

August 12, 2005

Explanation of Methodology for Replacing Questions on ANO Unit 1 Initial License RO Written Examination

The written examination and outline for the RO were modified in accordance with direction from NRC Region IV.

The first three questions' K/As were replaced. One New and two Modified questions developed for these K/As.

The next seven questions were replaced with four New and three Direct questions. The K/A for question eight was replaced due to the limited scope of the K/A.

An additional 27 questions were replaced with eight Modified, six Direct, and 13 New questions. Some of the New questions were developed as "New" for this examination in the original exam submittal but were modified as requested by NRC Region IV.

Question #21 was a Fuel Handling Accident question. The Chief Examiner made a comment that this question was SRO knowledge and not RO. This system and K/A was replaced with a K/A from the "Plant Runback" system and a question direct from the bank was selected. This caused questions 21 through 25 to be re-numbered. The Plant Runback question is now question #25 and previously numbered questions 22-25 are now numbered 21-24.

Please refer to the attached matrix for a comparison of replacement questions' QIDs and the original exam submittal question QIDs.

The changes shown on the accompanying outline (ES-401-2) only reflects the changes made for the replacement questions.

2005 ANO Unit One RO Initial Exam - Replacement Questions

	Q No.	New QID	Original QID	Source	Comments
1	1	608	23	New	New KA
2	2	324	27	Modified	New KA
3	3	368	28	Modified	New KA
4	4	198	507	Direct	
5	5	609	452	New	
6	6	610	549	New	
7	7	611	33	New	
8	8	7	282	Direct	New KA
9	9	395	155	Direct	
10	10	612	550	New	
11	15	613	336	New	
12	17	555	555	New	
13	18	614	556	Direct	
14	22	25	10	Direct	Originally question #23.
15	23	606	272	New	Originally question #24.
16	25	162	188	Direct	Originally question #21, changed system & KA, re-sequenced 21-25.
17	28	615	559	New	
18	31	560	560	Modified	
19	32	197	197	Modified	
20	33	71	71	Modified	
21	34	561	561	New	
22	39	307	563	Direct	
23	40	266	266	Modified	
24	49	616	567	New	
25	50	617	86	New	
26	55	569	569	Modified	
27	57	604	604	New	
28	58	571	571	Modified	
29	59	572	572	New	
30	61	201	81	Direct	
31	62	574	574	New	
32	65	619	90	New	
33	66	620	38	Modified	
34	68	576	576	New	
35	70	621	577	Direct	
36	72	605	605	New	
37	75	128	358	Modified	

Facility: Arkansas Nuclear One Unit 1 RO Written Outline														Date of Exam: 09/12/2005					
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 Evolution	1	3	4	3				3	2				3	18			6		
	2	2	1	1	N/A			2	2	N/A			1	9			4		
	Tier Totals	5	5	4				5	4				4	27			10		
2. Plant Systems	1	2	3	3	3	2	2	3	2	3	3	2	28			5			
	2	1	0	1	1	1	1	1	1	1	1	1	10			3			
	Tier Totals	3	3	4	4	3	3	4	3	4	4	3	38			8			
3. Generic Knowledge and Abilities Categories					1		2		3		4		10		1	2	3	4	7
					3		3		2		2								

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and the 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 that are not included on the outline should be added. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from 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.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) 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. 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 number, descriptions, importance ratings, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions – Tier1 /Group1 (RO/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	#	
00007 (BW/E02 & E10; CE/E02) Reactor Trip – Stabilization – Recovery / 1		X					EK3.01 – Knowledge of the reasons for the following as they apply to Reactor Trip: Actions contained in EOP for reactor trip. Changed to EK2.02 – Breakers, relays, and disconnects.	4.0 2.6	1	
00008 Pressurizer Vapor Space Accident / 3			X				AK2.01 – Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following: Valves. Changed to AK3.03 - Actions contained in EOP for PZR vapor space accident/ LOCA.	2.7* 4.1	2	
00009 Small Break LOCA / 3	X						EA2.01 – Ability to determine or interpret the following as they apply to a Small Break LOCA: Actions to be taken, based on RCS temperature and pressure, saturated and superheated. Changed to EK1.01 – Natural circulation and cooling, including reflux boiling.	4.2 4.2	3	
00011 Large Break LOCA / 3		X					EK2.02 – Knowledge of the interrelations between the Large Break LOCA and the following: Pumps.	2.6*	4	
00015/17 RCP Malfunctions / 4		X					AK2.07 – Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions (Loss of RC Flow) and the following: RCP seals.	2.9	5	
00022 Loss of Rx Coolant Makeup / 2			X				AK3.04 – Knowledge of the reasons for the following responses as they apply to Loss of Rx Coolant Makeup: isolating letdown.	3.2	6	
00025 Loss of RHR System / 4						X	2.4.10 - Knowledge of annunciator response procedures.	3.0	7	
00026 Loss of Component Cooling Water / 8					X		AA2.03 – Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: The valve lineups necessary to restart the CCWS while bypassing the portion of the system causing the abnormal condition. Changed to AA2.06 – The length of time after the loss of CCW flow to a component before that component may be damaged.	2.6 2.8	8	
00027 Pressurizer Pressure Control System Malfunction / 3		X					AK2.02 – Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following: Sensors and detectors. Justification for K/A <2.5: Knowledge of interrelationship between sensors/detectors and control systems is important to a Reactor Operator's duties of monitoring the control panels.	2.4	9	
00029 ATWS / 1							Not selected.			
00038 Steam Gen. Tube Rupture / 3				X			EA1.32 – Ability to operate and monitor the following as they apply to SGTR: Isolation of a ruptured S/G.	4.6	10	
00040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4	X						AK1.01 – Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture: Consequences of PTS.	4.1	11	
00054 (CE/E06) Loss of Main Feedwater / 4							Not selected.			
00055 Station Blackout / 6						X	2.4.1 Knowledge of EOP entry conditions and immediate action steps.	4.3	12	
00056 Loss of Off-site Power / 6	X						AK1.01 – Knowledge of the operational implications of the following concepts as they apply to Loss of Off-site Power: Principle of cooling by natural convection.	3.7	13	

