INITIAL SUBMITTAL

SURRY SEPTEMBER/2000 EXAM
50-280/2000-301

SEPTEMBER 14 - 21, 2000

INITIAL SUBMITTAL

INITIAL OUTLINE SUBMITTALS
NRC SUBMITTED/WRITTEN OUTLINES

Facility: SURRY Date of Exam: SEPT 2000 Exam Level: SRO

Tier	Group	K/A Category Points											Point Total
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	
1. Emergency & Abnormal Plant Evolutions	1	3	4	6				3	5			3	24
	2	4	1	2				3	4			2	16
	3	1	1	0				1	0			0	3
	Tier Totals	8	6	8				7	9			5	43
2. Plant Systems	1	2	1	3	3	1	0	3	2	2	0	2	19
	2	1	1	0	0	1	2	1	3	2	3	3	17
	3	0	0	1	1	0	1	0	1	0	0	0	4
	Tier Totals	3	2	4	4	2	3	4	6	4	3	5	40

3. Generic Knowledge and Abilities	Cat 1	Cat 2	Cat 3	Cat 4	17
	3	5	4	5	

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).
2. Actual point totals must match those specified in the table.
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.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
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.
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.

ES-401 | PWR SRO Examination Outline | Form ES-401-3

Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000001 Continuous Rod Withdrawal / 1		X					AK 2.06 Tavg Tref Deviation Meter	3.0/3.1	1
000003 Dropped Control Rod / 1		X					AK 2.05 Control Rod Pwr supplies and logic Circuits	2.5/2.8	1
000005 Inoperable/Stuck Control Rod / 1	X						AK1.02 Flux Tilt	3.1/3.9	1
000011 Large Break LOCA / 3					X		EA2.11 Conditions for throttling or Stopping HPI SRO only (AD2)	3.9/4.3	1
W/E04 LOCA Outside Containment / 3			X				EK3.3 Manipulation of controls to obtain desired outcome.	3.8/3.8	1
W/EO1 & E02 Rediagnosis & SI Termination / 3									
000015/17 RCP Malfunctions / 4				X			AA1.23 RCP Vibration	3.1/3.2	1
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4				X	X		EA2.2 Adherence to Appropriate Procedure SRO only EA1.3 Abnormal and Emergency Operations	3.4/3.8 3.5/3.8	2
000024 Emergency Boration / 1			X				AK3.02 Actions Contained in EOP	4.2/4.4	1
000026 Loss of Component Cooling Water / 8			X				AK3.02 Automatic CCW alignments resulting from ESFAS Actuation	3.6/3.9	1
000029 Anticipated Transient w/o Scram / 1						X	G 2.4.18 Knowledge of the Specific Basis for EOPs	2.7/3.6	1
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4	X			X			AA1.18 Control Rod Pos Indicators AK1.2 Normal, AOP, and EOP usage SRO only	4.24.2 3.5/3.8	2
CE/A11; W/E08 RCS Overcooling - PTS / 4	X						EK1.1 Components, Capacity & Function of ES	3.5/3.8	1
000051 Loss of Condenser Vacuum / 4					X		AA2.02 Conditions Requiring RX or Turbine Trip	3.9/4.1	1
000055 Station Blackout / 6			X			X	G 2.1.33 Entry Level For TS SRO only EK3.01 Length of Time for which Battery is Designed SRO Only (CEP-929)	3.4/4.0 4.3/4.6	2
000057 Loss of Vital AC Elec. Inst. Bus / 6					X		AA2.18 Ind, VLV, BKR, DMPR position on Loss of Power	3.1/3.1	1
000059 Accidental Liquid RadWaste Rel. / 9									
000062 Loss of Nuclear Service Water / 4			X				AK3.02 Auto Actions on ESFAS	3.6/3.9	1
000067 Plant Fire On-site / 9						X	G 2.4.27 Knowledge of Fire in the Plant proc. SRO only (CEP-002)	3.0/3.5	1
000068 (BW/A06) Control Room Evac. / 8		X					AK2.03 Controllers and Positioners	2.9/3.1	1
000069 (W/E14) Loss of CTMT Integrity / 5					X		AA2.01 Loss of Containment Integrity	3.7/4.3	1
000074 (W/E06&E07) Inad. Core Cooling / 4		X					EK2.03 AFW Pumps (CEP-912)	4.0/4.0	1
BW/E03 Inadequate Subcooling Margin / 4									
000076 High Reactor Coolant Activity / 9			X				AK3.06 EOP Actions for High Coolant Activity	3.2/3.8	1
BW/A02&A03 Loss of NNI-X/Y / 7									
K/A Category Totals:	3	4	6	3	5	3	Group Point Total:		24

