

Facility: Fort Calhoun Station		Date of Exam: 16 April 2012																
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			2	3	N/A			4	18	3	3	6	
	2	1	1	2	N/A			2	1	N/A			2	9	2	2	4	
	Tier Totals	4	4	5	N/A			4	4	N/A			6	27	5	5	10	
2. Plant Systems	1	4	3	3	3	1	2	2	3	3	2	2	28	2	3	5		
	2	0	0	0	1	2	1	2	1	1	2	0	10	1	1	3		
	Tier Totals	4	3	3	4	3	3	4	4	4	4	2	38	4	4	8		
3. Generic Knowledge and Abilities Categories				1		2		3		4		10		1	2	3	4	7
				3		2		2		3				2	2	1	2	

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

000038 Steam Gen. Tube Rupture / 3			X			Knowledge of the reasons for the following responses as they apply to the SGTR: EK3.06 Actions contained in EOP for RCS water inventory balance, S/G tube rupture, and plant shutdown procedures (CFR: 41.5, 41.10, 45.6, 45.13)	4.2	44
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4					X	2.1.28 Knowledge of the purpose and function of major system components and controls (CFR: 41.7)	4.1	50
000054 (CE/E06) Loss of Main Feedwater / 4			X			Knowledge of the reasons for the following responses as they apply to the Loss of Feedwater: EK3.4 RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated. (CFR: 41.5, 41.10, 45.6, 45.13)	3.2	53
000055 Station Blackout / 6			X			Knowledge of the reasons for the following responses as they apply to the SBO: EK3.02 Actions contained in EOP for loss of offsite and onsite power (CFR: 41.5, 41.10, 45.6, 45.13)	4.3	39
000056 Loss of Off-site Power / 6					X	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: AA2.54 Breaker position (remote and local) (CFR: 43.5, 45.13)	2.9	48
000057 Loss of Vital AC Inst. Bus / 6					X	2.2.37 Ability to determine operability and/or availability of safety related equipment. (CFR: 41.7, 43.5, 45.12)	3.6	49
000058 Loss of DC Power / 6					X	Ability to operate and / or monitor the following as they apply to the Loss of DC Power: AA1.01 Cross-tie of the affected dc bus with the alternate supply (CFR: 41.7, 45.5, 45.6)	3.4*	55
000062 Loss of Nuclear Svc Water / 4								
000065 Loss of Instrument Air / 8					X	Ability to determine and interpret the following as they apply to the Loss of Instrument Air: AA2.07 Whether backup nitrogen supply is controlling valve position. (CFR: 43.5, 45.13)	2.8*	45
W/E04 LOCA Outside Containment / 3								
W/E11 Loss of Emergency Coolant Recirc. / 4								
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4								

000077 Generator Voltage and Electric Grid Disturbances / 6	X							Knowledge of the operational implications of the following concepts as they apply to Generator Voltage and Electric Grid Disturbances: AK1.03 Under-excitation (CFR: 41.4, 41.5, 41.7, 41.10, 45.8)	3.3	56
K/A Category Totals:	3	3	3	2	3	4		Group Point Total:		18/6

000076 High Reactor Coolant Activity / 9			X					Knowledge of the reasons for the following responses as they apply to the High Reactor Coolant Activity: AK3.05 Corrective actions as a result of high fission-product radioactivity level in the RCS. (CFR: 41.5, 41.10, 45.6, 45.13)	2.9	60
W/E01 & E02 Rediagnosis & SI Termination / 3										
W/E13 Steam Generator Over-pressure / 4										
W/E15 Containment Flooding / 5										
W/E16 High Containment Radiation / 9										
BW/A01 Plant Runback / 1										
BW/A02&A03 Loss of NNI-X/Y / 7										
BW/A04 Turbine Trip / 4										
BW/A05 Emergency Diesel Actuation / 6										
BW/A07 Flooding / 8										
BW/E03 Inadequate Subcooling Margin / 4										
BW/E08; W/E03 LOCA Cooldown - Depress. / 4										
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4										
BW/E13&E14 EOP Rules and Enclosures										
CE/A11; W/E08 RCS Overcooling - PTS / 4				X				Ability to operate and / or monitor the following as they apply to the (RCS Overcooling) AA1.2 Operating behavior characteristics of the facility. (CFR: 41.7, 45.5, 45.6)	3.2	65
CE/A16 Excess RCS Leakage / 2				X				Ability to operate and / or monitor the following as they apply to the (Excess RCS Leakage) AA1.1 Components and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features. (CFR: 41.7, 45.5, 45.6)	3.4	59
CE/E09 Functional Recovery		X						Knowledge of the interrelations between the (Functional Recovery) and the following: EK2.2 Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility. (CFR 41.5, 41.10, 45.6, 45.13)	3.7	62
K/A Category Point Totals:	2	1	2	2	0	2		Group Point Total:		9/4

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / 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				X	X							<p>Knowledge of RCPS design feature(s) and/or interlocks(s) which provide for the following:</p> <p>K4.04 Adequate cooling of RCP motor and seals. (CFR: 41.7)</p>	2.8	1
												<p>Knowledge of the operational implications of the following concepts as they apply to the RCPS:</p> <p>K5.01 The relationship between the RCPS flow rate and the nuclear reactor core operating parameters (quadrant power tilt, imbalance, DNB rate, local power density, difference in loop T-hot pressure) (CFR: 41.5, 45.7)</p>	3.3	20
004 Chemical and Volume Control								X				<p>Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:</p> <p>A2.15 High or low PZR level (CFR: 41.5, 43.5, 45.3, 45.5)</p>	3.5	2
005 Residual Heat Removal		X	X									<p>Knowledge of the bus power supplies to the following:</p> <p>K2.03 RCS pressure boundary motor-operated valves. (CFR: 41.7)</p>	2.7*	5
												<p>Knowledge of the effect that a loss or malfunction of the RHRS will have on the following:</p> <p>K3.01 RCS (CFR: 41.7, 45.6)</p>	3.9	9
006 Emergency Core Cooling						X						<p>Knowledge of the effect of a loss or malfunction the following will have on the ECCS:</p> <p>K6.03 Safety Injection Pumps (CFR: 41.7, 45.7)</p>	3.6	24

