

Facility: ANO Unit 2 Date of Exam: 04/21/2000 Exam Level: SRO													
Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G *	
1. Emergency & Abnormal Plant Evolutions	1	5	3	6				4	5			1	24
	2	2	1	4				2	5			2	16
	3	0	1	0				1	1			0	3
	Tier Totals	7	5	10				7	11			3	43
2. Plant Systems	1	2	0	3	3	1	1	2	2	3	2	0	19
	2	3	1	1	2	2	1	0	3	1	1	2	17
	3	0	1	0	0	0	0	1	1	0	0	1	4
	Tier Totals	5	2	4	5	3	2	3	6	4	3	3	40
3. Generic Knowledge and Abilities				Cat 1		Cat 2		Cat 3		Cat 4		17	
				4		4		5		4			
<p>Note: 1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).</p> <p>2. Actual point totals must match those specified in the table.</p> <p>3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.</p> <p>4. Systems/evolutions within each group are identified on the associated outline.</p> <p>5. The shaded areas are not applicable to the category/tier.</p> <p>6.* The generic 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.</p> <p>7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.</p>													

ES-401 PWR SRO Examination OutlineForm ES-401-3 Emergency and Abnormal Plant Evolutions - Tier 1/Group 1									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	Imp.	Points
000001 Continuous Rod Withdrawal / 1					1		001 AA2.05 – Ability to determine and interpret uncontrolled rod withdrawal, from available indications.	4.6	1.0
000003 Dropped Control Rod / 1	1						003 AK1.04 – Knowledge of the operational implication of the effects of power level and control position on flux as they apply to Dropped Control Rods.	3.7	1.0
			1				003 AK3.04 – Knowledge of the reasons for the actions contained in AOP for Dropped Control Rod.	4.1	1.0
000005 Inoperable/Stuck Control Rod / 1	1						005 AK1.06 – Knowledge of the operational implications and bases for power limit, for rod misalignment.	3.8	1.0
000011 Large Break LOCA / 3					1		011 EA2.08 – Ability to determine or interpret conditions necessary for recovery when accident reaches stable phase as they apply to Large Break LOCA.	3.9	1.0
000015/17 RCP Malfunctions / 4					1		015 AA2.08 – Ability to determine/interpret when to secure RCPs on high bearing temperature as per Reactor Coolant Pump Malfunctions.	3.5	1.0
				1			017 AA1.21 – Ability to operate and/or monitor development of natural circulation.	4.5	1.0
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4				1			A13 AA1.2 – Ability to operate and/or monitor operating behavior characteristics of the facility as they apply to Natural Circulation Operations.	3.6	1.0
000024 Emergency Boration / 1			1				024 K3.02 – Knowledge of the reasons for actions contained in EOP as they apply to Emergency Boration.	4.4	1.0
					1		024 AA2.01 – Ability to determine and interpret whether boron flow and/or MOVs are malfunctioning from plant conditions as it applies to Emergency Boration.	4.1	1.0
000026 Loss of Component Cooling Water / 8						1	026 2.4.24 – Knowledge of Loss of Cooling Water procedures.	3.7	1.0
			1				026 AK3.03 – Knowledge of the reasons for guidance actions contained in EOPs for Loss of CCW.	4.2	1.0
000029 Anticipated Transient w/o Scram / 1		1					029 AK2.06 – Knowledge of the interrelations between breakers, relays, and disconnects and ATWS.	3.1	1.0
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4	1						040 AK1.06 – Knowledge of the operational implications of high-energy steam break considerations.	3.8	1.0
CE/A11; W/E08 RCS Overcooling - PTS / 4		1					A11 AK2.2 – Knowledge of the interrelations between RCS Overcooling and 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.	3.4	1.0
000051 Loss of Condenser Vacuum / 4					1		051 AA2.02 – Ability to determine and interpret conditions requiring reactor and/or turbine trip as they apply to Loss of Condenser Vacuum.	4.1	1.0
000055 Station Blackout / 6			1				055 EK3.02 – Knowledge of the reason for actions contained in EOP for Loss of Offsite and Onsite power as they apply to Station Blackout EOP.	4.6	1.0
000057 Loss of Vital AC Elec. Inst. Bus / 6				1			057 AA1.06 – Ability to operate and/or monitor manual control of components for which automatic control is lost as they apply to Loss of Vital AC Instrument Bus.	3.5	1.0

