

ANO Unit Two 2002 SRO Examination Outline

Based on NUREG-1021

Form ES-401-3

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Rev.8 Supplement 1

		K/A Category Points											
Tier	Group												Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	
Tier 1 Plant Evolutions	1	4	4	4				2	8			2	24
	2	2	2	2				3	5			2	16
	3	1	0	0				1	0			1	3
	Tier Totals	7	6	6				6	13			5	43
Tier 2 Plant Systems	1	3	1	1	2	2	2	2	2	1	1	2	19
	2	0	1	1	1	2	2	1	2	2	3	2	17
	3	1	0	1	0	1	0	0	1	0	0	0	4
	Tier Totals	4	2	3	3	5	4	3	5	3	4	4	40
Tier 3 Generic	Cat1	Cat2	Cat3	Cat4									
	5	4	3	5									17

SRO
Only

10
6
1

0
0
0

12

<i>Temp Total</i>	<i>Average</i>	<i>Std. Dev.</i>
24		
16		
3		
43	7.17	2.93
19		
17		
4		
40	3.64	0.92
17		
100	9.09	7.16

<i>K/A/G/ Totals</i>	11	8	9	3	5	4	9	18	3	4	26
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100

29
SRO
Only
Total

ANO Unit 2 2002 SRO Examination Outline									
Emergency and Abnormal Plant Evolutions - Tier1/Group1									
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000001 Continuous Rod Withdrawal / 1					1		001 AA2.04 - Ability to determine and interpret reactor power and its trend as they apply to the Continuous Rod Withdrawal. (QID 0408)	4.3	1
000003 Dropped Control Rod / 1	1						003 AK1.10 - Knowledge of the operational implications of the definitions of Core Quadrant Tilt as they apply to Dropped Control Rod. (QID 0324)	2.9	1
000005 Inoperable/Stuck Control Rod / 1					1		005 AA2.03 - Ability to determine and interpret required actions if more than one rod is stuck or inoperable as they apply to Inoperable/Stuck Rod. (QID 0409)	4.4	1
000011 Large Break LOCA / 3		1					011 EK2.02 - Knowledge of the interrelations between the pumps and Large Break LOCAs. (QID 0328)	2.7	1
W/E04 LOCA Outside Containment / 3							Not applicable.		0
W/E02 & E02 Rediagnosis & SI Termination / 3							Not applicable.		0
000015/17 RCP Malfunctions / 4						1	015 AA1.06 - Ability to operate and/or monitor the CCWS as it applies to a Reactor Coolant Pump Malfunction. (QID 0308)	2.9	1
CE/A13; Natural Circ. / 4	1						CE/A13 AK1.2 - Knowledge of the operational implications and the concepts contained in the normal, abnormal and emergency operating procedures associated with Natural Circulation operations. (QID 0309)	3.5	1
CE/A13; Natural Circ. / 4					1		CE/A13 AA2.2 - Ability to determine and interpret adherence to appropriate procedures and operation within the limitations in the facility's license and amendments. (QID 0410)	3.8	1
000024 Emergency Boration / 1			1				024 AK3.02 - Knowledge of the reasons for the actions contained in the EOP that apply to Emergency Boration. (QID 0310)	4.4	1
000026 Loss of Comp Cooling Water / 8				1			026 AA1.05 - Ability to operate and/or monitor the CCW Surge Tank, including level control and level alarms, and radiation monitors as they apply to the Loss of CCW. (QID 0311)	3.1	1
