

Facility: <u>ANO-2</u> Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Date of Examination: <u>07/17/2006</u> Operating Test Number: <u>1</u>
Administrative Topic (see note)	Type Code*	Describe activity to be performed
Conduct of Operations 2.1.23 RO (3.9)	N	Ability to perform specific system and integrated plant procedures during all modes of plant operation.  Determine volume of Boric acid and DI water to makeup to RWT.  JPM-ANO-2-JPM-NRC-ADMIN RWT
Conduct of Operations 2.1.23 RO (3.9)	M	Ability to perform specific system and integrated plant procedures during all modes of plant operation.  Determine CEDM temperature using OP 2105.009.  Modified-JPM-ANO-2-JPM-NRC-ADMIN XTCEA
Equipment Control 2.2.12 RO (3.0)	D/P	Knowledge of Surveillance procedures.  Review 2P89B Surveillance as RO.  Direct-JPM-ANO-2-NRC-ADMIN-Surveillance review 2P89B
Radiation Control 2.3.9 RO (2.5)	N	Knowledge of the process for performing a containment purge.  Complete a containment purge release permit  New-JPM-ANO-2-JPM-NRC-ADMIN-complete containment purge release permit
Emergency Plan	NA	NA
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 & ROretakes) (N)ew or (M)odified from bank (≥ 1) (P)revious 2 Exams (≤ 1; randomly selected)		

Facility: <u>ANO-2</u>		Date of Examination: <u>07/17/2006</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: <u>1</u>

  

Administrative Topic (see note)	Type Code*	Describe activity to be performed
Conduct of Operations 2.1.12 SRO (4.0)	D	Determine RPS trip set point due to inoperable MSSV is correct using Technical Specifications.  Ability to apply technical specification for a system Direct- ANO-2-JPM-NRC-ADMIN MSSVINOP
Conduct of Operations 2.1.23 SRO (4.0)	M	Ability to perform specific system and integrated plant procedures during all modes of plant operation. Approve CEDM temperature calculation using OP 2105.009. Modified-ANO-2-JPM-NRC-ADMIN XTCEA
Equipment Control 2.2.12 SRO (3.4)	D/P	Knowledge of Surveillance procedures. Review 2P89B Surveillance. Direct-ANO-2-JPM-NRC-ADMIN-Surveillance review 2P89B
Radiation Control 2.3.9 SRO (3.4)	N	Knowledge of the process for performing a containment purge. Review a containment purge release permit New-JPM-ANO-2-JPM-NRC-ADMIN-review containment purge release
Emergency Plan 2.4.29 SRO (4.0)	N	Knowledge of the emergency plan. Classify EAL and complete applicable Shift Manager forms. New-ANO-2-JPM-NRC-ADMIN-Classify event and Complete SM E-plan forms

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 ( $\leq 3$  for ROs;  $\leq 4$  for SROs & RO retakes)
- (N)ew or (M)odified from bank ( $\geq 1$ )
- (P)revious 2 Exams ( $\leq 1$ ; randomly selected)

Facility: <u>ANO UNIT 2</u>		Date of Examination: <u>07/17/2006</u>
Exam Level (circle one): RO <input checked="" type="checkbox"/> SRO(I) <input type="checkbox"/> SRO(U) <input type="checkbox"/>		Operating Test No.: <u>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-2-JPM-NRC-ELEC EOP 2 062 A4.01 RO-3.3 SRO-3.1 Energize 2A2, non-vital 4160VAC bus following a Loss Of Offsite Power	A/L/N/S	6 Electrical
b. ANO-2-JPM-NRC-SIT006 006 A4.08 RO-4.2 SRO-4.3 Isolate Safety Injection Tank's with Safety Injection Actuation System actuated	A/L/D/S	2 Inventory
c. ANO-2-JPM-NRC-LTOP 010 K4.03 RO-3.8 SRO-4.1 Respond to Annunciator 2K10 C-4 and place low temperature overpressure relief valves inservice	L/N/S	3 Reactor Pressure Control
d. ANO-2-JPM-NRC-RCP03 008 A4.01 RO-3.3 SRO-3.1 Restore Component Cooling Water to Reactor Coolant Pumps	A/L/D/P/S	8 Plant Service Systems
e. ANO-2-JPM-NRC-CEA5 001 A4.03 RO-4.0 SRO-3.7 Exercise a Control Element Assembly	A/M/S	1 Reactivity
f. ANO-2-JPM-NRC-FWCS1 035 A4.01 RO-3.7 SRO- 3.6 Place Feed Water Control System in Automatic	D/S	4 Heat Removal
g. ANO-2-JPM-NRC-H2001 028 A4.01 RO-4.0 SRO-4.0 Manually start Hydrogen analyzer	C/D	5 Containment Integrity
h. ANO-2-JPM-NRC-ICI01 015 A2.02 RO-3.1 SRO-3.5 Remove Incore instrument from scan for Core Operating Limits Supervisory System	D/P/S	7 Instrumentation
In- Plant Systems® ( 3 for RO; 3 for SRO-I; 3 or 2 for SRO- U)		
i. ANO-2-JPM-NRC-AACGLS 064 A3.06 RO-3.3 SRO-3.4 Local start of Station Blackout Diesel	A/D	6 Electrical
j. ANO-2-JPM-NRC-P36ASD 004 A4.08 RO-3.8 SRO-3.4 Operate Charging Pump 2P36B Locally During Alternate Shutdown	D/E/R	2 Inventory
k. ANO-2-JPM-NRC-PRHTR 006 A2.01 RO-3.3 SRO-3.6 Locally control pressurizer proportional heaters	D/E	3 Reactor Pressure Control
@ All 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 (L)ow-Power (N)ew or (M)odified from bank including 1(A) (P)revious 2 Exams (R)CA (S)imulator	4-6 / 4-6 / 2-3  $\leq 9$ / $\leq 8$ / $\leq 4$ $\geq 1$ / $\geq 1$ / $\geq 1$ $\geq 1$ / $\geq 1$ / $\geq 1$ $\geq 2$ / $\geq 2$ / $\geq 1$ $\leq 3$ / $\leq 3$ / $\leq 2$ (randomly selected) $\geq 1$ / $\geq 1$ / $\geq 1$	

Facility: <u>ANO UNIT 2</u>	Date of Examination: <u>07/17/2006</u>
Exam Level (circle one): RO <input type="checkbox"/> / SRO(I) <input checked="" type="checkbox"/> / SRO(U) <input type="checkbox"/>	Operating Test No.: <u>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-2-JPM-NRC-ELEC EOP 2 062 A4.01 RO-3.3 SRO-3.1 Energize 2A2, non-vital 4160VAC bus following a Loss Of Offsite Power	A/L/N/S	6 Electrical
b. ANO-2-JPM-NRC-SIT006 006 A4.08 RO-4.2 SRO-4.3 Isolate Safety Injection Tank's with Safety Injection Actuation System actuated	A/L/D/S	2 Inventory
c. ANO-2-JPM-NRC-LTOP 010 K4.03 RO-3.8 SRO-4.1 Respond to Annunciator 2K10 C-4 and place low temperature overpressure relief valves inservice	L/N/S	3 Reactor Pressure Control
d. ANO-2-JPM-NRC-RCP03 008 A4.01 RO-3.3 SRO-3.1 Restore Component Cooling Water to Reactor Coolant Pumps	A/L/D/P/S	8 Plant Service Systems
e. ANO-2-JPM-NRC-CEA5 001 A4.03 RO-4.0 SRO-3.7 Exercise a Control Element Assembly	A/M/S	1 Reactivity
f. ANO-2-JPM-NRC-FWCS1 035 A4.01 RO-3.7 SRO- 3.6 Place Feed Water Control System in Automatic	D/S	4 Heat Removal
g. ANO-2-JPM-NRC-H2001 028 A4.01 RO-4.0 SRO-4.0 Manually start Hydrogen analyzer	C/D	5 Containment Integrity
h.		