000057 Loss of Vital AC Inst. Bus / 6				X		AA1.01 – Ability to operate and/or monitor the following as they apply to the Loss of Vital AC Instrument Bus: Manual inverter swapping.	3.7	14
000058 Loss of DC Power / 6			X			AK3.02 Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: Actions contained in EOP for loss of DC power.	4.0	15
000062 Loss of Nuclear Svc Water / 4					X	2.4.9 - Knowledge of low power/shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.	3.3	16
000065 Loss of Instrument Air / 8					X	AA2.05 - 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.	3.4*	17
W/E04 LOCA Outside Containment / 3						Not applicable to this unit.		
W/E11 Loss of Emergency Coolant Recirc. / 4						Not applicable to this unit.		
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4				X		EA1.2 - Ability to operate and/or monitor the following as they apply to the (Inadequate Heat Transfer): Operating behavior characteristics of the facility.	3.4	18
K/A Category Totals:	3	4	3	3	2	3	Group Point Total:	18

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions – Tier1 /Group2 (RO /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.			
000003 Dropped Control Rod / 1					X		AA2.02 Ability to determine and interpret the following as they apply to the Dropped Control Rod: Signal inputs to rod control system.	2.7	19	
000005 Inoperable/Stuck Control Rod / 1							Not selected.			
000024 Emergency Boration / 1				X			AA1.03 Ability to operate and/or monitor the following as they apply to the Emergency Boration: Boric acid controller.	3.5	20	
000028 Pressurizer Level Malfunction / 2							Not selected.			
000032 Loss of Source Range NI / 7							Not selected.			
000033 Loss of Intermediate Range NI / 7							Not selected.			
000036 (BW/A08) Fuel Handling Accident / 8							Changed to "Not selected" (NRC comment "Not RO question"). Changed system to Plant Runback.			
000037 Steam Generator Tube Leak / 3	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to the Steam Generator Tube Leak: Leak rate vs. pressure drop.	3.5	21	
000051 Loss of Condenser Vacuum / 4						X	2.4.11 Knowledge of abnormal condition procedures.	3.4	22	
000059 Accidental Liquid RadWaste Rel. / 9							Not selected.			
000060 Accidental Gaseous Radwaste Rel. / 9			X				AK3.02 Knowledge of the reasons for the following responses as they apply to the Accidental Gaseous Radwaste Release: Isolation of the auxiliary building ventilation.	3.3	23	
000061 ARM System Alarms / 7							Not selected.			
000067 Plant Fire On-site / 8							Not selected.			
000068 (BW/A06) Control Room Evac. / 8				X			AA1.02 Ability to operate and/or monitor the following as they apply to the Control Room Evacuation: AFW emergency pump.	4.3	24	
000069 (W/E14) Loss of CTMT Integrity / 5							Not selected.			
000074 (W/E06&E07) Inad. Core Cooling / 4							Not selected.			
000076 High Reactor Coolant Activity / 9							Not Selected.			
W/E01 & E02 Rediagnosis & SI Termination / 3							Not applicable to this Unit.			
W/E13 Steam Generator Over-pressure / 4							Not applicable to this Unit.			
W/E15 Containment Flooding / 5							Not applicable to this Unit.			
W/E16 High Containment Radiation / 9							Not applicable to this Unit.			
BW/A01 Plant Runback / 1		X					AK2.2 Knowledge of the interrelations between the Plant Runback and the following: 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.	3.5	25	
BW/A02&A03 Loss of NNI-X/Y / 7							Not selected.			
BW/A04 Turbine Trip / 4							Not selected.			

BW/A05 Emergency Diesel Actuation / 6	X						AK1.3 Knowledge of the operational implications of the following concepts as they apply to the (Emergency Diesel Actuation): Annunciators and conditions indicating signals, and remedial actions associated with the (Emergency Diesel Actuation).	3.8	26
BW/A07 Flooding / 8							Not selected.		
BW/E03 Inadequate Subcooling Margin / 4					X		EA2.1 Ability to determine and interpret the following as they apply to the (Inadequate Subcooling Margin): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.0	27
BW/E08; W/E03 LOCA Cooldown - Depress. / 4							Not selected.		
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4							Not selected.		
BW/E13&E14 EOP Rules and Enclosures							Not selected.		
CE/A11; W/E08 RCS Overcooling - PTS / 4							Not applicable to this Unit.		
CE/A16 Excess RCS Leakage / 2							Not applicable to this Unit.		
CE/E09 Functional Recovery							Not applicable to this Unit.		
K/A Category Point Totals:	2	1	1	2	2	1			9

ES-401		PWR Examination Outline Plant systems – Tier 2/Group 1 (RO / SRO)											Form ES-401-2	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump						X						K6.14 Knowledge of the effect of a loss or malfunction of the following will have on the RCPS: Starting requirements.	2.6	28
004 Chemical and Volume Control			X									K3.05 Knowledge of the effect that a loss or malfunction of the CVCS will have on the following: PZR LCS.	3.8	29
005 Residual Heat Removal							X					A1.01 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RHRS controls including: heatup/cool-down rates.	3.5	30
005 Residual Heat Removal										X		A4.02 Ability to manually operate and/or monitor in the control room: Heat exchanger bypass flow control.	3.4	31
006 Emergency Core Cooling						X						K6.02 Knowledge of the effect of a loss or malfunction of the following will have on the ECCS system: Core flood tanks (accumulators).	3.4	32
006 Emergency Core Cooling											X	2.4.6 Knowledge of symptom based EOP mitigation strategies.	3.1	33
007 Pressurizer Relief/ Quench Tank					X							K5.02 Knowledge of the operational implications of the following concepts as they apply to the PRTS: Method of forming a steam bubble in the PZR.	3.1	34
007 Pressurizer Relief/ Quench Tank							X					A1.01 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: Maintaining Quench Tank water level within limits.	2.9	35
008 Component Cooling Water		X										K2.02 Knowledge of bus power supplies to the following: CCW pump, including emergency backup.	3.0	36
010 Pressurizer Pressure Control								X				A2.03 Ability to (a) predict the impacts of the following malfunctions or operations on the PZR PCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: PORV failures.	4.1	37
012 Reactor Protection					X							K5.01 Knowledge of the operational implications of the following concepts as they apply to the RPS: DNB.	3.3	38
012 Reactor Protection										X		A4.04 Ability to manually operate and/or monitor in the control room: Bistable trips, reset and test switches.	3.3	39
013 Engineered Safety Features Actuation	X											K1.06 Knowledge of the physical connections and/or cause-effect relationships between the ESFAS and the following systems: ECCS.	4.2	40
013 Engineered Safety Features Actuation											X	2.4.50 Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.3	41
022 Containment Cooling									X			A3.01 Ability to monitor automatic operation of the CCS, including: Initiation of safeguards mode of operation.	4.1	42
025 Ice Condenser												Not applicable to this Unit.		
026 Containment Spray				X								K4.06 Knowledge of CSS design feature(s) and/or interlock(s) which provide for the following: Iodine scavenging via the CSS.	2.8	43

