

Facility: Arkansas Nuclear One – Unit 1														Date of Exam: 9/5/2008				
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				3	3			3	18	3	3	6		
	2	1	2	2				1	2			1	9	2	2	4		
	Tier Totals	4	5	5				4	5			4	27	5	5	10		
2. Plant Systems	1	3	2	3	3	2	3	3	2	2	2	3	28	3	2	5		
	2	1	1	1	1	1	1	1	0	1	1	1	10	0	2	3		
	Tier Totals	4	3	4	4	3	4	4	2	3	3	4	38	5	3	8		
3. Generic Knowledge and Abilities Categories				1		2		3		4		10		1	2	3	4	7
				2		3		2		3				2	1	2	2	
<p>Note:</p> <ol style="list-style-type: none"> 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. 																		

ES-401 401-2		PWR Examination Outline							Form ES-	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO)										
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#	
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1					X		EA2.03 - Reactor trip breaker position	4.2	1	
000008 Pressurizer Vapor Space Accident / 3				X			AA1.07 - Reseating of code safety and PORV.	4.0	2	
000009 Small Break LOCA / 3		X					EK2.03 - S/Gs	3.0	3	
000011 Large Break LOCA / 3					X		EA2.11 – Conditions for throttling or stopping HPI.	3.9	4	
000015/17 RCP Malfunctions / 4	X						AK1.04 - Basic steady state thermodynamic relationship between RCS loops and S/Gs resulting from unbalanced RCS flow.	2.9	5	
000022 Loss of Rx Coolant Makeup / 2			X				AK3.01 - Adjustment of RCP seal backpressure regulator valve to obtain normal flow.	2.7	6	
000025 Loss of RHR System / 4	X						AK1.01 - Loss of RHRS during all modes of operation.	3.9	7	
000026 Loss of Component Cooling Water / 8							Not selected	n/a	n/a	
000027 Pressurizer Pressure Control System Malfunction / 3					X		AA2.07 - Makeup flow indication. Changed KA to AA2.12 – Pressurizer Level	3.7	8	
000029 ATWS / 1				X			EA1.11 - Manual Opening of the CRD Breakers	3.9	9	
000038 Steam Gen. Tube Rupture / 3			X				EK3.08 – Criteria for securing an RCP	4.1	10	
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4		X					EK2.1 – Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.8	11	
000054 (CE/E06) Loss of Main Feedwater / 4						X	2.2.40 – Ability to apply Technical Specifications for a system	3.4	12	
000055 Station Blackout / 6						X	2.4.45 – Ability to prioritize and interpret the significance of each annunciator or alarm.	4.1	13	
000056 Loss of Off-site Power / 6	X						AK1.04 - Definition of saturation conditions, implication for the systems	3.1	14	
000057 Loss of Vital AC Inst. Bus / 6						X	2.1.28 – Knowledge of the purpose and function of major system components and controls.	4.1	15	
000058 Loss of DC Power / 6			X				AK3.01 - Use of dc control power by ED/Gs	3.4	16	
000062 Loss of Nuclear Svc Water / 4							Not selected	n/a	n/a	
000065 Loss of Instrument Air / 8				X			AA1.02 - Components served by instrument air to minimize drain on system	2.6	17	
W/E04 LOCA Outside Containment / 3							Not selected	n/a	n/a	

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO)						Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
W/E11 Loss of Emergency Coolant Recirc. / 4							Not selected	n/a	n/a
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4		X					EK2.02 - 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	4.2	18
000077 Generator Voltage and Electric Grid Disturbances / 6							Not selected	n/a	n/a
K/A Category Totals:	3	3	3	3	3	3	Group Point Total:		18

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)						Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1							Not selected	n/a	n/a
000003 Dropped Control Rod / 1							Not selected	n/a	n/a
000005 Inoperable/Stuck Control Rod / 1		X					AK2.01 - Controllers and positioners	2.5	19
000024 Emergency Boration / 1							Not selected	n/a	n/a
000028 Pressurizer Level Malfunction / 2							Not selected	n/a	n/a
000032 Loss of Source Range NI / 7							Not selected	n/a	n/a
000033 Loss of Intermediate Range NI / 7							Not selected	n/a	n/a
000036 (BW/A08) Fuel Handling Accident / 8							2.1.28 – Knowledge of the purpose and function of major system components and controls. Changed to System 076 2.1.31	n/a	n/a
000037 Steam Generator Tube Leak / 3					X		AA2.15 - Magnitude of atmospheric radioactive release if cool-down must be completed using steam dump or atmospheric reliefs Changed to AA2.01 Unusual readings of the monitors; steps needed to verify readings.	3.0	20
000051 Loss of Condenser Vacuum / 4							Not selected	n/a	n/a
000059 Accidental Liquid RadWaste Rel. / 9							AK1.05 - The calculation of offsite doses due to a release from the power plant Changed to System 067 AK1.02	n/a	n/a
000060 Accidental Gaseous Radwaste Rel. / 9							Not selected	n/a	n/a
000061 ARM System Alarms / 7							Not selected	n/a	n/a
000067 Plant Fire On-site / 8	X						AK1.02 – Fire Fighting	3.1	21
000068 (BW/A06) Control Room Evac. / 8				X			AA1.13 – Charging Pump controllers (to maintain Pressurizer level)	4.1	22
000069 (W/E14) Loss of CTMT Integrity / 5							Not selected	n/a	n/a
000074 (W/E06&E07) Inad. Core Cooling / 4							Not selected	n/a	n/a
000076 High Reactor Coolant Activity / 9						X	2.1.31 – Ability to locate control switches, controls, and indications, and to determine they correctly reflect the desired plant lineup.	4.6	23
W/E01 & E02 Rediagnosis & SI Termination / 3							Not selected	n/a	n/a
W/E13 Steam Generator Over-pressure / 4							Not selected	n/a	n/a
W/E15 Containment Flooding / 5							Not selected	n/a	n/a
W/E16 High Containment Radiation / 9							Not selected	n/a	n/a
BW/A01 Plant Runback / 1							Not selected	n/a	n/a
BW/A02&A03 Loss of NNI-X/Y / 7							Not selected	n/a	n/a
BW/A04 Turbine Trip / 4			X				AK3.2 - Normal, abnormal and emergency operating procedures associated with (Turbine Trip)	3.4	24
BW/A05 Emergency Diesel Actuation / 6							Not selected	n/a	n/a
BW/A07 Flooding / 8					X		AA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.3	25
BW/E03 Inadequate Subcooling Margin / 4							Not selected	n/a	n/a
BW/E08; W/E03 LOCA Cooldown - Depress. / 4							Not selected	n/a	n/a
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4		X					EK2.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.7	26