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PWR SRO Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2

Form ES-401-3

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1						X	G 2.4.35 Knowledge of AUO Tasks During Emergency Operations	3.3/3.5	1
BW/A01 Plant Runback / 1									
BW/A04 Turbine Trip / 4									
000008 Pressurizer Vapor Space Accident / 3	X						AK1.01 Thermodynamics of Leaking Valves SRO only	3.2/3.7	1
000009 Small Break LOCA / 3				X			EA1.10 SPDS	3.8/3.9	1
BW/E08; W/E03 LOCA Cooldown - Depress. / 4		X					EK2.2 Heat removal system	3.7/4.0	1
W/E11 Loss of Emergency Coolant Recirc. / 4					X		EA2.2 Adherence to App procedures & OPS within limitations SRO only	3.4/4.2	1
000022 Loss of Reactor Coolant Makeup / 2				X			AA1.03 PZR Level Trend	3.2/3.2	1
000025 Loss of RHR System / 4	X						AK1.01 Loss of RHRS During all Modes	3.9/4.3	1
000027 Pressurizer Pressure Control System Malfunction / 3						X	G 2.1.11 Knowledge of 1 hour TS	3.0/3.8	1
000032 Loss of Source Range NI / 7			X				AK3.01 Reason for Startup Termination on SR loss SRO only	3.2/3.6	1
000033 Loss of Intermediate Range NI / 7	X						AK1.01 Effects on Voltage Change on Performance	2.7/3.0	1
000037 Steam Generator Tube Leak / 3				X	X		AA2.10 TS Limit for RCS Leakage AA1.09 RCS Loop Pressure Indicator SRO only	3.2/4.1 3.3/3.2	2
000038 Steam Generator Tube Rupture / 3									
000054 (CE/E06) Loss of Main Feedwater / 4					X		AA2.03 Conditions/Reasons for AFW pump startup SRO only	4.1/2.3	1
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4									
000058 Loss of DC Power / 6			X				AK3.01 Use of DC power by EDGS SRO Only	3.4/3.7	1
000060 Accidental Gaseous Radwaste Rel. / 9									
000061 ARM System Alarms / 7					X		AA2.05 Need for Area Evacuation	3.5/4.2	1
W/E16 High Containment Radiation / 9	X						EK1.3 Annunciators & conditions IND signals / Remedial actions	3.0/3.3	1
000065 Loss of Instrument Air / 8									
CE/E09 Functional Recovery									
K/A Category Point Totals:	4	1	2	3	4	2	Group Point Total:		16

Emergency and Abnormal Plant Evolutions - Tier 1/Group 3

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000028 Pressurizer Level Malfunction / 2									
000036 (BW/A08) Fuel Handling Accident / 8	X						AK1.01 Radiation Exposure Hazzards	3.5/4.1	1
000056 Loss of Off-site Power / 6				X			AA1.10 MDAFWP SRO ONLY (T1BLP)	4.3/4.3	1
BW/E13&E14 EOP Rules and Enclosures									
BW/A05 Emergency Diesel Actuation / 6									
BW/A07 Flooding / 8									
CE/A16 Excess RCS Leakage / 2									
W/E13 Steam Generator Over-pressure / 4		X					EK 2.1 Comp and Functions of Control and Safety System I &C	3.0/3.1	1
W/E15 Containment Flooding / 5									
K/A Category Point Totals:	1	1	0	1	0	0	Group Point Total:		3

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PWR SRO Examination Outline
Plant Systems - Tier 2/Group 1

Form ES-401-3

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
001 Control Rod Drive									X			A3.04 Radial Imbalance	3.5/3.8	1
003 Reactor Coolant Pump		X					X					A1.09 Seal Flow and DP (CEP-920) K2.01 Power Supply to RCPs	2.8/2.8 3.1/3.1	2
004 Chemical and Volume Control							X	X				A1.03 RCS Pressure A2.12 CIAS, SIAS (CEP-903)	3.8/3.8 4.1/4.3	2
013 Engineered Safety Features Actuation			X								X	G 2.1.26 Knowledge of non-nuclear safety proc. SRO ONLY K 3.01 Fuel	2.2/2.6 4.4/4.7	2
014 Rod Position Indication					X							K5.01 Differences between RPIS and Step Counter	2.7/3.0	1
015 Nuclear Instrumentation											X	G. 2.1.10, Knowledge of license conditions	2.7/3.9	1
017 In-core Temperature Monitor				X								K4.01 Input to Subcooling Monitors	3.4/3.7	1
022 Containment Cooling									X			A3.01 Initiation of Safeguards Mode	4.1/4.3	1
025 Ice Condenser														
026 Containment Spray			X									K3.01 Cont Cooling System (CEP-908)	39/4.1	1
056 Condensate	X											K1.03 MFW	2.6/2.6	1
059 Main Feedwater			X									K3.03 S/Gs	3.5/3.7	1
061 Auxiliary/Emergency Feedwater	X			X								K1.07 Emergency Water Source (CEP-912) K4.06 AFW Startup Permissives	3.6/3.8 4.0/4.2	2
063 DC Electrical Distribution							X					A1.01 Charging rate vs Battery Capacity	2.5/3.3	1
068 Liquid Radwaste														
071 Waste Gas Disposal								X				A2.02 Gas release monitors, flow rate	3.3/3.6	1
072 Area Radiation Monitoring				X								K4.01 Release Termination	3.3/3.6	1
K/A Category Point Totals:	2	1	3	3	1	0	3	2	2	0	2	Group Point Total:		19