  

In- Plant Systems® ( 3 for RO; 3 for SRO-I; 3 or 2 for SRO- U)		
i. ANO-2-JPM-NRC-AACGLS 064 A3.06 RO-3.3 SRO-3.4 Local start of Station Blackout Diesel	A/D	6 Electrical
j. ANO-2-JPM-NRC-P36ASD 004 A4.08 RO-3.8 SRO-3.4 Operate Charging Pump 2P36B Locally During Alternate Shutdown	D/E/R	2 Inventory
k. ANO-2-JPM-NRC-PRHTR 006 A2.01 RO-3.3 SRO-3.6 Locally control pressurizer proportional heaters	D/E	3 Reactor Pressure Control

@ All 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	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: <u>ANO UNIT 2</u>	Date of Examination: <u>7/17/2006</u>
Exam Level : RO <input type="checkbox"/> / SRO(I) <input type="checkbox"/> / SRO(U) <input checked="" type="checkbox"/>	Operating Test No.: <u>1</u>

  

Control Room Systems <sup>®</sup> ( 8 for RO; 7 for SRO-I; 2 or 3 for SRO- U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a.		
b.		
c. ANO-2-JPM-NRC-LTOP 010 K4.03 RO-3.8 SRO-4.1 Respond to Annunciator 2K10 C-4 and place low temperature overpressure relief valves in service	L/N/S	3 Reactor Pressure Control
d. ANO-2-JPM-NRC-RCP03 008 A4.01 RO-3.3 SRO-3.1 Restore Component Cooling Water to Reactor Coolant Pumps	A/L/D/P/S	8 Plant Service Systems
e. ANO-2-JPM-NRC-CEA5 001 A4.03 RO-4.0 SRO-3.7 Exercise a Control Element Assembly	A/M/S	1 Reactivity
f.		
g.		
h.		

  

In- Plant Systems <sup>®</sup> ( 3 for RO; 3 for SRO-I; 3 or 2 for SRO- U)		
i. ANO-2-JPM-NRC-AACGLS 064 A3.06 RO-3.3 SRO-3.4 Local start of Station Blackout Diesel	A/D	6 Electrical
j. ANO-2-JPM-NRC-P36ASD 004 A4.08 RO-3.8 SRO-3.4 Operate Charging Pump 2P36B Locally During Alternate Shutdown	D/E/R	2 Inventory
k.		

  

@ All 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	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-2		Scenario No.: 1		Op-Test No.: 2006-1	
Page 1					
Examiners:			Operators:		
<p>Initial Conditions:</p> <p>20% MOL, All Engineered Safety Features systems are in standby. Plant startup following a five day stator water cooling outage. 2P27, MFP standby lube oil pump tagged out for maintenance. Green Train Maintenance Week.</p>					
<p>Turnover:</p> <p>20%. 250 EFPD. EOOS indicates 'Minimal Risk.' Plant Startup in progress; OP 2104.004 section 9, raising power above 20%, is the controlling procedure. 2P27, MFP standby lube oil pump tagged out for maintenance. Green Train Maintenance Week.</p>					
Event No.	Malf. No.	Event Type*	Event Description		
1	Raise Power above 20%	R (ATC)	Raise reactor and turbine power.		
2	XRCCHAPCNT	I (ATC)	Pressurizer control channel pressure fails high.		
3	CCWFAILBAUTO CCW2P33CPWR	C (CBOT)	Loop II Component Cooling Water pump 'C' Trips and 'B' Component Cooling Water pump fails to automatically start.		
4	RCP2P32AASLK	M (ATC) N (CBOT)	Reactor Coolant System inter-system leak into Component Cooling Water system resulting in Loss of Coolant Accident and Safety Injection Actuation System (post reactor trip).		
5	BUS2H2	M (ALL)	2H2 lockout. Loss of 2 Reactor Coolant Pump's and one condenser circulating water pump.		
6	RPSRXAUTO	C (ATC)	Reactor Protection System fails to automatically trip the reactor on loss of Reactor Coolant Pumps.		
7	XMSHDRPRS	I (CBOT)	Steam Dump and Bypass Control System fails to automatically open bypass and dump valves to control Steam Generator pressure.		
8	HPI2P89AFAL	C (CBOT)	2P89A, 'A' High Pressure Safety Injection pump fails to auto-start.		

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

Facility: ANO-2		Scenario No.: 2		Op-Test No.: 2006-1	
Page 1					
Examiners:			Operators:		
Initial Conditions: 100% MOL, All ESF systems in standby. Green Train Maintenance Week.					
Turnover: 100%. 250 EFPD. EOOS indicates 'Minimal Risk. Green Train Maintenance Week. 'B' main chiller is tagged out for oil change out.					
Event No.	Malf. No.	Event Type*	Event Description		
1	COND2P2AWIND	C(CBOT)	'A' Condensate Pump motor winding with rise resulting in manual start of 'D' Condensate Pump and securing 'A' Condensate Pump.		
2	XCV2LT4861	I (ATC)	Volume Control Tank level instrument fails low resulting in Refueling Water Tank being aligned to Coolant Charging Pump suction.		
3	CWS2P3BBOL	R (ATC) N (CBOT)	Trip 2P3B, 'B' Circulating Water Pump, which causes a partial loss of main condenser circulating water flow resulting in a rapid down power to ~ 90% power.		
4	MSSGBLK	M (CBOT) M (ATC)	'B' Steam Generator Excess Steam Demand (ESD) inside containment results in manual reactor trip and control of Reactor Coolant System heat up and Pressurizer pressure post SG blowdown.		
5	CEA51STUCK	C (ATC)	Control Element Assembly #51 stuck on reactor trip results in Emergency Boration.		
6	CV1036-2 CV1075-1	C (CBOT)	'B' Emergency Feed Water (EFW) Pump to 'B' Steam Generator valves fail to close from control room resulting in over feeding Steam Generator with ESD cooldown of RCS unnecessarily. Secure 'B' EFW pump.		
7	BS2P35BFAL BS2P35AFAULT	C (CBOT)	'B' Spray Pump fails to start. Can be manually started.  'A' Spray Pump cannot be restarted.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Facility: ANO-2	Scenario No.: 3	Op-Test No.: 2006-1	
Page 1			
Examiners:	Operators:		
Initial Conditions: 100% MOL, All ESF systems in standby. Green Train Maintenance Week.			
Turnover: 100%. 250 EFPD. EOOS indicates 'Minimal Risk. Green Train Maintenance Week. Tornado watch for Pope County in effect until 10:00pm today. Natural Emergency AOP actions have been completed.			
Event No.	Malfunction No.	Event Type*	Event Description
1	CV-4816	C(ATC)	Letdown flow control valve fails closed. Restore Letdown using 2CV 4817.
2	XFW2FIS0735	I (CBOT)	'A' Main Feedwater Pump (MFP) suction flow transmitter fails low. Recirculation valves ('A' loop condensate and 'A' MFP) to manual and closed.
3	MFWWPMPBTRP	R (ATC) N (CBOT)	'B' MFP trips on thrust bearing wear. Emergency borate and reduce power to <90%. Start 'D' Condensate Pump.
4	500LOSE500 500LOSE161	M (CBOT) M (ATC)	Loss of offsite power due to tornado.
5	EDGDG1OIL	C (CBOT)	#1 Emergency Diesel Generator trips on low lube oil pressure. Loss of Red vital AC power. Loss of 2Y1, 120VAC non-vital power. CBOT energize Vital Red AC busses with Station Blackout diesel generator.
6	Channel 1 PZR level and pressure channels lose power.	I (ATC)	Pressurizer control channel 1 for level and pressure will fail low due to loss of power. Control manually / select opposite channel.
7	CV0332	C (CBOT)	Over speed trip of 'A' Emergency Feedwater Pump. Requires starting 'B' Emergency Feedwater Pump.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			