007 Pressurizer Relief/Quench Tank				X															Knowledge of PRTS design feature(s) and/or interlock(s) which provide for the following: K4.01 Quench tank cooling (CFR: 41.7)	2.6	13	
008 Component Cooling Water			X							X									Knowledge of the effect that a loss or malfunction of the CCWS will have on the following: K3.01 Loads cooled by CCWS. (No CFR listed for this K3) Ability to monitor automatic operation of the CCWS, including: A3.04 Requirements on and for the CCWS for different conditions of the power plant. (CFR: 41.7, 45.5)	3.4	4	
010 Pressurizer Pressure Control	X																		Knowledge of the physical connections and/or cause-effect relationships between the PZR PCS and the following systems: K1.01 RPS (CFR: 41.2 to 41.9, 45.7, 45.8)	3.9	6	
012 Reactor Protection										X									Ability to monitor automatic operation of the RPS, including: A3.03 Power supply (CFR: 41.7, 45.5)	3.4	18	
013 Engineered Safety Features Actuation									X										Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ESFAS controls including: A1.07 Containment radiation (CFR: 41.5, 45.5)	3.6	12	
022 Containment Cooling																			Ability to manually operate and/or monitor in the control room: A4.01 CCS fans (CFR: 41.7, 45.5 to 45.8)	3.6	27	
025 Ice Condenser																						
026 Containment Spray										X									Ability to (a) predict the impacts of the following malfunctions or operations on the CSS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: A2.08 Safe securing of containment spray (when it can be done) (CFR: 41.5, 43.5, 45.3, 45.13)	3.2	19	

039 Main and Reheat Steam									X			Ability to monitor automatic operation of the MRSS, including: A3.02 Isolation of the MRSS (CFR: 41.5, 45.5)	3.1	3
059 Main Feedwater								X				Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MFW controls including: A1.03 Power level restrictions for operation of MFW pumps and valves. (CFR: 41.5, 45.5)	2.7*	7
061 Auxiliary/Emergency Feedwater								X				Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: K6.01 Controllers and positioners (CFR: 41.7, 45.7)	2.5	17
062 AC Electrical Distribution		X							X			Knowledge of bus power supplies to the following: K2.01 Major system loads (CFR: 41.7) Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedure to correct, control, or mitigate the consequences of those malfunctions or operations: A2.05 Methods for energizing a dead bus (CFR: 41.5, 43.5, 45.3, 45.13)	3.3 2.9	11 26
063 DC Electrical Distribution	X									X		Knowledge of the physical connections and/or cause-effect relationships between the DC electrical system and the following systems: K1.02 AC electrical system (CFR: 41.2 to 41.9, 45.7, 45.8) Ability to manually operate and/or monitor in the control room: A4.03 Battery discharge rate (CFR: 41.7, 45.5 to 45.8)	2.7 3.0*	14 28
064 Emergency Diesel Generator	X											Knowledge of the physical connections and/or cause-effect relationships between the ED/G system and the following systems: K1.03 Diesel fuel oil supply system (CFR: 41.2 to 41.9, 45.7, 45.8)	3.6	8

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										
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4										
000077 Generator Voltage and Electric Grid Disturbances / 6										
K/A Category Totals:					3	3	Group Point Total:			18/6

BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4					X		Ability to determine and interpret the following as they apply to the (Natural Circulation Operations) AA2.2 Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments. (CFR: 43.5, 45.13)	3.8	
BW/E13&E14 EOP Rules and Enclosures									
CE/A11; W/E08 RCS Overcooling - PTS / 4									
CE/A16 Excess RCS Leakage / 2					X		Ability to determine and interpret the following as they apply to the (Excess RCS Leakage) AA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations. (CFR: 43.5, 45.13)	3.5	
CE/E09 Functional Recovery									
K/A Category Point Totals:					2	2	Group Point Total:		9/4

Facility:		Date of Exam:				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.4	Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license status, 10CFR55, etc. (CFR: 41.10, 43.2)	3.3			
	2.1.15	Knowledge of administrative requirements for temporary management directives, such as standing orders, night orders, Operations memos, etc. (CFR: 41.10, 45.12)	2.7			
	2.1.32	Ability to explain and apply system limits and precautions (CFR: 41.10, 43.2, 45.12)	3.8			
	2.1.35	Knowledge of the fuel-handling responsibilities of SROs. (CFR: 41.10, 43.7)			3.9	
	2.1.37	Knowledge of procedures, guidelines, or limitations associated with reactivity management. (CFR: 41.1, 43.6, 45.6)			4.6	
	2.1.					
	Subtotal				3	
2. Equipment Control	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels. (CFR: 41.6, 41.7, 45.2)	4.6			
	2.2.20	Knowledge of the process for managing troubleshooting activities. (CFR: 41.10, 43.5, 45.13)	2.6			
	2.2.21	Knowledge of pre- and post-maintenance operability requirements. (CFR: 41.10, 43.2)			4.2	
	2.2.38	Knowledge of conditions and limitations in the facility license. (CFR: 41.7, 41.10, 43.1, 45.13)			4.5	
	2.2.					
	2.2.					
	Subtotal				2	
	2.3.					