BW/E13&E14 EOP Rules and Enclosures			X				EK3.2- Normal, Abnormal and Emergency Operating Procedures associated with (EOP Rules and EOP Enclosures)	3.2	27
CE/A11; W/E08 RCS Overcooling - PTS / 4							Not selected	n/a	n/a
CE/A16 Excess RCS Leakage / 2							Not selected	n/a	n/a
CE/E09 Functional Recovery							Not selected	n/a	n/a
K/A Category Point Totals:	1	2	2	1	2	1	Group Point Total:	9	

PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO)													Form ES-401-2	
	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			K5.03 - Effects of RCP shutdown on T-ave., including the reason for the unreliability of T-ave. in the shutdown loop Changed to K5.02 – Effects of RCP coastdown on RCS parameters. A3.01 – Seal Injection flow	2.8 3.3	28 29
004 Chemical and Volume Control						X						K6.09 - Purpose of VCT divert valve	2.8	30
005 Residual Heat Removal			X								X	2.2.38 - Knowledge of conditions and limitations in the facility license. K3.01 - RCS	3.6 3.9	31 32
006 Emergency Core Cooling				X								K4.08 - Recirculation flowpath of reactor building sump	3.4 *	33
007 Pressurizer Relief/Quench Tank	X											K1.01 – Containment System	2.9	34
008 Component Cooling Water	X											K1.02 - Loads cooled by CCWS	3.3	35
010 Pressurizer Pressure Control				X								K4.02 - Prevention of uncovering PZR heaters	3.0	36
012 Reactor Protection						X						K6.04 – Bypass block circuits	3.3	37
013 Engineered Safety Features Actuation				X								K5.02 - Safety system logic and reliability	2.9	38
022 Containment Cooling		X										K2.02 - Chillers	2.5	39
025 Ice Condenser												Not selected	n/a	n/a
026 Containment Spray		X								X		K2.02 - MOVs A4.01 – CSS control	2.7 4.5	40 41
039 Main and Reheat Steam	X									X		K1.06 - Condenser steam dump A4.07 - Steam dump valves	3.1 2.8 *	42 43
059 Main Feedwater							X					A1.07 - Feed Pump speed, including normal control speed for ICS	2.5 *	44
061 Auxiliary/Emergency Feedwater			X						X			K3.02 - S/G A3.02 – RCS Cooldown during AFW operations.	4.2 4.0	45 46
062 AC Electrical Distribution								X				A2.16 - Degraded system voltages	2.5	47

PWR Examination Outline													Form ES-401-	
Plant Systems - Tier 2/Group 1 (RO)														
	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	#
063 DC Electrical Distribution								X			X	A2.01 – Grounds	2.5	48
												2.2.42 – Ability to recognize system parameters that are entry level condition for Technical Specificationn	3.4	49
064 Emergency Diesel Generator						X						K6.08 – Fuel Oil Storage Tanks	3.2	50
073 Process Radiation Monitoring							X					A1.01 - Radiation levels	3.2	51
076 Service Water				X								K4.01 - Conditions initiating automatic closure of closed cooling water auxiliary building header supply and return valves	2.5 *	52
078 Instrument Air			X								X	K3.01 – Containment Air System		
												Changed KA to		
												K3.02 – Pneumatic Valves and Controls	3.4	53
												2.1.32 – Ability to explain and apply system limits and precautions.	3.8	54
103 Containment							X					A1.01 - Containment pressure, temperature, and humidity	3.7	55
K/A Category Point Totals:	3	2	3	3	2	3	3	2	2	2	3	Group Point Total:		28

PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO)													Form ES-401-2	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
001 Control Rod Drive				X								K4.01 – Rod Position Indication	3.5	56
002 Reactor Coolant												Not selected	n/a	n/a
011 Pressurizer Level Control									X			A3.01 - Boration/dilution	2.8 *	57
014 Rod Position Indication												Not selected	n/a	n/a
015 Nuclear Instrumentation					X							K5.10 – Excore Detector Operation	2.8	58
016 Non-nuclear Instrumentation												Not selected	n/a	n/a
017 In-core Temperature Monitor											X	2.1.27 - Knowledge of system purpose and / or function.	3.9	59
027 Containment Iodine Removal												Not selected	n/a	n/a
028 Hydrogen Recombiner and Purge Control		X										K2.01 – Hydrogen Recombiners	2.5	60
029 Containment Purge												Not selected	n/a	n/a
033 Spent Fuel Pool Cooling												Not selected	n/a	n/a
034 Fuel Handling Equipment	X											K1.05 - Shutdown monitor	2.5 *	61
035 Steam Generator						X						K6.01 - MSIVs	3.2	62
041 Steam Dump/Turbine Bypass Control												Not selected	n/a	n/a
045 Main Turbine Generator			X									K3.01 – Remainder of the plant	2.9	63
055 Condenser Air Removal												Not selected	n/a	n/a
056 Condensate												Not selected	n/a	n/a
068 Liquid Radwaste												Not selected	n/a	n/a
071 Waste Gas Disposal										X		A4.26 – Authorized waste gas release, conducted in compliance with radioactive gas discharge permit	3.1	64
072 Area Radiation Monitoring							X					A1.01 - Radiation levels	3.4	65
075 Circulating Water												Not selected	n/a	n/a
079 Station Air												Not selected	n/a	n/a
086 Fire Protection												Not selected	n/a	n/a
K/A Category Point Totals:	1	1	1	1	1	1	1	0	1	1	1	Group Point Total:		10

Facility: Arkansas Nuclear One – Unit 1		Date of Exam: 9/5/2008				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.21	Ability to obtain and verify controlled procedure copy.	3.5	66		
	2.1.29	Knowledge of how to conduct and verify valve lineups.	4.1	67		
	2.1.					
	2.1.					
	2.1.					
	Subtotal			2		
2. Equipment Control	2.2.15	Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups, tag-outs, etc.	3.9	68		
	2.2.13	Knowledge of tagging and clearance procedures	4.1	69		
	2.2.36	Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	2.9	70		
	2.2.21	Knowledge of pre- and post-maintenance operability requirements.				
	2.2.					
	2.2.					
	2.2.					
	Subtotal			3		
3. Radiation Control	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	3.2	71		
	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	72		
	2.3.					
	2.3.					
	2.3.					
	Subtotal			2		
4. Emergency Procedures / Plan	2.4.11	Knowledge of abnormal condition procedures.	4.0	73		
	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.	4.0	74		
	2.4.49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.6	75		
	2.4.					
	2.4.					
	2.4.					
	Subtotal			3		
Tier 3 Point Total				10		

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ES-401							PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO)			Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#		
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1						X	2.4.2- Knowledge of system setpoints, interlocks and automatic actions associated with EOP entry conditions.	4.6	76		
000008 Pressurizer Vapor Space Accident / 3							Not selected	n/a	n/a		
000009 Small Break LOCA / 3							Not selected	n/a	n/a		
000011 Large Break LOCA / 3							Not selected	n/a	n/a		
000015/17 RCP Malfunctions / 4							Not selected	n/a	n/a		
000022 Loss of Rx Coolant Makeup / 2							Not selected	n/a	n/a		
000025 Loss of RHR System / 4							Not selected	n/a	n/a		
000026 Loss of Component Cooling Water / 8							Not selected	n/a	n/a		
000027 Pressurizer Pressure Control System Malfunction / 3							Not selected	n/a	n/a		
000029 ATWS / 1						X	2.2.39 Knowledge of less than or equal to one hour Technical Specification action statements for systems.	4.5	77		
000038 Steam Gen. Tube Rupture / 3							Not selected	n/a	n/a		
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4					X		EA2.2 – Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	4.0	78		
000054 (CE/E06) Loss of Main Feedwater / 4							Not selected	n/a	n/a		
000055 Station Blackout / 6							Not selected	n/a	n/a		
000056 Loss of Off-site Power / 6							Not selected	n/a	n/a		
000057 Loss of Vital AC Inst. Bus / 6					X		AA2.16 – Normal and Abnormal Pressurizer Level for various modes of plant operation.	3.1	79		
000058 Loss of DC Power / 6							Not selected	n/a	n/a		
000062 Loss of Nuclear Svc Water / 4							Not selected	n/a	n/a		
000065 Loss of Instrument Air / 8							Not selected	n/a	n/a		
W/E04 LOCA Outside Containment / 3							Not selected	n/a	n/a		
W/E11 Loss of Emergency Coolant Recirc. / 4							Not selected	n/a	n/a		
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4						X	2.4.46 – Ability to verify that the alarms are consistent with the plant conditions.	4.2	80		
000077 Generator Voltage and Electric Grid Disturbances / 6					X		AA2.03 – Generator current outside the capability curve.	3.6	81		
K/A Category Totals:					3	3	Group Point Total:			6	