039 Main and Reheat Steam								X							A1.06 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MRSS controls including: Main Steam pressure.	3.0	44
059 Main Feedwater	X														K1.07 Knowledge of the physical connections and/or cause-effect relationships between the MFW and the following systems: ICS (FWCS).	3.2	45
059 Main Feedwater										X					A3.04 Ability to monitor automatic operation of the MFW, including: Turbine driven feed pump.	2.5	46
061 Auxiliary/Emergency Feedwater		X													K2.02 Knowledge of bus power supplies to the following: AFW electric drive pumps.	3.7	47
062 AC Electrical Distribution									X						A2.04 Ability to (a) predict the impacts of the following malfunctions or operations on the AC Distribution System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effect on plant of de-energizing a bus.	3.1	48
062 AC Electrical Distribution											X				A4.01 Ability to manually operate and/or monitor in the control room: All breakers (including available switchyard).	3.3	49
063 DC Electrical Distribution			X												K3.02 Knowledge of the effect that a loss or malfunction of the DC Electrical Distribution System will have on the following: Components using DC control power.	3.5	50
064 Emergency Diesel Generator										X					A3.04 Ability to monitor automatic operation of the ED/G system, including: Number of starts available with an air compressor.	3.1	51
073 Process Radiation Monitoring				X											K4.01 Knowledge of PRM System design feature(s) and/or interlock(s) which provide for the following: Release termination when radiation exceeds setpoint.	4.0	52
076 Service Water		X													K2.01 Knowledge of bus power supplies to the following: Service Water.	2.7	53
078 Instrument Air				X											K4.02 Knowledge of IAS design feature(s) and/or interlock(s) which provide for the following: Cross-over to other air systems.	3.2	54
103 Containment			X												K3.02 Knowledge of the effect that a loss or malfunction of the Containment System will have on the following: Loss of containment integrity under normal operations.	3.8	55
K/A Category Point Totals:	2	3	3	3	2	2	3	2	3	3	2				Group Point Total:		28

ES-401		PWR Examination Outline											Form ES-401-2	
Plant systems – Tier 2/Group 2 (RO/SRO)														
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			A3.07 Ability to monitor automatic operation of the CRDS, including: Boration/dilution.	4.1	56
002 Reactor Coolant								X				A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the RCS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of coolant inventory.	4.3	57
011 Pressurizer Level Control												Not selected.		
014 Rod Position Indication												Not selected.		
015 Nuclear Instrumentation			X									K3.01 Knowledge of the effect that a loss or malfunction of the NIS will have on the following: RPS.	3.9	58
016 Non-nuclear Instrumentation												Not selected.		
017 In-core Temperature Monitor										X		2.1.33 Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	3.4	59
027 Containment Iodine Removal												Not selected.		
028 Hydrogen Recombiner and Purge Control												Not selected.		
029 Containment Purge												Not selected.		
033 Spent Fuel Pool Cooling	X											K1.02 Knowledge of the physical connections and/or cause-effect relationships between the Spent Fuel Cooling System and the following systems: RHRS.	2.5	60
034 Fuel Handling Equipment												Not selected.		
035 Steam Generator				X								K4.01 Knowledge of S/GS design feature(s) and/or interlock(s) which provide for the following: S/G level control.	3.6	61
041 Steam Dump/Turbine Bypass Control					X							K5.07 Knowledge of the operational implications of the following concepts as they apply to the SDS: Reactivity feedback effects.	3.1	62
045 Main Turbine Generator							X					A1.06 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MT/G System controls including: Expected response of secondary plant parameters following a T/G trip.	3.3	63
055 Condenser Air Removal												Not selected.		
056 Condensate												Not selected.		
068 Liquid Radwaste												Not selected.		
071 Waste Gas Disposal									X			A4.25 Ability to manually operate and/or monitor in the control room: Setting of process radiation monitor alarms, automatic functions, and adjustment of setpoints.	3.2	64
072 Area Radiation Monitoring												Not selected.		
075 Circulating Water												Not selected.		
079 Station Air												Not selected.		
086 Fire Protection						X						K6.04 Knowledge of the effect of a loss or malfunction of the following will have on the Fire Protection System: Fire, smoke, and heat detectors.	2.6	65
K/A Category Totals:	1	0	1	1	1	1	1	1	1	1	1	Group Point Total:		10

Facility: Arkansas Nuclear One Unit 2 RO Written Outline			Date of Exam: 01/21/2005	
Category	K/A #	Topic	RO	
			IR	#
1. Conduct of Operations	2.1	2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	3.7	66
	2.1	2.1.20 Ability to execute procedure steps.	4.3	67
	2.1	2.1.22 Ability to determine mode of operation.	2.8	68
	2.1			
	2.1			
	2.1			
	Subtotal			3
2. Equipment Control	2.2	2.2.1 Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.	3.7	69
	2.2	2.2.13 Knowledge of tagging and clearance procedures.	3.6	70
	2.2	2.2.33 Knowledge of control rod programming.	2.5	71
	2.2			
	2.2			
	Subtotal			3
3. Radiation Control	2.3	2.3.4 Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	2.5	72
	2.3	2.3.10 Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9	73
	2.3			
	2.3			
	2.3			
	2.3			
	Subtotal			2
4. Emergency Procedures/ Plan	2.4	2.4.17 Knowledge of EOP terms and definitions.	3.1	74
	2.4	2.4.29 Knowledge of the emergency plan.	2.6	75
	2.4			
	2.4			
	2.4			
	Subtotal			2
Tier 3 Point Total				10