3. Radiation Control	2.3.11	Ability to control radiation releases. (CFR: 41.11, 43.4, 45.10)	3.8			
	2.3.13	Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.4			
	2.3.14	Knowledge of radiation or contamination hazards that arise during normal, abnormal, or emergency conditions or activities (43.4)			3.8	
	2.3.					
	2.3.					
	Subtotal				2	
4. Emergency Procedures / Plan	2.4.32	Knowledge of operator response to loss of all annunciators. (CFR: 41.10, 43.5, 45.13)	3.6			
	2.4.37	Knowledge of the lines of authority during implementation of the emergency plan. (CFR: 41.10, 45.13)	3.0			
	2.4.42	Knowledge of emergency response facilities. (CFR: 41.10, 45.11)	2.6			
	2.4.8	Knowledge of how abnormal operating procedures are used in conjunction with EOPs. (CFR: 41.10, 43.5, 45.13)			4.5	
	2.4.28	Knowledge of procedures relating to a security event (non-safeguards information). (CFR: 41.10, 43.5, 45.13)			4.1	
	2.4.					
	Subtotal				3	
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/1	APE 022 AK2.01-2.06	No importance rating \geq 2.5. Randomly replaced with AA1.01.
1/1	APE 27 AK2.01, AK2.02, AK2.04, AK2.05	Importance rating not \geq 2.5. Randomly replaced with AK2.03.
1/1	EPE 38 EK2.01-2.07	Importance rating not \geq 2.5. Randomly replaced with EK 3.07.
1/1	EPE 38 EK3.07	FCS does not have loop isolation valves. Randomly replaced with EK 3.04.
1/2	APE 28 AK3.04	At FCS, Program Tave not constant with power change. Randomly replaced with AK 3.05.
2/1	003 K4.05	Importance rating not \geq 2.5. Randomly replaced with K 4.04.
2/1	003 A2.02	Resample to obtain required (by NUREG-1021) sample of category K5. Replaced with K 5.04.
2/1	006 K6.04 K6.16	Importance rating not \geq 2.5. Randomly replaced with K 6.03.
2/1	007 K4.02 K4.03	Importance rating not \geq 2.5. Randomly replaced with K 4.01.
2/1	022 K6.01 – K6.08	Importance rating not \geq 2.5. Replaced with A 4.05 to help maintain even distribution between categories.
2/1	026 A2.06	Importance rating not \geq 2.5. Randomly replaced with A 2.05.
2/1	026 A2.01 A2.05	At FCS, reflux boiling pressure spike when first going on recirculation is not an expected plant response (A2.01). Also, FCS does not have chemical addition tanks (A2.05). Randomly replaced with A 2.04.
2/1	059 K5	No importance rating \geq 2.5. Randomly replaced with A 1.07.
2/1	059 A1.07	FCS does not have a turbine driven MFW pump. Randomly replaced with A 1.03.
2/1	062 A1.02 A1.05	Importance rating not \geq 2.5. Randomly replaced with A 1.01.
2/1	063 K1.04	Importance rating not \geq 2.5. Randomly replaced with K 1.02.
2/1	073 K4.02	FCS does not have automatic letdown isolation on high RCS activity. Randomly replaced with K 4.01.
2/2	014 A4	Resample to obtain required (by NUREG-1021) sample of category K5. Replaced with K 5.01.
2/2	014 K5.01 K5.02	Not part of FCS design. No other K5 has importance rating \geq 2.5. Replaced with A 4.02.

2/2	027	K2.01	FCS does not have this system. Randomly reselected Steam Generator system, K 5.03 to replace.
2/2	034	K5	Importance rating not ≥ 2.5 . Randomly replaced with A 3.03.
2/2	034	A3.03	FCS does not have a high flux at shutdown alarm. Replaced with A 3.02.
2/2	075	K5	Importance rating not ≥ 2.5 . Randomly replaced with K3.07.
2/2	075	K3.07	At FCS, no connection between circulating water system and ESFAS. No other K3 has importance rating ≥ 2.5 , so randomly replaced with K 4.01.
2/1	004	A2.09	Cannot write a discriminating question using RO knowledge for this K/A (uses GFE knowledge). Randomly replaced with A2.15
2/1	103	2.4.41	Cannot write a question using RO knowledge for this K/A (tests SRO-only knowledge). Randomly replaced with generic K/A 2.1.20
2/2	001	K5.20	Cannot write a question using RO knowledge for this K/A (tests GFE knowledge). Replaced with K5.28
1/1	EPE38	EK3.04	Resampled for better distribution. Too many questions on PRM's. Replaced with EK3.02
2/1	003	K5.04	Cannot write a question using RO knowledge for this K/A (tests GFE knowledge). Replaced with K5.01
2/1	008	A3.06	Cannot write a discriminating question using RO knowledge. Replaced with A3.04
2/1	103	K3.03	Cannot write a question using RO knowledge (SRO-only level). Replaced with K3.02
2/2	029	K1.03	Resampled for better question distribution. Too many containment questions. Replaced with 001 K5.20
2/2	001	K5.20	Cannot write discriminating question using RO knowledge. Replaced with K5.28
2/2	068	A2.04	Resampled for better question distribution. Too many liquid radwaste questions. Replaced with 002 K6.03
2/2	041	A4.07	FCS does not remote gag stuck open relief valves. Replaced with A4.08
2/2	086	A1.04	Cannot write discriminating RO question. Replaced with A1.01
1/1	038	EK3.02	Cannot write discriminating RO question. Resample to EK3.06.
1/2	00040	2.2.42	Cannot write RO knowledge question. Replaced with 2.1.28
1/2	000057	2.2.40	Cannot write RO knowledge question, SRO-only knowledge. Replaced with 2.2.37.
1/2	000069	AK1.01	Already had a question on pressure vs. leak rate. Resampled to obtain better K/A distribution and issue distribution (already questioned containment integrity). Replaced with 000068 AA2.06.
3	2.3.7		This K/A is being tested as an administrative JPM. Randomly replaced with 2.3.13.