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PWR SRO Examination Outline
Plant Systems - Tier 2/Group 2

Form ES-401-3

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
002 Reactor Coolant														
006 Emergency Core Cooling									X			A3.05 SI Pumps	3.4/3.9	1
010 Pressurizer Pressure Control					X							K5.01 Fluid condition in PZR	3.5/4.0	1
011 Pressurizer Level Control										X		A4.05 Letdown flow controller	3.2/2.9	1
012 Reactor Protection		X										K2.01 RPS BUS Power Supply	3.3/3.7	1
016 Non-nuclear Instrumentation								X				A2.03 Interruption of signal	3.0/3.3	1
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control														
029 Containment Purge														
033 Spent Fuel Pool Cooling									X			A3.02 Spent fuel leakage SRO only	2.9/3.1	1
034 Fuel Handling Equipment							X					A1.02 Water Level in Refueling Canal	2.9/3.7	1
035 Steam Generator						X						K6.03 S/G Level Det	2.6/3.0	1
039 Main and Reheat Steam								X				A2.04 Malfunctioning Steam Dumps	3.4/3.7	1
055 Condenser Air Removal														
062 AC Electrical Distribution										X		A4.03 Synchroscope	2.8/2.9	1
064 Emergency Diesel Generator						X						K6.08 Fuel oil Storage Tanks	3.2/3.3	1
073 Process Radiation Monitoring	X											K1.01 Systems Served by PRM	3.6/3.9	1
075 Circulating Water								X			X	A2.02 Loss of Circ Water Pumps (CEP-904) G 2.1.32 System Limits and Precautions	2.5/2.7 3.4/3.8	2
079 Station Air										X		A4.01 X tie with IA	2.7/2.7	1
086 Fire Protection											X	G 2.4.27 Plant Fire Procedures SRO only (CEP-002)	3.0/3.5	1
103 Containment											X	G 2.1.32 System Precautions and limits	3.4/3.8	1
K/A Category Point Totals:	1	1	0	0	1	2	1	3	2	3	3	Group Point Total:		17

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System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
005 Residual Heat Removal						X						K6.03 RHR heat exchanger (CEP-923)	2.5/2.6	1
007 Pressurizer Relief/Quench Tank			X									K3.01 Effects on Containment	3.3/3.6	1
008 Component Cooling Water								X				A2.02 High/Low Surge Tank Level (CEP-905)	3.2/3.5	1
041 Steam Dump/Turbine Bypass Control														
045 Main Turbine Generator				X								K4.11 T/G Rx trip	3.6/3.9	1
076 Service Water														
078 Instrument Air														
K/A Category Point Totals:	0	0	1	1	0	1	0	1	0	0	0	Group Point Total:		4

Plant-Specific Priorities

System / Topic	Recommended Replacement for...	Reason	Points
Plant-Specific Priority Total: (limit 10)			

Facility: Surry	Date of Exam: September 2000			Exam Level:SRO
Category	K/A #	Topic	Imp.	Points
Conduct of Operations	2.1.1	Conduct of Operations SRO only	3.7/3.8	1
	2.1.20	Execute Procedure Steps	4.3/4.2	1
	2.1.34	Primary and Secondary Chemistry SRO only	2.3/2.9	1
	2.1.			
	2.1.			
	2.1.			
	Total			3
Equipment Control	2.2.26	Refueling Administrative Requirements SRO only	2.5/3.7	1
	2.2.28	New and Spent Fuel Movement Procedures SRO only	2.6/3.5	1
	2.2.6	Changes in the SAR SRO only	2.3/3.3	1
	2.2.1	Pre-start-up Procedures	3.7/3.6	1
	2.2.13	Tagging and Clearance	3.6/3.8	1
	2.2.			
	Total			5
Radiation Control	2.3.2	ALARA	2.5/2.9	1
	2.3.6	Reviewing and Approving Release Permits SRO only	2.1/3.1	1
	2.3.9	Containment Purge SRO only	2.5/3.4	1
	2.3.10	Reduce excessive levels of radiation	2.9/3.3	1
	2.3.			
	2.3.			
	Total			4
Emergency Procedures/ Plan	2.4.10	Annunciator Response Procedures	3.0/3.1	1
	2.4.21	Safety Function parameters and logic	3.7/4.3	1
	2.4.38	Actions from the EP SRO only	2.2/4.0	1
	2.4.44	Protective Action Recommendations SRO only	2.1/4.0	1
	2.4.9	Low Power/ Shutdown implications in Accidents SRO only	3.3/3.9	1
	2.4.			
	Total			5
Tier 3 Point Total SRO				17

