCS cooldown IAW E-3, Steam Generator Tube Rupture, or at the discretion of the lead evaluator.

Critical Tasks:

Event #7 CT - Close FWIV "B" prior to transitioning from E-0, Reactor Trip or Safety Injection

Event #8 CT - Start Safety Injection Pump "A" prior to completing Attachment A, Automatic Action Verification, in E-0, Reactor Trip or Safety Injection

Event #9 CT - Manually initiate a Containment Purge Isolation Signal (CPIS) prior to completing Attachment A, Automatic Action Verification, in E-0, Reactor Trip or Safety Injection

References
OSP-NE-0001B, Standby Diesel Generator B Periodic Tests
OTO-BG-00001, Pressurizer Level Control Malfunction
OTO-MA-00002, Generator Seal Oil System Malfunction
OTO-BB-00001, Steam Generator Tube Leak
OTO-MA-00008, Rapid Load Reduction
E-0, Reactor Trip or Safety Injection
E-3, Steam Generator Tube Rupture

Facility: Callaway

Scenario No.: 2, rev. 2

Op-Test No.: 2013301

Examiners: _____ Operators: _____

Initial Conditions: 100% Power, with the "A" CCP Out of Service for oil change and pump alignment.

Turnover: Reduce Power to 95% to allow testing of the Main Turbine Control Valves.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	RO (R) SRO (N) BOP (N)	Reduce Power to 95% for Control Valve Testing
2	ACPT0506	SRO (I) BOP (I)	Turbine Impulse Pressure Channel PT-506 Fails Low (Tech Spec)
3	BGLT0149	SRO (I) RO (I)	VCT Level Transmitter BG LT-149 Fails High
4	BB002_A	SRO (C) RO (C) BOP (C)	Small Break LOCA, Crew must determine Leak Rate (Tech Spec)
5	PBB01C_S1TVFL	SRO (C)	RCP "C" Seal Degrades, then Fails completely, requiring Reactor Trip / Trip of RCP "C"
6	BB002_A	SRO (M) RO (M) BOP (M)	Upon Reactor Trip Leak degrades to 5,000 gpm
7	SB SIS_BLOCK	RO (I)	SI Fails to Automatically Actuate in Both Trains, must be manually actuated
8	PBG05B_1	RO (C)	"B" Centrifugal Charging Pump fails to Auto Start on receipt of SI Signal

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5-8)	7
2. Malfunctions after EOP entry (1-2)	2
3. Abnormal events (2-4)	4
4. Major transients (1-2)	1
5. EOPs entered/requiring substantive actions (1-2)	2
6. EOP contingencies requiring substantive actions (0-2)	0
7. Critical tasks (2-3)	3

Scenario Event Description

Callaway 2013 NRC Scenario #2

The plant is operating at 100%, steady state power. Centrifugal Charging Pump (CCP) "A" is tagged out of service for an oil change and pump alignment. The crew is directed to reduce reactor power to 95% to allow testing of the Main Turbine Control Valves.

After power has been reduced to 95%, Turbine Impulse Pressure Channel, AC PT-506 fails low. The crew should respond per OTO-AC-00003, Turbine Impulse Pressure Channel Failure, place rod control in manual and select Turbine Impulse Pressure Channel, AC PT-505, for control. Tech Spec 3.3.1 applies.

After Tech Specs have been addressed for AC PT-506, VCT Level Transmitter BG LT-149 fails high, causing Letdown to Divert to the RHUT. The crew should respond per OTO-BG-00004, VCT Level Channel Failures, and re-position the Divert valve to the VCT position.

After the VCT Level Transmitter Failure, a 30 gpm leak to containment develops. The crew will address the leak using OTO-BB-00003, RCS Excessive Leakage. The crew calculates the leak rate and reviews Tech Specification 3.4.13 for RCS Operational Leakage, requiring the plant to be shutdown in 4 hours.