Facility: Arkansas Nuclear One Unit 2 RO/SRO Written Outline															Date of Exam: 07/14/2006		
Tier	Group	RO K/A Category Points											SRO – Only Points				
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	TOTAL	
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A			3	18	4	2	6
	2	2	1	2				1	1				2	9	3	1	4
	Tier Totals	5	4	5				4	4				5	27	7	3	10
2. Plant Systems	1	2	2	3	3	3	2	2	2	3	3	3	28	3	2	5	
	2	1	1	1	0	1	1	1	1	1	1	1	10	1	2	3	
	Tier Totals	3	3	4	3	4	3	3	3	4	4	4	38	4	4	8	
3. Generic Knowledge and Abilities Categories						1	2	3	4	10			1	2	3	4	7
						3	2	2	3				2	2	1	2	

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO Outline 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  $\pm 1$  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 as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
- 7.\* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.
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. 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				<b>Knowledge of the reasons for the following responses as they apply to the (Reactor Trip Recovery):</b>  EK3.4 RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated	3.2	1
00007 (BW/E02 & E10; CE/E02) Reactor Trip – Stabilization – Recovery / 1						x	<b>Generic</b>  2.1.19 Ability to use plant computer to obtain and evaluate parametric information on system or component status.	3.0	76
00008 Pressurizer Vapor Space Accident/3					X		<b>Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident:</b>  AA2.19 PZR spray valve failure, using plant parameters	3.4	2
000009 Small Break LOCA / 3		X					<b>Knowledge of the interrelations between the small break LOCA and the following:</b>  EK2.03 S/Gs	3.0	3
000011 Large Break LOCA / 3					X		<b>Ability to determine and interpret the following as they apply to a Large Break LOCA:</b>  EA2.02 Consequences to RHR of not resetting safety injection	3.3*	4
000015/17 RCP Malfunctions / 4		X					<b>Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions and the following:</b>  AK2.08 CCWS	2.6	5
000022 Loss of Rx Coolant Makeup / 2	X						<b>Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Pump Makeup:</b>  AK1.03 Relationship between charging flow and PZR level.	3.0	6
000025 Loss of RHR System / 4	X						<b>Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System:</b>  AK1.01 Loss of RHRS during all modes of operation	3.9	7
000026 Loss of Component Cooling Water / 8						X	<b>Generic:</b>  2.4.6 Knowledge symptom based EOP mitigation strategies.	3.1	8
000027 Pressurizer Pressure Control System Malfunction / 3						X	<b>Generic:</b>  2.4.11 Knowledge of abnormal condition procedures.	3.4	9
000029 ATWS / 1				X			<b>Ability to operate and/or monitor the following as they apply to a ATWS:</b>  EA1.01 Charging pumps	3.4*	10
000038 Steam Gen. Tube Rupture / 3					x		<b>Ability to determine and interpret the following as they apply to a SGTR:</b>  EA2.02 Existence of an S/G tube rupture and its potential consequences	4.8	77
000038 Steam Gen. Tube Rupture / 3					x		<b>Ability to determine and interpret the following as they apply to a SGTR:</b>  EA2.12 Status of MSIV activating system	4.2	78

000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4	X					040 <b>Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture:</b> AK1.04 Nil ductility temperature	3.2	11
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4				X		CE/E05 <b>Ability to operate and/or monitor the following as they apply to the (Excess Steam Demand):</b> EA1.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.9	12
000054 (CE/E06) Loss of Main Feedwater / 4					X	054 <b>Ability to determine and interpret the following as they apply to the Loss of Main Feedwater (MFW):</b> AA2.01 Occurrence of reactor and/or turbine trip	4.3	13
000054 (CE/E06) Loss of Main Feedwater / 4		X				CE/E06 <b>Knowledge of the interrelations between the (Loss of Feedwater) and the following:</b> EK2.2 Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	3.5	14
000055 Station Blackout / 6					x	<b>Generic</b> 2.2.20 Knowledge of the process for managing troubleshooting activities.	3.3	79
000056 Loss of Off-site Power / 6			X			<b>Knowledge of the reasons for the following responses as they apply to the Loss of Offsite Power:</b> AK3.01 Order and time to initiation of power for the load sequencer	3.5	15
000057 Loss of Vital AC Inst. Bus / 6			X			<b>Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus:</b> AK3.01 Actions contained in EOP for loss of vital ac electrical instrument bus.	4.1	16
000058 Loss of DC Power / 6				X		<b>Ability to operate and/or monitor the following as they apply to the Loss of DC Power:</b> AA1.02 Static inverter dc input breaker, frequency meter, ac output breaker, and ground fault detector	3.1*	17
000062 Loss of Nuclear Svc Water / 4					X	<b>Generic</b> 2.1.28 Knowledge of the purpose and function of major system components and controls.	3.2	18
000065 Loss of Instrument Air / 8					x	<b>Ability to determine and interpret the following as they apply to the Loss of Instrument Air:</b> AA2.02 Relationship of flow readings to system operation	2.6*	80
000065 Loss of Instrument Air / 8					x	<b>Ability to determine and interpret the following as they apply to the Loss of Instrument Air:</b> AA2.05 When to commence plant shutdown if instrument air pressure is decreasing	4.1	81
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							Not applicable to this Unit.		
K/A Category Totals:	3	3	3	3	3 / 4	3 / 2	Group Point Total:		18/6