Facility: Arkansas Nuclear One Unit 1 SRO Written Outline

Date of Exam: 09/12/2005

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	6				
	2					N/A				N/A				3	1	4				
	Tier Totals													6	4	10				
2. Plant Systems	1													3	2	5				
	2													1	2	3				
	Tier Totals													4	4	8				
3. Generic Knowledge and Abilities Categories																1	2	3	4	7
																2	2	2	1	

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 9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A number, descriptions, importance ratings, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43

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00008 Pressurizer Vapor Space Accident / 3							Not selected.			
000009 Small Break LOCA / 3						X	2.4.9 Knowledge of low power / shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.	3.9	76	
000011 Large Break LOCA / 3							Not selected.			
000015/17 RCP Malfunctions / 4							Not selected.			
000022 Loss of Rx Coolant Makeup / 2							Not selected.			
000025 Loss of RHR System / 4							Not selected.			
000026 Loss of Component Cooling Water / 8							Not selected.			
000027 Pressurizer Pressure Control System Malfunction / 3							Not selected.			
000029 ATWS / 1							Not selected.			
000038 Steam Gen. Tube Rupture / 3					X		EA2.07 – Ability to determine or interpret the following as they apply to the SGTR: Plant conditions, from a survey of control room indications.	4.8	77	
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4						X	2.4.6 – Knowledge of symptom based EOP mitigation strategies.	4.0	78	
000054 (CE/E06) Loss of Main Feedwater / 4							Not selected.	4.3		
000055 Station Blackout / 6							Not selected.			
000056 Loss of Off-site Power / 6						X	2.1.12 - Ability to apply Technical Specifications for a system.	4.0	79	
000057 Loss of Vital AC Inst. Bus / 6					X		AA2.06 – Ability to determine and interpret the following as they apply to the Loss of Vital AC Inst. Bus: AC instrument bus alarms for the inverter and alternate power source.	3.7	80	
000058 Loss of DC Power / 6							Not selected.			
000062 Loss of Nuclear Svc Water / 4							Not selected.			
000065 Loss of Instrument Air / 8							Not selected.			
W/E04 LOCA Outside Containment / 3							Not applicable to this Unit.			
W/E11 Loss of Emergency Coolant Recirc. / 4							Not applicable to this Unit.			
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4					X		EA2.1 - Ability to determine and interpret the following as they apply to the (Inadequate Heat Transfer): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	4.4	81	
K/A Category Totals:					3	3	Group Point Total:		6	

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions – Tier1 /Group2 (RO/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.			
000003 Dropped Control Rod / 1							Not selected.			
000005 Inoperable/Stuck Control Rod / 1					X		AA2.03 - Ability to determine and interpret the following as they apply to the Inoperable/Stuck Control Rod: Required actions if more than one rod is stuck or inoperable.	4.4	82	
000024 Emergency Boration / 1							Not selected.			
000028 Pressurizer Level Malfunction / 2							Not selected.			
000032 Loss of Source Range NI / 7							Not selected.			
000033 Loss of Intermediate Range NI / 7					X		AA2.10 - Ability to determine and interpret the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: Tech-spec limits if both intermediate-range channels have failed.	3.8	83	
000036 (BW/A08) Fuel Handling Accident / 8							Not selected.			
000037 Steam Generator Tube Leak / 3							Not selected.			
000051 Loss of Condenser Vacuum / 4							Not selected.			
000059 Accidental Liquid RadWaste Rel. / 9							Not selected.			
000060 Accidental Gaseous Radwaste Rel. / 9							Not selected.			
000061 ARM System Alarms / 7							Not selected.			
000067 Plant Fire On-site / 8							Not selected.			
000068 (BW/A06) Control Room Evac. / 8							Not selected.			
000069 (W/E14) Loss of CTMT Integrity / 5							Not selected.			
000074 (W/E06&E07) Inad. Core Cooling / 4							Not selected.			
000076 High Reactor Coolant Activity / 9							Not selected.			
W/E01 & E02 Rediagnosis & SI Termination / 3							Not applicable to this Unit.			
W/E13 Steam Generator Over-pressure / 4							Not applicable to this Unit.			
W/E15 Containment Flooding / 5							Not applicable to this Unit.			
W/E16 High Containment Radiation / 9							Not applicable to this Unit.			
BW/A01 Plant Runback / 1							Not selected.			
BW/A02&A03 Loss of NNI-X/Y / 7					X		AA2.1 - Ability to determine and interpret the following as they apply to the (NNI-X): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	4.0	84	
BW/A04 Turbine Trip / 4							Not selected..			
BW/A05 Emergency Diesel Actuation / 6							Not selected.			
BW/A07 Flooding / 8							Not selected.			

BW/E03 Inadequate Subcooling Margin / 4							Not selected.		
BW/E08; W/E03 LOCA Cooldown - Depress. / 4						X	2.4.16 Knowledge of EOP implementation hierarchy and coordination with other support procedures.	4.0	85
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4							Not selected.		
BW/E13&E14 EOP Rules and Enclosures							Not selected.		
CE/A11; W/E08 RCS Overcooling - PTS / 4							Not applicable to this Unit.		
CE/A16 Excess RCS Leakage / 2							Not applicable to this Unit.		
CE/E09 Functional Recovery							Not applicable to this Unit.		
K/A Category Point Totals:					3	1	Group Point Total:		4

ES-401		PWR Examination Outline											Form ES-401-2	
		Plant systems – Tier 2/Group 1 (RC/SRO)												
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump												Not selected.		
004 Chemical and Volume Control												Not selected.		
005 Residual Heat Removal								X				A2.02 - Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Pressure transient protection during cold shutdown.	3.7	86
006 Emergency Core Cooling								X				A2.03 - Ability to (a) predict the impacts of the following malfunction 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: System leakage.	3.7	87
007 Pressurizer Relief/ Quench Tank												2.2.22 – Knowledge of limiting conditions for operation and safety limits. Change to System 006 A2.03.	4.1	
008 Component Cooling Water												Not selected.		
010 Pressurizer Pressure Control												Not selected.		
012 Reactor Protection												Not selected.		
013 Engineered Safety Features Actuation												Not selected.		
022 Containment Cooling											X	2.2.24 Ability to analyze the affect of maintenance activities on LCO status.	3.8	88
025 Ice Condenser												Not applicable to this unit.		
026 Containment Spray												Not selected.		
039 Main and Reheat Steam												Not selected.		
059 Main Feedwater												Not selected.		
061 Auxiliary/Emergency Feedwater												Not selected.		
062 AC Electrical Distribution												Not selected.		
063 DC Electrical Distribution												Not selected.		
064 Emergency Diesel Generator												Not selected.		
073 Process Radiation Monitoring											X	2.2.28 Knowledge of new and spent fuel movement procedures.	3.5	89
076 Service Water								X				A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the SWS System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of SWS.	3.7	90
078 Instrument Air												Not selected.		
103 Containment												Not selected.		
K/A Category Point Totals:								3			2	Group Point Total:		5