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO)						Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1							Not selected	n/a	n/a
000003 Dropped Control Rod / 1							Not selected	n/a	n/a
000005 Inoperable/Stuck Control Rod / 1							Not selected	n/a	n/a
000024 Emergency Boration / 1							Not selected	n/a	n/a
000028 Pressurizer Level Malfunction / 2							Not selected	n/a	n/a
000032 Loss of Source Range NI / 7							Not selected	n/a	n/a
000033 Loss of Intermediate Range NI / 7							Not selected	n/a	n/a
000036 (BW/A08) Fuel Handling Accident / 8							Not selected	n/a	n/a
000037 Steam Generator Tube Leak / 3							Not selected	n/a	n/a
000051 Loss of Condenser Vacuum / 4						X	2.4.21 – Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.	4.6	82
000059 Accidental Liquid RadWaste Rel. / 9							Not selected	n/a	n/a
000060 Accidental Gaseous Radwaste Rel. / 9							Not selected	n/a	n/a
000061 ARM System Alarms / 7							Not selected	n/a	n/a
000067 Plant Fire On-site / 8							Not selected	n/a	n/a
000068 (BW/A06) Control Room Evac. / 8							Not selected	n/a	n/a
000069 (W/E14) Loss of CTMT Integrity / 5							Not selected	n/a	n/a
000074 (W/E06&E07) Inad. Core Cooling / 4							Not selected	n/a	n/a
000076 High Reactor Coolant Activity / 9						X	AA2.02 – Corrective Actions required for High Fission Product Activity in RCS.	3.4	83
W/E01 & E02 Rediagnosis & SI Termination / 3							Not selected	n/a	n/a
W/E13 Steam Generator Over-pressure / 4							Not selected	n/a	n/a
W/E15 Containment Flooding / 5							Not selected	n/a	n/a
W/E16 High Containment Radiation / 9							Not selected	n/a	n/a
BW/A01 Plant Runback / 1							Not selected	n/a	n/a
BW/A02&A03 Loss of NNI-X/Y / 7							Not selected	n/a	n/a
BW/A04 Turbine Trip / 4							Not selected	n/a	n/a
BW/A05 Emergency Diesel Actuation / 6							Not selected	n/a	n/a
BW/A07 Flooding / 8							Not selected	n/a	n/a
BW/E03 Inadequate Subcooling Margin / 4						X	EA2.1 – Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	4.0	84
BW/E08; W/E03 LOCA Cooledown - Depress. / 4							Not selected	n/a	n/a
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4						X	2.1.7 – Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.7	85
BW/E13&E14 EOP Rules and Enclosures							Not selected	n/a	n/a
CE/A11; W/E08 RCS Overcooling - PTS / 4							Not selected	n/a	n/a
CE/A16 Excess RCS Leakage / 2							Not selected	n/a	n/a
CE/E09 Functional Recovery							Not selected	n/a	n/a
K/A Category Point Totals:	0	0	0	0	2	2	Group Point Total:	4	

PWR Examination Outline Plant Systems - Tier 2/Group 1 (SRO)													Form ES-401-2	
	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				A2.03 – Problems associated with RCP motors, including faulty motors and current, and winding and bearing temperature problems.	3.1	86
004 Chemical and Volume Control												2.4.1 – Knowledge of EOP entry conditions and immediate action steps. Changed to System 006 A2.03	n/a	n/a
005 Residual Heat Removal												Not selected	n/a	n/a
006 Emergency Core Cooling								X				A2.03 – System Leakage	3.7	87
007 Pressurizer Relief/Quench Tank												Not selected	n/a	n/a
008 Component Cooling Water												Not selected	n/a	n/a
010 Pressurizer Pressure Control												Not selected	n/a	n/a
012 Reactor Protection												Not selected	n/a	n/a
013 Engineered Safety Features Actuation											X	2.4.1 – Knowledge of EOP entry conditions and immediate action steps.	4.8	88
022 Containment Cooling												Not selected	n/a	n/a
025 Ice Condenser												Not selected	n/a	n/a
026 Containment Spray											X	2.4.21 - Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc. Changed to 2.4.4 Ability to recognize abnormal indications for system operating parameters that are entry level conditions for emergency and abnormal operating procedures.	4.7	89
039 Main and Reheat Steam												Not selected	n/a	n/a
059 Main Feedwater												Not selected	n/a	n/a
061 Auxiliary/Emergency Feedwater								X				A2.02 – Loss of air to steam supply valve Changed to A2.03 Loss of DC Power	3.4	90
062 AC Electrical Distribution												Not selected	n/a	n/a
063 DC Electrical Distribution												Not selected	n/a	n/a
064 Emergency Diesel Generator												Not selected	n/a	n/a
073 Process Radiation Monitoring												Not selected	n/a	n/a
076 Service Water												Not selected	n/a	n/a
078 Instrument Air												Not selected	n/a	n/a
103 Containment												Not selected	n/a	n/a
K/A Category Point Totals:	0	0	0	0	0	0	0	3	0	0	2	Group Point Total:		5

