

Facility: Arkansas Nuclear One Unit 2

Date of Exam: 08/07/2009

Tier	Group	RO K/A Category Points												SRO-Only Points			
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2		G*	Total
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A		3	18	0		0	0
	2	1	2	1				1	2			2	9	0		0	0
	Tier Totals	4	5	4				4	5			5	27	0		0	0
2. Plant Systems	1	2	2	3	3	3	2	2	3	2	3	3	28	0		0	0
	2	0	1	1	1	1	1	1	1	1	1	1	10	0	0	0	0
	Tier Totals	2	3	4	4	4	3	3	4	3	4	4	38	0		0	0
3. Generic Knowledge And Abilities Categories				1		2		3		4		10	1	2	3	4	0
				2		3		3		2			0	0	0	0	

Note:

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

PWR Examination Outline										
Emergency and Abnormal Evolutions - Tier 1/Group 1 (RO)										
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	QID	IR	#
000008 Pressurizer Vapor Space Accident / 3			X				AK3.01 - Knowledge of the reasons for the following responses as they apply to the Pressurizer Vapor Space Accident: - Why PZR level may come back on scale if RCS is saturated	1	3.7	1
000009 Small Break LOCA / 3					X		EA2.09 - Ability to determine and interpret the following as they apply to a small break LOCA: - Low-pressure SWS activity monitor	2	2.8	1
000011 Large Break LOCA / 3	X						EK1.01 - Knowledge of the operational implications of the following concepts as they apply to the Large Break LOCA: - Natural circulation and cooling, including reflux boiling	3	4.1	1
000015/000017 RCP Malfunctions / 4		X					AK2.10 - Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions and the following: - RCP indicators and controls	4	2.8	1
000022 Loss of Rx Coolant Makeup / 2			X				AK3.05 - Knowledge of the reasons for the following responses as they apply to the Loss of Reactor Coolant Makeup: - Need to avoid plant transients	5	3.2	1
000026 Loss of Component Cooling Water / 8						X	2.2.44 - Equipment Control - Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.	6	4.2	1
000027 Pressurizer Pressure Control System Malfunction / 3	X						AK1.03 - Knowledge of the operational implications of the following concepts as they apply to Pressurizer Pressure Control Malfunctions: - Latent heat of vaporization/condensation	7	2.6	1
000029 ATWS / 1						X	2.2.36 - Equipment Control - Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	8	3.1	1
000038 Steam Gen. Tube Rupture / 3			X				EK3.02 - Knowledge of the reasons for the following responses as they apply to the SGTR: - Prevention of secondary PORV cycling	9	4.4	1
000054 Loss of Main Feedwater / 4						X	2.4.6 - Emergency Procedures/Plan - Knowledge of EOP mitigation strategies.	10	3.7	1

PWR Examination Outline										
Emergency and Abnormal Evolutions - Tier 1/Group 1 (RO)										
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	QID	IR	#
000055 Station Blackout / 6				X			EA1.05 - Ability to operate and/or monitor the following as they apply to a Station Blackout: - Battery, when approaching fully discharged	11	3.3	1
000056 Loss of Off-site Power / 6	X						AK1.03 - Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: - Definition of subcooling: use of steam tables to determine it	12	3.1	1
000057 Loss of Vital AC Inst. Bus / 6				X			AA1.05 - Ability to operate and/or monitor the following as they apply to the Loss of Vital AC Instrument Bus: - Backup instrument indications	13	3.2	1
000058 Loss of DC Power / 6					X		AA2.02 - Ability to determine and interpret the following as they apply to the Loss of DC Power: - 125V dc bus voltage, low/critical low, alarm	14	3.3	1
000062 Loss of Nuclear Svc Water / 4				X			AA1.03 - Ability to operate and/or monitor the following as they apply to the Loss of Nuclear Service Water (SWS): - SWS as a backup to the CCWS	15	3.6	1
000077 Generator Voltage and Electric Grid Disturbances / 6		X					AK2.06 - Knowledge of the interrelations between Generator Voltage and Electric Grid Disturbances and the following: - Reactor power	16	3.9	1
CE/E02 Reactor Trip - Stabilization - Recovery / 1		X					EK2.1 - Knowledge of the interrelations between the (Reactor Trip Recovery) and the following: - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	17	3.3	1
CE/E05 Steam Line Rupture - Excessive Heat Transfer / 4					X		EA2.2 - Ability to determine and interpret the following as they apply to the (Excess Steam Demand): - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	18	3.4	1
K/A Category Totals:	3	3	3	3	3	3	Group Point Totals:	18		

PWR Examination Outline										
Emergency and Abnormal Evolutions - Tier 1/Group 2 (RO)										
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	QID	IR	#
000001 Continuous Rod Withdrawal / 1					X		AA2.05 - Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal: - Uncontrolled rod withdrawal, from available indications	19	4.4	1
000003 Dropped Control Rod / 1		X					AK2.05 - Knowledge of the interrelations between the Dropped Control Rod and the following: - Control rod drive power supplies and logic circuits	20	2.5	1
000032 Loss of Source Range NI / 7						X	2.1.28 - Conduct of Operations - Knowledge of the purpose and function of major system components and controls.	21	4.1	1
000036 Fuel Handling Accident / 8				X			AA1.03 - Ability to operate and/or monitor the following as they apply to the Fuel Handling Incidents: - Reactor building containment evacuation alarm enable switch	22	3.5	1
000051 Loss of Condenser Vacuum / 4					X		AA2.02 - Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum: - Conditions requiring reactor and/or turbine trip	23	3.9	1
000060 Accidental Gaseous Radwaste Rel. / 9						X	2.1.27 - Conduct of Operations - Knowledge of system purpose and/or function.	24	3.9	1
000074 Inad. Core Cooling / 4			X				EK3.05 - Knowledge of the reasons for the following responses as they apply to the Inadequate Core Cooling: - Activating the HPI system	25	4.2	1
CE/A11 RCS Overcooling - PTS / 4		X					EK2.1 - Knowledge of the interrelations between the (RCS Overcooling) and the following: - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	26	3.2	1
CE/E09 Functional Recovery	X						EK1.1 - Knowledge of the operational implications of the following concepts as they apply to the (Functional Recover): - Components, capacity, and function of emergency systems	27	3.4	1
K/A Category Totals:	1	2	1	1	2	2	Group Point Totals:	9		

PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO)															
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	QID	IR	#
003 Reactor Coolant Pump					X							K5.03 - Knowledge of the operational implications of the following concepts as they apply to the RCPS: - Effects of RCP shutdown on T-ave., including the reason for the unreliability of T-ave. in the shutdown loop	28	3.1	1
004 Chemical and Volume Control	X											K1.17 - Knowledge of the physical connections and/or cause-effect relationships between the CVCS and the following systems: - PZR	29	3.4	1
005 Residual Heat Removal						X						K6.03 - Knowledge of the effect of a loss or malfunction of the following will have on the RHRS: - RHR heat exchanger	30	2.5	1
006 Emergency Core Cooling	X											K1.03 - Knowledge of the physical connections and/or cause-effect relationships between the ECCS and the following systems: - RCS	31	4.2	1
007 Pressurizer Relief/Quench Tank				X								K4.01 - Knowledge of PRTS design feature(s) and/or interlock(s) which provide for the following: - Quench tank cooling	32	2.6	1
008 Component Cooling Water							X					A1.01 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCWS controls including: - CCW flow rate	33	2.8	1
010 Pressurizer Pressure Control				X								K4.02 - Knowledge of PZR PCS design feature(s) and/or interlock(s) which provide for the following: - Prevention of uncovering PZR heaters	34	3.0	1
010 Pressurizer Pressure Control											X	A4.01 - Ability to manually operate and/or monitor in the control room: - PZR spray valve	35	3.7	1

PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO)															
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	QID	IR	#
012 Reactor Protection		X										K2.01 - Knowledge of bus power supplies to the following: - RPS channels, components, and interconnections	36	3.3	1
013 Engineered Safety Features Actuation											X	2.2.44 - Equipment Control - Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.	37	4.2	1
013 Engineered Safety Features Actuation					X							K5.02 - Knowledge of the operational implications of the following concepts as they apply to the ESFAS: - Safety system logic and reliability	38	2.9	1
022 Containment Cooling										X		A4.02 - Ability to manually operate and/or monitor in the control room: - CCS pumps	39	3.2	1
022 Containment Cooling								X				A2.01 - Ability to (a) predict the impacts of the following malfunctions or operations on the CCS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Fan motor over-current	40	2.5	1
026 Containment Spray			X									K3.02 - Knowledge of the effect that a loss or malfunction of the CSS will have on the following: - Recirculation spray system	41	4.2	1
039 Main and Reheat Steam			X									K3.04 - Knowledge of the effect that a loss or malfunction of the MRSS will have on the following: - MFW pumps	42	2.5	1

PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO)															
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	QID	IR	#
059 Main Feedwater				X								K4.19 - Knowledge of MFW System design feature(s) and/or interlock(s) which provide for the following: - Automatic feedwater isolation of MFW	43	3.2	1
059 Main Feedwater									X			A3.03 - Ability to monitor automatic operation of the MFW System, including: - Feedwater pump suction flow pressure	44	2.5	1
061 Auxiliary/Emergency Feedwater					X							K5.02 - Knowledge of the operational implications of the following concepts as they apply to the AFW System: - Decay heat sources and magnitude	45	3.2	1
062 AC Electrical Distribution							X					A1.03 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the A.C. Distribution System controls including: - Effect on instrumentation and controls of switching power supplies	46	2.5	1
063 DC Electrical Distribution											X	2.1.27 - Conduct of Operations - Knowledge of system purpose and/or function.	47	3.9	1
063 DC Electrical Distribution									X			A3.01 - Ability to monitor automatic operation of the D.C. Electrical System, including: - Meters, annunciators, dials, recorders, and indicating lights	48	2.7	1
064 Emergency Diesel Generator										X		A4.01 - Ability to manually operate and/or monitor in the control room: - Local and remote operation of the ED/G	49	4.0	1
064 Emergency Diesel Generator						X						K6.08 - Knowledge of the effect of a loss or malfunction of the following will have on the ED/G System: - Fuel oil storage tanks	50	3.2	1

PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO)															
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	QID	IR	#
073 Process Radiation Monitoring			X									K3.01 - Knowledge of the effect that a loss or malfunction of the PRM System will have on the following: - Radioactive effluent releases	51	3.6	1
076 Service Water								X				A2.02 - Ability to (a) predict the impacts of the following malfunctions or operations on the SWS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Service water header pressure	52	2.7	1
078 Instrument Air		X										K2.01 - Knowledge of bus power supplies to the following: - Instrument air compressor	53	2.7	1
103 Containment								X				A2.05 - Ability to (a) predict the impacts of the following malfunctions or operations on the Containment System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Emergency containment entry	54	2.9	1
103 Containment											X	2.1.23 - Conduct of Operations - Ability to perform specific system and integrated plant procedures during all modes of plant operation.	55	4.3	1
K/A Category Totals:	2	2	3	3	3	2	2	3	2	3	3	Group Point Totals:			28

PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO)															
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	QID	IR	#
001 Control Rod Drive		X										K2.05 - Knowledge of bus power supplies to the following: - M/G sets	56	3.1	1
014 Rod Position Indication				X								K4.06 - Knowledge of RPIS design feature(s) and/or interlock(s) which provide for the following: - Individual and group misalignment	57	3.4	1
016 Non-nuclear Instrumentation										X		A4.02 - Ability to manually operate and/or monitor in the control room: - Recorders	58	2.7	1
017 In-core Temperature Monitor						X						K6.01 - Knowledge of the effect of a loss or malfunction of the following will have on the ITM System components: - Sensors and detectors	59	2.7	1
028 Hydrogen Recombiner and Purge Control							X					A1.02 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the HRPS controls including: - Containment pressure	60	3.4	1
034 Fuel Handling Equipment									X			A3.03 - Ability to monitor automatic operation of the Fuel Handling System, including: - High flux at shutdown	61	2.9	1
045 Main Turbine Generator			X									K3.01 - Knowledge of the effect that a loss or malfunction of the MT/G System will have on the following: - Remainder of the plant	62	2.9	1
068 Liquid Radwaste								X				A2.02 - Ability to (a) predict the impacts of the following malfunctions or operations on the Liquid Radwaste System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Lack of tank recirculation prior to release	63	2.7	1

PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO)															
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Q	IR	#
075 Circulating Water											X	2.1.28 - Conduct of Operations - Knowledge of the purpose and function of major system components and controls.	64	4.1	1
086 Fire Protection					X							K5.04 - Knowledge of the operational implications of the following concepts as they apply to the Fire Protection System: - Hazards to personnel as a result of fire type and methods of protection	65	2.9	1
K/A Category Totals:	0	1	1	1	1	1	1	1	1	1	1	Group Point Totals:			10

Facility:		Date of Exam:					
Category	K/A #	Topic	QID	RO		SRO Only	
				IR	#	IR	#
1 - Conduct of Operations	2.1.15	Knowledge of administrative requirements for temporary management directives, such as standing orders, night orders, Operations memos, etc.	66	2.7	1		
	2.1.18	Ability to make accurate, clear, and concise logs, records, status boards, and reports.	67	3.6	1		
	Subtotal				2		
2 - Equipment Control	2.2.7	Knowledge of the process for conducting special or infrequent tests.	68	2.9	1		
	2.2.21	Knowledge of pre- and post-maintenance operability requirements.	69	2.9	1		
	2.2.23	Ability to track Technical Specification limiting conditions for operations.	70	3.1	1		
	Subtotal				3		
3 - Radiological Controls	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	71	3.2	1		
	2.3.11	Ability to control radiation releases.	72	3.8	1		
	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.	73	3.2	1		
	Subtotal				3		
4 - Emergency Procedures/Plan	2.4.6	Knowledge of EOP mitigation strategies.	74	3.7	1		
	2.4.26	Knowledge of facility protection requirements, including fire brigade and portable fire fighting equipment usage.	75	3.1	1		
	Subtotal				2		
Tier 3 Point Total					10		

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		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2		G*	Total	
1. Emergency & Abnormal Plant Evolutions	1	0	0	0	N/A			0	0	N/A		0	0	3		3	6	
	2	0	0	0				0	0			0	0	2		2	4	
	Tier Totals	0	0	0				0	0			0	0	0	5		5	10
2. Plant Systems	1	0	0	0	0	0	0	0	0	0	0	0	0	3		2	5	
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3	
	Tier Totals	0	0	0	0	0	0	0	0	0	0	0	0	5		3	8	
3. Generic Knowledge And Abilities Categories					1		2		3		4		0	1	2	3	4	7
					0		0		0		0			2	2	2	1	