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Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (Continued)

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	Imp.	Points
000059 Accidental Liquid RadWaste Rel. / 9			1				059 AK3.01 – Knowledge of the reasons for termination of a release of radioactive liquid as they apply to the Accidental Liquid Radwaste Release.	3.9	1.0
000062 Loss of Nuclear Service Water / 4				1			062 AA1.02 – Ability to operate and/or monitor loads on the SWS in the control room as they apply to Loss of Nuclear Service Water	3.3	1.0
000067 Plant Fire On-site / 9	1						067 K1.02 – Knowledge of the operational implications of fire fighting as they apply to Plant Fire on Site.	3.9	1.0
000068 (BW/A06) Control Room Evac. / 8		1					068 K2.02 – Knowledge of the interrelations between the Control Room Evacuation and Reactor trip system.	3.9	1.0
000069 (W/E14) Loss of CTMT Integrity / 5									
000074 (W/E06&E07) Inad. Core Cooling / 4	1						074 EK1.02 – Knowledge of the operational implications and potential consequences of uncovering the core as they apply to Inadequate Core Cooling.	4.8	1.0
000076 High Reactor Coolant Activity / 9			1				076 AK3.06 – Knowledge of the actions contained in EOP for high reactor coolant activity.	3.8	1.0
K/A Category Totals:	5	3	6	4	5	1	Group Point Total:		24

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E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	Imp.	Points
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1					1		E02 EA2.1 – Ability to determine and interpret facility conditions and selection of appropriate procedures during abnormal and emergency operations (Reactor Trip Recovery).	3.7	1.0
	1						007 EK1.06 – Knowledge of the operational implications of the relationship of emergency feedwater flow to SG and decay heat removal following a Reactor Trip.	4.1	1.0
000008 Pressurizer Vapor Space Accident / 3				1			008 AA1.02 – Ability to operate and/or monitor the HPSI Pump to control Pzr level/pressure with a Pressurizer Vapor Space Accident.	3.9	1.0
000009 Small Break LOCA / 3				1			009 EA1.16 – Ability to operate and/or monitor subcooling margin monitors as they apply to small break LOCA.	4.2	1.0
000022 Loss of Reactor Coolant Makeup / 2			1				022 AK3.02 – Knowledge of the reasons for actions contained in SOPs and EOPs for RCPs, Loss of Makeup, Loss of Charging, and abnormal charging as they apply to the Loss of Reactor Coolant Makeup.	3.8	1.0
000025 Loss of RHR System / 4			1				025 AK3.01 – Knowledge of the reasons for shifting to alternate flowpath as they apply to Loss of Residual Heat Removal System.	3.4	1.0
000027 Pressurizer Pressure Control System Malfunction / 3						1	027 2.4.2 – Knowledge of system setpoints, interlocks, and automatic actions associated with EOP entry conditions.	4.1	1.0
000032 Loss of Source Range NI / 7		1					032 AK2.01 – Knowledge of the interrelations between the Loss of Source Range Nuclear Instrumentation and Power supplies, including proper switch positions.	3.1	1.0
000033 Loss of Intermediate Range NI / 7									
000037 Steam Generator Tube Leak / 3					1		037 AA2.16 – Ability to determine and interpret pressure at which to maintain RCS during SG cooldown during a Steam Generator Tube Leak.	4.3	1.0
000038 Steam Generator Tube Rupture / 3					1		038 EA2.02 – Ability to determine or interpret existence of a SG tube rupture and its potential consequences as they apply to SGTR.	4.8	1.0
						1	038 2.4.48 – Ability to interpret control room indications to verify the status and operation of systems, and understand how operator actions and directives affect plant and system conditions.	3.8	1.0
000054 (CE/E06) Loss of Main Feedwater / 4			1				E06 EK3.2 – Knowledge for the reasons for normal, abnormal and emergency operating procedures associated with Loss of Feedwater.	3.7	1.0
000058 Loss of DC Power / 6					1		058 AA2.03 – Ability to determine and interpret DC loads lost and impact on ability to operate and monitor plant systems as they apply to the Loss of DC Power.	3.9	1.0
000060 Accidental Gaseous Radwaste Rel. / 9									
000061 ARM System Alarms / 7					1		061 AA2.01 – Ability to determine and interpret the ARM displays as they apply to the Area Radiation Monitoring System.	3.7	1.0
000065 Loss of Instrument Air / 8			1				065 AK3.08 – Knowledge of the reasons for action contained in AOP for Loss of Instrument Air.	3.9	1.0
CE/E09 Functional Recovery	1						E09 EK1.2 – Knowledge of operational implications of normal, abnormal and emerg operating procedure associated with Functional Recovery.	4.0	1.0
K/A Category Point Totals:	2	1	4	2	5	2	Group Point Total:		16