PWR Examination Outline Plant Systems - Tier 2/Group 2 (SRO)														Form ES-401-2
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
001 Control Rod Drive												Not selected	n/a	n/a
002 Reactor Coolant												Not selected	n/a	n/a
011 Pressurizer Level Control								X				A2.12 – Operation of Auxiliary Spray	3.3	91
014 Rod Position Indication												Not selected	n/a	n/a
015 Nuclear Instrumentation											X	2.2.39 – Knowledge of less than or equal to one hour Technical Specification action statements for systems.	4.5	92
016 Non-nuclear Instrumentation								X				A2.01 – Detector Failure.	3.1	93
017 In-core Temperature Monitor												Not selected	n/a	n/a
027 Containment Iodine Removal												Not selected	n/a	n/a
028 Hydrogen Recombiner and Purge Control												Not selected	n/a	n/a
029 Containment Purge												Not selected	n/a	n/a
033 Spent Fuel Pool Cooling												Not selected	n/a	n/a
034 Fuel Handling Equipment												Not selected	n/a	n/a
035 Steam Generator												Not selected	n/a	n/a
041 Steam Dump/Turbine Bypass Control												Not selected	n/a	n/a
045 Main Turbine Generator												Not selected	n/a	n/a
055 Condenser Air Removal												Not selected	n/a	n/a
056 Condensate												Not selected	n/a	n/a
068 Liquid Radwaste												Not selected	n/a	n/a
071 Waste Gas Disposal												Not selected	n/a	n/a
072 Area Radiation Monitoring												Not selected	n/a	n/a
075 Circulating Water												Not selected	n/a	n/a
079 Station Air												Not selected	n/a	n/a
086 Fire Protection												Not selected	n/a	n/a
K/A Category Point Totals:	0	0	0	0	0	0	0	2	0	0	1	Group Point Total:		3

Facility: ANO Unit 1		Date of Exam: 9/5/2008				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.5	Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.			3.9	94
	2.1.35	Knowledge of the fuel-handling responsibilities of SROs.			3.9	95
	Subtotal					2
2. Equipment Control	2.2.19	Knowledge of maintenance work order requirements.			3.4	96
	Subtotal					1
3. Radiation Control	2.3.5	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personal monitoring equipment, etc.			2.9	97
	2.3.11	Ability to control radiation releases			4.3	98
	Subtotal					2
4. Emergency Procedures / Plan	2.4.8	Knowledge of how abnormal operating procedures are used in conjunction with EOPs.			4.5	99
	2.4.35	Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.			4.0	100
	Subtotal					2
Tier 3 Point Total						7

Facility: <u>ANO-1</u>		Date of Examination: <u>9-8-2008</u>
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: <u>2008-1</u>

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations 2.1.23 (Imp 4.3)	D/R	Ability to perform specific system and integrated plant procedures during all modes of plant operation. A1JPM-RO-HTBAL2
Conduct of Operations 2.1.19 (Imp 3.9)	N/S	Ability to use plant computers to evaluate system or component status. A1JPM-RO-PMS3
Equipment Control 2.2.12 (Imp 3.7)	D/R	Knowledge of surveillance procedures. A1JPM-RO-SURV3
Radiation Control 2.3.4 (Imp 3.2)	N/R	Knowledge of radiation exposure limits under normal or emergency conditions. A1JPM-RO-DOSE-SVY2
Emergency Procedures/Plan	N/A	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>ANO-1</u>		Date of Examination: <u>9-8-2008</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: <u>2008-1</u>

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations 2.1.23 (Imp 4.3)	D/R	Ability to perform specific system and integrated plant procedures during all modes of plant operation. A1JPM-SRO-HTBAL1
Conduct of Operations 2.1.34 (Imp 3.5)	M/R	Knowledge of primary and secondary plant chemistry limits. A1JPM-SRO-CHEM1
Equipment Control 2.2.12 (Imp 4.1)	D/R	Knowledge of surveillance procedures. A1JPM-SRO-SURV4
Radiation Control 2.3.4 (Imp 3.7)	N/R	Knowledge of radiation exposure limits under normal or emergency conditions. A1JPM-SRO-DOSE-SVY2
Emergency Procedures/Plan 2.4.41 (Imp 4.6)	N/S	Knowledge of the Emergency Action Level thresholds and classification A1JPM-SRO-EAL11

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>ANO-1</u>		Date of Examination: <u>9-8-2008</u>
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: <u>2008-1</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
a. A1JPM-RO-CRD03 Transfer a Group of Rods to the Auxiliary Power Supply 003 AA2.01 (RO 3.7/SRO 3.9)	A/D/S	1 Reactivity Control
b. A1JPM-RO-MUP01 Isolate Letdown, Restore Makeup and Seal Injection 004 A4.06 (RO 3.6/SRO 3.1)	D/E/L/S	2 Reactor Coolant System Inventory Control
c. ANO-1-JPM-RO-PZR05 CONTROL RCS PRESSURE IN MANUAL IN RESPONSE TO RCS PRESSURE HI ANNUNCIATOR 010 A3.02 (RO 3.6/SRO 3.5)	N/A/S	3 Reactor Pressure Control
d. A1JPM-RO-DHR03 Establish Decay Heat Removal Using P-34A 005 A4.01 (RO 3.6/SRO 3.4)	A/D/L/S	4 Heat Removal From Reactor Core (Primary)
e. A1JPM-RO-HYD01, Place Hydrogen Recombiner M-55A in operation 028 A4.01 (RO 4.0/SRO 4.0)	D/EN/S	5 Containment Integrity
f. A1JPM-RO-EDG04 Emergency Diesel Generator (EDG) System 064 A4.07 (RO 3.4/SRO 3.4)	A/D/EN/S	6 Electrical
g. A1-JPM-RO-RPS05 Place Channel "A" in a Tripped Condition B/W E02.EA1.1 (RO 4.0/SRO 3.6)	D/E/S	7 Instrumentation
h. A1JPM-RO-ICW01 Contingency Actions for Loss of Two ICW Pumps 008 A2.01 (RO 3.3/SRO 3.6)	D/L/P/S	8 Plant Service Systems