Once the RCS Leak is addressed, RCP "C" seal #1 degrades, requiring the crew to enter OTO-BB-00002, RCP Off-Normal. Once the crew gets to the point in the procedure where they contact Engineering for additional actions to be taken, RCP "C" seal degrades further, forcing the crew to manually trip the reactor and enter E-0, Reactor Trip or Safety Injection. RCP "C" should be tripped IAW OTO BB-00002 following the trip of the reactor. Since the RCS leak is not large enough to cause a Safety Injection (SI), the crew will transition to ES-0.1, Reactor Trip Response

When cued by the Lead Examiner, the RCS leak increases to 5,000 gpm. Both trains of Safety Injection fail to actuate and the crew must manually initiate Safety Injection. The crew will transition back to E-0 and then to E-1, Loss of Reactor or Secondary Coolant.

CCP "B" fails to automatically start on the Safety Injection signal and will have to be started manually by the operator.

The scenario can be terminated when the crew has commenced a RCS cooldown IAW with ES-1.2, Post LOCA Cooldown and Depressurization, or at the discretion of the lead evaluator.

Critical Tasks:

Event #7 CT - Trip all RCPs such that the core does not uncover (RVLIS<55%) AND prior to commencing an operator controlled cooldown

Event #8 CT - Manually actuate Safety Injection prior to a transition from E-0, Reactor Trip or Safety Injection

Event #9 CT - Establish flow from at least one Centrifugal Charging Pump before transitioning from E-0, Reactor Trip or Safety Injection

References
OTG-ZZ-00004, Addendum 3, Planned Power Changes From Full Power
OTO-AC-00003, Turbine Impulse Pressure Channel Failure
OTO-BG-00004, VCT Level Channel Failures
OTO-BB-00003, RCS Excessive Leakage
OTO-BB-00002, RCP Off-Normal
E-0, Reactor Trip or Safety Injection
ES-0.1, Reactor Trip Response
E-1, Loss of Reactor or Secondary Coolant
ES-1.2, Post LOCA Cooldown and Depressurization

Facility: Callaway	Scenario No.: 3, Rev 2	Op-Test No.: 2013301
Examiners: _____ Operators: _____ _____ _____		
Initial Conditions: 80% Power, Steady State Conditions		
Turnover: The "B" Motor Driven Auxiliary Feedwater Pump is out of service for scheduled maintenance and will not be returned to service until next shift. The NCP is vibrating excessively, so after the completion of Shift Turnover, shift to the "A" CCP		

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	RO (N)	Swap Charging Pumps (High Vibration on NCP)
2	BBTE0411 A1	SRO (I) RO (I)	RTD Fails High (Tech Spec)
3	AEFC0530_1	SRO (C) BOP (C)	MFW Reg Valve (FRV) "C" Fails Closed – Manual Control Available
4	BNLT0932	SRO (I)	Refueling Water Storage Tank (RWST) Level Channel Fails Low (Tech Spec)
5	PB03	SRO (M) RO (M) BOP (M)	Loss of Power Supply PB03 / Reactor Trip
6	PBG05A	SRO (C) RO (C)	Running CCP Trips ("A") / Non Running CCP ("B") must be manually started
7	SA036D_MDAFAS SA036E_MDAFAS	SRO (I) BOP (I)	Auxiliary Feedwater Actuation Signal (AFAS) fails to actuate on both trains
8	PAL02_1	SRO (C) BOP (C)	Turbine Driven Auxiliary Feedwater Pump trips 60 seconds following the Reactor Trip (Loss of Secondary Heat Sink)
9	ALV0043	SRO (C) BOP (C)	"A" Motor Driven Auxiliary Feedwater Pump Discharge Flow Degraded. Discharge Valve cannot be opened (Loss of Secondary Heat Sink)

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5-8)	8
2. Malfunctions after EOP entry (1-2)	4
3. Abnormal events (2-4)	2
4. Major transients (1-2)	1
5. EOPs entered/requiring substantive actions (1-2)	1
6. EOP contingencies requiring substantive actions (0-2)	1
7. Critical tasks (2-3)	3

Scenario Event Description
Callaway 2013 NRC Scenario #3

The plant is operating at 80%, steady state power. Motor Driven Auxiliary Feedwater (MDAFW) Pump "B" is out of service for scheduled maintenance and will not be returned to service until next shift. The crew is directed to shift charging to Centrifugal Charging Pump (CCP) "A" after shift turnover due to excessive vibration reported on the Normal Charging Pump (NCP).