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000007 Reactor Trip - Stabilization - Recovery / 1						X	2.4.45 - Emergency Procedures/Plan - Ability to prioritize and interpret the significance of each annunciator or alarm.	76	4.3	1
000025 Loss of RHR System / 4					X		AA2.04 - Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: - Location and isolability of leaks	77	3.6	1
000040 Steam Line Rupture - Excessive Heat Transfer / 4					X		AA2.01 - Ability to determine and interpret the following as they apply to the Steam Line Rupture: - Occurrence and location of a steam line rupture from pressure and flow indications	78	4.7	1
000058 Loss of DC Power / 6						X	2.4.20 - Emergency Procedures/Plan - Knowledge of operational implications of EOP warnings, cautions, and notes.	79	4.3	1
000065 Loss of Instrument Air / 8					X		AA2.01 - Ability to determine and interpret the following as they apply to the Loss of Instrument Air: - Cause and effect of low pressure instrument air alarm	80	3.2	1
CE/E06 Loss of Main Feedwater / 4						X	2.1.23 - Conduct of Operations - Ability to perform specific system and integrated plant procedures during all modes of plant operation.	81	4.4	1
K/A Category Totals:	0	0	0	0	3	3	Group Point Totals:			6

PWR Examination Outline										
Emergency and Abnormal Evolutions - Tier 1/Group 2 (SRO)										
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Q	IR	#
000037 Steam Generator Tube Leak / 3					X		AA2.06 - Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak: - S/G tube failure	82	4.5	1
000059 Accidental Liquid RadWaste Rel. / 9						X	2.4.41 - Emergency Procedures/Plan - Knowledge of the emergency action level thresholds and classifications.	83	4.6	1
000068 Control Room Evac. / 8					X		AA2.05 - Ability to determine and interpret the following as they apply to the Control Room Evacuation: - Availability of heat sink	84	4.3	1
000069 Loss of CTMT Integrity / 5						X	2.4.46 - Emergency Procedures/Plan - Ability to verify that the alarms are consistent with the plant conditions.	85	4.2	1
K/A Category Totals:	0	0	0	0	2	2	Group Point Totals:			4

PWR Examination Outline Plant Systems - Tier 2/Group 1 (SRO)															
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Q	IR	#
006 Emergency Core Cooling								X				A2.07 - Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Loss of heat tracing	86	3.1	1
012 Reactor Protection								X				A2.01 - Ability to (a) predict the impacts of the following malfunctions or operations on the RPS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Faulty bistable operation	87	3.6	1
039 Main and Reheat Steam											X	2.4.11 - Emergency Procedures/Plan - Knowledge of abnormal condition procedures.	88	4.2	1
061 Auxiliary/Emergency Feedwater								X				A2.03 - Ability to (a) predict the impacts of the following malfunctions or operations on the AFW System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Loss of dc power	89	3.4	1
078 Instrument Air											X	2.2.36 - Equipment Control - Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	90	4.2	1
K/A Category Totals:	0	0	0	0	0	0	0	3	0	0	2	Group Point Totals:			5

PWR Examination Outline Plant Systems - Tier 2/Group 2 (SRO)															
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Q	IR	#
071 Waste Gas Disposal								X				A2.09 - Ability to (a) predict the impacts of the following malfunctions or operations on the Waste Gas Disposal System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Stuck-open relief valve	91	3.5	1
072 Area Radiation Monitoring											X	2.2.40 - Equipment Control - Ability to apply Technical Specifications for a system.	92	4.7	1
029 Containment Purge								X				A2.01 - Ability to (a) predict the impacts of the following malfunctions or operations on the Containment Purge System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Maintenance or other activity taking place inside containment	93	3.6	1
K/A Category Totals:	0	0	0	0	0	0	0	2	0	0	1	Group Point Totals:			3

Facility:		Date of Exam:					
Category	K/A #	Topic	Q	RO		SRO Only	
				IR	#	IR	#
1 - Conduct of Operations	2.1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	94			4.7	1
	2.1.23	Ability to perform specific system and integrated plant procedures during all modes of plant operation.	95			4.4	1
	Subtotal						2
2 - Equipment Control	2.2.11	Knowledge of the process for controlling temporary design changes.	96			3.3	1
	2.2.43	Knowledge of the process used to track inoperable alarms.	97			3.3	1
	Subtotal						2
3 - Radiological Controls	2.3.6	Ability to approve release permits.	98			3.8	1
	2.3.12	Knowledge of radiation safety principles pertaining to licensed duties, such as containment entry requirements, fuel handling responsibilities, access to high-radiation areas, aligning filters, etc.	99			3.7	1
	Subtotal						2
4 - Emergency Procedures/Plan	2.4.6	Knowledge of EOP mitigation strategies.	100			4.7	1
	Subtotal						1
Tier 3 Point Total							7

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO Exam Tier 1 Group 1	<p><i>QID #6</i></p> <p><i>026 Loss of CCW</i></p> <p><i>Generic 2.2.17 – Knowledge of the maintenance activities during power operations, such as risk assessments, work prioritization.</i></p>	<p>This K&A is more directed to the SRO applicant and is not one of the required Generic K&As to be used in Tier 1 and 2 as directed by NUREG 1021 ES-410 section D.1.b. therefore, it was rejected and another generic 2.2 K&A was randomly selected form the list in NUREG 1021 ES-401 Section D1.b.</p> <p><i>Generic 2.2.44 – Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions</i> was randomly selected from the Generic K&A list in NUREG 1021 ES-401 Section D1.b. for this category.</p>
	<p><i>QID #9</i></p> <p><i>038 Steam Generator Tube Rupture</i></p> <p><i>EK3.07 - Knowledge of the reasons for the following responses as they apply to the SGTR: - RCS loop isolation values</i></p>	<p>This K&A is not applicable to ANO since the RCS at ANO does not have RCS loop isolation valves therefore, a credible and operationally valid question can not be developed on this K&A.</p> <p><i>EK3.02 – Knowledge of the reasons for the following responses as they apply to the SGTR: - Prevention of secondary PORV cycling</i> was randomly selected as a replacement from the other EK3 K&A statements under this category with a RO importance rating of > 2.5.</p>
	<p><i>QID #10</i></p> <p><i>054 Loss of Main Feedwater</i></p> <p><i>2.3.7 - Ability to comply with radiation work permit requirements during normal or abnormal conditions.</i></p>	<p>This K&A does not directly tie to the MFW system and is not one of the required Generic K&As to be used in Tier 1 and 2 as directed by NUREG 1021 ES-401 section D.1.b. therefore, it was rejected and another generic K&A was randomly selected form the list in NUREG 1021 ES-401 Section D1.b.</p> <p><i>2.4.6 Emergency Procedures/Plan - Knowledge of EOP mitigation strategies</i> was randomly selected from the Generic K&A list in NUREG 1021 ES-401 Section D1.b. for this category.</p>