In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. A1JPM-RO-EFW03 Relieve steam binding of an Emergency Feedwater Pump 061 K5.05 (RO 2.7/SRO 3.2)	D/R/EN	4 Heat Removal From Reactor Core (Secondary)
j. A1JPM-RO-RPS06 Remove Power from CRD System Due to "D" RPS channel trip relay failure. 012 A2.06 (RO 4.4/SRO 4.7)	N	7 Instrumentation
k. A1JPM-RO-GRW01, Waste Gas Decay Tank release 071 A4.26 (RO 3.1/SRO 3.9)	D/P/R	9 Radioactivity Release
<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	$\leq 9 / \leq 8 / \leq 4$	
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$	
(EN)gineered safety feature	- / - / ≥ 1 (control room system)	
(L)ow-Power / Shutdown	$\geq 1 / \geq 1 / \geq 1$	
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$	
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)	
(R)CA	$\geq 1 / \geq 1 / \geq 1$	
(S)imulator		

Facility: <u>ANO Unit 1</u>		Date of Examination: <u>9/5/2008</u>
Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>		Operating Test No.: <u>2008-1</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
a. ANO-1-JPM-RO-PZR05 CONTROL RCS PRESSURE IN MANUAL IN RESPONSE TO RCS PRESSURE HI ANNUNCIATOR 010 A3.02 (RO 3.6/SRO 3.5)	N/A/S	3 Reactor Pressure Control
b. A1JPM-RO-HYD01, Place Hydrogen Recombiner M-55A in operation 028 A4.01 (RO 4.0/SRO 4.0)	D/EN/S	5 Containment Integrity
c. A1JPM-RO-EDG04 Emergency Diesel Generator (EDG) System 064 A4.07 (RO 3.4/SRO 3.4)	A/D/EN/S	6 Electrical
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
d. A1JPM-RO-EFW03 Relieve steam binding of an Emergency Feedwater Pump 061 K5.05 (RO 2.7/SRO 3.2)	D/R/EN	4 Heat Removal From Reactor Core (Secondary)
e. A1JPM-RO-RPS06 Remove Power from CRD System Due to "D" RPS channel trip relay failure. 012 A2.06 (RO 4.4/SRO 4.7)	N	7 Instrumentation
@ 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-1			Date of Exam: 9-8-2008			Operating Test No.: 2008-1								
A P P L I C A N T	E V E N T T Y P E	Scenarios												
		1			2			3			T O T A L	M I N I M U M(*)		
		CREW POSITION			CREW POSITION			CREW POSITION						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P		R	I	U
RO ATC	RX		5			5			6			1	1	0
	NOR		5			5			6,10			1	1	1
	I/C		3,5,7,8			6,9,10			4,8			4	4	2
	MAJ		7,8			7,10			8,9			2	2	1
	TS											0	2	2
RO BOP	RX											1	1	0
	NOR			1			1,11			1		1	1	1
	I/C			2,4,6,8			3,4,6,8			2,4,5,7		4	4	2
	MAJ			7,8			7,10			8,9		2	2	1
	TS											0	2	2
SRO-U	RX											1	1	0
	NOR	1			1,5,11			1,6,10				1	1	1
	I/C	2,3,5,6, 7,8			3,4,6, 8,10			2,4,5,6, 7,10				4	4	2
	MAJ	7,8			7,10			8,9				2	2	1
	TS	2,8			4,10			4,8,9				0	2	2

Instructions:

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

Facility: ANO-1

Scenario No.: 1

Op-Test No.: 2008-1

Examiners: _____ Operators: _____

Initial Conditions:

75% power due to dispatcher direction for loss of 500KV.

C2A IA compressor is out of service for overhaul.

P36C HPI pump is the operating pump. P36B MOD aligned to A4.

ULD is failed and will not lower power.

RPS is failed and will not initiate a RX trip.

Turnover:

75% power due to dispatcher direction for loss of 500KV line as a result of severe thunderstorms in south east Arkansas. Down power occurred 4 hours ago.

Severe thunderstorm warning in effect for the next 2 hours.

All Natural Emergencies AOP actions are complete.

C2A IA compressor is out of service for overhaul.

1104.005 Supplement 2 RB Spray Red Train Valves Quarterly Test is in progress up to step 2.0.

Crew will continue in surveillance after turnover.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP)	Perform remaining steps of 1104.005 Supplement 2 RB Spray Red Train Valves Quarterly Test.
2	CV-2401	C (BOP)	The CV-2401 RB Spray Block stroke time will be outside acceptable limits for operability (TS)
3	To be developed	I (ATC)	RCP total flow transmitter fails to mid scale. This will result CV-1207 Seal Injection control valve traveling full open.
4	CV016	C (BOP)	RCP seal failure requiring power reduction and securing on the RCP.
5	DI_ICC0009L	N (ATC) C (ATC) R (ATC)	ULD is failed requiring ATC to reduce power manually using the SG/RX master.
6	DI_H24T	C (BOP)	Loss of H2 bus when RCP is secured.
	If power <55%	N/A	Trip of 'A' RCP (Contingency to ensure RPS trip setpoint is reached.)
7	RP246,7,8,9	C (ATC) M (ALL)	RPS is failed requiring a manual RX trip on a loss of two RCP's >55% power (TS) (ATC-CT)
8	CV020 RC006	C (ALL) M (ALL)	The 'B' RCP seal will fail resulting in a ~200gpm RCS leak in the RX building requiring HPI (TS) (BOP-CT)
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