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Emergency and Abnormal Plant Evolutions - Tier 1/Group 3

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	Imp.	Points
000028 Pressurizer Level Malfunction / 2									
000036 (BW/A08) Fuel Handling Accident / 8				1			036 AA1.04 – Ability to operate and/or monitor fuel handling equipment during a fuel handling incident.	3.7	1.0
000056 Loss of Off-site Power / 6					1		056 AA2.56 – Ability to determine and interpret RCS Tave as it applies to the Loss of Offsite Power.	3.7	1.0
CE/A16 Excess RCS Leakage / 2		1					A16 AK2.2 – Knowledge of the interrelationship between the Excess RCS Leakage and the facilities 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.	3.3	1.0
K/A Category Point Totals:	0	1	0	1	1	0	Group Point Total:		3

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Plant Systems - Tier 2/Group 1

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)	Imp.	Points
001 Control Rod Drive				1								001 K4.23 – Knowledge of CRDS design feature(s) and/or interlock(s), which provide rod motion, inhibits.	3.8	1.0
003 Reactor Coolant Pump									1			003 A3.05 – Ability to monitor automatic operation of the RCPs including RCP Lube Oil and Bearing Lift Pumps.	2.6	1.0
004 Chemical and Volume Control										1		004 A4.05 – Ability to manually operate and/or monitor from the control room the Letdown pressure and temperature control valves.	3.1	1.0
013 Engineered Safety Features Actuation			1									013 K3.01 – Knowledge of the effect that a loss or malfunction of the ESFAS will have on the fuel.	4.7	1.0
					1							013 K5.02 – Knowledge of the operational implications of safety system logic and reliability as they apply to the ESFAS.	3.3	1.0
								1				013 A2.06 – Ability to (a) predict the impacts of inadvertent ESFAS actuation on the ESFAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of Inadvertent ESFAS actuation.	4.0	1.0
014 Rod Position Indication				1								014 K4.06 – Knowledge of RPIS design feature(s) and/or interlock(s), which provide for individual and group misalignment.	3.7	1.0
015 Nuclear Instrumentation				1								015 K4.06 – Knowledge of Nuclear Instrumentation System design feature(s) and/or interlock(s), which provide for Reactor Trip Bypasses.	4.2	1.0
							1					015 A1.01 – Ability to predict/monitor changes in parameters (to prevent exceeding design limits) associated with operating the Nuclear Instrumentation System (NIS) controls including NIS calibration by heat balance.	3.8	1.0