000029 Anticipated Transient w/o Scram / 1			1				029 EK3.12 - Knowledge of the reasons for actions contained in EOP for ATWS. (QID 0411)	4.7	1
000040 Steam Line Rupture / 4		1					040 AK2.02 - Knowledge of the interrelations between the Steam Line Rupture and its associated sensors and detectors. (QID 0313)	2.6	1
CE/E05 Excessive Heat Transfer / 4					1		CE/E05 EA2.2 - Ability to determine and interpret the adherence to procedures and operation within the limitations in the facility's license and amendments. (QID 0412)	4.2	1
CE/A11; RCS Overcooling - PTS / 4	1						CE/A11 AK1.2 - Knowledge of the operational implications of normal, abnormal and emergency operating procedures as they apply to RCS Overcooling. (QID 0314)	3.3	1
000051 Loss of Condenser Vacuum / 4			1				051 AK3.01 - Knowledge of the reasons for the loss of steam dump capability upon loss of condenser vacuum. (QID 0315)	3.1	1
000055 Station Blackout / 6				1			055 EA1.06 - Ability to operate and/or monitor the restoration of power with one EDG during a Station Blackout. (QID 0316)	4.5	1
000057 Loss of Vital AC Elec. Inst. Bus / 6					1		057 AA2.05 - Ability to determine and interpret S/G pressure and level meters as they apply to the Loss of Vital AC Instrument Bus. (QID 0317)	3.8	1
000059 Accidental Liquid Radwaste Rel. / 9					1		059 AA2.04 - Ability to determine and interpret the valve lineup for a release of radioactive fluid as they apply to the Accidental Liquid Radwaste Release. (QID 0337)	3.5	1
000062 Loss of Nuclear Service Water / 4					1		062 AA2.06 - Ability to determine and interpret the length of time after the loss of Service Water System flow to a component before component may be damaged. (QID 0318)	3.1	1
000067 Plant Fire On-site / 9						1	067 2.4.27 - Knowledge of the operation implications of fire fighting as they apply to Plant Fire on Site. (QID 0319)	3.5	1
000068 Control Room Evac. / 8			1				068 AK3.17 - Knowledge of the reasons for the system response to injection of Boric Acid into the RCS. (QID 0320)	4.0	1
000069 Loss of CTMT Integrity / 5	1						069 AK1.01 - Knowledge of the operational implications of the effects of pressure on Containment leak rate as they apply to a Loss of Containment Integrity. (QID 0321)	3.1	1
000074Inad. Core Cooling / 4		1					074 EK2.03 - Knowledge of the interrelations between the AFW pump and Inadequate Core Cooling. (QID 0322)	4.0	1
000074Inad. Core Cooling / 4		1					074 EK3.07 - Knowledge of the reasons for the actions contained in EOP for reactor trip as they apply to Inadequate Core Cooling. (QID 0413)	4.4	1
BW/E03 Inadequate Subcooling Margin / 4							Not applicable.		0
000076 High Reactor Coolant Activity / 9					1		076 AA2.02 - Ability to determine/interpret corrective actions required for high fission product activity in RCS. (QID 0136)	3.4	1
BW/A02&A03 Loss of NNI-X/Y / 7							Not applicable.		0
K/A Category Totals:	4	4	4	2	8	2	Group Point Total =	24	24