SCENARIO #1 NARRATIVE

The crew will assume the watch at 75% power. The Mayflower 500KV line is out of service due to storm related damage in south east Arkansas. The down power was completed 4 hours ago. Reactor engineering has directed that rods can be used to account for the xenon transient. There is a severe thunderstorm warning in effect for Pope and Yell counties for the next two hours. All Natural Emergency (1203.025) actions are complete for this notification.

1104.005 Supplement 2 RB Spray Red Train Valves Quarterly Test is complete up to step 2.1. The crew should brief the remaining steps of the surveillance. The BOP will perform the stroke test **(BOP-N)**. CV-2401 RB Spray Header Block valve opening time will be outside its limiting value for operability. The BOP will identify this condition and report it to the CRS **(BOP-C) (TS)**. The CRS should communicate the failure to the surrogate SM. The surrogate SM will assume responsibility for completing the actions of step 3.2. A retest of the valve is not desired.

The RCP total seal injection flow transmitter PDT1239 will fail to ~mid scale resulting in the RCP Seal Injection Total Flow FIC1207 on C04 indicating ~25gpm **(ATC-I)**. This will cause CV-1207 RCP Seal Injection Control Valve to fail open raising total seal injection flow to maximum. Annunciator K08-D7 RCP Seal Cavity Press HI/LO will alarm due to the high seal injection flow. The CRS should reference 1203.012G K08 Annunciator Corrective Action. The ACA will direct the CRS to 1203.031 Reactor Coolant Pump and Motor Emergency. The crew should recognize high seal injection flow on C04 and take manual control of CV-1207 to establish 8-10gpm individual seal injection flow.

The RCP seal injection transient will cause the 'B' RCP lower seal to fail **(BOP-C)**. The CRS should implement 1203.031 Reactor Coolant Pump and Motor Emergency and reduce power to ~60% in order to stop the 'B' RCP.

The ATC should recognize that the ULD is not responding and power is not lowering **(ATC-C)**. The ATC should reduce power to ~60% using the SG/RX Master station in hand **(ATC-R) (ATC-N)**.

When the 'B' RCP is stopped a loss of the H2 bus will occur resulting in a loss of two RCP's (B and D) **(BOP-C)**. If reactor power is <55% then the 'A' RCP will be tripped by the simulator instructor. The ATC should recognize the reactor should have tripped and manually trip the reactor. **(ATC-C) (ATC-CT) (ALL-M) (TS)**.

A ~200gpm leak will occur in the reactor building from the failed RCP seal **(ALL-C) (ALL-M) (TS)**. The crew should recognize the leak and the BOP should initiate HPI per RT-2 to maintain RCS inventory pressure and subcooling margin **(BOP-CT)**.

Facility: ANO-1

Scenario No.: 2

Op-Test No.: 2008-1

Examiners: _____ Operators: _____

Initial Conditions:

100% Power

EFIC is failed and will not auto actuate.

A crew is in the switchyard performing visual inspections of all MOD's.

P36C HPI pump is the operating pump. P36B MOD aligned to A4.

C2A IA compressor is out of service for overhaul.

Turnover:

C2A IA compressor is out of service for overhaul.

Swap ICW pumps for normal pump rotation to have P33A, and P33B running. The Inside AO has been briefed and is standing by the ICW pumps. P33B had not been drained.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP)	Swap operating ICW pumps to have P33A and P33B running.
2	N/A	N/A	Dispatcher will call and report a severe thunderstorm warning in effect for the next two hours for Pope and Yell counties. There is currently a line of thunderstorms entering the western edge of Pope county.
3	IRF Lightning IOR DI-DG1S	C (BOP)	Lightning strike will cause the auto start of #1 EDG.
4	IMF CV-3806	C (BOP)	#1 EDG SW valve will not open following the EDG auto start. This will require the operators to shutdown #1 EDG. (TS)
5	N/A	N (ATC) R (ATC)	Dispatcher will call and direct a power reduction to 75% in the next 15 minutes.
6	IRF Lightning IMF ED451	I (ALL)	Another lightning strike will result in the loss of the NNI Y power supply.
7	IMF ED183	M (ALL)	A Loss of Offsite Power will occur resulting in an automatic reactor trip.
8	IMF DG176	C (BOP)	The #2 EDG will not auto start requiring the operators to manually start the EDG. (BOP-CT)
9	IMF FW621	C (ATC)	EFIC is failed and will not automatically actuate EFW. (ATC-CT) (TS)
10	IMF DG174	C (ALL) M (ALL)	The #2 EDG will trip putting the plant into a blackout. (TS)
11	IRF A901	N (BOP)	The Alternate AC Generator will become available. (BOP-CT)

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

SCENARIO #2 NARRATIVE

The crew will assume the watch at 100% power. C2A IA compressor is out of service for overhaul.