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		X					<b>Knowledge of the interrelations between the Continuous Rod Withdrawal and the following:</b> AK2.06 T-ave./ref. deviation meter	3.0*	19
000003 Dropped Control Rod / 1					X		<b>Ability to determine and interpret the following as they apply to the Dropped Control Rod:</b> AA2.03 Dropped rod, using in-core/ex-core instrumentation, in-core or loop temperature measurements	3.8	82
000005 Inoperable/Stuck Control Rod / 1				X			<b>Ability to operate and/or monitor the following as they apply to the Inoperable/Stuck Control Rod:</b> AA1.05 RPI	3.4	20
000024 Emergency Boration / 1					X		<b>Ability to determine and interpret the following as they apply to the Emergency Boration:</b> AA2.02 When use of manual boration valve is needed	4.4	83
000028 Pressurizer Level Malfunction / 2							Not Selected.		
000032 Loss of Source Range NI / 7							Not Selected.		
000033 Loss of Intermediate Range NI / 7							Not applicable to this Unit.		
000036 (BW/A08) Fuel Handling Accident / 8			X				<b>Knowledge of the reasons for the following responses as they apply to the Fuel Handling Incidents:</b> AK3.03 Guidance contained in EOP for fuel handling incident.	3.7	21
000037 Steam Generator Tube Leak / 3						X	<b>Generic</b> 2.2.22 Knowledge of limiting conditions for operations and safety limits.	3.4	22
000051 Loss of Condenser Vacuum / 4						X	<b>Generic</b> 2.1.32 Ability to explain and apply all system limits and precautions.	3.4	23
000059 Accidental Liquid RadWaste Rel. / 9							Not Selected.		
000060 Accidental Gaseous Radwaste Rel. / 9							Not Selected.		
000061 ARM System Alarms / 7	X						<b>Knowledge of the operational implications of the following concepts as they apply to Area Radiation Monitoring (ARM)</b> AK1.01 Detector limitations	2.5*	24
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					X		<b>Ability to determine and interpret the following as they apply to the Loss of Containment Integrity:</b> AA2.01 Loss of containment integrity	4.3	84
000074 (W/E06&E07) Inad. Core Cooling / 4							Not Selected.		

000076 High Reactor Coolant Activity / 9					X		<b>Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity:</b> AA2.02 Corrective actions required for high fission product activity in RCS	2.8	25
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 applicable to this Unit.		
BW/A02&A03 Loss of NNI-X/Y / 7							Not applicable to this Unit.		
BW/A04 Turbine Trip / 4							Not applicable to this Unit.		
BW/A05 Emergency Diesel Actuation / 6							Not applicable to this Unit.		
BW/A07 Flooding / 8							Not applicable to this Unit.		
BW/E03 Inadequate Subcooling Margin / 4							Not applicable to this Unit.		
BW/E08; W/E03 LOCA Cooldown - Depress. / 4							Not applicable to this Unit.		
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4							Not Selected.		
BW/E13&E14 EOP Rules and Enclosures							Not applicable to this Unit.		
CE/A11; W/E08 RCS Overcooling - PTS / 4	X						<b>Knowledge of the operational implications of the following concepts as they apply to the (RCS Overcooling):</b> AK1.1 Components, capacity, and function of emergency systems	3.1	26
CE/A16 Excess RCS Leakage / 2			X				<b>Knowledge of the reasons for the following responses as they apply to the (Excess RCS Leakage):</b> AK3.2 Normal, abnormal and emergency operating procedures associated with (Excess RCS Leakage)	2.8	27
CE/E09 Functional Recovery						x	<b>Generic</b> 2.3.10 Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	85
K/A Category Point Totals:	2	1	2	1	1	2			9/4

ES-401		PWR Examination Outline 401-2										Form ES-		
Plant systems – Tier 2/Group 1 (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	#
003 Reactor Coolant Pump				X								<b>Knowledge of RCPS design feature(s) and/or interlock(s) which provide for the following:</b> K4.04 Adequate cooling of RCP motor and seals	2.8	28
003 Reactor Coolant Pump											x	<b>Generic</b> 2.2.29 Knowledge of SRO fuel handling responsibilities.	3.8	86
004 Chemical and Volume Control							X					<b>Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CVCS controls including:</b> A1.06 VCT level	3.0	29
005 Residual Heat Removal		X										<b>Knowledge of bus power supplies to the following:</b> K2.03 RCS Pressure boundary motor operated valves.	2.7*	30
005 Residual Heat Removal										X		<b>Ability to manually operate and/or monitor in the control room:</b> A4.03 RHR temperature, PZR heaters and flow, and nitrogen	2.8*	31
006 Emergency Core Cooling									X			<b>Ability to monitor automatic operation of the ECCS, including:</b> A3.08 Automatic transfer of ECCS flowpaths	4.2	32
006 Emergency Core Cooling								x				<b>Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:</b> A2.09 Radioactive release from venting RWST to atmosphere	3.2*	87
007 Pressurizer Relief/ Quench Tank					X							<b>Knowledge of the operational implications of the following concepts as they apply to the PRTS:</b> K5.02 Method of forming a steam bubble in the PZR.	3.1	33
008 Component Cooling Water								X				<b>Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:</b> A2.05 Effect of loss of instrument and control air on the position of the CCW valves that are airoperated	3.3*	34
010 Pressurizer Pressure Control		X										<b>Knowledge of bus power supplies to the following:</b> K2.01 PZR heaters.	3.0	35
012 Reactor Protection			X									<b>Knowledge of the effect that a loss or malfunction of the RPS will have on the following:</b> K3.03 SDS	3.1*	36

013 Engineered Safety Features Actuation	X																	<b>Knowledge of the physical connections and/or cause-effect relationships between the ESFAS and the following systems:</b> K1.18 Premature reset of ESF actuation	3.7	37
013 Engineered Safety Features Actuation																		X <b>Generic</b> 2.1.25 Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.	2.8	38
022 Containment Cooling																		X <b>Ability to manually operate and/or monitor in the control room:</b> A4.02 CCS pumps	3.2*	39
022 Containment Cooling																		X <b>Ability to manually operate and/or monitor in the control room:</b> A4.04 Valves in the CCS	3.1*	40
025 Ice Condenser																		Not applicable to this unit.		
026 Containment Spray																		X <b>Ability to monitor automatic operation of the CSS, including:</b> A3.02 Verification that cooling water is supplied to the containment spray heat exchanger	3.9*	41
026 Containment Spray																		x <b>Generic</b> 2.4.17 Knowledge of EOP terms and conditions.	3.8	88
039 Main and Reheat Steam				X														<b>Knowledge of the effect that a loss or malfunction of the MRSS will have on the following:</b> K3.04 MFW pumps	2.5*	42
059 Main Feedwater				X														<b>Knowledge of the effect that a loss or malfunction of the MFW System will have on the following:</b> K3.02 AFW System	3.6	43
059 Main Feedwater																		X <b>Generic</b> 2.4.14 Knowledge of general guidelines for EOP flowchart use.	3.0	44
061 Auxiliary/Emergency Feedwater	X																	<b>Knowledge of the physical connections and/or cause-effect relationships between the AFW System and the following systems:</b> K1.07 Emergency Water Source	3.6	45
061 Auxiliary/Emergency Feedwater																		x <b>Ability to (a) predict the impacts of the following malfunctions or operations on the AFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:</b> A2.05 Automatic control malfunction	3.4*	89
062 AC Electrical Distribution																		<b>Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the A.C. Distribution System controls including:</b> A1.03 Effect on instrumentation and controls of switching power supplies	2.5	46