After the NCP is secured and pressurizer level has been stabilized, the Loop 1 Hot Leg RTD will fail high causing the control rods to drive in. The Reactor Operator will take manual control of the control rods and respond in accordance with OTO-BB-00004, RCS RTD Channel Failures. Tech Spec 3.3.1 applies.

After Tech Specs have been addressed for the RTD, MFW Reg Valve (FRV) "C" fails closed. This causes a feedwater flow reduction and a lowering SG level. The crew should respond per OTO-AE-00001, Feedwater System Malfunction, and take manual control of the failed valve to prevent a reactor trip.

After Steam Generator "C" level has been stabilized, a Refueling Water Storage Tank (RWST) level channel fails low. The crew will respond IAW OTO-BN-00001, RWST Level Channel Malfunction, and refer to Tech Specs.

After Tech Specs have been reviewed for the RWST level channel a loss of Bus PB03 occurs. This results in a loss Heater Drain Pump "A" and Condensate Pumps "A" and "C". The crew should respond by manually tripping the reactor and entering E-0, Reactor Trip or Safety Injection. If the reactor is not tripped manually, it will trip automatically on SG low level.

When the reactor trips, CCP "A" will trip. CCP "B" will have to be manually started to provide RCS charging and seal injection to the Reactor Coolant Pumps. This could be on prudent operation action or from direction in ES-0.1, Reactor Trip Response, or from FR-H.1, Response to Loss of Secondary Heat Sink.

The Auxiliary Feedwater Actuation Signal-Motor Driven (AFAS-MD) fails to actuate on both trains from the SG low level. The crew should respond to the failed AFAS-MD signal by starting MDAFW Pump "A" ("B" pump is OOS for maintenance). The manual discharge valve for MDAFW Pump "A" is failed at 10% open and cannot be opened locally.

The Auxiliary Feedwater Actuation Signal Turbine Driven (AFAS-TD) will actuate, however, the Turbine Driven Aux Feedwater Pump will trip 3 minutes after the reactor trip.

Due to the status of the AFW system, the crew should transition to FR-H.1. The crew should use EOP Addendum 38, Non Safety Auxiliary Feedwater Pump, as directed in FR-H.1, to restore Aux Feedwater flow.

The scenario can be terminated once the crew restores Aux Feedwater flow IAW EOP Addendum 38 or at the discretion of the lead evaluator.

Critical Tasks:

Event #3 CT - Take manual control of FRV "C" prior to a reactor trip occurring on low steam generator water level

Event #5 CT - Manually start CCP "B" prior to initiating a RCS bleed and feed due to having no CCPs in service

Event #8 CT - Manually start the Non Safety Auxiliary Feedwater Pump IAW FR-H.1, Response to Loss of Secondary Heat Sink, prior to initiating a RCS bleed and feed due to Steam Generator low level

References
OTN-BG-00001, Addendum 1, Shifting From The NCP to One Of The CCPs
OTO-BB-00004, RCS RTD Channel Failures
OTO-AE-000001, Feedwater System Malfunction
OTO-BN-00001, RWST Level Channel Malfunction
E-0, Reactor Trip or Safety Injection
ES-0.1, Reactor Trip Response
FR-H.1, Response To Loss Of Secondary Heat Sink
EOP Addendum 38, Non Safety Auxiliary Feedwater Pump