2/2	0410000 A4.08	This system underwent major revisions during the outage, but post modification cannot be completed until plant restarts, and procedures are still in draft. Therefore, cannot write a question based on this as the modification is still outstanding, and resampled to 072000 Area Radiation Monitoring A4.01.
1/2	000076 AK3.05	This K/A was rejected due to concerns about the quality of the procedure associated with the K/A
1/1	0065 A2.07	This KA was rejected because this topic was already used on another question (ie handjacking of raw water valves). Reselected A2.08 in its place.
2/1	0007 K4.01	This KA was rejected because this topic was already used on another question (Q22). Reselected A1.02 in its place.
3	2.2.20	This KA was rejected because it was too difficult to write RO knowledge question on troubleshooting activities. Reselected 2.2.13 for Knowledge of tagging and clearance procedures.
Tier / Group SRO only	Randomly Selected K/A SRO only	Reason for Rejection (SRO only)
1 / 1		Q76 change 000008 Pressurizer Vapor Space Accident / 3 KaA2.05 rejected since not capable of writing SRO only question from this selection. Reselected new topic and K/A, 000009 Small Break LOCA - EA2.36
1 / 1		Q77 change 000015/17 RCP Malfunctions - AA2.08 rejected since not capable of writing SRO only question from this selection. Reselected new topic and K/A, CE/E05 Steam Line Rupture - Excessive Heat Transfer EA2.1
1 / 1		Q78 change 000022 Loss of RCS makeup –G2.4.21, changed topic and kept K/A since not capable of writing SRO only question from this selection. Reselected new topic, 0025 Loss of RHR
1 / 1		Q79 change 000029 ATWS EA2.05 rejected since not capable of writing SRO only question from this selection. Reselected new topic and K/A, 0038 SGTR, EA2.14
1 / 1		Q 81 change 000077 Generator Voltage and Electric Grid Disturbances / 6, K/A G2.4.46 , rejected since not capable of writing SRO only question from this selection. Reselected new topic and K/A, 000055 Station Blackout / 6 K/A 2.4.8
1 / 2		Q 82 change 000028 Pressurizer Level malfunction, K/A G2.4.9 , rejected since not capable of writing SRO only question from this selection. Reselected new topic and K/A, 000003 Dropped Rod, K/A 2.2.37

1 / 2		Q 83 change 000068 Control Room Evac, K/A A2.09, rejected since not capable of writing SRO only question from this selection. Reselected new topic and K/A, 000069 Containment Integrity, K/A 2.2.40
2 / 1		Q 86 change 006 Emergency Core Cooling, K/A 2.4.34 changed K/A to 2.2.5 in order to balance CFR distribution. There were no CFR 43.3 topics selected for plant mods.
2 / 1		Q 89 change 022.A2.04 topic used on last exam as a JPM. Resampled and used 008.A2.03 (CCW hi/low Temperature)
2 / 1		Q 90 change 064 EDG, K/A A2.19 changed K/A to G2.2.21 in order to balance CFR distribution. There were no CFR 43.2 topics
2 / 2		Q 92 change 045 Main TG, K/AG2.1.27 rejected since not capable of writing SRO only question from this selection. Reselected new topic and K/A, 00027 Containment iodine Removal, K/A G 2.4.6 Knowledge of EOP mitigation strategies.
3		Q98 change G2.3.5 K/A not SRO only topic, changed to G2.3.14.
3		Q 96 change G2.2.21 K/A already sampled for SRO in question 90. Changed to G2.2.22
3		Q 97 change G2.2.38 K/A not discriminating for SRO only question. Changed to G2.2.12
1/1		Q 80 K/A 2.2.22 N/A for 000054 Loss of Main Feedwater. Changed to 000056 Loss of Off-site Power (same K/A)

Facility: <u>Fort Calhoun Station</u> Examination Level: RO		Date of Examination: April 16, 2012 Operating Test Number: 2012-01
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
RA1: Conduct of Operations	N, R	Create a 1/M plot to estimate when criticality will be reached. (Per OP-2A, Attachment 2, 2A) K/A 2.1.23 Ability to perform specific and integrated plant procedures during all modes of plant operation (CFR: 41.10, 45.2, 45.6) RO IR: 4.3
RA2: Conduct of Operations	N, R	Quadrant Power Tilt Calculation with Excore detectors operable and ERF inoperable per OI-NI-1 K/A 2.1.20 Ability to interpret and execute procedure steps (CFR: 41.10, 45.12) RO IR: 4.6
RA3: Equipment Control	N, R	Determine tagout/clearance requirements to remove a HPSI pump from service. K/A 2.2.13 Knowledge of tagging and clearance procedures (CFR: 41.10, 45.13) RO IR: 4.1
RA4: Radiation Control	N, R	Perform a stay time calculation. K/A 2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions (CFR: 41.14, 45.10) RO IR: 3.5
Emergency Procedures/Plan		N/A
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.		
* Type Codes & Criteria: (C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) (N)ew or (M)odified from bank (≥ 1) (P)revious 2 exams (≤ 1 ; randomly selected)		