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO Exam Tier 2 Group 1	<p><i>QID #37</i></p> <p><i>013 ESF Actuation</i></p> <p><i>2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions.</i></p>	<p>This K&A is not one of the required Generic K&As to be used in Tier 1 and 2 as directed by NUREG 1021 ES-401 section D.1.b. therefore, it was rejected and another generic K&A was randomly selected from the list in NUREG 1021 ES-401 Section D1.b.</p> <p><i>2.2.44 Equipment Control - Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions</i> was randomly selected from the Generic K&A list in NUREG 1021 ES-401 Section D1.b. for this category.</p>
	<p><i>QID #49</i></p> <p><i>064 Emergency Diesel Generator.</i></p> <p><i>A4.04 – Ability to manually operate and/or monitor in the control room: - Remote operation of the air compressor switch (different modes)</i></p>	<p>ANO Unit 2 does not have the capability to operate the Emergency Diesel Generator air compressors remotely; therefore, a credible and operationally valid question can not be developed on this K&A; therefore, it was rejected and another generic K&A was randomly selected from the A4 section of K&As for EDGs</p> <p><i>A4.01 – Ability to manually operate and/or monitor in the control room: - Local and remote operation of the ED/G</i> was randomly selected as a replacement from the other A4 K&A statements under this category with a RO importance rating of > 2.5.</p>
	<p><i>QID #50</i></p> <p><i>064 Emergency Diesel Generator.</i></p> <p><i>K6.07 Knowledge of the effect of a loss or malfunction of the following will have on the ED/G System: - Air receivers</i></p>	<p>This K&A statement was randomly selected on the last 2 NRC exams given to Unit 2 and 2 different questions on EDG air receivers was used. This K&A was rejected due to over sampling of this K&A statement on the 2 previous NRC Exams and no additional operationally valid questions could be generated.</p> <p><i>K6.08 - Knowledge of the effect of a loss or malfunction of the following will have on the ED/G System: - Fuel oil storage tanks</i> was selected as a replacement from the other K6 K&A statements under this category with a RO importance rating of > 2.5.</p>
	<p><i>QID #53</i></p> <p><i>078 Instrument Air System</i></p> <p><i>K2.02 Knowledge of bus power supplies to emergency air compressors.</i></p>	<p>ANO Unit 2 does not have an emergency air compressor for an IA backup. Unit 2 and Unit 1 IA systems are normally cross tied to allow for backup air in case of a problem on the opposite unit.; therefore, a credible and operationally valid question can not be developed on this K&A.</p> <p><i>K2.01 – Knowledge of bus power supplies to the following: - Instrument air compressor</i> was selected as a replacement from the other K2 K&A statements under this category with a RO importance rating of > 2.5.</p>

RO Exam Tier 2 Group 1	<p><i>QID #54</i></p> <p><i>103 Containment System</i></p> <p><i>A2.04 Ability to (a) predict the impacts of the following malfunctions or operations on the Containment System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Containment evacuation (including recognition of the alarm)</i></p>	<p>This K&A was rejected due to the similarities between question #22 K&A 036 AA1.03 and over sampling of the containment evacuation alarm.</p> <p><i>A2. 05- Ability to (a) predict the impacts of the following malfunctions or operations on the Containment System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Emergency Containment Entry</i> was randomly selected as a replacement from the other A2 K&A statements under this category with a RO importance rating of > 2.5.</p>
	<p><i>QID #55</i></p> <p><i>103 Containment System</i></p> <p><i>2.1.34 Conduct of Operations - Knowledge of primary and secondary plant chemistry limits.</i></p>	<p>This K&A is not one of the required Generic K&As to be used in Tier 1 and 2 as directed by NUREG 1021 ES-401 section D.1.b. therefore, it was rejected and another generic K&A was randomly selected from the list in NUREG 1021 ES-401 Section D1.b.</p> <p><i>2.1.23 Conduct of Operations - Ability to perform specific system and integrated plant procedures during all modes of plant operation</i> was randomly selected from the Generic K&A list in NUREG 1021 ES-401 Section D1.b. for this category.</p>
RO Exam Tier 2 Group 2	<p><i>QID #64</i></p> <p><i>075 Circulating Water</i></p> <p><i>Generic 2.2.3 – Equipment Control - (multi-unit license) Knowledge of the design, procedural, and operational differences between units.</i></p>	<p>Although there are 2 units here at ANO, they are not of the same vender design and a Unit 2 operator cannot operate the Unit 1 plant; therefore, this K&A statement does not apply and is being rejected as directed by NUREG 1021 ES-401 section D.1.b. This K&A was rejected and another generic K&A was randomly selected from the list in NUREG 1021 ES-401 Section D1.b.</p> <p><i>Generic 2.1.28 – Conduct of Operations - Knowledge of the purpose and function of major system components and control</i> was randomly selected from the Generic K&A list in NUREG 1021 ES-401 Section D1.b. for this category.</p>

Tier / Group	Randomly Selected K/A	Reason for Rejection
SRO Exam Tier 1 Group 1	<p><i>QID #76</i></p> <p><i>007 Reactor Trip – Stabilization - Recovery</i></p> <p>Generic 2.2.19 – Knowledge of maintenance work order requirements</p>	<p>This K&A is not one of the required Generic K&As to be used in Tier 1 and 2 as directed by NUREG 1021 ES-401 section D.1.b. therefore, it was rejected and another generic K&A was randomly selected from the list in NUREG 1021 ES-401 Section D1.b.</p> <p><i>Generic 2.4.45 – Emergency Procedures/Plan - Ability to prioritize and interpret the significance of each annunciator or alarm</i> was randomly selected from the Generic K&A list in NUREG 1021 ES-401 Section D1.b. for this category.</p>
	<p><i>QID #79</i></p> <p><i>058 Loss of DC Power</i></p> <p><i>Generic 2.4.16 – Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines.</i></p>	<p>This K&A is not one of the required Generic K&As to be used in Tier 1 and 2 as directed by NUREG 1021 ES-401 section D.1.b. therefore, it was rejected and another generic K&A was randomly selected from the list in NUREG 1021 ES-401 Section D1.b.</p> <p><i>Generic 2.4.20 – Emergency Procedures/Plan - Knowledge of operational implications of EOP warnings, cautions, and notes</i> was randomly selected from the Generic K&A list in NUREG 1021 ES-401 Section D1.b. for this category.</p>
	<p><i>QID #80</i></p> <p><i>CE/E06 Loss of Instrument Air</i></p> <p><i>Ability to determine and interpret the following as they apply to the Loss of Instrument Air: - When to commence plant shutdown if instrument air pressure is decreasing</i></p>	<p>This K&A statement was randomly selected on the last 2 NRC exams given to Unit 2 and 2 different questions on when to shutdown on loss of IA was used. This K&A was rejected due to over sampling of this K&A statement on the 2 previous NRC Exams and no additional operationally valid questions could be generated.</p> <p><i>AA2.01 Ability to determine and interpret the following as they apply to the Loss of Instrument Air: - Cause and effect of low-pressure instrument air alarm</i> was randomly selected as a replacement from the other AA2 K&A statements under this category with a SRO importance rating of > 2.5.</p>
	<p><i>QID #81</i></p> <p><i>CE/E06 Loss of Main Feedwater</i></p> <p>Generic 2.2.23 – Equipment Control - Ability to track Technical Specification limiting conditions for operations.</p>	<p>This K&A is not one of the required Generic K&As to be used in Tier 1 and 2 as directed by NUREG 1021 ES-401 section D.1.b. therefore, it was rejected and another generic K&A was randomly selected from the list in NUREG 1021 ES-401 Section D1.b.</p> <p><i>Generic 2.1.23 – Conduct of Operations - Ability to perform specific system and integrated plant procedures during all modes of plant operation</i> was randomly selected from the Generic K&A list in NUREG 1021 ES-401 Section D1.b. for this category.</p>