063 DC Electrical Distribution								X										Ability to (a) predict the impacts of the following malfunctions or operations on the D.C. Electrical System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: A2.01 Grounds	2.5	47
064 Emergency Diesel Generator							X											Knowledge of the effect of a loss or malfunction of the following will have on the ED/G System: K6.08 Fuel oil storage tanks	3.2	48
064 Emergency Diesel Generator							X											Knowledge of the effect of a loss or malfunction of the following will have on the ED/G System: K6.07 Air receivers	2.7	49
073 Process Radiation Monitoring						X												Knowledge of the operational implications of the following concepts as they apply to the PRM System: K5.01 Radiation theory, including sources, types, units, and effects	2.5	50
073 Process Radiation Monitoring						X												Knowledge of the operational implications of the following concepts as they apply to the PRM System: K5.02 Radiation intensity changes with source distance	2.5	51
076 Service Water					X													Knowledge of SWS design feature(s) and/or interlock(s) which provide for the following: K4.02 Automatic start features associated with SWS pump controls	2.9	52
078 Instrument Air					X													Knowledge of IAS design feature(s) and/or interlock(s) which provide for the following: K4.02 Cross-over to other air systems	3.2	53
078 Instrument Air															X			Generic 2.2.13 Knowledge tagging and clearance procedures.	3.6	54
103 Containment															X			Ability to monitor automatic operation of the containment system, including: A3.01 Containment Isolation	3.9	55
103 Containment																X		Ability to (a) predict the impacts of the following malfunctions or operations on the containment system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: A2.04 Containment evacuation (including recognition of the alarm)	3.6*	90
K/A Category Point Totals:	2	2	3	3	3	2	2	2	2	3	3	3	2	3	2			Group Point Total:		28/5

ES-401		PWR Examination Outline 401-2										Form ES-		
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		<b>Ability to manually operate and/or monitor in the control room:</b> A4.01 RCS leakage calculation program using the computer	3.5*	56
011 Pressurizer Level Control			X									<b>Knowledge of the effect that a loss or malfunction of the PZR LCS will have on the following:</b> K3.03 PZR PCS	3.2	57
014 Rod Position Indication												Not selected		
015 Nuclear Instrumentation		X										<b>Knowledge of bus power supplies to the following:</b> K2.01 NIS channels, components, and interconnections	3.3	58
016 Non-nuclear Instrumentation								x				<b>Ability to (a) predict the impacts of the following malfunctions or operations on the NNIS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:</b> A2.03 Interruption of transmitted signal	3.3*	91
017 In-core Temperature Monitor									X			<b>Ability to monitor automatic operation of the ITM System, including:</b> A3.01 Indications of normal, natural, and interrupted circulation of RCS	3.6*	59
027 Containment Iodine Removal												Not applicable to this unit		
028 Hydrogen Recombiner and Purge Control												Not selected		
029 Containment Purge												Not selected		
033 Spent Fuel Pool Cooling	X											<b>Knowledge of the physical connections and/or cause-effect relationships between the Spent Fuel Pool Cooling System and the following systems:</b> K1.05 RWST	2.7*	60
034 Fuel Handling Equipment												Not selected		
035 Steam Generator						X						<b>Knowledge of the effect of a loss or malfunction of the following will have on the S/GS:</b> K6.01 MSIVs	3.2	61
041 Steam Dump/Turbine Bypass Control												Not selected		
045 Main Turbine Generator								X				<b>Ability to (a) predict the impacts of the following malfunctions or operations on the MT/G System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:</b> A2.17 Malfunction of electrohydraulic control	2.7*	62
055 Condenser Air Removal												Not selected		

056 Condensate												X	<b>Generic</b> 2.3.1 Knowledge of 10CFR20 and related facility radiation control requirements.	2.6	63
068 Liquid Radwaste												x	<b>Generic</b> 2.4.41 Knowledge of the emergency action level thresholds and classifications.	4.1	92
071 Waste Gas Disposal												x	<b>Generic</b> 2.3.8 Knowledge of process for performing a planned gaseous radioactive release.	3.2	93
072 Area Radiation Monitoring					X								<b>Knowledge of the operational implications of the following concepts as they apply to the ARM system:</b> K5.01 Radiation theory, including sources, types, units, and effect.	2.7	64
075 Circulating Water													Not selected		
079 Station Air													Not selected		
086 Fire Protection								X					<b>Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Fire Protection System controls including:</b> A1.05 FPS lineups	2.9	65
K/A Category Totals:	1	1	1	0	1	1	1	1	1	1	1	1 / 2	Group Point Total:		10/3

Facility: Arkansas Nuclear One Unit 2 RO/SRO Written Outline  
07/14/2006

Date of Exam:

Category	K/A #	Topic	RO		SRO-only	
			IR	#	IR	#
1. Conduct of Operations	2.1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	3.7	66		
	2.1.22	Ability to determine Mode of Operation.	2.8	67		
	2.1.27	Knowledge of system purpose and or function	2.8	68		
	2.1.11	Knowledge of less than one hour technical specification action statements for systems.			3.8	94
	2.1.30	Ability to locate and operate components, including local controls.			3.4	95
	Subtotal			3		2
2. Equipment Control	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		
	2.2.26	Knowledge of refueling administrative requirements	2.5	70		
	2.2.10	Knowledge of the process for determining if the margin of safety, as defined in the basis of any technical specification is reduced by a proposed change, test, or experiment.			3.3	96
	2.2.11	Knowledge of the process for controlling temporary changes.			3.4*	97
	Subtotal			2		2
3. Radiation Control	2.3.9	Knowledge of the process for performing a containment purge.	2.5	71		
	2.3.11	Ability to control radiation releases.	2.7	72		
	2.3.6	Knowledge of the requirements for reviewing and approving release permits.			3.1	98
	Subtotal			2		1

4. Emergency Procedures/ Plan	2.4.35	Knowledge of local auxiliary operator tasks during emergency operations including system geography and system implications.	3.3	73		
	2.4.47	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	3.4	74		
	2.4.49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	75		
	2.4.36	Knowledge of chemistry / health physics tasks during emergency operations.			2.8	99
	2.4.48	Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions.			3.8	100
	Subtotal			3		2
Tier 3 Point Total				10		7

## METHOD USED FOR RANDOM K/A SAMPLING

A commercial random generation program was used to generate both the RO and SRO written sample plan. The program which was specifically designed for Combustion Engineering designed plants was supplied by the Westinghouse Owner's Group (WOG). The name of the program is PWR K&A Database by WD Version 2.2.0 June 2004. This program pre-screens the non-CE related EPE/APE K/As and allows all other K/As of 2.5 or greater importance rating to be sampled. The program also provides for manual input for suppression of additional K/As to tailor the sample pool to fit individual unit design.

Several individual K/As were suppressed as well as 3 complete systems due to design applicability to ANO Unit 2. The systems suppressed include **025** – *Ice Condenser System*, **027** – *Containment Iodine Removal System*, and **EPE/APE 033** – *Loss of Intermediate Range Nuclear Instrumentation*. ANO Unit 2 does not have an Ice Condenser in Containment nor do we have intermediate range nuclear instrumentation. The excore nuclear instrumentation used at ANO covers the full spectrum of power from the subcritical range to 200% power. The Containment Spray system in conjunction with a passive chemical addition system provides the function of post accident containment iodine removal. A complete list of Suppressed K/As has been submitted for review.