Facility: SURRY Date of Exam: Sept 2000 Exam Level: RO

Tier	Group	K/A Category Points											Point Total
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	
1. Emergency & Abnormal Plant Evolutions	1	2	2	5				3	3			1	16
	2	3	3	1				3	4			3	17
	3	1	1	0				1	0			0	3
	Tier Totals	6	6	6				7	7			4	36
2. Plant Systems	1	3	2	3	4	2	0	2	3	2	1	1	23
	2	1	1	2	0	3	2	1	4	1	3	2	20
	3	0	1	1	2	0	1	1	1	0	0	1	8
	Tier Totals	4	4	6	6	5	3	4	8	3	4	4	51

3. Generic Knowledge and Abilities	Cat 1	Cat 2	Cat 3	Cat 4	13
	4	3	3	3	

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).
2. Actual point totals must match those specified in the table.
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.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
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.
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.

Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000005 Inoperable/Stuck Control Rod / 1	X						AK1.02 Flux Tilt	3.1/3.9	1
000015/17 RCP Malfunctions / 4				X			AA1.23 RCP Vibration	3.1/3.2	1
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4				X			EA1.3 Abnormal and Emergency Operations	3.5/3.8	1
000024 Emergency Boration / 1			X				AK3.02 Actions Contained in EOP	4.2/4.4	1
000026 Loss of Component Cooling Water / 8			X				AK3.02 Automatic CCW alignments resulting from ESFAS Actuation	3.6/3.9	1
000027 Pressurizer Pressure Control System Malfunction / 3						X	G2.1.11 Knowledge of 1 Hour TS	3.0/3.8	1
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4				X			AA1.18 Control Rod Pos Indicators	4.2/4.2	1
CE/A11; W/E08 RCS Overcooling - PTS / 4	X						EK1.1 Components, Capacity & Function of ES	3.5/3.8	1
000051 Loss of Condenser Vacuum / 4					X		AA2.02 Conditions Requiring RX or Turbine Trip	3.9/4.1	1
000055 Station Blackout / 6			X				EK3.02 EOP Actions	4.3/4.6	1
000057 Loss of Vital AC Elec. Inst. Bus / 6					X		AA2.18 Ind, VLV, BKR, DMPR position on Loss of Power	3.1/3.1	1
000062 Loss of Nuclear Service Water / 4			X				AK3.02 Auto Actions on ESFAS	3.6/3.9	1
000067 Plant Fire On-site / 9									
000068 (BW/A06) Control Room Evac. / 8		X					AK2.03 Controllers and Positioners	2.9/3.1	1
000069 (W/E14) Loss of CTMT Integrity / 5					X		AA2.01 Loss of Containment Integrity	3.7/4.3	1
000074 (W/E06&E07) Inad. Core Cooling / 4		X					EK2.03 AFW Pumps (CEP-912)	4.0/4.0	1
BW/E03 Inadequate Subcooling Margin / 4									
000076 High Reactor Coolant Activity / 9			X				AK3.06 EOP Actions for high Coolant Activity	3.2/3.8	1
BW/A02&A03 Loss of NNI-X/Y / 7									
K/A Category Totals:	2	2	5	3	3	1	Group Point Total:		16