PWR SRO Examination Outline

Emergency and Abnormal Plant Evolutions - Tier1/Group3

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000028 Pressurizer Level Malfunction / 2				1			028 AA1.07 - Ability to operate and/or monitor charging pumps in maintenance of PZR level (including manual backup) as applied to the Pressurizer Level Control Malfunctions. (QID 0341)	3.3	1
000036 Fuel Handling Accident / 8							Not Selected		0
000056 Loss of Off-site Power / 6	1						056 AK1.01 - Knowledge of the operational implications of the principle of cooling by natural convection. (QID 0342)	4.2	1
BW/E13&E14 EOP Rules and Enclosures							Not applicable.		0
BW/A05 Emergency Diesel Actuation / 6							Not applicable.		0
BW/A07 Flooding / 8							Not applicable.		0
CE/A16 Excess RCS Leakage / 2						1	CE/A16 2.4.1 - Knowledge of EOP Entry conditions and immediate action steps. (QID 0417)	4.6	1
W/E13 Steam Generator Over-pressure / 4							Not applicable.		0
W/E15 Containment Flooding / 5							Not applicable.		0
K/A Category Totals:	1	0	0	1	0	1	Group Point Total =	3	3

ANO Unit 2 2002 SRO Examination Outline																										
Plant Systems - Tier2/Group1																										
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic	Imp.	Points												
001 Control Rod Drive												Not Selected		0												
001 Control Rod Drive				1								001 K4.20 - Knowledge of CRDS design feature(s) and/or interlocks which provide the permissives and interlocks associated with increase from zero power. (QID 0345)	3.4	1												
003 Reactor Coolant Pump						1						003 K6.04 - Knowledge of the effect of a loss of containment isolation valves will have on RCP operation. (QID 0346)	3.1	1												
003 Reactor Coolant Pump												Not Selected		0												
004 Chemical and Volume Control									1			004 A3.06 - Ability to monitor automatic operation of the CVCS including effects of Tave and Tref. (QID 0348)	3.8	1												
004 Chemical and Volume Control												Not Selected		0												
013 Engineered Safety Features Actuation										1		013 A4.01 - Ability to manually operate and/or monitor in the control room ESFAS initiated equipment which fails to actuate. (QID 0350)	4.8	1												
013 Engineered Safety Features Actuation			1									013 K3.03 - Knowledge of the effect that a loss or malfunction of the ESFAS will have on the Containment. (QID 0351)	4.7	1												
014 Rod Position Indication					1							014 K5.01 - Knowledge of the operational implications of the reasons for differences between Rod Position Indication System and step counter. (QID 0373)	3.0	1												
015 Nuclear Instrumentation											1	015 G2.2.12 - Knowledge of surveillance procedures associated with Nuclear Instrumentation. (QID 0352)	3.4	1												
015 Nuclear Instrumentation												Not Selected		0												
017 In-core Temp Monitor/RVLMS								1				017 A1.01 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ITM/RVLMS System controls including Core Exit Temperatures. (QID 0354)	3.9	1												
017 In-core Temp Monitor/RVLMS						1						017 K6.01 - Knowledge of the effect of a loss or malfunction of the ITM/RVLMS System sensors and detectors. (QID 0355)	3.0	1												
022 Containment Cooling	1											022 K1.01 - Knowledge of the physical connections and/or cause-effect relationships between the Containment Cooling System and Service Water System/Cooling System. (QID 0356)	3.7	1												
022 Containment Cooling				1								022 K3.02 - Knowledge of the effect that a loss or malfunction of the Containment Cooling System will have on Containment Instrumentation readings. (QID 0357)	3.3	1												
025 Ice Condenser												Not applicable.		0												
026 Containment Spray	1											026 K1.01 - Knowledge of the physical connections and/or cause-effect relationships between the Containment Spray System and the ECCS. (QID 0374)	4.2	1												
056 Condensate								1				056 A2.04 - Ability to (a) predict the impacts of a Loss of Condensate pump on the Condensate System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of a Loss of Condensate Pumps. (QID 0358)	2.8	1												
059 Main Feedwater	1											059 K1.05 - Knowledge of the physical connections and/or cause effect relationships between the MFW System and the RCS. (QID 0359)	3.2	1												
061 Auxiliary/Emergency Feedwater								1				061 A1.05 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the AFW/EFW controls including AFW/EFW flow/motor amps. (QID 0360)	3.7	1												
061 Auxiliary/Emergency Feedwater		1										061 K2.01 - Knowledge of bus power supplies to the AFW/EFW System MOVs. (QID 0361)	3.3	1												
063 DC Electrical Distribution												Not Selected		0												
068 Liquid Radwaste												Not Selected		0												
068 Liquid Radwaste											1	068 G2.3.1 - Knowledge of 10CFR20 and related facility radiation controls. (QID 0363)	3.0	1												
071 Waste Gas Disposal					1							071 K5.04 - Knowledge of the operational implications of the relationship of hydrogen/oxygen concentration to flammability as they apply to the Waste Gas Disposal System. (QID 0364)	3.1	1												
072 Area Radiation Monitoring									1			072 A2.02 - Ability to (a) predict the impacts of a detector failure on the Area Radiation Monitoring System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations. (QID 0365)		1												
K/A Category Totals:													3	1	1	2	2	2	2	2	1	1	2	Group Point Total =	19	19