The computer program was initially designed for the Draft Revision 9 of NUREG-1021 and did not select the required SRO points. Westinghouse was contacted prior to the 2005 exam and their programmer sent an executable batch file to update the required SRO point totals, however, the program continued to select one less SRO point total than required in the Plant System's Tier 2 Group 1 and 2. A manual random selection of an additional K/A for both Tier 2 Group 1 and Tier 2 Group 2 of the SRO outline was performed. This allowed us to align our point totals to match the required point totals in Revision 9 of NUREG-1021 for both the RO and SRO outline. The manual sample was performed as described below.

The system numbers for the remaining systems for Tier 2 Group 1 were placed in a can and a system number was randomly selected. The number selected was 061, Auxiliary/Emergency Feedwater. The required SRO categories A2 and G were then placed in the can and A2 was randomly selected. The numbers 1-9 were then placed in the can and the number 5 was randomly selected. This gave a final K/A of 061 A2.05 which was then added to the written outline.

The system numbers for the remaining systems for Tier 2 Group 2 were placed in a can and a system number was randomly selected. The number selected was 071, Waste Gas Disposal. Then the required SRO categories A2 and G were placed in the can and G was randomly selected. The numbers 1-4 were then placed in the can to select the generic category and the number 4 was randomly selected. Finally, the numbers 1-50 were placed in the can and the number 37 was selected. This gave a final K/A of Generic 2.4.37. This was later rejected, as noted on the Record of Rejected K/As Form ES-401-4 due to the overdraw on the generic category 4 K/As, and replaced with generic 2.3.8.

Replacement of the rejected K/As was performed by manual random sample similar to the method described above and is discussed on the Record of Rejected K/As Form ES-401-4.

# Suppressed K/As

Printed: 03/27/2006

Facility: Arkansas Nuclear One - Unit 2

		<u>Basis</u>	IMPORTANCE <u>RO / SRO</u>
<b>001</b>	<b>Continuous Rod Withdrawal</b>		
AK1.14	Interaction of ICS control stations as well as purpose, function, and modes of operation of ICS	ICS not applicable to Unit 2	3.4*/3.7
<b>003</b>	<b>Dropped Control Rod</b>		
AK1.13	Interaction of ICS control stations as well as purpose, function, and modes of operation of ICS	Not applicable to Unit 2.	3.2*/3.6
AK2.03	Metroscope	Not applicable to Unit 2	3.1*/3.2*
AK3.01	When ICS logic has failed on a dropped rod, the load must be reduced until flux is within specified target bank	Not applicable to Unit 2	3.5*/3.9*
<b>005</b>	<b>Inoperable/Stuck Control Rod</b>		
AK2.03	Metroscope	Not applicable to Unit 2 systems.	3.1*/3.3*
AA1.03	Metroscope	Not applicable to Unit 2 systems.	3.4*/3.4*
AA2.02	Difference between jog and run rod speeds, effect on CRDM of stuck rod	Not applicable to Unit 2 systems.	2.5*/3.0*
<b>015</b>	<b>017 Reactor Coolant Pump (RCP) Malfunctions</b>		
AK1.03	The basis for operating at a reduced power level when one RCP is out of service	Not applicable to unit 2 design/operation.	3.0*/4.0*
AK3.04	Reduction of power to below the steady state power-to-flow limit	Not applicable to unit 2 design/operation.	3.1*/3.2*
AK3.05	Shift of T-ave. sensors to the loop with the highest flow	Not applicable to unit 2 design/operation.	2.8*/3.0*
AA1.15	High-power/low-flow reactor trip block status lights	Not applicable to unit 2 design/operation.	3.5*/3.6*
AA1.16	Low-power reactor trip block status lights	Not applicable to unit 2 design/operation.	3.2*/3.5*
AA1.19	Power transfer confirm lamp	Not applicable to unit 2 design/operation.	2.9*/3.0*

# Suppressed K/As

Printed: 03/27/2006

Facility: Arkansas Nuclear One - Unit 2

		<u>Basis</u>	<u>IMPORTANCE</u> <u>RO / SRO</u>
<b>033</b>	<b>Loss of Intermediate Range Nuclear Instrumentation</b> (complete system suppressed)		
AK1.01	Effects of voltage changes on performance	Not applicable to Unit 2 design.	2.7/3.0
AK2.01	Power supplies, including proper switch position	Not applicable to Unit 2 design.	2.4/2.9
AK2.02	Sensors and detectors	Not applicable to Unit 2 design.	2.3/2.6
AK3.01	Termination of startup following loss of intermediate-range instrumentation	Not applicable to Unit 2 design.	3.2/3.6
AK3.02	Guidance contained in EOP for loss of intermediate-range instrumentation	Not applicable to Unit 2 design.	3.6/3.9
AA1.01	Power-available indicators in cabinets or equipment drawers	Not applicable to Unit 2 design.	2.9/3.1
AA1.02	Level trip bypass	Not applicable to Unit 2 design.	3.0/3.1
AA1.03	Manual restoration of power	Not applicable to Unit 2 design.	3.0*/3.2*
AA2.01	Equivalency between source-range, intermediate-range, and power-range channel readings	Not applicable to Unit 2 design.	3.0/3.5
AA2.02	Indications of unreliable intermediate-range channel operation	Not applicable to Unit 2 design.	3.3/3.6
AA2.03	Indication of blown fuse	Not applicable to Unit 2 design.	2.8/3.1
AA2.04	Satisfactory overlap between source-range, intermediate-range and power-range instrumentation	Not applicable to Unit 2 design.	3.2/3.6
AA2.05	Nature of abnormality, from rapid survey of control room data	Not applicable to Unit 2 design.	3.0*/3.1?
AA2.06	Cause of failure of an intermediate-range channel	Not applicable to Unit 2 design.	2.3/2.8*
AA2.07	Confirmation of reactor trip	Not applicable to Unit 2 design.	3.9/4.2
AA2.08	Intermediate range channel operability	Not applicable to Unit 2 design.	3.3/3.4
AA2.09	Conditions which allow bypass of an intermediate-range level trip switch	Not applicable to Unit 2 design.	3.4*/3.7*
AA2.10	Tech-Spec limits if both intermediate-range channels have failed	Not applicable to Unit 2 design.	3.1/3.8
AA2.11	Loss of compensating voltage	Not applicable to Unit 2 design.	3.1/3.4
AA2.12	Maximum allowable channel disagreement	Not applicable to Unit 2 design.	2.5*/3.1*
AA2.13	Testing required if power lost, then restored	Not applicable to Unit 2 design.	2.2*/2.8*