Facility: <u>Fort Calhoun Station</u> Examination Level: SRO		Date of Examination: April 16, 2012 Operating Test Number: 2012-01
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
SA1: Conduct of Operations	N, R	Perform a spent fuel pool demineralized water makeup calculation per OI-SFP-2 Appendix 1. K/A 2.1.37 Knowledge of procedures, guidelines, or limitations associated with reactivity management. (CFR: 43.6, 45.6) SRO IR: 4.6
SA2: Conduct of Operations (same as RA2)	N, R	Quadrant Power Tilt Calculation with Excore detectors operable and ERF inoperable per OI-NI-1 K/A 2.1.20 Ability to interpret and execute procedure steps (CFR: 43.5, 45.12) SRO IR: 4.6
SA3: Equipment Control	N, R	Review a tagging/clearance for removal of a HPSI pump from service. K/A 2.2.13 Knowledge of tagging and clearance procedures (CFR: 45.13) SRO IR: 4.3
SA4: Radiation Control	N, R	Determine whether to install shielding based on given dose rates and work times. K/A 2.3.12 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. (CFR: 45.9, 45.10) SRO IR: 3.7
SA5: Emergency Procedures/Plan	N, R	Determine Emergency Action Level for a given emergency. K/A 2.4.38 Ability to take actions called for in the facility emergency plan, including supporting or acting as emergency coordinator if required. (CFR: 43.5, 45.11) SRO IR: 4.4
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.		

* Type Codes & Criteria:

(C)ontrol room, (S)imulator, or Class(R)oom

(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)

(N)ew or (M)odified from bank (≥ 1)

(P)revious 2 exams (≤ 1 ; randomly selected)

Facility: <u>Fort Calhoun Station</u>		Date of Examination: April 16, 2012
Exam Level: RO		Operating Test No.: 2012-01
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
S-1: Swap pressurizer pressure mode from manual to automatic, followed by spurious actuation of PORV (block valve not operable)	N, A, S	3
S-2: Engineered Safeguards Actuation Verification	N, EN, A, S	2
S-3: Place a containment cooling unit in service	D, S	5
S-4: Place shutdown cooling in service.	N, L, S	4P
S-5: Maintain S/G water levels during startup using AFW.	N, A, L, S	4S
S-6: Valve stroke time testing of CCW valves HCV-401C/D	N, S	8
S-7: Dilute to achieve desired boron concentration for desired critical rod height (dilution continues until stopped)	N, A, L, S	1
S-8: Transfer 4160V loads onto 345kV bus per AOP-32	N, S	6
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
P-1: Respond to a steam bound AFW pump	D, E	4S
P-2: Rack in GE Automatic 480V breaker	N	6
P-3: Waste Gas Transfer from the Vent Header to the Gas Decay Tank	D, A, R	9
<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	4-6 / 4-6 / 2-3	
(C)ontrol room		
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4	
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	
(EN)gineered safety feature	- / - / ≥ 1 (control room system)	
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1	
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1	
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	
(R)CA	≥ 1 / ≥ 1 / ≥ 1	
(S)imulator		

Facility: <u>Fort Calhoun Station</u>		Date of Examination: April 16, 2012
Exam Level: SRO-I		Operating Test No.: 2012-01
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
S-1: Swap pressurizer pressure mode from manual to automatic, followed by spurious actuation of PORV (block valve not operable)	N, A, S	3
S-2: Engineered Safeguards Actuation Verification	N, EN, A, S	2
S-3: Place a containment cooling unit in service	D, S	5
S-5: Maintain S/G water levels during startup using AFW.	N, A, L, S	4S
S-6: Valve stroke time testing of CCW valves HCV-401C/D	N, S	8
S-7: Dilute to achieve desired boron concentration for desired critical rod height (dilution continues until stopped)	N, A, L, S	1
S-8: Transfer 4160V loads onto 345kV bus per AOP-32	N, S	6
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
P-1: Respond to a steam bound AFW pump	D, E	4S
P-2: Rack in GE Automatic 480V breaker	N, R	6
P-3: Waste Gas Transfer from the Vent Header to the Gas Decay Tank	D, A, R	9
<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	4-6 / 4-6 / 2-3	
(C)ontrol room		
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4	
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	
(EN)gineered safety feature	- / - / - ≥ 1 (control room system)	
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1	
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1	
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	
(R)CA	≥ 1 / ≥ 1 / ≥ 1	
(S)imulator		

Facility: <u>Fort Calhoun Station</u> Exam Level: SRO-U		Date of Examination: April 16, 2012 Operating Test No.: 2012-01	
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
S-1: Swap pressurizer pressure mode from manual to automatic, followed by spurious actuation of PORV (block valve not operable)		N, A, S	3
S-2: Engineered Safeguards Actuation Verification		N, EN, A, S	2
S-7: Dilute to achieve desired boron concentration for desired critical rod height (dilution continues until stopped)		N, A, L, S	1
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
P-1: Respond to a steam bound AFW pump		D, E	4S
P-3: Waste Gas Transfer from the Vent Header to the Gas Decay Tank		D, A, R	9
<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		4-6 / 4-6 / 2-3	
(C)ontrol room			
(D)irect from bank		≤ 9 / ≤ 8 / ≤ 4	
(E)mergency or abnormal in-plant		≥ 1 / ≥ 1 / ≥ 1	
(EN)gineered safety feature		- / - / - ≥ 1 (control room system)	
(L)ow-Power / Shutdown		≥ 1 / ≥ 1 / ≥ 1	
(N)ew or (M)odified from bank including 1(A)		≥ 2 / ≥ 2 / ≥ 1	
(P)revious 2 exams		≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	
(R)CA		≥ 1 / ≥ 1 / ≥ 1	
(S)imulator			