ANO Unit 2 2002 SRO Examination Outline

Plant Systems - Tier2/Group3

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic	Imp.	Points
005 Residual Heat Removal					1							005 K5.02 - Knowledge of the operational implications of the need for adequate subcooling as they apply to the Residual Heat Removal System. (QID 0387)	3.5	1
007 Pressurizer Relief/Quench Tank	1											007 K1.03 - Knowledge of the physical connections and/or cause-effect relationships between the Quench Tank System and the RCS. (QID 0388)	3.2	1
008 Component Cooling Water														0
041 Steam Dump/Turbine Bypass Control			1									041 K3.01 - Knowledge of the effect that a loss or malfunction of the Steam Dump System will have on SGs. (QID 0391)	3.3	1
045 Main Turbine Generator								1				045 A2.08 - Ability to (a) predict the impacts of steam dumps not cycling properly at low load, or stick open at higher load (isolate and use atmospheric reliefs when necessary) on MTG system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations. (QID 0392)	3.1	1
076 Service Water												Not Selected		0
078 Instrument Air												Not Selected		0
K/A Category Totals:	1	0	1	0	1	0	0	1	0	0	0	Group Point Total =	4	4
Plant-Specific Priorities														
System/Topic	Recommended Replacement for.....											Reason	Points	
064 Emergency Diesel Generators	079 Station Air in Tier 2 Group 2											064 A2.09 Ability to predict the impact of a malfunction of the EDG System during synchronizing an EDG with other electric power supplies and based on those predictions, use procedures to correct, control or mitigate the consequences of the malfunction or operation. Condition reports ANO-2-2001 0158 and 0491 document a condition whereby the number 1 EDG was declared inoperable during an attempt to tie the diesel to offsite power during a surveillance. (Refer to the references in the question) This is a much higher plant priority than the randomly selected Station Air K&A 079 K4.01 (Tier 2 Group2) especially since the Station Air System crossconnect to the Instrument Air system is a manual valve. (QID 0385)	1	
Plant-Specific Priority Total: (limit 10)														1

Based on NUREG 1021 Rev. 8 Supplement 1 Form ES-401-5

Facility:		Date of Exam:02/08/02		Exam Level: SRO	
Category	K/A #	Topic	Imp.	Points	
Conduct of Operations	2.1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. (QID 0419)	4.4	1	
	2.1.10	Knowledge of conditions and limitations in the facility license. (QID 0420)	3.9	1	
	2.1.12	Ability to apply technical specifications for a system. (QID 0397)	4.0	1	
	2.1.22	Ability to determine Mode of Operation. (QID 0421)	3.3	1	
	2.1.32	Ability to explain and apply all system limits and precautions. (QID 0398)	3.8	1	
		Total			
Equipment Control	2.2.9	Knowledge of the process for determining if the proposed change, test or experiment increases the probability of occurrence or consequence of an accident during the change, test, or experiment. (QID 0422)	3.3	1	
	2.2.11	Knowledge of the process for controlling temporary changes. (QID 0037)	3.4	1	
	2.2.27	Knowledge of the refueling process (QID 0399)	3.5	1	
	2.2.32	Knowledge of the effects of alterations on core configuration. (QID 0423)	3.3	1	
	2.2.				
	2.2.				
	Total				4
Radiation Control	2.3.1	Knowledge of 10CFR20 and related facility radiation control requirements. (QID 0424)	3.0	1	
	2.3.6	Knowledge of the requirements for reviewing and approving release permits. (QID 0425)	3.1	1	
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure. (QID 0426)	3.3	1	
	2.3.				
	2.3.				
	2.3.				
	Total				3
Emergency Procedures/ Plan	2.4.10	Knowledge of Annunciator response procedures. (QID 0427)	3.1	1	
	2.4.11	Knowledge of abnormal condition procedures. (QID 0428)	3.6	1	
	2.4.15	Knowledge of communications procedures associated with EOP Implementation. (QID 0407)	3.5	1	
	2.4.29	Knowledge of emergency plan. (QID 0429)	4.0	1	
	2.4.33	Knowledge of the process used to track inoperable alarms. (QID 0430)	2.8	1	
	2.4.				
	Total				5
Tier 3 Point Total (SRO)					17