Emergency and Abnormal Plant Evolutions - Tier 1/Group 2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000001 Continuous Rod Withdrawal / 1		X					AK 2.06 Tavg Tref Deviation Meter	3.0/3.1	1
000003 Dropped Control Rod / 1		X					AK 2.05 Control Rod Pwr supplies and logic Circuits	2.5/2.8	1
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1						X	G 2.4.35 Knowledge of AUO Tasks During Emergency Operations	3.3/3.5	1
BW/A01 Plant Runback / 1									
BW/A04 Turbine Trip / 4									
000008 Pressurizer Vapor Space Accident / 3					X		AA2.10 HPI valves and Controllers RO ONLY	3.6/3.6	1
000009 Small Break LOCA / 3				X			EA 1.10 SPDS	3.8/3.9	1
000011 Large Break LOCA / 3				X			EA1.14 Subcooling Margin Monitor RO ONLY	3.9/4.1	1
W/E04 LOCA Outside Containment / 3			X				EK3.3 Manipulation of Controls to Obtain Desired Outcome	3.8/3.8	1
BW/E08; W/E03 LOCA Cooldown/Depress. / 4		X					EK2.2 Heat Removal System	3.7/4.0	1
W/E11 Loss of Emergency Coolant Recirc. / 4					X		EA2.1 Procedure Selection in EOPs and AOPs RO ONLY	3.4/4.2	1
W/EO1 & E02 Rediagnosis & SI Termination / 3									
000022 Loss of Reactor Coolant Makeup / 2				X			AA1.03 PZR Level Trend	3.2/3.2	1
000025 Loss of RHR System / 4	X						AK1.01 Loss of RHRS During all Modes	3.9/4.3	1
000029 Anticipated Transient w/o Scram / 1						X	G 2.4.18 Knowledge of the Specific Basis for EOPs	2.7/3.6	1
000032 Loss of Source Range NI / 7									
000033 Loss of Intermediate Range NI / 7	X						AK1.01 Effects on Voltage Change on Performance	2.7/3.0	1
000037 Steam Generator Tube Leak / 3					X		AA2.10 TS Limit for RCS Leakage	3.2/4.1	1
000038 Steam Generator Tube Rupture / 3						X	G 2.4.48 How actions affect plant and system conditions RO ONLY (T70o2)	3.5/3.8	1
000054 (CE/E06) Loss of Main Feedwater / 4									
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4									
000058 Loss of DC Power / 6									
000059 Accidental Liquid RadWaste Rel. / 9									
000060 Accidental Gaseous Radwaste Rel. / 9									
000061 ARM System Alarms / 7					X		AA2.05 Need for Area evacuation	3.5/4.2	1
W/E16 High Containment Radiation / 9	X						EK1.3 Annunciators & conditions IND signals / Remedial actions	3.0/3.3	1
CE/E09 Functional Recovery									
K/A Category Point Totals:	3	3	1	3	4	3	Group Point Total:		17

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Emergency and Abnormal Plant Evolutions - Tier 1/Group 3

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000028 Pressurizer Level Malfunction / 2				X			AA1.06 Checking of RCS Leakage RO ONLY	3.3/3.6	1
000036 (BW/A08) Fuel Handling Accident / 8	X						AK 1.01 Radiation Exposure Hazzards	3.5/4.1	1
000056 Loss of Off-site Power / 6									
000065 Loss of Instrument Air / 8									
BW/E13&E14 EOP Rules and Enclosures									
BW/A05 Emergency Diesel Actuation / 6									
BW/A07 Flooding / 8									
CE/A16 Excess RCS Leakage / 2									
W/E13 Steam Generator Over-pressure / 4		X					EK 2.1 Comp and Functions of Control and Safety System I &C	3.0/3.1	1
W/E15 Containment Flooding / 5									
K/A Category Point Totals:	1	1	0	1	0	0	Group Point Total:		3

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PWR RO Examination Outline
Plant Systems - Tier 2/Group 1

Form ES-401-4

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
001 Control Rod Drive									X			A3.04 Radial Imbalance	3.5/3.8	1
003 Reactor Coolant Pump		X					X					A1.09 Seal Flow and DP (CEP-920) K2.01 Power Supply to RCPs	2.8/2.8 3.1/3.1	2
004 Chemical and Volume Control	X						X	X				A1.03 RCS Pressure A2.12 CIAS, SIAS (CEP-903) K1.30 Letdown and RCS Press Relationship RO ONLY	3.8/3.8 4.1/4.3 2.9/3.1	3
013 Engineered Safety Features Actuation			X		X							K3.01 Fuel K5.02 Safety System Logic/ Reliability RO ONLY	4.4/4.7 2.9/3.3	2
015 Nuclear Instrumentation		X									X	G. 2.1.10, Knowledge of license conditions K2.01 NIS channel, component RO ONLY	2.7/3.9 3.3/3.7	2
017 In-core Temperature Monitor				X								K4.01 Input to Subcooling Monitors	3.4/3.7	1
022 Containment Cooling			X						X			A3.01 Initiation of Safeguards Mode K3.01 Environmental Equipment damage RO ONLY	4.1/4.3 2.9/3.2	2
025 Ice Condenser														
056 Condensate	X											K1.03 MFW	2.6/2.6	1
059 Main Feedwater			X	X								K3.03 S/Gs K4.16 Automatic MFW pump trips RO ONLY	3.5/3.7 3.1/3.2	2
061 Auxiliary/Emergency Feedwater	X			X								K1.07 Emergency Water Source (CEP-912) K4.06 AFW Startup Permissives	3.6/3.8 4.0/4.2	2
068 Liquid Radwaste					X							K5.03 Units of Radiation RO ONLY	2.6/2.6	1
071 Waste Gas Disposal								X		X		A2.02 Gas Release Monitors. Flow rate A4.25 Process rad monitor setpoint adjustment RO ONLY	3.3/3.6 3.2/3.2	2
072 Area Radiation Monitoring				X				X				A2.02 Detector Failure RO ONLY K4.01 Release Termination	2.8/2.9 3.3/3.6	2
K/A Category Point Totals:	3	2	3	4	2	0	2	3	2	1	1	Group Point Total:		23