Facility: Fort Calhoun Station				Date of Exam: April 16, 2012				Scenario Numbers: / /				Operating Test No.: 2012-01					
1. General Criteria												Initials					
												a	b*	c#			
a. The operating test conforms with the previously approved outline; changes are consistent with sampling requirements (e.g., 10 CFR 55.45, operational importance, safety function distribution).																	
b. There is no day-to-day repetition between this and other operating tests to be administered during this examination.																	
c. The operating test shall not duplicate items from the applicants' audit test(s). (see Section D.1.a.)																	
d. Overlap with the written examination and between different parts of the operating test is within acceptable limits.																	
e. It appears that the operating test will differentiate between competent and less-than-competent applicants at the designated license level.																	
2. Walk-Through Criteria												--	--	--			
a. Each JPM includes the following, as applicable:																	
<ul style="list-style-type: none"> • initial conditions • initiating cues • references and tools, including associated procedures • reasonable and validated time limits (average time allowed for completion) and specific designation if deemed to be time-critical by the facility licensee • operationally important specific performance criteria that include: <ul style="list-style-type: none"> – detailed expected actions with exact criteria and nomenclature – system response and other examiner cues – statements describing important observations to be made by the applicant – criteria for successful completion of the task – identification of critical steps and their associated performance standards – restrictions on the sequence of steps, if applicable 																	
b. Ensure that any changes from the previously approved systems and administrative walk-through outlines (Forms ES-301-1 and 2) have not caused the test to deviate from any of the acceptance criteria (e.g., item distribution, bank use, repetition from the last 2 NRC examinations) specified on those forms and Form ES-201-2.																	
3. Simulator Criteria												--	--	--			
The associated simulator operating tests (scenario sets) have been reviewed in accordance with Form ES-301-4 and a copy is attached.																	
												Printed Name / Signature			Date		
a. Author												_____			_____		
b. Facility Reviewer(*)												_____			_____		
c. NRC Chief Examiner (#)												_____			_____		
d. NRC Supervisor												_____			_____		
NOTE:												* The facility signature is not applicable for NRC-developed tests.					
												# Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.					

Facility: Fort Calhoun Station Date of Exam: April 16, 2012 Scenario Numbers: / / Operating Test No.: 2012-01					
QUALITATIVE ATTRIBUTES		Initials			
		a	b*	c#	
1.	The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the operators into expected events.				
2.	The scenarios consist mostly of related events.				
3.	Each event description consists of <ul style="list-style-type: none"> • the point in the scenario when it is to be initiated • the malfunction(s) that are entered to initiate the event • the symptoms/cues that will be visible to the crew • the expected operator actions (by shift position) • the event termination point (if applicable) 				
4.	No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.				
5.	The events are valid with regard to physics and thermodynamics.				
6.	Sequencing and timing of events is reasonable, and allows the examination team to obtain complete evaluation results commensurate with the scenario objectives.				
7.	If time compression techniques are used, the scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.				
8.	The simulator modeling is not altered.				
9.	The scenarios have been validated. Pursuant to 10 CFR 55.46(d), any open simulator performance deficiencies or deviations from the referenced plant have been evaluated to ensure that functional fidelity is maintained while running the planned scenarios.				
10.	Every operator will be evaluated using at least one new or significantly modified scenario. All other scenarios have been altered in accordance with Section D.5 of ES-301.				
11.	All individual operator competencies can be evaluated, as verified using Form ES-301-6 (submit the form along with the simulator scenarios).				
12.	Each applicant will be significantly involved in the minimum number of transients and events specified on Form ES-301-5 (submit the form with the simulator scenarios).				
13.	The level of difficulty is appropriate to support licensing decisions for each crew position.				
Target Quantitative Attributes (Per Scenario; See Section D.5.d)		Actual Attributes	--	--	--
1.	Total malfunctions (5–8)	6 / 6 / 6 / 7			
2.	Malfunctions after EOP entry (1–2)	2 / 2 / 2 / 2			
3.	Abnormal events (2–4)	2 / 2 / 2 / 2			
4.	Major transients (1–2)	1 / 1 / 1 / 1			
5.	EOPs entered/requiring substantive actions (1–2)	2 / 2 / 2 / 2			
6.	EOP contingencies requiring substantive actions (0–2)	0 / 0 / 1 / 0			
7.	Critical tasks (2–3)	2 / 2 / 2 / 2			

Facility: Fort Calhoun Station				Date of Exam: April 16, 2012				Operating Test No.: 2012-01									
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 P O S I T I O N			CREW P O S I T I O N			CREW P O S I T I O N			CREW P O S I T I O N						
		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
R1	RX		1										1	1			
	NOR							1,6					2	1			
	I/C		2,3,4					3,5,8,9					7	4			
	MAJ		6					7					2	2			
	TS												0	0			
R2	RX					6							1	1			
	NOR			1									1	1			
	I/C			4,5,7,8		2,4,5,9							8	4			
	MAJ			6		7							2	2			
	TS												0	0			
R3	RX		1										1	1			
	NOR							1,6					2	1			
	I/C		2,3,4					3,5,8,9					7	4			
	MAJ		6					7					2	2			
	TS												0	0			
R4	RX					6							1	1			
	NOR			1						1			2	1			
	I/C			4,5,7,8		2,4,5,9				3,5,6			11	4			
	MAJ			6		7				8			3	2			
	TS													0			
R5	RX					6							1	1			
	NOR			1									1	1			
	I/C			4,5,7,8		2,4,5,9							8	4			
	MAJ			6		7							2	2			
	TS												0	0			