# Suppressed K/As

Printed: 03/27/2006

Facility: Arkansas Nuclear One - Unit 2

		<u>Basis</u>	IMPORTANCE <u>RO / SRO</u>
<b>065</b>	<b>Loss of Instrument Air</b>		
AK3.07	Backup of compressor cooling water	Not applicable to unit 2 system design.	2.3*/2.5*
AA1.01	Remote manual loaders	Not applicable to unit 2 system design.	2.7*/2.5
AA1.04	Emergency air compressor	Not applicable to unit 2 system design.	3.5*/3.4*
AA2.07	Whether backup nitrogen supply is controlling valve position	Not applicable to unit 2 system design.	2.8*/3.2*
<b>025</b>	<b>Ice Condenser System</b> (complete system suppressed)		
K1.01	Containment ventilation	Not Applicable to Unit 2 Design.	2.7*/2.7*
K1.02	Refrigerant systems	Not Applicable to Unit 2 Design.	2.7*/2.7*
K1.03	Containment sump system	Not Applicable to Unit 2 Design.	3.2*/3.0*
K2.01	Containment ventilation fans and dampers	Not Applicable to Unit 2 Design.	2.2*/2.7*
K2.02	Refrigerant systems	Not Applicable to Unit 2 Design.	2.0*/2.5*
K2.03	Isolation valves	Not Applicable to Unit 2 Design.	2.0*/2.2*
K3.01	Containment	Not Applicable to Unit 2 Design.	3.8*/3.8*
K4.01	Glycol expansion tank levels and ice condenser system containment isolation valves	Not Applicable to Unit 2 Design.	2.2*/2.5*
K4.02	System control	Not Applicable to Unit 2 Design.	2.8*/3.0*
K5.01	Relationships between pressure and temperature	Not Applicable to Unit 2 Design.	3.0*/3.4*
K5.02	Heat transfer	Not Applicable to Unit 2 Design.	2.6*/2.8*
K5.03	Gas laws	Not Applicable to Unit 2 Design.	2.4*/2.8*
K6.01	Upper and lower doors of the ice condenser	Not Applicable to Unit 2 Design.	3.4*/3.6*
A1.01	Temperature chart recorders	Not Applicable to Unit 2 Design.	3.0*/3.0*
A1.02	Glycol expansion tank level	Not Applicable to Unit 2 Design.	2.5*/2.2*
A1.03	Glycol flow to ice condenser air handling units	Not Applicable to Unit 2 Design.	2.5*/2.5*
A2.01	Trip of glycol circulation pumps	Not Applicable to Unit 2 Design.	2.2*/2.7*
A2.02	High/low floor cooling temperature	Not Applicable to Unit 2 Design.	2.7*/2.5*

# Suppressed K/As

Printed: 03/27/2006

**Facility:** Arkansas Nuclear One - Unit 2

		<u>Basis</u>	IMPORTANCE <u>RO / SRO</u>
A2.03	Opening of ice condenser doors	Not Applicable to Unit 2 Design.	3.0*/3.2*
A2.04	Containment isolation	Not Applicable to Unit 2 Design.	3.0*/3.2*
A2.05	Abnormal glycol expansion tank level	Not Applicable to Unit 2 Design.	2.5*/2.7*
A2.06	Decreasing ice condenser temperature	Not Applicable to Unit 2 Design.	2.5*/2.7*
A3.01	Refrigerant system	Not Applicable to Unit 2 Design.	3.0*/3.0*
A3.02	Isolation valves	Not Applicable to Unit 2 Design.	3.4*/3.4*
A4.01	Ice condenser isolation valves	Not Applicable to Unit 2 Design.	3.0*/2.7*
A4.02	Containment vent fans	Not Applicable to Unit 2 Design.	2.7*/2.5*
A4.03	Glycol circulation pumps	Not Applicable to Unit 2 Design.	2.2*/2.2*
 <b>026                    Containment Spray System (CSS)</b>			
A2.05	Failure of chemical addition tanks to inject	ANO-2 chemical addition is a passive system.	3.7/4.1
 <b>027                    Containment Iodine Removal System (CIRS) (complete system suppressed)</b>			
K1.01	CSS	System not applicable to unit 2.	3.4*/3.7*
K2.01	Fans	System not applicable to unit 2.	3.1*/3.4*
K5.01	Purpose of charcoal filters	System not applicable to unit 2.	3.1*/3.4*
A2.01	High temperature in the filter system	System not applicable to unit 2.	3.0*/3.3*
A4.01	CIRS controls	System not applicable to unit 2.	3.3*/3.3*
A4.02	Remote operation and handling of iodine filters	System not applicable to unit 2.	2.8*/3.0*
A4.03	CIRS fans	System not applicable to unit 2.	3.3*/3.2*
A4.04	Filter temperature	System not applicable to unit 2.	2.8*/2.9*

# Suppressed K/As

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Facility: Arkansas Nuclear One - Unit 2

		<u>Basis</u>	IMPORTANCE <u>RO / SRO</u>
<b>086</b>	<b>Fire Protection System (FPS)</b>		
A1.02	Fire water storage tank level	Not applicable to ANO fire system design	3.0*/3.2*
<b>103</b>	<b>Containment System</b>		
K1.03	Shield building vent system	Not applicable to Unit 2 design.	3.1*/3.5*
K1.07	Containment vacuum system	Not applicable to Unit 2 design.	3.5*/3.7*
K4.01	Vacuum breaker protection	Not applicable to Unit 2 design.	3.0*/3.7*
A2.03	Phase A and B isolation	Not applicable to unit 2 design.	3.5*/3.8*
A4.02	Excess letdown divert valves to reactor coolant drain tank	Not applicable to unit 2 design.	2.1*/2.2*
A4.03	ESF slave relays	Not applicable to unit 2 design.	2.7*/2.7*
A4.04	Phase A and phase B resets	Not applicable to unit 2 design.	3.5*/3.5*
A4.05	PDP speed controller	Not applicable to Unit 2 design.	2.4*/2.2*
A4.09	Containment vacuum system	Not applicable to Unit 2 design.	3.1*/3.7*
	<b>Generic</b>		
<b><u>2.2</u></b>	<b>Equipment Control</b>		
2.2.3	(multi-unit) Knowledge of the design, procedural, and operational differences between units.	Single unit license.	3.1/3.3
2.2.4	(multi-unit) Ability to explain the variations in control board layouts, systems, instrumentation and procedural actions between units at a facility.	Single unit license.	2.8/3.0*

Tier / Group	Randomly Selected K/A	Reason for Rejection
<b>RO Exam Tier 1 Group 1</b>	008 Pressurizer Vapor Space Accident  AA2.05 – PORV isolation	PORV or PORV isolation valves are not applicable to Unit 2 design. A manual random sample of the remaining A2 statements was performed.  AA2.09 – PZR spray block valve controls and indicators was selected as a replacement.
	* 008 Pressurizer Vapor Space Accident  AA2.09 – PZR spray block valve controls and indicators	Unable to develop a credible question for this KA. Re-sampled from the remaining AA2 statements.  AA2.19 – PZR Spray valve failure, using plant parameters was selected as a replacement.
	027 Pressurizer Pressure Control System Malfunction  Generic 2.4.6 - Knowledge of symptom based EOP mitigation strategies.	This generic KA was also selected for the 026 Loss of CCW system. A manual random sample of the remaining Generic, Category 4 statements was performed.  Generic 2.4.11 – Knowledge of abnormal condition procedures was selected as a replacement.
	062 Loss of Nuclear Svc Water  Generic 2.4.39 – Knowledge of the RO's responsibilities in emergency plan implementation.	The random sample was unusually heavy on the Category 4 generic K/As between the RO/SRO exams combined. A manual random sample of the remaining 3 Generic categories was performed for balance.  Generic 2.1.28 – Knowledge of the purpose and function of major system components and controls was selected as a replacement.
<b>RO Exam Tier 2 Group 1</b>	010 Pressurizer Pressure Control K2.03	PORVs are not applicable to Unit 2 design for PZR over-pressure protection or control. A manual random sample of the remaining K2 statements was performed.  K2.01 – PZR heaters was selected as a replacement.
	061 Auxiliary/Emergency Feedwater  K1.10 – Diesel fuel oil	This knowledge statement is not applicable to unit 2 design. Unit 2 does not have a diesel engine driven EFW/AFW pump. A manual random sample of the remaining K1 statements for this system was performed.  K1.09 – PRMS was selected as a replacement.
	* 061 Auxiliary/Emergency Feedwater  K1.09 – PRMS	Difficulty in developing a credible exam question for this KA. A manual random sample of the remaining K1 statements for this system was performed.  K1.07 – Emergency Water Source was selected as a replacement.