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System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
002 Reactor Coolant					X							K5.01 Basic Heat Transfer Concepts RO ONLY	3.1/3.4	1
006 Emergency Core Cooling									X			A3.05 SI Pumps	3.4/3.9	1
010 Pressurizer Pressure Control					X							K5.01 Fluid condition in PZR	3.5/4.0	1
011 Pressurizer Level Control										X		A4.05 Letdown flow controller	3.2/2.9	1
012 Reactor Protection		X										K2.01 RPS BUS Power Supply	3.3/3.7	1
014 Rod Position Indication					X							K5.01 Differences between RPIS and Step Counter	2.7/3.0	1
016 Non-nuclear Instrumentation								X				A2.03 Interruption of signal	3.0/3.3	1
026 Containment Spray			X									K3.01 Cont Cooling System (CEP-908)	39/4.1	1
029 Containment Purge														
033 Spent Fuel Pool Cooling								X				A2.01 Inadequate Shutdown Margin RO ONLY	3.0/3.5	1
035 Steam Generator						X						K6.03 S/G Level Det	2.6/3.0	1
039 Main and Reheat Steam								X				A2.04 Malfunctioning Steam Dumps	3.4/3.7	1
055 Condenser Air Removal			X									K3.01 Main Condenser RO ONLY	2.5/2.7	1
062 AC Electrical Distribution										X		A4.03 Synchroscope	2.8/2.9	1
063 DC Electrical Distribution							X					A1.01 Charging rate vs Battery Capacity	2.5/3.3	1
064 Emergency Diesel Generator						X						K6.08 Fuel oil Storage Tanks	3.2/3.3	1
073 Process Radiation Monitoring	X											K1.01 Systems Served by PRM	3.6/3.9	1
075 Circulating Water								X			X	A2.02 Loss of Circ Water Pumps (CEP-904) G 2.1.32 System Limits and Precautions	2.5/2.7 3.4/3.8	2
079 Station Air										X		A4.01 X tie with IA	2.7/2.7	1
086 Fire Protection											X	G 2.4.27 Plant Fire Procedures RO ONLY	3.0/3.5	1
K/A Category Point Totals:	1	1	2	0	3	2	1	4	1	3	2	Group Point Total:		20

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
005 Residual Heat Removal						X						K6.03 RHR Heat Exchanger (CEP-923)	2.5/2.6	1
007 Pressurizer Relief/Quench Tank			X									K3.01 Effects on Containment	3.3/3.6	1
008 Component Cooling Water								X				A2.02 High/Low Surge Tank Level	3.2/3.5	1
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control		X										K2.01 H2 Recombiner Power Sup RO ONLY	2.5/2.8	1
034 Fuel Handling Equipment							X					A1.02 Water Level in Refueling Canal	2.9/3.7	1
041 Steam Dump/Turbine Bypass Control														
045 Main Turbine Generator				X								K4.11 T/G Rx Trip	3.6/3.9	1
076 Service Water														
078 Instrument Air				X								K4.02 Crossover to other air sys RO ONLY (CEP-906)	3.2/3.5	1
103 Containment											X	G 2.1.32 System Precautions and limits	3.4/3.8	1
K/A Category Point Totals:	0	1	1	2	0	1	1	1	0	0	1	Group Point Total:		8

Plant-Specific Priorities

System / Topic	Recommended Replacement for...	Reason	Points
Plant-Specific Priority Total: (limit 10)			