I1	RX	1						1					2		1
	NOR	1				1,6							3		1
	I/C	2,3,4 5,7,8				3,5,8, 9		2,9, 10					10		4
	MAJ	6				7		8					3		2
	TS	2,3, 5											3		2
I2	RX		1		6			1					3		1
	NOR				1			1					2		1
	I/C		2,3,4		2,3,4 5,8,9			2,3,5 6,9, 10					15		4
	MAJ		6		7			8					3		2
	TS				2,4,5			4,6,7					6		2
I3	RX	1				6							2		1
	NOR	1							1				2		1
	I/C	2,3,4 5,7,8				2,4, 5,9				3,5,6			11		4
	MAJ	6				7				8			3		2
	TS	2,3, 5											3		2
I4	RX		1					1					2		1
	NOR						1,6	1					3		1
	I/C		2,3,4				3,5,8, 9	2,3,5 6,9, 10					10		4
	MAJ		6				7	8					3		2
	TS							4,6,7					3		2
I5	RX				6				1				2		1
	NOR			1	1								2		1
	I/C			4,5, 7,8	2,3,4 5,8,9				2,9, 10				13		4
	MAJ			6	7				8				3		2
	TS				2,4,5								3		2
U1	RX	1			6								2		0
	NOR	1			1								2		1
	I/C	2,3,4 5,7,8			2,3,4 5,8,9								12		2
	MAJ	6			7								2		1
	TS	2,3, 5			2,4,5								6		2
U2	RX	1			6								2		0
	NOR	1			1								2		1

	I/C	2,3,4 5,7,8			2,3,4 5,8,9									12			2
	MAJ	6			7									2			1
	TS	2,3, 5			2,4,5									6			2

Instructions:

1. 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.
2. 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.
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.

Check the applicants' license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Facility: <u>Fort Calhoun Station</u> Scenario No.: <u>1</u>		Op-Test No.: _____	
Examiners: _____		Operators: _____	
_____		_____	
_____		_____	
Initial Conditions: <u>100% power, diesel generator #1 is tagged out for maintenance.</u>			

Turnover: <u>Reduce power to <95% per grid operator.</u>			

Event No.	Malf. No.	Event Type*	Event Description
1		R-ATCO N-BOPO	Reduce power to <95% per OP-4, Attachment 2.
2		I-ATCO TS-CRS	PIC-244 fails, causing HCV-204 (Letdown heat exchanger isolation valve) to close. Alarms are for VCT level low and Pressurizer level high (CB-1,2,3/A2 Window B-2 and CB-1,2,3/A4 Window A-8). If pressurizer level goes >69.2%, TS 2.1.7 applies. Reference OI-CH-1 to restore letdown.
3		C-ATCO TS-CRS	Inadvertent VIAS. AOP-23 Section IV.
4		C-ATCO C-BOPO	HCV-153 opens, causing quench tank level to decrease. Alarm is CB-1,2,3/A4 Window C-3. Action will be to restore level and close HCV-153
5		C-BOPO TS-CRS	Loss of 161 kV line. Alarm is CB-20/A15, Window A-1, 4160V Supply Breaker from 161KV Tripped, also Windows A-2 and A-3. Since a fast transfer will occur, the ARP states to go to AOP-31. T.S. reference 2.7
6		M-All	Loss of 345kV line (LOOP) Reactor trips, SRO enters EOP-00 and after SPTA's, transfers to EOP-07, due to below failure. Upon operator manually closing breaker, power will be restored to one vital bus.
7		C-BOPO (CT)	AFW valve HCV-1108A remains closed. It can be opened from the control panel. EOP-07 Step 6.1. Critical task is to restore AFW flow using either FW-54 or FW-10 to either steam generator prior to reaching 27% wide range level.
8		C-BOPO (CT)	Diesel Generator #2 breaker fails to close automatically due to diesel not reaching rated speed. Once operators increase governor, breaker will close once required speed is reached. See Step 12 of EOP-07. Critical task is to perform this action before exiting EOP-07
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: <u>Fort Calhoun Station</u>		Scenario No.: <u>2</u>		Op-Test No.: _____	
Examiners: _____		Operators: _____		_____	
_____		_____		_____	
_____		_____		_____	
Initial Conditions: <u>100% power. Condensate pump FW-2B is currently in service</u>					

Turnover: _____ . Rotate condensate pumps FW-2B and FW-2C.					
Event No.	Malf. No.	Event Type*	Event Description		
1	N/A	N-BOPO	Rotate condensate pumps FW-2B and FW-2C per OI-FW-1 Attachment 4.		
2		C-ATCO TS-CRS	Charging pump CH1B trips. Alarm CB-1,2,3/A2, Window A-6L. This isolates letdown. Another charging pump should be started per OI-CH-1. T.S. 2.15(5) requires CH-1B and required instruments for AI-179		
3		I-BOPO	LT-903Y (Steam generator RC-1 level transmitter) degrades over a 10 minute period until it fails. This will shift FWCS to manual at the last good signal, requiring operator action to restore level. Alarm is ARP-DCS-FW, L0903E AL5.		
4		I-ATCO TS-CRS	Pressurizer pressure instrument fails high. Possible TS if pressure falls below 2075 psia. Uses ARP-CB-1,2,3/A4 Window B-4 Pressurizer Pressure Deviation		
5		C-ATCO C-BOPO TS-CRS	Dropped CEA 4-01. Alarm CB-4/A8 Window A-5L. This will send the operators to AOP-02, which has actions to stabilize the plant. T.S. 2.10. Because the rod is dropped, this will require a rapid downpower per AOP-05.		
6	N/A	R-ATCO N-BOPO	Rapid downpower per AOP-05.		
7		M-All	RCP Seal Cooler Leak of CVC16. Due to high RCP temperatures, AOP-35 will be entered. AOP-35 will direct the operators to trip the reactor and enter EOP-00. This is an intersystem LOCA. EOP-03 will be entered after SPTA's are performed.		
8		C-BOPO (CT)	Turbine fails to trip. Critical task is for BOP to immediately trip the turbine before performing other SPTA's		
9		C-ATCO C-BOPO (CT)	HCV-438C fails to close on demand. This LOCA cannot be isolated. It will require a cooldown and depressurization to stop the LOCA. Critical task is to commence a cooldown and depressurization.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Facility: <u>Fort Calhoun Station</u> Scenario No.: <u>3</u>		Op-Test No.: _____	
Examiners: _____		Operators: _____	
_____		_____	
_____		_____	
<p>Initial Conditions: <u>Reactor is currently at approximately 90% power. TM/LP trip unit for channel A is currently in BYPASS while I&C troubleshoots erratic pressurizer pressure readings. Technical Specification 2.15(1) was entered at 0428 today.</u></p> <p>_____</p> <p>_____</p>			
Turnover: <u>Increase power to 100%</u>			