ES-401		PWR Examination Outline											Form ES-401-2	
Plant systems – Tier 2/Group 2 (RO/SRO)														
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
001 Control Rod Drive												Not selected.		
002 Reactor Coolant								X				A2.03 Ability to (a) predict the impacts of the following malfunctions or operations on the RCS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of forced circulation.	4.3	91
011 Pressurizer Level Control												Not selected.		
014 Rod Position Indication												Not selected.		
015 Nuclear Instrumentation												Not selected.		
016 Non-nuclear Instrumentation											X	2.1.12 Ability to apply technical specifications for a system.	4.0	92
017 In-core Temperature Monitor												Not selected.		
027 Containment Iodine Removal												Not selected.		
028 Hydrogen Recombiner and Purge Control												Not selected.		
029 Containment Purge												Not selected.		
033 Spent Fuel Pool Cooling												Not selected.		
034 Fuel Handling Equipment											X	2.2.26 Knowledge of refueling administrative requirements.	3.7	93
035 Steam Generator												Not selected.		
041 Steam Dump/Turbine Bypass Control												Not selected.		
045 Main Turbine Generator												Not selected.		
055 Condenser Air Removal												Not selected.		
056 Condensate												Not selected.		
068 Liquid Radwaste												Not selected.		
071 Waste Gas Disposal												Not selected.		
072 Area Radiation Monitoring												Not selected.		
075 Circulating Water												Not selected.		
079 Station Air												Not selected.		
086 Fire Protection												Not selected.		
K/A Category Totals:								1			2	Group Point Total:		3

Facility: Arkansas Nuclear One Unit 2 SRO Written Outline			Date of Exam: 01/21/2005	
Category	K/A #	Topic	SRO-Only	
			IR	#
1. Conduct of Operations	2.1	2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	94
	2.1	2.1.11 Knowledge of less than one hour technical specification action statements for systems.	3.8	95
	2.1			
	2.1			
	2.1			
	2.1			
	Subtotal			2
2. Equipment Control	2.2	2.2.5 Knowledge of process for making changes in the facility as described in the Safety Analysis Report.	2.7	96
	2.2	2.2.22 Knowledge of limiting conditions for operations and safety limits.	4.1	97
	2.2			
	2.2			
	2.2			
	2.2			
	Subtotal			2
3. Radiation Control	2.3	2.3.1 Knowledge of 10 CFR: 20 and related facility radiation control requirements.	3.0	98
	2.3	2.3.8 Knowledge of the process for performing a planned gaseous radioactive release.	3.2	99
	2.3			
	2.3			
	2.3			
	2.3			
	Subtotal			2
4. Emergency Procedures/ Plan	2.4	2.4.22 Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	4.0	100
	2.4			
	2.4			
	2.4			
	2.4			
	2.4			
	Subtotal			1
Tier 3 Point Total				7

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/1	00007 EK3.01	Instructed by NRC to replace K/A. Replaced with EK2.02.
1/1	00008 AK2.01	Instructed by NRC to replace K/A. Replaced with AK3.03.
1/1	00009 EA2.01	Instructed by NRC to replace K/A. Replaced with EK1.01.
1/1	000026 AA2.03	Unable to write a replacement question for such a specific K/A. There is only one restart procedure for ICW on ANO-1. Replaced with AA2.06.
2/1	000036 AK2.02	NRC comment "This is not an RO level question." Changed system to BW/A01 Plant Runback, K/A AK2.2.

[illegible]

ES-401 Record of Rejected K/As (During Development) Form ES-401-4

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/1	0029 EA2.02	The ATWS topic does not have any Tech. Spec. implications or stand-alone procedures, therefore a plausible SRO level question could not be developed for this topic. Selected topic 056 Loss of Offsite Power, KA 2.1.12.
1/1	038 EA2.01	This KA changed due to double jeopardy from RO exam, i.e., when to isolate ruptured SG. Selected KA EA2.07.
1/1	054 AA2.06	This Loss of Main Feedwater KA, and all of the remaining 054 A2 KAs, did not allow development of an SRO level question in accordance with the requirements of 10CFR55.43. Selected topic BW E04 Inadequate Heat Transfer, KA EA2.1.
1/1	057 AA2.02	This KA did not allow development of an SRO level question in accordance with the requirements of 10CFR55.43. Selected KA AA2.06.
2/1	012 A2.03	This KA did not allow development of an SRO level question in accordance with the requirements of 10CFR55.43. Selected another topic 022 KA 2.2.24.
2/1	064 A2.02	This KA did not allow development of an SRO level question in accordance with the requirements of 10CFR55.43. Selected another topic 073 KA 2.2.28.
2/2	014 A2.05	This KA did not allow development of an SRO level question in accordance with the requirements of 10CFR55.43. Selected another system 002 Reactor Coolant, KA A2.03.
2/2	034 A2.01	This KA would have placed two questions on the exam on the topic of a dropped fuel assembly. Selected KA 2.2.26.
3	2.2.11	This KA did not allow development of an SRO level question in accordance with the requirements of 10CFR55.43. Selected KA 2.2.5.