SRO Exam Tier 1 Group 2	<p><i>QID #83</i></p> <p><i>059 Accidental Liquid Rad waste Release.</i></p> <p><i>Generic 2.4.5 – Emergency Procedures/Plan - Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions.</i></p>	<p>This K&A is not one of the required Generic K&As to be used in Tier 1 and 2 as directed by NUREG 1021 ES-401 section D.1.b. therefore, it was rejected and another generic K&A was randomly selected form the list in NUREG 1021 ES-401 Section D1.b.</p> <p><i>Generic 2.4.41 – Emergency Procedures/Plan - Knowledge of the emergency action level thresholds and classifications</i> was randomly selected from the Generic K&A list in NUREG 1021 ES-401 Section D1.b. for this category.</p>
SRO Exam Tier 2 Group 1	<p><i>QID #88</i></p> <p><i>039 Main and Reheat Steam</i></p> <p><i>Generic 2.2.6 – Equipment Control - Knowledge of the process for making changes to procedures.</i></p>	<p>This K&A is not one of the required Generic K&As to be used in Tier 1 and 2 as directed by NUREG 1021 ES-401 section D.1.b. therefore, it was rejected and another generic K&A was randomly selected form the list in NUREG 1021 ES-401 Section D1.b.</p> <p><i>Generic 2.4.11 – Emergency Procedures/Plan - Knowledge of abnormal condition procedures</i> was randomly selected from the Generic K&A list in NUREG 1021 ES-401 Section D1.b. for this category.</p>
SRO Exam Tier 2 Group 2	<p><i>QID #92</i></p> <p><i>072 Area Radiation Monitoring</i></p> <p><i>Generic 2.2.35</i></p> <p><i>Equipment Control - Ability to determine Technical Specification Mode of Operation.</i></p>	<p>This K&A is not one of the required Generic K&As to be used in Tier 1 and 2 as directed by NUREG 1021 ES-401 section D.1.b. therefore, it was rejected and another generic K&A was randomly selected form the list in NUREG 1021 ES-401 Section D1.b.</p> <p><i>Generic 2.2.40 – Equipment Control - Ability to apply Technical Specifications for a system</i> was randomly selected from the Generic K&A list in NUREG 1021 ES-401 Section D1.b. for this category.</p>
	<p><i>QID #93</i></p> <p><i>079 Station Air System</i></p> <p><i>A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the SAS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Cross-connection with IAS.</i></p>	<p>There is no credible 10 CFR 43 SRO tie between this K&A statement because Unit 2 does not have a cross connection with IA and Station air therefore, a credible and operationally valid question can not be developed on this K&A statement or any others Station Air K&A statements. (most have an importance rating of less than 2.5)</p> <p>Based on this selection, the <i>Containment Purge System</i> was randomly selected from the Tier 2 Group 2 systems and the originally selected A2.01 K&A statement was retained: <i>Ability to (a) predict the impacts of the following malfunctions or operations on the Containment Purge System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Maintenance or other activity taking place inside Containment.</i></p>

SRO Exam Tier 3	<i>QID # 99</i> <i>Generic 2.3.15</i> <i>Radiological Controls - Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.</i>	<p>This K&A is not SRO only knowledge and does not allow an SRO only question to be developed thus this K&A was rejected.</p> <p>Generic K&A 2.3.12, <i>Radiological Controls - 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.</i> was randomly selected as a replacement from the required section 2.3 generic K&A statements.</p>
	<i>QID #100</i> <i>Generic 2.4.35</i> <i>Emergency Procedures/Plan - Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.</i>	<p>This K&A is not SRO only knowledge and does not allow an SRO only question to be developed thus this K&A was rejected.</p> <p>Generic K&A 2.4.6, <i>Emergency Procedures/Plan - Knowledge of EOP mitigation strategies</i> was randomly selected as a replacement from the required section 2.4 generic K&A statements.</p>

Facility: <u>Arkansas Nuclear One</u>		Date of Examination: <u>8-10-09</u>
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: <u>2009-1</u>

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
A1. Conduct of Operations 2.1.23 RO (4.3)	P/R	Determine volume of Boric acid and DI water to makeup to RWT. ANO-2-JPM-NRC-ADMIN RWT
A2. Conduct of Operations 2.1.25 RO (3.9)	N/R	Determine limits for CEA positions using the COLR PDIL. ANO-2-JPM-NRC-ADMIN-PDIL
A3. Equipment Control 2.2.12 RO (3.7)	D/R	Surveillance review ANO-2-JPM-NRC-2P-35A REVIEW
A4. Radiation Control 2.3.7 RO (3.5)	D/R	Review RWP and determine requirements for tagging 'B' LPSI pump. ANO-2-JPM-NRC-RWP
Emergency Procedures/Plan		

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)

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Administrative Topic (see Note)	Type Code*	Describe activity to be performed
A5. Conduct of Operations 2.1.25 SRO (4.2)	N/R	Determine if COLR DNBR limit is being met during a loss of COLSS and what action is required. ANO-2-JPM-NRC-ADMIN-DNBRL
A6. Conduct of Operations 2.1.23 SRO (4.4)	D/R	Review and approve calculation of volume needed to raise SFP level. ANO-2-JPM-NRC-ADMIN-SFPMU
A7. Equipment Control 2.2.40 SRO (4.7)	P/R	Determine RPS trip set point due to inoperable MSSV is correct using Technical Specifications. Ability to apply technical specification for a system ANO-2-JPM-NRC-ADMIN-MSSVINOP
A8. Radiation Control 2.3.14 SRO (3.8)	D/R	Approve administration of Potassium Iodide ANO-2-JPM-NRC-KI
A9. Emergency Procedures/Plan 2.4.44 SRO (4.4)	D/R	Issue Protective Action Recommendation to Offsite Authorities (Time Critical) ANO-2-JPM-NRC-PAR3

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.

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(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>Arkansas Nuclear One</u>	Date of Examination: <u>8-10-09</u>
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	Operating Test No.: <u>2009-1</u>

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. ANO-2-JPM-NRC-EOP01 026 A2.03 RO 4.1 SRO 4.4 Secure Containment Spray System (inadvertent)	EN/L/P/S	5 Containment Integrity
S2. ANO-2-JPM-NRC-RCP04 003 A2.02 RO-3.7/SRO-3.9 RCP Shutdown	A/L/M/S	4 Heat Removal
S3. ANO-2-JPM-NRC-SIT01 006 A2.03 RO-3.3 SRO-3.7 High pressure fill of Safety Injection Tank	A/P/S	2 RCS Inventory
S4. ANO-2-JPM-NRC-PZR01 010 A4.01 RO-3.7/SRO-3.5 Equalize Pressurizer boron	D/S	3 Pressure Control
S5. ANO-2-JPM-NRC- VCTMU 004 A4.15 RO-3.6 SRO-3.7 Perform Manual Makeup to the VCT	D/S	1 Reactivity control
S6. ANO-2-JPM-NRC-ELECXT 062 A4.01 RO-3.3/SRO-3.1 Cross connect 2B-1 and 2B-2.	A/M/S	6 Electrical
S7. ANO-2-JPM-NRC-CCW02 008 A4.01 RO 3.3/SRO 3.1 Shift running CCW pumps	M/S	8 Plant service systems
S8. ANO-2-JPM-NRC-CPC02 015 A3.03 RO-3.9/SRO-3.9 DNBR/LPD limits with COLSS out of service	D/S	7 Instrumentation
In-Plant Systems® (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
P1. A2JPM-RO-RSD 062 A2.01 RO-3.4/SRO-3.9 Perform a remote shutdown as an CBOT	A//D/E/L	6 Electrical
P2. ANO-2-JPM-NRC-XFCEA 001 A2.14 RO-3.7/SRO-3.9 Transfer a CEA to the hold bus	D/E	1 Reactivity control
P3. ANO-2-JPM-NRC-69REL 068 A4.02 RO-3.2/SRO-3.1 Perform a release of 2T-69A Boric Acid Condensate Tank	N/R	9 Radioactivity Release
@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path (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 / 4-6 / 2-3 $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / ≥ 1 (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$	