Event No.	Malf. No.	Event Type*	Event Description
1		R-ATCO N-BOPO	Increase power to 100% per OP-4 Attachment 1.
2		C-ATCO	SIT Tank level low on SI-6B. Alarm is from ARP-CB-4/A7 Window C-4L. Actions will require sluicing to SI-6B from another SIT or filling to restore level to >68% per OI-SI-1. T.S. 2.3 might apply.
3		C-BOPO	Instrument Air Compressor CA-1A fails. Standby compressor CA-1B running but not loaded. Alarm is ARP-CB-10,11/A11 Window B-3L. No entry into AOP-17.
4		TS-CRS	B/TI-112C fails high. Alarm is per ARP-CB-4/A20 Window E-6, Nuclear Power and ΔT power deviation, only action for ATCO is to check indications and meters, and if an RCS temperature is abnormal, to notify I&C, therefore, this will not count towards an instrument failure for the ATCO.. T.S. 2.15(1) was already entered due to an inoperable TM/LP channel, so this channel must be placed in trip.
5		C-BOPO	ARP-CB-10,11/A10 Window A-6U, Iso Phase Bus Air Flow Low. Entry into AOP-27 is directed. Operators will direct local operators to swap motor belt and start the standby motor.
6		C-BOPO TS-CRS	Loss of MCC 3C2 due to a ground fault. This causes a loss of boric acid pump CH-4A, boric acid gravity feed line valve HCV-265, and boric acid pumps discharge valve HCV-268. Alarm: CB-4/A7 "Boric Acid Valves Trouble." T.S. 2.7 for MCC 3C2 (8 hour). AOP-32
7		TS-CRS	RCS oxygen levels are greater than 0.15 ppm, causing entry into T.S. 2.1.5(1).
8	CVC16	M-ALL (CT)	ATWS – RPS pressurizer pressure channel D/PIA-102Y fails low, causing 2 out of 3 for TM/LP but no RPS trip. Critical task is for ATCO to manually trip the reactor before performing any other actions.

9		C-ATCO	Following manual trip, 5 control rods fail to insert. This will require emergency boration.
10		C-ATCO (CT)	Emergency boration problem – HCV-258 is mechanically bound when the operators attempt to open it. This results in the inability to emergency borate using the BASTs and requires use of the SIRWT to emergency borate. EOP-20. Critical task is to open LCV-218-3, Charging pump suction SIRWT isol. Valve, close LCV-218-2, VCT Outlet valve, and starting all charging pumps prior to exiting that safety function success path.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: Fort Calhoun Station Scenario No.: 4 Op-Test No.: _____

Examiners: _____ Operators: _____

Initial Conditions: Mode 2 <1% power. Next step in OP-2A is to start 1 MFW pump. Desired MFW pump is FW-4B.

Turnover: Continue in OP-2A to raise power and load turbine

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOPO	Start MFW pump FW-4B per OP-2A, Attachment 3. Attachment 2 contains local operator actions and the instructions for starting the lube oil pump.
2		R-ATCO	Raise reactor power to 10% per OP-2A.
3		C-ATCO TS-CRS	Wide range log NI-002 fails high. This failure should occur when the ATC has raised power sufficient to see reactor response and when directed by lead examiner. ARP-CB-4/A20, Windows B-7 and C-1. This will send the operators to AOP-15, where they are directed to secure from raising power and stabilize reactor. T.S. 2.15 for failure of NI
4		C-BOPO	MFW pump FW-4B trips, no auto start of standby pump. Alarm is ARP-CB-10,11/A12.
5		C-ATCO	Controlling pressurizer level instrument 101X fails low. Alarm is ARP-CB-1,k2,3/A4 Windows A-8 and C-8
6		C-ATCO TS-CRS	CCW pump AC-3A trips, no autostart of standby pump. Alarm is ARP-CB-1,2,3/A2 Window D-3U. T.S. 2.4(b) applies.
7		C-BOPO TS-CRS	Inadvertent AFAS. AOP-28 for inadvertent AFAS. T.S.2.5, 2.15, and 2.0.1 apply (Motherhood statement – 6 hr shutdown T.S.A.S.)
8		M-ALL (CT)	Steam line break inside containment on RC-2A. EOP-00 to EOP-05.
9		C-BOPO	SGIS on RC-2A fails. Critical task will be for BOPO to isolate steam generator before exiting procedure step.
10		C-ATCO (CT)	Containment spray pump 3B fails to autostart but can be started from control panel. Containment spray pump 3A shaft shears. Critical task is to restore containment spray flow by either starting containment spray pump 3C or 3B.

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