Facility: Surry Date of Exam: September 2000 Exam Level: RO

Category	K/A #	Topic	Imp.	Points
Conduct of Operations	2.1.20	Execute Procedure Steps	4.3/4.2	1
	2.1.22	Ability To Determine Mode of Operation RO ONLY	2.8/3.3	1
	2.1.25	Interpret Sation Reference Materials RO ONLY	2.8/3.1	1
	2.1.8	Ability to Coordinate Activities outside the CR RO ONLY	3.8/3.6	1
	2.1.			
	2.1.			
	Total			4
Equipment Control	2.2.			
	2.2.1	Pre-Start-up Procedures	3.7/3.6	1
	2.2.13	Tagging and Clearance	3.6/3.8	1
	2.2.30	RO Duties in CR during fuel handling RO ONLY	3.5/3.3	1
	2.2.			
	2.2.			
	Total			3
Radiation Control	2.3.10	Reduce excessive levels of radiation	2.9/3.3	1
	2.3.4	Radiation Exposure Limits/Contamination Control RO ONLY	2.5/3.1	1
	2.3.2	ALARA	2.5/2.9	1
	2.3.			
	2.3.			
	2.3.			
	Total			3
Emergency Procedures/ Plan	2.4.1	EOP Entry Conditions RO ONLY	4.3/4.6	1
	2.4.10	Annunciator Response Procedures	3.0/3.1	1
	2.4.21	Safety Function parameters and logic	3.7/4.3	1
	2.4.			
	2.4.			
	2.4.			
	Total			3
Tier 3 Point Total (RO)				13

Facility: SURRY Date of Exam: Sept 2000 Exam Level: RO

Tier	Group	K/A Category Points											Point Total
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	
1. Emergency & Abnormal Plant Evolutions	1	2	2	5				3	3			1	16
	2	3	3	1				3	4			3	17
	3	1	1	0				1	0			0	3
	Tier Totals	6	6	6				7	7			4	36
2. Plant Systems	1	3	2	3	4	2	0	2	3	2	1	1	23
	2	1	1	2	0	3	2	1	4	1	3	2	20
	3	0	1	1	2	0	1	1	1	0	0	1	8
	Tier Totals	4	4	6	6	5	3	4	8	3	4	4	51

3. Generic Knowledge and Abilities	Cat 1	Cat 2	Cat 3	Cat 4	13
	4	3	3	3	

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).
2. Actual point totals must match those specified in the table.
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.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
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.
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.

Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000005 Inoperable/Stuck Control Rod / 1	X						AK1.02 Flux Tilt	3.1/3.9	1
000015/17 RCP Malfunctions / 4				X			AA1.23 RCP Vibration	3.1/3.2	1
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4				X			EA1.3 Abnormal and Emergency Operations	3.5/3.8	1
000024 Emergency Boration / 1			X				AK3.02 Actions Contained in EOP	4.2/4.4	1
000026 Loss of Component Cooling Water / 8			X				AK3.02 Automatic CCW alignments resulting from ESFAS Actuation	3.6/3.9	1
000027 Pressurizer Pressure Control System Malfunction / 3						X	G2.1.11 Knowledge of 1 Hour TS	3.0/3.8	1
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4				X			AA1.18 Control Rod Pos Indicators	4.2/4.2	1
CE/A11; W/E08 RCS Overcooling - PTS / 4	X						EK1.1 Components, Capacity & Function of ES	3.5/3.8	1
000051 Loss of Condenser Vacuum / 4					X		AA2.02 Conditions Requiring RX or Turbine Trip	3.9/4.1	1
000055 Station Blackout / 6			X				EK3.02 EOP Actions	4.3/4.6	1
000057 Loss of Vital AC Elec. Inst. Bus / 6					X		AA2.18 Ind, VLV, BKR, DMPR position on Loss of Power	3.1/3.1	1
000062 Loss of Nuclear Service Water / 4			X				AK3.02 Auto Actions on ESFAS	3.6/3.9	1
000067 Plant Fire On-site / 9									
000068 (BW/A06) Control Room Evac. / 8		X					AK2.03 Controllers and Positioners	2.9/3.1	1
000069 (W/E14) Loss of CTMT Integrity / 5					X		AA2.01 Loss of Containment Integrity	3.7/4.3	1
000074 (W/E06&E07) Inad. Core Cooling / 4		X					EK2.03 AFW Pumps (CEP-912)	4.0/4.0	1
BW/E03 Inadequate Subcooling Margin / 4									
000076 High Reactor Coolant Activity / 9			X				AK3.06 EOP Actions for high Coolant Activity	3.2/3.8	1
BW/A02&A03 Loss of NNI-X/Y / 7									
K/A Category Totals:	2	2	5	3	3	1	Group Point Total:		16