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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. ANO-2-JPM-NRC-EOP01 026 A2.03 RO 4.1 SRO 4.4 Secure Containment Spray System (inadvertent)	EN/L/P/S	5 Containment Integrity
S2. ANO-2-JPM-NRC-RCP04 003 A2.02 RO-3.7/SRO-3.9 RCP Shutdown	A/L/M/S	4 Heat Removal
S3. ANO-2-JPM-NRC-SIT01 006 A2.03 RO-3.3 SRO-3.7 High pressure fill of Safety Injection Tank	A/D/P/S	2 RCS Inventory
S4. ANO-2-JPM-NRC-PZR01 010 A4.01 RO-3.7/SRO-3.5 Equalize Pressurizer boron	D/S	3 Pressure Control
S5. ANO-2-JPM-NRC- VCTMU 004 A4.15 RO-3.6 SRO-3.7 Perform Manual Makeup to the VCT	D/S	1 Reactivity control
S6. ANO-2-JPM-NRC-ELECXT 062 A4.01 RO-3.3/SRO-3.1 Cross connect 2B-1 and 2B-2.	A/M/S	6 Electrical
S7. ANO-2-JPM-NRC-CCW02 008 A4.01 RO 3.3/SRO 3.1 Shift running CCW pumps	M/S	8 Plant service systems
In-Plant Systems® (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
P1. A2JPM-RO-RSD 062 A2.01 RO-3.4/SRO-3.9 Perform a remote shutdown as an CBOT	A/D/E/L	6 Electrical
P2. ANO-2-JPM-NRC-XFCEA 001 A2.14 RO-3.7/SRO-3.9 Transfer a CEA to the hold bus	D/E	1 Reactivity control
P3. ANO-2-JPM-NRC-69REL 068 A4.02 RO-3.2/SRO-3.1 Perform a release of 2T-69A Boric Acid Condensate Tank	N/R	9 Radioactivity Release
@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path (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 / 4-6 / 2-3 $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / ≥ 1 (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$	

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Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>		Operating Test No.: <u>2009-1</u>
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. ANO-2-JPM-NRC-EOP01 026 A2.03 RO 4.1 SRO 4.4 Secure Containment Spray System (inadvertent)	EN/L/P/S	5 Containment Integrity
S2. ANO-2-JPM-NRC-RCP04 003 A2.02 RO-3.7/SRO-3.9 RCP Shutdown	A/L/M/S	4 Heat Removal
In-Plant Systems® (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
P1. A2JPM-RO-RSD 062 A2.01 RO-3.4/SRO-3.9 Perform a remote shutdown as an CBOT	A/D/E/L	6 Electrical
P2. ANO-2-JPM-NRC-XFCEA 001 A2.14 RO-3.7/SRO-3.9 Transfer a CEA to the hold bus	D/E	1 Reactivity control
P3. ANO-2-JPM-NRC-69REL 068 A4.02 RO-3.2/SRO-3.1 Perform a release of 2T-69A Boric Acid Condensate Tank	N/R	9 Radioactivity Release
@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path (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 / 4-6 / 2-3 $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / ≥ 1 (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$	

Facility: ANO-2	Scenario No.: 1 (New)	Op-Test No.: 2009-1	
Examiners: _____		Operators: _____	
_____		_____	
_____		_____	
Initial Conditions: 100% MOL, All Engineered Safety Features systems are in standby. Gland Seal pressure control valve 2PCV-0231 is jacked closed. Green Train Maintenance Week.			
Turnover: 100%. 260 EFPD. EOOS indicates 'Minimal Risk'. 2PCV-0231 jacked closed, manually control seal steam pressure. Green Train Maintenance Week.			
Event No.	Malf. No.	Event Type*	Event Description
1	XSG2PT10411	I (BOP) I (SRO)	'A' Steam generator safety channel pressure transmitter fails low. Tech Spec for SRO.
2	XCVLDNHXOU	I (ATC) I (SRO)	Letdown temperature control valve input fails low.
3	CVC2P36BFAL	C (ATC) C (SRO)	'B' Charging pump supply breaker trips due to a motor fault.
4	RCSLOCATCB	N (BOP) R (ATC) N (SRO)	Shutdown required due to 15 gpm Reactor Coolant system leak on 'B' cold leg. Tech Spec for SRO.
5	MTGTRPLOCKO FAILSU3	M (ALL)	Main Turbine Generator trip causing a reactor trip and a Startup #3 transformer lockout causing natural circulation of the RCS.
6	CV15042	C (BOP) C (SRO)	#2 Emergency Diesel Generator service water outlet valve fails to open. This will result in de-energizing green train vital 4160VAC (2A-4) and vital 480VAC (2B-6).
7	RCSLOCATCB	M (ALL)	Reactor Coolant system 'B' cold leg leakage ramps up to 225 gpm over 10 minutes.
8	HPISI10A	C (BOP) C (SRO)	2P-89A Safety injection pump shaft shear.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Total malfunctions. = 8, Malfunctions after EOP entry = 2, Abnormal events = 4, Major transient = 2,
EOPs with substantive actions = 1, EOP Contingencies = 0, Critical tasks = 2.

Scenario #1 Objectives

- 1) Evaluate individual response to a failure of a Steam Generator Safety Channel Pressure detector.
- 2) Evaluate individual response to a failure of a Letdown temperature controller.
- 3) Evaluate individual response to a failure of a Coolant Charging pump.
- 4) Evaluate individual response to a small Reactor Coolant system leak.
- 5) Evaluate individual ability to perform a reduction in plant power.
- 6) Evaluate individual ability to respond to Degraded Electrical power.
- 7) Evaluate individual ability to mitigate a LOCA.
- 8) Evaluate individual response to a failure of cooling water to an Emergency Diesel Generator.
- 9) Evaluate individual ability to monitor operation of Emergency Core Cooling Equipment.

SCENARIO #1 NARRATIVE

Simulator session begins with the plant at 100% power. Gland seal regulator, 2PCV-0231 is jacked closed.

When the crew has completed their control room walk down and brief, the 'A' Steam Generator pressure safety channel pressure instrument, 2PT-1041-1, will fail low. This will trip one of the four PPS channels for low SG pressure trip and MSIS. Alarms for MSIS pre-trip, RPS channel trip/pre-trip, and channel 'A' operator insert (2C03) trip and pre-trip lights will be lit. The SRO will refer to the ACA 2203.012D and tech specs 3.3.1.1, 3.3.2.1, 3.3.3.5 and 3.3.3.6 for guidance. The BOP will place Channel 'A' PPS in bypass for point 11, SG pressure low, point 19, 'A' SG delta-P for EFAS 1, and point 20, 'B' SG delta-P for EFAS 2 for maintenance and trouble shooting. The crew will have one hour to place these points in bypass before exceeding the tech spec LCO.

After the 'A' PPS channel is placed in bypass and cued by lead examiner, the Letdown heat exchanger temperature input will fail low. The ATC will report that LETDOWN HX 2E29 OUTLET TEMP HI alarm is in and the letdown heat exchanger temperature is reading low on the hand indicating controller but the computer point and control board indication are reading higher than normal. The SRO will direct the ATC to take manual control of the Letdown heat exchanger temperature control valve and manually control temperature. The SRO will also refer to the ACA for letdown radiation monitor flow low 2K12 J1 RADMONITOR FLOW LO and restore letdown radiation monitor flow.

