

Final Submittal
(Blue Paper)

FINAL OUTLINES

SURRY JAN./FEB. 2006 EXAM

0500280/2006301 AND 05000281/2006301

JANUARY 23 - FEBRUARY 3, 2006
FEBRUARY 8, 2006 (WRITTEN)

2/9/06

Facility: Surry															FINAL				
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	2	N/A			3	4	N/A			3	18	3	3	6		
	2	2	1	1	N/A			2	2	N/A			1	9	1	3	4		
	Tier Totals	5	4	3	N/A			5	6	N/A			4	27	5	5	10		
2. Plant Systems	1	3	3	3	3	3	2	3	2	2	2	2	28	3	2	5			
	2	1	0	1	1	1	1	1	1	1	1	1	10	1	2	3			
	Tier Totals	4	3	4	4	4	3	4	3	3	3	3	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 and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from 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.
- e. 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 (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2. 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 numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (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	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1						x	EG2.4.4 Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures (CFR 41.10)	4.0	1
					x		EA2.02 Ability to determine or interpret the following as they apply to a reactor trip: Proper actions to be taken if the automatic safety functions have not taken place (CFR 45.5 / 45.6)	4.6	1
000008 Pressurizer Vapor Space Accident / 3									
000009 Small Break LOCA / 3	x						EK 1.01 Knowledge of the operational implications of the following concepts as they apply to the small break LOCA: Natural circulation and cooling, including reflux boiling (CFR 41.8 / 41.10)	4.2	1
000011 Large Break LOCA / 3						x	EG2.1.20 Ability to execute procedure steps (CFR 41.10)	4.3	1
					S		SRO EA2.01 Ability to determine or interpret the following as they apply to a Large Break LOCA: Actions to be taken, based on RCS temperature and pressure – saturated and superheated (CFR 43.5)	4.7	1
000015/17 RCP Malfunctions / 4						S	SRO AG2.1.33 Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications (CFR 43.2 / 43.3)	4.0	1
000022 Loss of Rx Coolant Makeup / 2									
000025 Loss of RHR System / 4		x					AK2.03 Knowledge of the interrelations between the Loss of Residual Heat Removal System and the following: Service water or closed cooling water pumps (CFR 41.7)	2.7	1
000026 Loss of Component Cooling Water / 8						x	AG2.4.4 Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures (CFR 41.10)	4.0	1
000027 Pressurizer Pressure Control System Malfunction / 3		x					AK2.03 Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following: Controllers and positioners (CFR 41.7)	2.6	1
000029 ATWS / 1									
000038 Steam Gen. Tube Rupture / 3						S	SRO EK3.06 Knowledge of the reasons for the following responses as they apply to the SGTR: Actions contained in EOP for RCS water inventory balance, S/G tube rupture, and plant shutdown procedures (CFR 41.5)	4.2	1
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4					x		EA2.2 Ability to determine and interpret the following as they apply to the Uncontrolled Depressurization of all Steam Generators: Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments (CFR 43.5 / 45.13)	3.4	

000054 (CE/E06) Loss of Main Feedwater / 4			x				AK3.04 Knowledge of the reasons for the following response as they apply to the Loss of main Feedwater (MFW): Actions contained in EOPs for loss of MFW (CFR 41.5, 41.10)	4.4	1
000055 Station Blackout / 6			x			S	EA1.06 Ability to operate and monitor the following as they apply to a Station Blackout: Restoration of power with one ED/G (CFR 41.7)	4.1	1
							SRO EG2.1.32 Ability to explain and apply all system limits and precautions (CFR 43.2)	3.8	1
000056 Loss of Off-site Power / 6	x						AK1.01 Knowledge of the operational implications of the following concepts as they apply to the Loss of Offsite Power: Principles of cooling by natural convection (CFR 41.8 / 41.10)	3.7	1
000057 Loss of Vital AC Inst. Bus / 6			x			S	AK3.01 Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: Actions contained in EOP for loss of vital ac electrical instrument bus (CFR 41.5, 41.10)	4.1	1
							SRO AG2.2.22 Knowledge of limiting conditions for operations and safety limits (CFR 43.2)	4.1	1
000058 Loss of DC Power / 6					x		AA2.02 Ability to determine and interpret the following as they apply to the Loss of DC Power: 125V dc bus voltage, low/critical low, alarm (CFR 43.5, 45.13)	3.3*	1
000062 Loss of Nuclear Svc Water / 4			x			S	AA1.01 Ability to operate and / or monitor the following as they apply to the Loss of Nuclear Service Water (SWS): Nuclear service water temperature indications (CFR 41.7)	3.1	1
							SRO AA2.02 Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The cause of possible SWS loss (CFR 43.5)	3.6	1
000065 Loss of Instrument Air / 8			x				AA1.04 Ability to operate and / or monitor the following as they apply to the Loss of Instrument Air: Emergency air compressor (CFR 41.7)	3.5*	1
W/E04 LOCA Outside Containment / 3	x						EK1.2 Knowledge of the operational implications of the following concepts as they apply to the LOCA Outside Containment: Normal, abnormal and emergency operating procedures associated with LOCA Outside Containment CFR 41.8 / 41.10)	3.5	1
W/E11 Loss of Emergency Coolant Recirc. / 4		x					EK2.1 Knowledge of the interrelations between the Loss of Emergency Coolant Recirculation and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features (CFR 41.7)	3.6	1
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4					x		EA2.2 Ability to determine and interpret the following as they apply to the Loss of Secondary Heat Sink: Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments (CFR 43.5 / 45.13)	3.7	1
K/A Category Totals:	3	3	2	3	4	3	Group Point Total:		18
					2	4			6