The crew will start P33B and secure P33C per 1104.028 ICW Operating Procedure step 10.2 **(BOP-N)**. This is being performed in order to visually inspect the motor rotor. P33B had not been drained.

The dispatcher will call and report a severe thunderstorm warning in effect for the next two hours for Pope and Yell counties. There is currently a line of thunderstorms entering the western edge of Pope County. The CRS should implement 1203.025 Natural Emergencies

A lightning strike will cause the auto start of the #1 EDG **(BOP-C)**. The crew should determine it is a spurious actuation. The #1 EDG SW valve CV-3806 will not open resulting in no cooling flow to the EDG **(BOP-C)**. The crew should take the #1 EDG to lockout to prevent an automatic trip of the EDG **(TS)**.

The dispatcher will call and direct U1 to reduce net generator output to 650Mwe **(ATC-N) (ATC-R)**.

A second lightning strike will result in the loss on NNI-Y power supply **(ATC-I)**. The crew should recognize the loss of power. The CRS should implement 1203.047 Loss of NNI Power.

A loss of offsite power will occur due to storm related grid instabilities **(ALL-M)**. The reactor will trip automatically.

The #2 EDG will not auto start requiring the BOP to manually start the EDG **(BOP-C) (BOP-CT)**.

The EFIC system is failed and will not automatically actuate EFW **(ATC-C)**. The ATC should manually actuate EFW from the remote switch matrix **(ATC-CT) (TS)**.

The #2 EDG will trip putting the plant into a blackout **(ALL-M) (ALL-C) (TS)**.

The alternate AC generator will become available. The BOP should energize the A3 bus from the AAC generator **(BOP-CT) (BOP-N)**.

Facility: ANO-1

Scenario No.: 3

Op-Test No.: 2008-1

Examiners: _____ Operators: _____

Initial Conditions:

100% power

P36C HPI pump is the operating pump. P36B MOD aligned to A4.

C2A IA compressor is out of service for overhaul.

Turnover:

C2A IA compressor is out of service for overhaul.

Swap operating EH oil pumps for following maintenance on the standby pump.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP)	Swap the operating EH oil pumps
2	N/A	C (BOP)	When standby EH pump is started it will not come up to normal operating pressure requiring the operator to shut it down.
3	IRF K16B8	N/A	An earth quake will occur on the Mew Madrid fault north of Memphis that will result in a .01G alarm at ANO.
4	To be developed	I (ALL)	Immediately upon receiving the earth quake alarm the 'B' core flood tank pressure indication will fail to zero and the 'B' CFT actual pressure will slowly vent to the RB atmosphere. (TS)
5	IMF FW086	C (BOP)	P8A heater drain pump will experience a winging failure causing it to heat up and eventually trip.
6	IOR DO_HS2420R IOR DO_HS2420G IMF CV2420	N (ALL) R (ATC)	A power reduction is required to maintain feedwater suction pressure.
7	IRF CO_P14A IRF CO_P14B	C (BOP)	The operating EH pump will trip causing a loss of EH fluid and a main turbine trip >43% power.
8	IMF RP246,7,8,9	C (ATC) M (ALL)	RPS is failed and will not cause a automatic trip. (TS) The operators are required the manually trip the reactor. (ATC-CT)
9	IMF RC001	M (ALL)	A ~150 GPM tube leak will develop in the 'A" SG requiring initiation of HPI. (TS) (BOP-CT)
10	N/A	N (ATC)	A plant cooldown is required to allow for isolation of the bad SG.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

SCENARIO #3 NARRATIVE

The crew will assume the watch with the plant at 100% power. C2A IA compressor is out of service for overhaul.

The turn over sheet will direct the crew to swap operating turbine electro-hydraulic pumps per 1106.012 Electro-Hydraulic Oil System Operation Section 14 **(BOP-N)**. When the standby pump is started it will not come up to operating pressure. This will require the operator to shut it down and keep existing EH pump in service. **(BOP-C)**.

An earth quake will occur on the New Madrid fault. A 'SEISMIC XSH-8007 0.01g' alarm will come in on K15. The CRS should reference 1203.012M Annunciator Corrective Action and implement 1203.025 Natural Emergencies, "Earthquake" section. The earth quake will cause the failure of one of two 'B' pressure instrument resulting in a low pressure alarm and the slow venting on the 'B' CFT **(ALL-I) (TS)**.

P8A heater drain pump will experience a winding failure causing a high temperature alarm and P8A trip **(BOP-C)**. The CRS should reference 1203.012E Annunciator Corrective Action P8A/P8B FLOW LO and CONDENSATE PUMP AUTOSTART.

A plant power reduction is required to maintain suction pressure. The CRS should direct the power reduction per 1203.045 Rapid Plant Shutdown **(ATC-R) (ALL-N)**.

After the power reduction the operating EH oil pump will trip. The standby pump will not auto start and cannot be manually started **(BOP-C)**. The loss of both EH pumps will result in a turbine trip. The reactor will fail to trip do to a failure of RPS **(ATC-C)**. The ATC should manually trip the reactor **(ATC-CT) (ALL-M)**.

A ~150gpm tube leak will occur in the 'A' SG **(ALL-M)**. The CRS should direct operation per 1202.006 Tube Rupture. An RCS depressurization and cooldown should be started **(ATC-N)**.

The scenario may be terminated when a controlled cooldown and depressurization is started or at the direction of the lead evaluator.