After the ATC has taken manual control of the letdown temperature control valve, the 'B' Coolant Charging Pump (CCP) will trip. The SRO will enter AOP 2203.036, Loss of Charging. The SRO will direct the ATC to manually start a standby CCP. The SRO should refer to the TRM and determine no LCOs are applicable.

SCENARIO #1 NARRATIVE (continued)

When a backup Charging pump has been started or at the lead examiner's cue, a 15 gpm RCS leak will start. The SRO will enter the excess RCS leakage AOP, OP 2203.016. ATC and BOP will perform RCS Leak rate determinations. The SRO will enter Tech Spec 3.4.6.2. The SRO will direct to ATC to maintain pressurizer level within 5% of set point by starting additional charging pumps as needed. The SRO will also direct the ATC to isolate letdown to determine the leak location. After the crew has determined the leak is not in letdown, they will restore letdown and the crew will perform a plant shutdown.

After the ATC has completed the required reactivity manipulation or cued by lead examiner, a Main Turbine Trip will occur and the crew will verify the reactor has tripped. When the reactor trips Start up transformer #3 will lock out. The RCPs and Circulating Water pumps lose power which will cause natural circulation conditions in the RCS and require steaming to atmosphere. During SPTAs, the BOP will report that #2 EDG service water outlet valve is not open requiring the #2 EDG to be secured locally.

The Crew will implement Standard Post Trip Actions (SPTA), OP 2202.001. After the reactor trips the RCS leakrate will ramp to 225 gpm over 10 minutes.

The SRO will diagnose a loss of coolant accident and enter EOP 2202.003, Loss of Coolant Accident (LOCA).

The ATC will cool down the RCS using the atmospheric dump valves. The BOP will override and open the Service Water to Component Cooling Water and Auxiliary Cooling Water valves. The ATC will control RCS pressure to recover pressurizer level. The BOP will take manual control of Emergency Feedwater flow and restore steam generator levels to normal.

Post SIAS, the 'A' High Pressure Safety Injection (HPSI) pump will shear the shaft (red train) and the 'B' high pressure safety injection pump (green train) will not be available due to loss of power. The BOP will start the 'C' HPSI pump to satisfy the required HPSI flow requirements.

Facility: ANO-2	Scenario No.: 2 (New)	Op-Test No.: 2009-1	
Examiners:		Operators:	
<p>Initial Conditions: 100% MOL, All Engineered Safety Features systems are in standby. Gland Seal steam pressure control valve 2PCV-0231 jacked closed. RED Train Maintenance Week. 2T-6A Boric Acid Make up tank is aligned for acid reducing shut down chemistry for Unit 1</p>			
<p>Turnover: 100%. 260 EFPD. EOOS indicates 'Minimal Risk'. 2PCV-0231 jacked closed, manually control seal steam pressure. RED Train Maintenance Week. 2T-6A Boric Acid Make up tank is aligned for acid reducing shut down chemistry for Unit 1 refueling outage that starts next week. Evolution scheduled: Drain Containment Sump to 50% level. Steps 20.1.1 and 20.1.2 of OP-2104.014 have been completed.</p>			
Event No.	Malf. No.	Event Type*	Event Description
1	CV20612	C (BOP) C (SRO)	Containment sump drain valve fails open during normal drain evolution. Tech Spec for SRO
2	SW2P-4A	C (BOP) C (SRO)	2P-4A Service water pump breaker trips
3	XRCCHAPLVL	I (ATC) I (SRO)	'A' Pressurizer level channel fails High. Tech Spec for SRO
4		R (ATC) N (BOP) N (SRO)	System Dispatcher call with a request to reduce power to ~ 850MWe(~80%) within 30 min.
5	CV10101 SGAMSIVBEF	M (ALL)	'A' Steam Generator MSIV 2CV-1010-1 fails closed. Then 4 minutes after trip an Excess Steam Demand on 'A' S/G outside containment commences.
6	CEA38STUCK CV48731 CVC2P39B	C (ATC) C (SRO)	Control Element Assembly #38 remains fully withdrawn when the reactor trips. The VCT outlet will not close and 2P-39B will trip when the reactor trips.
7	ESFCCAS2	C (BOP) C (SRO)	Green train Containment coolers fail to automatically actuate.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Total malfunctions. = 6, Malfunctions after EOP entry = 2, Abnormal events = 3, Major transient = 1, EOPs with substantive actions = 1, EOP Contingencies = 1, Critical tasks = 2.

Scenario #2 Objectives

- 1) Evaluate individual response to a failure of a Containment isolation valve.
- 2) Evaluate individual ability to operate safety related equipment.
- 3) Evaluate individual response to a failure of a Service Water pump.
- 4) Evaluate individual response to a failure of a Pressurizer level control channel.
- 5) Evaluate individual ability to perform a reduction in plant power.
- 6) Evaluate individual response to a stuck out CEA after a Reactor Trip.
- 7) Evaluate individual response to a failed closed Main Steam Isolation Valve.
- 8) Evaluate individual ability to mitigate an Excess Steam Demand Outside containment.
- 9) Evaluate individual ability to monitor operation of Engineered Safety Features equipment.

SCENARIO #2 NARRATIVE

Simulator session begins with the plant at 100% power steady state Gland seal regulator, 2PCV-0231 is jacked closed and 2T-6A is aligned for acid reducing chemistry.

When the crew has completed their control room walk down and brief, The BOP will drain the Containment sump to the Auxiliary building sump using the normal drain method. When the BOP attempts to close 2CV-2061-2 it remains open. The BOP should ensure the series sump drain valve 2CV-2060-1 is closed and sump level is stable. The SRO will determine that Tech Spec 3.6.3.1 is applicable and will enter Tech Spec 3.6.3.1.

After the Crew has entered the appropriate Tech Spec, verified sump level is stable and cued by lead examiner; the 'A' Service Water Pump (2P-4A) breaker will trip open. The SRO will enter AOP, 2203.022 Loss of Service Water. The SRO will direct the BOP to start 2P-4B Service Water Pump.

After the 'B' Service Water pump is placed in service and cued by lead examiner, the in service Pressurizer (PZR) control channel level instrument will fail high. This will result in letdown going to maximum flow, the two backup CCP's will automatically stop, all PZR heaters energizing and actual PZR level lowers. AOP 2203.028, PZR Systems Malfunctions, will be entered and actions directed by the SRO. The ATC will take the letdown flow controller to manual and control PZR level. The ATC will also verify that the other level control channel is reading correctly and select that channel for control and place the PZR low level cutoff switch to the unaffected channel. The SRO will enter Tech Spec 3.3.3.6 Post Accident Instrumentation. When the auto and manual signals are matched, the ATC will place the letdown flow controller to automatic.

SCENARIO #2 NARRATIVE (continued)

After the ATC has placed 'B' Channel pressurizer level control in service and restored letdown to automatic, The Pine Bluff Systems Operations Center (SOC) will call the Control Room with a Transmission Loading Relief (TLR) to reduce plant output by 200MWe. The SOC will also report that all limits of EN-DC-199 are still met. If Contacted, Unit 1 will be unable to maneuver due to a planned refueling outage.

After the ATC has completed the required reactivity manipulation and cued by lead examiner, 2CV-1010-1 'A' Steam Generator Main Steam Isolation Valve will fail closed. The crew will verify the reactor is tripped.