Tier / Group	Randomly Selected K/A	Reason for Rejection
	<p><i>076 Service Water</i></p> <p>K4.03 – Automatic opening features associated with SWS isolation valves to CCW heat exchangers</p>	<p>This knowledge statement is not applicable to unit 2 design. This description of CCW/SW operation is more related to Westinghouse design. A random sample of the remaining K4 statements for this system was performed.</p> <p><i>K4.02 – Automatic start features associated with SWS pump controls</i> was selected as a replacement.</p>
	<p><i>078 Instrument Air</i></p> <p>Generic 2.2.33 – Knowledge of control rod programming</p>	<p>There is no direct tie between the Instrument Air system and control rod programming so a credible question could not be created. A random sample of the remaining Generic, Category 2 statements was performed.</p> <p><i>Generic 2.2.27 – Knowledge of the refueling process</i> was selected as a replacement to be used with the 078 Instrument Air System.</p>
	<p>* <i>078 Instrument Air</i></p> <p>Generic 2.2.27 – Knowledge of the refueling process</p>	<p>Unable to match KA to 10CFR50.41 criteria. Re-sampled Generic Category 2.</p> <p><i>2.2.13 - Knowledge tagging and clearance procedures</i> was selected as a replacement.</p>
	<p>* <i>103 Containment</i></p> <p>A2.05 Emergency Containment Entry</p>	<p>Tie to KA not clear on initial submittal. Rejected question and KA. No more unused applicable KAs or importance values <math>\geq 2.5</math> in the A2 category. Randomly sampled categories and then re-sampled KAs in the new category.</p> <p><i>A3.01 – Containment Isolation</i> was selected as a replacement.</p>
<b>RO Exam Tier 2 Group 2</b>	<p>* <i>033 Spent Fuel Pool Cooling</i></p> <p>K1.02 RHRS</p>	<p>Tie to KA not clear on initial submittal. Unable to develop a credible exam question due to system design at ANO-2. Rejected question and KA. Re-sampled K1 statements.</p> <p>K1.05 RWST was selected as a replacement.</p>
	<p><i>035 Steam Generator</i></p> <p>K6.02 – secondary PORV</p>	<p>PORVs are not applicable to Unit 2 design for SG/S over-pressure protection or control. A manual random sample of the remaining K6 statements for this system was performed.</p> <p><i>K6.01 – MSIVs</i> was selected as a replacement.</p>
	<p><i>056 Condensate</i></p> <p>Generic 2.3.10 – Ability to perform procedures to reduce excessive levels of radiation</p>	<p>This K/A was randomly selected in 3 different Tiers between the RO and SRO exams. A manual random sample of the remaining Generic, Category 3 statements was performed.</p> <p><i>Generic 2.3.1 – Knowledge of 10CFR20 and related facility radiation control requirements</i> was selected as a replacement.</p>
	<p><i>079 Station Air</i></p> <p>K4.01 – Cross-connect with IAS</p>	<p>This knowledge statement is not applicable to unit 2 design. There were no other applicable K4 statements for this system with an Importance Rating of <math>\geq 2.5</math>. A manual random sample of remaining Group 2 systems was performed and then a random sample of the remaining K/A statements.</p> <p><i>017 In-Core Temperature Monitor system, A3.01 – Indications of normal, natural, and interrupted circulation of RCS</i> was selected as a replacement.</p>

Tier / Group	Randomly Selected K/A	Reason for Rejection
<b>SRO Exam Tier 1 Group 1</b>	<p><i>007 Reactor Trip – Stabilization – Recovery</i></p> <p>Generic 2.1.11 – Knowledge of less than one hour TS actions</p>	<p>This generic knowledge statement was also selected for Tier 3. A manual random sample of the remaining Generic, Category 1 statements was performed.</p> <p>Generic 2.1.19 – <i>Ability to use plant computer to obtain and evaluate parametric information on system or component status</i> was selected as a replacement.</p>
<b>SRO Exam Tier 2 Group 1</b>	<p><i>003 Reactor Coolant Pump</i></p> <p>Generic 2.2.28 – Knowledge of new and spent fuel movement procedures</p>	<p>There is no direct tie between the Reactor Coolant Pump system and this generic knowledge statement so a credible question could not be created. A random sample of the remaining Generic, Category 2 statements was performed.</p> <p><i>Generic 2.2.18 – Knowledge of the process for managing maintenance activities during shutdown operations</i> was selected as a replacement to be used with the 003 RCP system.</p>
	<p><i>* 003 Reactor Coolant Pump</i></p> <p>Generic 2.2.18 – Knowledge of the process for managing maintenance activities during shutdown operations</p>	<p>Question on initial submittal was at too low of responsibility level (RO). Rejected and re-sampled from Generic Category 2.</p> <p><i>Generic 2.2.29 – Knowledge of SRO fuel handling responsibilities</i> was selected as a replacement to be used with the 003 RCP system.</p>
	<p><i>* 026 Containment Spray</i></p> <p>Generic – 2.4.46 Ability to verify that the alarms are consistent with the plant conditions.</p>	<p>Question on initial submittal was at too low of responsibility level (RO). Rejected and re-sampled from Generic Category 4.</p> <p><i>Generic 2.4.17 – Knowledge of EOP terms and conditions</i> was selected as a replacement to be used with the 003 RCP system.</p>
<b>SRO Exam Tier 2 Group 2</b>	<p><i>071 Waste Gas Disposal</i></p> <p>Generic 2.4.37 – Knowledge of the lines of authority during an emergency.</p>	<p>The random sample was unusually heavy on the Category 4 generic K/As between the RO/SRO exams combined. A manual random sample of the remaining 3 Generic categories was performed for balance.</p> <p><i>Generic 2.3.8 – Knowledge of process for performing a planned gaseous radioactive release</i> was selected as a replacement.</p>
<b>SRO Exam Tier 3 (Generic)</b>	<p><i>Generic</i></p> <p>2.3.10 – Ability to perform procedures to reduce excessive levels of radiation</p>	<p>This K/A was randomly selected in 3 different Tiers between the RO and SRO exams. A manual random sample of the Generic Category 1 and 3 statements was performed.</p> <p>Generic 2.1.30 – <i>Ability to locate and operate components, including local controls</i> was selected as a replacement.</p>