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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)	Imp.	Points
017 In-core Temperature Monitor							1					017 A1.01 – Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ITM system controls including core exit temperatures.	3.9	1.0
022 Containment Cooling										1		022 A4.03 – Ability to manually operate and/or monitor dampers in the Containment Cooling System.	3.2	1.0
025 Ice Condenser														
026 Containment Spray								1				026 A2.04 - Ability to predict the impacts of the failure of a spray pump on the CSS.	4.2	1.0
056 Condensate	1											056 K1.03 – Knowledge of the physical connections and/or cause-effect relationships between the Condensate System and the Main Feedwater System.	2.6	1.0
059 Main Feedwater			1									059 K3.03 – Knowledge of the effect that a loss or malfunction of the MFW will have on SGs.	3.7	1.0
									1			059 A3.02 – Ability to monitor automatic operation of the MFW, including programmed levels in the SGs.	3.1	1.0
061 Auxiliary/Emergency Feedwater									1			061 A3.03 – Ability to monitor Automatic operation of EFW including EFW SG level control on automatic start.	3.9	1.0
063 DC Electrical Distribution			1									063 K3.02 – Knowledge of the effect that a loss or malfunction of the DC electrical system will have on components us DC control power.	3.7	1.0
068 Liquid Radwaste						1						068 K6.10 – Knowledge of the effect of a loss or malfunction of radiation monitor will have on the Liquid Radwaste System.	2.9	1.0
071 Waste Gas Disposal														
072 Area Radiation Monitoring	1											072 K1.04 – Knowledge of the physical connections and/or cause-effect relationships between the ARM system and Control Room Ventilation System	3.5	1.0
K/A Category Point Totals:	2	0	3	3	1	1	2	2	3	2	0	Group Point Total:		19

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Plant Systems - Tier 2/Group 2 (Continued)

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ES-401 PWR SRO Examination OutlineForm ES-401-3
Plant Systems - Tier 2/Group 2 (Continued)

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)	Imp.	Points
086 Fire Protection					1							086 K5.03 – Knowledge of the operational implication of the effects of water spray on electrical components as they apply to the Fire Protection System.	3.4	1.0
103 Containment														
K/A Category Point Totals:	3	1	1	2	2	1	0	3	1	1	2	Group Point Total:		17

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Plant Systems - Tier 2/Group 3

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Facility: ANO Unit 2 Date of Exam: 04/21/99 Exam Level: SRO				
Category	K/A #	Topic	Imp.	Points
Conduct of Operations	2.1.1	Knowledge of conduct of operations requirements.	3.8	1.0
	2.1.17	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	1.0
	2.1.21	Ability to obtain and verify controlled procedure copy.	3.2	1.0
	2.1.32	Ability to explain and apply all system limits and precautions.	3.8	1.0
	Total			4.0
Equipment Control	2.2.11	Knowledge of the process for controlling temporary changes.	3.4	1.0
	2.2.12	Knowledge of surveillance procedures.	3.4	1.0
	2.2.25	Knowledge of bases in Technical Specifications for limiting conditions for operations and Safety Limits.	3.7	1.0
	2.2.30	Knowledge of RO duties in the control room during fuel handling such as alarms for fuel handling area, communications with fuel storage facility, systems operated from the control room in support of fueling operations and supporting instrumentation.	3.3	1.0
	Total			4.0
Radiation Control	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	3.1	1.0
	2.3.7	Knowledge of the process for preparing a radiation work permit.	3.3	1.0
	2.3.9	Knowledge of the process for performing a containment purge.	3.4	1.0
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1.0
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1.0
	Total			5.0
Emergency Procedures/ Plan	2.4.1	Knowledge of EOP Entry conditions and immediate action steps.	4.6	1.0
	2.4.4	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating conditions.	4.3	1.0
	2.4.21	Knowledge of the parameters and logic used to assess the status of inventory safety function.	4.3	1.0
	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	1.0
	Total			4.0
Tier 3 Point Total (SRO)				17