Facility: Callaway	Scenario No.: 4, Rev 3	Op-Test No.: 2013301	
Examiners: _____ Operators: _____ _____ _____			
<p>Initial Conditions: A Reactor Startup has just been completed with Reactor power just above the Point of Adding Heat (POAH). "A" Train CCW in Service.</p> <p>Turnover: The plant is in Mode 2. Reactor Startup has just been completed on the previous shift. Conditions are being held steady while the on-coming crew is performing Just In Time Training for the power increase. There are severe weather warnings in the surrounding area.</p>			
Event	Malf. No.	Event Type*	Event Description
1	N/A	RO (N) SRO (N)	Swap CCW Trains from "A" to "B" Train
2	BBPT0455	SRO (I) RO (I)	Pressurizer pressure fails high (Tech Spec)
3	ABPV0002A	BOP (C) SRO (C)	Atmospheric Steam Dump Failure on "B" SG (Tech Spec)
4	XMR01_1 PEF01B_1	SRO (C) BOP (C) RO (C)	Loss of ESF transformer XNB02 causing a Loss of NB02/ EDG "B" starts, ESW Pump "B" trips (Tech Spec)
5	MD	SRO (M) RO (M) BOP (M)	Loss of Offsite Power, Manual Reactor Trip, "A" EDG fails to start Automatically, Loss of All AC Power
6	BBPCV0455A	RO (C) SRO (C)	Pressurizer PORV Fails Partially Open
7	PEF01A_2	SRO (C) BOP (C)	ESW Pump "A" Auto Start Failure
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5-8)	8
2. Malfunctions after EOP entry (1-2)	2
3. Abnormal events (2-4)	3
4. Major transients (1-2)	1
5. EOPs entered/requiring substantive actions (1-2)	1
6. EOP contingencies requiring substantive actions (0-2)	1
7. Critical tasks (2-3)	3

Scenario Event Description
Callaway 2013 NRC Scenario #4

The plant is in Mode 2. Reactor Startup has just been completed on the previous shift. Conditions are being held steady while the on-coming crew is performing Just In Time Training prior to the startup. There are severe weather warnings in the surrounding area.

The crew starts the scenario by having the ATC Operator shift CCW trains from the "A" to the "B" Train due to normal equipment rotation.

Once the Pumps have been shifted, Pressurizer Pressure Channel, PT-455 fails high. The RO and CRS should respond IAW OTO-BB-00006, Pressurizer Pressure Control Malfunction, and selects away from the failed channel prior to the reactor tripping on low pressurizer pressure. T.S. 3.3.1, 3.3.2, and 3.3.4 apply.

Once Tech Specs are addressed, SG "B" Atmospheric Steam Dump fails Open. The BOP Operator and CRS should respond per OTO-AB-00001, Steam Dump Malfunction, close the failed valve and initiate action to make repairs. T.S. 3.7.4 applies.

A fault on the ESF Transformer XNB02 occurs, resulting in a loss of power to Bus NB02. "B" EDG starts, but Essential Service Water Pump "B" trips, forcing the crew to trip the affected Diesel and enter OTO-NB-00002, Loss of Power to NB02. T.S. 3.8.1 applies. The crew will also have to shift back to "A" Train CCW and stop Aux Feed Flow to the Steam Generators from the Turbine Driven Aux Feed Pump.

Due to the severe weather, a fault at the Montgomery substation results in a Loss of Offsite power. The reactor does not automatically trip (RCP loss) since power is below the P-7 setpoint. However, it should be manually tripped when it is realized that the Rod Drive MG sets are deenergized. The crew may enter E-0, Reactor Trip or Safety Injection, initially.

Once the Reactor is tripped, the crew sees that the "A" EDG has not started and will not start causing a loss of power to NB01. Since there is no power to NB01 or NB02, the crew will transition to ECA-0.0, Loss of All AC Power.

Once the transition is made to ECA-0.0, PZR PORV BB PCV-455 fails partially open. The crew should close the failed PORV in step 3. When the crew gets to step 5 of ECA-0.0, they will attempt to start the "A" Emergency Diesel Generator and it will start, however the "A" ESW fails to start automatically, but should be started manually. The crew will return to E-0 and perform appropriate actions. Once the crew has completed applicable portions of E-0 and transitioned to ES-0.1, Reactor Trip Response, or as determined by the Lead examiner, the Scenario can be stopped.

Critical Tasks:

Event #2 CT – Select away from the failed Pressurizer Pressure Channel prior to Reactor tripping on low pressurizer pressure.

Event #7 CT - Manually close the PORV before receiving a Safety Injection.

Event #8 CT - Manually start ESW Pump A before Emergency Diesel Generator NE01 trips on high temperature.

References
OTG-ZZ-00002, Reactor Startup
OTN-EG-00001, Component Cooling Water System
OTO-BB-00006, Pressurizer Pressure Control Malfunction
OTO-AB-00001, Steam Dump Malfunction
OTO-NB-00002, Loss of Power to NB02
E-0, Reactor Trip or Safety Injection
ECA-0.0, Loss of All AC Power