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/2	000001 AA2.02	ANO-1 does not have Emergency Boration valves. Replaced with randomly selected 000003 AA2.02.
1/2	000068 AA1.15	Replaced due to double jeopardy with K/A in Tier 1 Group 1. Replaced with randomly selected 068 AA1.02.
1/2	CE/A13 EK2.2	ANO-1 is a B&W unit, not CE. Replaced with randomly selected BW/A03 EA2.1.
1/2	CE/E09 EK1.1	ANO-1 is a B&W unit, not CE. Replaced with randomly selected BW/A05 AK1.1.
2/1	007 A3.01	Replaced due to clues to answer being given in questions to be developed for other K/As. Replaced with randomly selected
2/1	013 K1.18	ANO-1 cannot prematurely reset ESF. Replaced with randomly selected 013 K1.06.
2/1	026 2.2.30	ANO-1 Containment Spray is not related to fuel handling. Replaced with 006 Gen 2.4.6 since 026 already had a KA randomly selected.
2/1	059 A3.02	ANO-1 does not have programmed levels for SGs. Replaced with randomly selected 059 A3.04.
2/1	061 K2.03	ANO-1 does not have diesel driven AFW pumps. Replaced with randomly selected 061 K2.02.
2/1	062 A4.02	ANO-1 does not have Control Room remote racking capability for breakers. Replaced with randomly selected 062 A4.01.
2/1	073 K4.02	ANO-1 does not have automatic Letdown isolation on high RCS activity. Replaced with randomly selected 073 K4.01.
2/1	073 2.2.30	This KA was rejected since it was too similar to a KA selected for an administrative JPM and thus would compromise another part of the exam. Replaced with 005 A4.02 since 026 already had a KA randomly selected.
2/2	001 K2.03	Could not write multiple choice question on one line diagrams. Replaced with randomly selected 001 A3.07.
2/2	027 A2.01	ANO-1 does not have a Containment Iodine Removal filter system. Replaced with randomly selected 002 A2.03.
3	2.1.16	An adequate written exam question could not be constructed on the ability to operate plant phone.

[illegible]

Facility: <u>ANO-1</u>		Date of Examination: <u>9-12-05</u>
Examination Level (circle one): <u>RO</u> SRO		Operating Test Number: <u>1</u>
Administrative Topic (see note)	Type Code*	Describe activity to be performed
Conduct of Operations 2.1.19 (Imp 3.0)	M/S	Ability to use plant computer to obtain and evaluate parametric information on system or component status. A1JPM-RO-PMS1 Rev. 2
Conduct of Operations 2.1.23 (Imp 3.9)	D/S	Ability to perform specific and integrated plant procedures during all modes of operation. A1JPM-RO-RBAL3 Rev. 1
Equipment Control 2.2.26 (Imp 2.5)	N/S	Knowledge of refueling administration requirements. A1JPM-RO-REFUL1 Rev. 0
Radiation Control 2.3.11 (Imp 2.7)	D/P/S	Ability to control radiation releases. A1JPM-RO-RAD1 Rev. 2
Emergency 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 (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs) (N)ew or (M)odified from bank (≥ 1) (P)revious (≥ 1 ; randomly selected) (S)imulator		

Facility: ANO-1Date of Examination: 9-12-05Examination Level (circle one): RO / (SRO)Operating Test Number: 1

Administrative Topic (see note)	Type Code*	Describe activity to be performed
Conduct of Operations 2.1.12 (Imp 4.0)	N/S	Ability to apply technical specifications for a system. New admin JPM A1JPM-SRO-TS1
Conduct of Operations 2.1.34 (Imp2.9)	N/S	Ability to maintain primary and secondary plant chemistry within allowable limits. New admin JPM A1JPM-SRO-CHEM1
Equipment Control 2.2.11 (Imp 3.4)	N/S	Knowledge of the process for controlling temporary changes. New admin JPM A1JPM-SRO-TALT2
Radiation Control 2.3.10 (Imp 3.3)	M/S	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure. Modified A1JPM-SRO-RC22
Emergency Plan 2.4.29 (Imp 4.0)	N/S	Knowledge of the emergency plan. New admin JPM A1JPM-SRO-EAL9.

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
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs)
(N)ew or (M)odified from bank (≥ 1)
(P)revious (≥ 1 ; randomly selected)
(S)imulator

Facility: <u>ANO-1</u>		Date of Examination: <u>9/12/2005</u>
Exam Level (circle one): <u>RO</u> / SRO(I) / SRO(U)		Operating Test No.: <u>One</u>
Control Room Systems [®] (8 for RO; 7 for SRO-I; 2 or 3 for SRO- U)		
System / JPM Title	Type Code*	Safety Function
a. A1JPM-RO-EOP22, Perform Reactor Trip Immediate Actions 007 EK3.01 (RO 4.0/SRO 4.6)	A/M/S	1 Reactivity
b. A1JPM-RO-LTOP1, Establish LTOP protection during cool down of RCS 002 K4.10 (RO 4.2/SRO 4.4)	D/L/S	3 Reactor Pressure Control
c. A1JPM-RO-RCP05, Shutdown of P-32C and P-32D after Decay Heat in service 003 A4.03 (RO 2.8/SRO 2.5)	D/L/S	4 Reactor Heat Removal (Primary)
d. A1JPM-RO-EOP16, Perform actions required to correct overcooling of the RCS 039 A2.04 (RO 3.4/SRO 3.7)	A/D/S	4 Reactor Heat Removal (Secondary)
e. A1JPM-RO-HYD03, Place Hydrogen Recombiner M-55B in operation 028 A4.01 (RO 4.0/SRO 4.0)	C/D/L/S	5 Containment Integrity
f. A1JPM-RO-EDO08, Shift buses A1, A2, H1, H2 from SU#1 to Unit Aux 062 A4.07 (RO 3.1/SRO 3.1)	A/D/S	6 Electrical
g. A1JPM-RO-ARM01, Respond to Area Rad Monitor alarm 072 A4.01 (RO 3.0/SRO 3.3)	C/N/S	7 Instrumentation
h. A1JPM-RO-AOP28, Respond to lo-lo Instrument Air pressure 065 AK3.08 (RO 3.7/SRO 3.9)	D/S	8 Plant Service Systems
In- Plant Systems [®] (3 for RO; 3 for SRO-I; 3 or 2 for SRO- U)		
i. A1JPM-RO-CA01, Borate via alternate path bypassing batch controller 004 K6.13 (RO 3.1/SRO 3.3)	N/R	1 Reactivity
j. A1JPM-RO-EFW01, Reset EFW pump P-7A after an overspeed trip 061 A2.04 (RO 3.4/SRO 3.8)	D/E/P/R	4 Reactor Heat Removal (Secondary)
k. A1JPM-RO-EDO30, Place battery charger D-03B in service 2.1.30 (RO 3.9/SRO 3.4)	A/D/P	6 Electrical
[®] All control room (and in-plant) systems must be different and serve different safety functions;		
Type Codes	Criteria for RO /SRO-I / SRO-U	
(A)lternate path	4-6 / 4-6 / 2-3	
(C)ontrol room		
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4	
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	
(L)ow-Power	≥ 1 / ≥ 1 / ≥ 1	
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1	
(P)revious 2 Exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	
(R)CA	≥ 1 / ≥ 1 / ≥ 1	
(S)imulator		