The Crew will implement Standard Post Trip Actions (SPTA), OP 2202.001. When the reactor trips one CEA will remain withdrawn which requires emergency boration. The VCT outlet will remain open and 2P-39B Boric Acid Makeup pump will trip when the reactor trips. Reactivity control will not be satisfied. During SPTAs, an Excess Steam Demand event outside of Containment will commence. The Crew will manually actuate Main Steam Isolation Signal (MSIS) or verify that a Main Steam Isolation signal automatically actuates. The Crew will secure and/or verify that Emergency Feedwater (EFW) is not feeding 'A' Steam generator. The ATC will secure two Reactor coolant Pumps when RCS pressure goes below 1400 psia.

The SRO will diagnose Functional Recovery due to reactivity control not being met and enter OP 2202.009, Functional Recovery.

The crew will manually control Reactor Coolant Temperature once the 'A' SG boils dry using the upstream Atmospheric Dump Valve on 'B' SG. The ATC will control RCS pressure using normal spray.

Facility: ANO-2	Scenario No.: 3 (Modified)	Op-Test No.: 2009-1	
Examiners:		Operators:	
<p>Initial Conditions: ~60% MOL, Condenser outer waterboxes placed in service after tube plugging. All Engineered Safety Features systems are in standby. 2PCV-0231 jacked closed. RED Train Maintenance Week.</p>			
<p>Turnover: ~60% power Condenser outer waterboxes placed in service after tube plugging. 260 EFPD. EOOS indicates 'Minimal Risk'. 2PCV-0231 jacked closed, manually control seal steam pressure. RED Train Maintenance Week. The previous shift has completed steps 10.1.1 through 10.1.6 and section 10.2 of starting the second heater drain pump and 'B' Heater drain pump needs to be placed in service. 2 Condensate pumps are running with Condensate recirculation valves in manual. Commence power escalation using applicable 2104.002 step 9.1 through 9.11 are complete and steps 9.13 to 9.18 and 9.20 to 9.28 are not applicable or complete. Reactor engineering recommends a 12% per hour rate.</p>			
Event No.	Malf. No.	Event Type*	Event Description
1	(New)	N (SRO) R (ATC)	Power escalation following a forced outage.
2	(New)	N (BOP) N (SRO)	Place the 'B' Heater Drain pump in service.
3	NIBLINEPWR (Modified)	I (BOP) I (SRO)	'B' channel nuclear instrument fails high. Tech Spec for SRO.
4	XRCCHBPCNT (New)	I (ATC) I (SRO)	'B' Pressurizer control channel pressure fails high.
5	SGBTUBE (Modified)	M (ALL)	'B' Steam Generator tube leakage ramps up to 275 gpm over 25 minutes. Manual reactor trip criteria when greater than 44 gpm. Tech Spec for SRO
6	RPSRXMAN RPSRXAUTO (New)	C (ATC) C (SRO)	Failure of the reactor protection system to automatically or manually trip the reactor.
7	OP5130 OP5134 (New)	C (BOP) C (SRO)	Generator output breakers fail to open automatically
8	CNDVACPPA CND2C5B	C (BOP) C (SRO)	2C-5A Vacuum pump trip 2C-5B Vacuum pump fails to auto start.
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p>			

Total malfunctions. = 6, Malfunctions after EOP entry = 2, Abnormal events = 2, Major transient = 1, EOPs with substantive actions = 1, EOP Contingencies = 0, Critical tasks = 2.

Scenario #3 Objectives

- 1) Evaluate individual ability to perform a power escalation.
- 2) Evaluate individual ability to place the second heater drain pump in service.
- 3) Evaluate individual response to a failure of a Nuclear Instrumentation channel.
- 4) Evaluate individual response to a failure of a Pressurizer pressure control channel.
- 5) Evaluate individual response to a steam generator tube rupture.
- 6) Evaluate individual response to a failure of a RPS to manually or automatically trip the reactor.
- 7) Evaluate individual response to the generator output breakers failure to automatically open.
- 8) Evaluate individual ability to mitigate a steam generator tube rupture.
- 9) Evaluate individual response to a vacuum pump trip.
- 10) Evaluate individual response to a failure to the backup vacuum pump to auto start.

SCENARIO #3 NARRATIVE

Simulator session begins with the plant at 60% power Condenser outer waterboxes placed in service after tube plugging. Gland seal regulator, 2PCV-0231 is jacked closed. The previous shift has completed steps 10.1.1 through 10.1.6 of OP-2106.016 (Condensate and Feedwater operations) for placing the 'B' Heater Drain pump in service.

When the crew has completed their control room walk down and brief, the ATC will commence a power escalation and the BOP will place the 'B' Heater drain pump in service.

After the 'B' Heater Drain pump is placed in service, the ATC has completed all required reactivity manipulations and cued by lead examiner, 'B' nuclear instrumentation channel will fail high. This will result in a PPS channel trip and pre-trip, CPC sensor failure alarms and the NI linear and log power instruments on 'B' channel failing to High. The SRO will enter the Nuclear Instrument Malfunction AOP, AOP 2203.026. The SRO will direct the BOP to bypass points 1, 2, 3, and 4 on 'B' PPS. TS 3.3.1.1 and 3.3.3.5 will be entered due to the excore failure.

After the BOP has bypassed points 1, 2, 3, and 4 on 'B' PPS and cued by lead examiner, the 'B' channel Pressurizer (PZR) control channel will fail high. This will result in both main spray valves to automatically open and both proportional heater banks to go to minimum fire. Actual PZR pressure will drop and will result in an automatic reactor trip, if actions are not taken to mitigate the event. The SRO will enter Abnormal operating procedure OP 2203.028, PZR systems malfunctions. The SRO will direct selecting the opposite control channel.

After the Crew has taken all actions of OP 2203.028 PZR systems malfunctions and cued by lead examiner, a primary to secondary leak will start. The SRO will enter the primary to secondary leakage AOP, OP 2203.038. ATC and BOP will perform RCS Leak rate determinations. The SRO will enter Tech Spec 3.4.6.2. The SRO will direct the NLO's to control secondary contamination using standard attachment 19 and direct the chemists to sample the SG's for activity. When the crew has determined that the primary to secondary leak is greater than 44 gpm, the ATC will trip the reactor.

SCENARIO #3 NARRATIVE (continued)

When the ATC attempts to manually trip the reactor RPS will not work and the SRO will direct the ATC to trip the reactor using the DSS system. The Crew will implement Standard Post Trip Actions (SPTA), OP 2202.001. During SPTAs the generator output breakers will fail to automatically open and require the BOP to manually open the breakers. The Crew should actuate safety injection (SIAS) and containment cooling actuation signal (CCAS) or verified that SIAS and CCAS automatically actuates. The Crew will lower Steam Dump master controller setpoint during SPTAs to aid in maintaining margin to saturation. The ATC will secure two Reactor coolant Pumps when RCS pressure goes below 1400 psia.

The SRO will diagnose a Steam Generator Tube Rupture event and enter OP 2202.004, Steam Generator Tube Rupture. The ATC will cool down the RCS to less than 535°F using the bypass valves to the condenser. The BOP will override SW to CCW and ACW. The BOP will isolate the 'B' SG using standard attachment 10 when RCS Thot is less than 535°F.

After the EOP is entered, the RCS cooldown is started and at the lead examiner's discretion, 'A' vacuum pump will trip and 'B' vacuum pump will NOT automatically start. The BOP will manually start 'B' vacuum pump. If this vacuum pump is not started, the SDBCS bypass valves will close and the crew will have to steam the ruptured SG to atmosphere resulting in an off site radiological release.