000074 (W/E06&E07) Inad. Core Cooling / 4	x								WE06EK1.2 Knowledge of the operational implications of the following concepts as they apply to the Degraded Core Cooling: Normal, abnormal and emergency operating procedures associated with Degraded Core Cooling (CFR 41.8 / 41.10)	3.5	1
								x	WE07EA2.1 Ability to determine and interpret the following as they apply to the Saturated Core Cooling: Facility conditions and selection of appropriate procedures during abnormal and emergency operations (CFR 43.5 / 45.13)	3.2	1
								S	SRO WE07EG2.4.4 Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures (CFR 43.2)	4.3	1
000076 High Reactor Coolant Activity / 9			x						AK3.05 Corrective actions as a result of high fission-product radioactivity level in the RCS (CFR 41.5 / 41.10)	2.9	1
W/E01 & E02 Rediagnosis & SI Termination / 3											
W/E13 Steam Generator Over-pressure / 4											
W/E15 Containment Flooding / 5											
W/E16 High Containment Radiation / 9											
BW/A01 Plant Runback / 1											
BW/A02&A03 Loss of NNI-X/Y / 7											
BW/A04 Turbine Trip / 4											
BW/A05 Emergency Diesel Actuation / 6											
BW/A07 Flooding / 8											
BW/E03 Inadequate Subcooling Margin / 4											
BW/E08; W/E03 LOCA Cooldown - Depress. / 4								x	EA1.1 Ability to operate and / or monitor the following as they apply to the LOCA Cooldown and Depressurization: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features (CFR 41.7)	4.0	1
BW/E13&E14 EOP Rules and Enclosures											
CE/A11; W/E08 RCS Overcooling - PTS / 4								x	EA2.2 Ability to determine and interpret the following as they apply to the Pressurized Thermal Shock: Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments (CFR 43.5 / 45.13)	3.5	1
CE/A16 Excess RCS Leakage / 2											
CE/E09 Functional Recovery											
K/A Category Point Totals:	2	1	1	2	2	1			Group Point Total:		9
					2	2					4

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)										Form ES-401-2			
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump							x					A1.04 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RCPS controls including: RCP oil reservoir levels (CFR 41.5)	2.6	1
		x										K2.02 Knowledge of bus power supplies to the following: CCW pumps (CFR 41.7)	2.5*	1
004 Chemical and Volume Control							x					K6.02 Knowledge of the effect of a loss or malfunction on the following CVCS components: Demineralizers and ion exchangers (CFR 41.7)	2.5	1
								S				SRO A2.12 Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: CIAA, SIAS (CFR 43.5)	4.3	1
005 Residual Heat Removal										x		A4.03 Ability to manually operate and/or monitor in the control room: RHR temperature, PZR heaters and flow, and nitrogen (CFR 41.7)	2.8*	1
					x							K5.05 Knowledge of the operational implications of the following concepts as they apply to the RHRS: Plant response during "solid plant" - pressure change due to the relative incompressibility of water (CFR 41.5)	2.7*	1
006 Emergency Core Cooling	x											K1.11 Knowledge of the physical connections and/or cause-effect relationships between the ECCS and the following systems: CCWS (CFR 41.2 to 41.9)	2.8	1
007 Pressurizer Relief/Quench Tank							x					A1.01 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: Maintaining quench tank water level within limits (CFR 41.5)	2.9	1
								x				A2.02 Ability to (a) predict the impacts of the following malfunctions or operations on the PS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Abnormal pressure in the PRT (CFR 41.5)	2.6	1
008 Component Cooling Water										x		A4.08 Ability to manually operate and/or monitor in the control room: CCW pump control switch (CFR 41.7)	3.1*	1

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO / SRO)											Form ES-401-2	
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
001 Control Rod Drive														
002 Reactor Coolant					x							K5.07 Knowledge of the operational implications of the following concepts as they apply to the RCS: Reactivity effects of RCS boron, pressure, and temperature (CFR 41.5) SRO G2.1.32 Ability to explain and apply all system limits and precautions (CFR 43.2)	3.3	1
011 Pressurizer Level Control								S				SRO A2.10 Ability to (a) predict the impacts of the following malfunctions or operations on the PZR LCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of PZR level instrument – high (CFR 41.5)	3.6	1
014 Rod Position Indication														
015 Nuclear Instrumentation											S	SRO G2.1.33 Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications (CFR 43.2 / 43.3)	4.0	1
016 Non-nuclear Instrumentation								x				A2.04 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: Voltage to instruments, both too high and too low (CFR 41.5)	2.5*	1
017 In-core Temperature Monitor									x			A3.01 Ability to monitor automatic operation of the ITM system including: Indications of normal, natural, and interrupted circulation of RCS (CFR 41.7)	3.6*	1
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control														
029 Containment Purge	x											K1.04 Knowledge of the physical connections and/or cause-effect relationships between the Containment Purge System and the following systems: Purge system (CFR 41.2 to 41.9)	3.0 ?	1
033 Spent Fuel Pool Cooling											x	G2.4.31 Knowledge of annunciators alarms and indications, and use of the response instructions (CFR 41.10)	3.3	1
034 Fuel Handling Equipment				x								K4.01 Knowledge of design feature(s) and/or interlock(s) which provide the following: Fuel protection from binding and dropping (CFR 41.7)	2.6	1