Facility: ANO-1Date of Examination: 9/12/2005Exam Level (circle one): RO / SRO(I) / SRO(U)Operating Test No.: One

Control Room Systems® (8 for RO; 7 for SRO-I; 2 or 3 for SRO- U)

System / JPM Title	Type Code*	Safety Function
a. A1JPM-RO-EOP22, Perform Reactor Trip Immediate Actions 007 EK3.01 (RO 4.0/SRO 4.6)	A/M/S	1 Reactivity
b. A1JPM-RO-LTOP1, Establish LTOP protection during cool down of RCS 002 K4.10 (RO 4.2/SRO 4.4)	D/L/S	3 Reactor Pressure Control
c. A1JPM-RO-RCP05, Shutdown of P-32C and P-32D after Decay Heat in service 003 A4.03 (RO 2.8/SRO 2.5)	D/L/S	4 Reactor Heat Removal (Primary)
d. A1JPM-RO-EOP16, Perform actions required to correct overcooling of the RCS 039 A2.04 (RO 3.4/SRO 3.7)	A/D/S	4 Reactor Heat Removal (Secondary)
e. A1JPM-RO-HYD03, Place Hydrogen Recombiner M-55B in operation 028 A4.01 (RO 4.0/SRO 4.0)	C/D/L/S	5 Containment Integrity
f. A1JPM-RO-EDO08, Shift buses A1, A2, H1, H2 from SU#1 to Unit Aux 062 A4.07 (RO 3.1/SRO 3.1)	A/D/S	6 Electrical
g. A1JPM-RO-ARM01, Respond to Area Rad Monitor alarm 072 A4.01 (RO 3.0/SRO 3.3)	C/N/S	7 Instrumentation
h.		

In- Plant Systems® (3 for RO; 3 for SRO-I; 3 or 2 for SRO- U)

i. A1JPM-RO-CA01, Borate via alternate path bypassing batch controller 004 K6.13 (RO 3.1/SRO 3.3)	N/R	1 Reactivity
j. A1JPM-RO-EFW01, Reset EFW pump P-7A after an overspeed trip 061 A2.04 (RO 3.4/SRO 3.8)	D/E/P/R	4 Reactor Heat Removal (Secondary)
k. A1JPM-RO-EDO30, Place battery charger D-03B in service 2.1.30 (RO 3.9/SRO 3.4)	A/D/P	6 Electrical

@ All control room (and in-plant) systems must be different and serve different safety functions;

Type Codes	Criteria for RO /SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	≤ 9 / ≤ 8 / ≤ 4
(D)irect from bank	≥ 1 / ≥ 1 / ≥ 1
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(L)ow-Power	≥ 2 / ≥ 2 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(P)revious 2 Exams	≥ 1 / ≥ 1 / ≥ 1
(R)CA	
(S)imulator	

Facility: ANO-1Date of Examination: 9/12/2005Exam Level (circle one): RO / SRO(I) / SRO(U)Operating Test No.: OneControl Room Systems[®] (8 for RO; 7 for SRO-I; 2 or 3 for SRO- U)

System / JPM Title	Type Code*	Safety Function
a. A1JPM-RO-EOP22, Perform Reactor Trip Immediate Actions 007 EK3.01 (RO 4.0/SRO 4.6)	A/M/S	1 Reactivity
b. A1JPM-RO-LTOP1, Establish LTOP protection during cool down of RCS 002 K4.10 (RO 4.2/SRO 4.4)	D/L/S	3 Reactor Pressure Control
c. A1JPM-RO-ARM01, Respond to Area Rad Monitor alarm 072 A4.01 (RO 3.0/SRO 3.3)	C/N/S	7 Instrumentation
d.		
e.		
f.		
g.		
h.		

In- Plant Systems[®] (3 for RO; 3 for SRO-I; 3 or 2 for SRO- U)

i. A1JPM-RO-EFW01, Reset EFW pump P-7A after an overspeed trip 061 A2.04 (RO 3.4/SRO 3.8)	D/E/P/R	4 Reactor Heat Removal (Secondary)
j. A1JPM-RO-EDO30, Place battery charger D-03B in service 2.1.30 (RO 3.9/SRO 3.4)	A/D/P	6 Electrical
k.		

© All control room (and in-plant) systems must be different and serve different safety functions;

Type Codes	Criteria for RO /SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	≤ 9 / ≤ 8 / ≤ 4
(D)irect from bank	≥ 1 / ≥ 1 / ≥ 1
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(L)ow-Power	≥ 2 / ≥ 2 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(P)revious 2 Exams	≥ 1 / ≥ 1 / ≥ 1
(R)CA	
(S)imulator	

Facility: ANO-1	Scenario No.: 1 NEW	Op-Test No.: 2005-1	
Examiners:	Operators:		
<p>Initial Conditions: IC 101 70% power holding for the start of P8B (2nd heater drain pump) Power escalation to 100% in progress following maintenance to the "A" MFW pump. Idle condensate pump handswitch is in P-T-L.</p>			
<p>Turnover: 70% power holding for the start of P8B (2nd heater drain pump). Heater Drain Pump, P8A has just been placed in service per 1106.016, section 16.0 through 16.19. Step 16.20 is ready to be performed and P8B placed in service. All preparations for the start of P8B have been completed. Condensate Pump, P2A, is in P-T-L per the procedure and the SG/RX Demand H/A station is in "MANUAL". Power escalation to 100% in progress following maintenance to the "A" MFW pump.</p>			
Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (CBOT)	Start a heater drain pump during power escalation
2	N/A	R (CBOR)	Power escalation toward 100% following maintenance to main Feedwater pump and after Heater Drain Pumps in service.
3	TR565 Ramp=4 Min.	I (CBOR)	RCS T _{hot} slowly fails low
4	N/A	N (CBOR)	Place the ICS in AUTO.
5	RX604 30%/min.	C (CBOT)	False increasing pulser signal to EHC causes Turbine Generator to raise load.
6	ED191	C (CBOT)	Loss of non vital bus B3
7	ED183	M (All)	Random electrical grid upsets result in loss of offsite power. Reactor trip. Degraded Power.
8	IRF CV3807 IRF B6231	C (CBOT)	EDG #2 service water valve (CV3807) breaker trips during opening causing minimal flow to the EDG for cooling.
9	DI_A_MSLI_1A False DI_A_MSLI_1B False DI_A_MSLI_2A False DI_A_MSLI_2B False DI_B_MSLI_1A False DI_B_MSLI_1B False DI_B_MSLI_2A False DI_B_MSLI_2B False	C (CBOR)	All MSLI pushbuttons on the EFIC Remote Switch Matrix fail to manually actuate the MSLI function requiring alternative effort for performing function.
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p>			

Facility: ANO-1	Scenario No.: 2 NEW	Op-Test No.:2005-1	
Examiners:	Operators:		
<p>Initial Conditions: IC 102 100% power; Equilibrium xenon Power has been stable at 100% for last two days following return to full power after maintenance to the "B" main feedwater pump. Chemistry is performing routine Tech Spec chemistry and sampling is aligned from pressurizer water space per 1104.002, Section 19.2.</p>			
<p>Turnover: 100% power; Equilibrium xenon Power has been stable at 100% for last two days following return to full power after maintenance to the "B" main feedwater pump. Chemistry is performing routine Tech Spec chemistry and sampling is aligned from pressurizer water space per 1104.002, Section 19.2. CV1207 seal injection control valve is in hand. Small fuel leak based on RCS isotopic analysis for Cycle 19.</p>			
Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (CBOR)	Chemistry calls and reports boron samples with a 55 PPM difference. Equalize RCS/Pzr boron concentration
2	CV1008 .12	C (CBOR)	Pressurizer Spray Valve fails open
3	FW087	C (CBOT)	Heater drain pump "B" bearing heat up resulting in need to trip the pump. Pump will trip if no action is taken. (2 min.15 sec.- alarm, 3 min. 15 sec. -trip)
4	N/A	R (CBOR)	Lower power to ~70% in response to a trip of a heater drain pump
5	DI_ICC0009L False	C (CBOR)	ULD station fails to lower demand signal in manual
6	TR049 0	I (CBOR)	Pressurizer level transmitter fails low
7	RC001 (.325) R20:00	M (ALL) R	OTSG tube leak progressing to a ~150 gpm.
8	DI_H15C False	C (CBOT)	H1 feeder breaker from SU#1 transformer fails to close when transferring auxiliaries.
9	CO_P75	C (CBOT)	P75 will not start
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: ANO-1	Scenario No.: 3 NEW	Op-Test No.: 2005-1	
Examiners:	Operators:		
<p>Initial Conditions: IC 103 ICS in Automatic at ~30% power following a mid-cycle shutdown. Power escalation is in progress per the Startup and Power Operations procedures. "A" MFW pump is in service and "B" MFW pump is running at minimum speed.</p>			
<p>Turnover: ICS in Automatic at ~30% power following a mid-cycle shutdown. Power escalation is in progress per the Startup and Power Operations procedures. "A" MFW pump is in service and "B" MFW pump is running at minimum speed. CV1207 seal injection control valve is in hand.</p>			
Event No.	Malfunction No.	Event Type*	Event Description
1	N/A	R (CBOR)	Power escalation from ~30% power to 40% power to place "B" MFP in service
2	AI_TIC4018S (.7)	C (CBOT)	Automatic control of CV4018 fails to maintain generator temperatures
3	N/A	N (CBOR)	Place the second main feedwater pump in service
4	TR575 0 R20	I (CBOR)	"B" OTSG startup level transmitter fails low
5	CW084	C (CBOT)	P3C, Circulating Water Pump, winding temperature begins to heatup due to internal motor problem.
6	RC464 2.5 R7:00	M (ALL)	LOCA- Leak on an HPI line inside containment
7	RP246 RP247 RP248 RP249 DI_ICC0020 (False)	C (CBOR)	RPS fails to trip the reactor automatically on a valid RPS trip setpoint. The "Manual" trip button on C03 fails to perform a reactor trip. (The backup pushbuttons on C03 must be depressed to complete a reactor trip)
8	CV1407	C (CBOT)	BWST outlet valve CV1407 fails to open on ESAS signal
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p>			

Facility: ANO-1	Scenario No.: 4 (Spare)	Op-Test No.: 2005-1	
Examiners:	Operators:		
Initial Conditions: IC 104 100% Power, Equilibrium Xenon			
Turnover: 100% Power, Equilibrium Xenon, MOL (250 EFPD) An RCS delithiation is anticipated for this shift. Chemistry will call to provide the duration of the evolution. CV1207, Seal Injection control valve, is in manual due to oscillations of seal injection when in "auto". Main Steam Safety Valve PSV2687 on the "B" main steam line is gagged due to premature lifting.			
Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (CBOR)	Perform 5 minute RCS delithiation at the request of chemistry. (Idle purification DI is ~65 PPM above RCS boron concentration)
2	BAT ES19_2.txt (Batch file that creates this condition)	C (CBOT)	Condenser vacuum leak caused by the failure of the #5 turbine bearing gland seal regulator.
3	N/A	R (CBOR)	Power reduction to stabilize vacuum
4	CV097	C (CBOT)	Operating MU/HPI pump experiences high winding temperature and causes the pump to trip. The standby pump has no oil indicated in one of the oil bubblers and must have oil added prior to start.
5	BAT crd_asym.txt (Batch file that creates this condition)	I (CBOR)	CRD position indication faulty with a CRD W/D inhibit
6	MS143 MS134 .4	M (ALL)	Main steam safety valve associated with 'B' OTSG experiences structural failure and lifts. Steam Leak significant to warrant manual reactor trip.
7	TU155 TU156	C (CBOT)	The main turbine fails to fully trip when the unit is tripped. One governor valve and one throttle valve fail to close, requiring the crew to shut the MSIV from the affected OTSG.
8	CV2648 CV2626	C (CBOR)	EFW valves to "B" OTSG from P7B fail open and will not close from the handswitches.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			