Emergency and Abnormal Plant Evolutions - Tier 1/Group 2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000001 Continuous Rod Withdrawal / 1		X					AK 2.06 Tavg Tref Deviation Meter	3.0/3.1	1
000003 Dropped Control Rod / 1		X					AK 2.05 Control Rod Pwr supplies and logic Circuits	2.5/2.8	1
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1						X	G 2.4.35 Knowledge of AUO Tasks During Emergency Operations	3.3/3.5	1
BW/A01 Plant Runback / 1									
BW/A04 Turbine Trip / 4									
000008 Pressurizer Vapor Space Accident / 3					X		AA2.10 HPI valves and Controllers RO ONLY	3.6/3.6	1
000009 Small Break LOCA / 3				X			EA 1.10 SPDS	3.8/3.9	1
000011 Large Break LOCA / 3				X			EA1.14 Subcooling Margin Monitor RO ONLY	3.9/4.1	1
W/E04 LOCA Outside Containment / 3			X				EK3.3 Manipulation of Controls to Obtain Desired Outcome	3.8/3.8	1
BW/E08; W/E03 LOCA Cooldown/Depress. / 4		X					EK2.2 Heat Removal System	3.7/4.0	1
W/E11 Loss of Emergency Coolant Recirc. / 4					X		EA2.1 Procedure Selection in EOPs and AOPs RO ONLY	3.4/4.2	1
W/EO1 & E02 Rediagnosis & SI Termination / 3									
000022 Loss of Reactor Coolant Makeup / 2				X			AA1.03 PZR Level Trend	3.2/3.2	1
000025 Loss of RHR System / 4	X						AK1.01 Loss of RHRS During all Modes	3.9/4.3	1
000029 Anticipated Transient w/o Scram / 1						X	G 2.4.18 Knowledge of the Specific Basis for EOPs	2.7/3.6	1
000032 Loss of Source Range NI / 7									
000033 Loss of Intermediate Range NI / 7	X						AK1.01 Effects on Voltage Change on Performance	2.7/3.0	1
000037 Steam Generator Tube Leak / 3					X		AA2.10 TS Limit for RCS Leakage	3.2/4.1	1
000038 Steam Generator Tube Rupture / 3						X	G 2.4.48 How actions affect plant and system conditions RO ONLY (T70o2)	3.5/3.8	1
000054 (CE/E06) Loss of Main Feedwater / 4									
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4									
000058 Loss of DC Power / 6									
000059 Accidental Liquid RadWaste Rel. / 9									
000060 Accidental Gaseous Radwaste Rel. / 9									
000061 ARM System Alarms / 7					X		AA2.05 Need for Area evacuation	3.5/4.2	1
W/E16 High Containment Radiation / 9	X						EK1.3 Annunciators & conditions IND signals / Remedial actions	3.0/3.3	1
CE/E09 Functional Recovery									
K/A Category Point Totals:	3	3	1	3	4	3	Group Point Total:		17

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Emergency and Abnormal Plant Evolutions - Tier 1/Group 3 | Form ES-401-4

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000028 Pressurizer Level Malfunction / 2				X			AA1.06 Checking of RCS Leakage RO ONLY	3.3/3.6	1
000036 (BW/A08) Fuel Handling Accident / 8	X						AK 1.01 Radiation Exposure Hazzards	3.5/4.1	1
000056 Loss of Off-site Power / 6									
000065 Loss of Instrument Air / 8									
BW/E13&E14 EOP Rules and Enclosures									
BW/A05 Emergency Diesel Actuation / 6									
BW/A07 Flooding / 8									
CE/A16 Excess RCS Leakage / 2									
W/E13 Steam Generator Over-pressure / 4		X					EK 2.1 Comp and Functions of Control and Safety System I &C	3.0/3.1	1
W/E15 Containment Flooding / 5									
K/A Category Point Totals:	1	1	0	1	0	0	Group Point Total:		3

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
001 Control Rod Drive									X			A3.04 Radial Imbalance	3.5/3.8	1
003 Reactor Coolant Pump		X					X					A1.09 Seal Flow and DP (CEP-920) K2.01 Power Supply to RCPs	2.8/2.8 3.1/3.1	2
004 Chemical and Volume Control	X						X	X				A1.03 RCS Pressure A2.12 CIAS, SIAS (CEP-903) K1.30 Letdown and RCS Press Relationship RO ONLY	3.8/3.8 4.1/4.3 2.9/3.1	3
013 Engineered Safety Features Actuation			X		X							K3.01 Fuel K5.02 Safety System Logic/ Reliability RO ONLY	4.4/4.7 2.9/3.3	2
015 Nuclear Instrumentation		X									X	G. 2.1.10, Knowledge of license conditions K2.01 NIS channel, component RO ONLY	2.7/3.9 3.3/3.7	2
017 In-core Temperature Monitor				X								K4.01 Input to Subcooling Monitors	3.4/3.7	1
022 Containment Cooling			X						X			A3.01 Initiation of Safeguards Mode K3.01 Environmental Equipment damage RO ONLY	4.1/4.3 2.9/3.2	2
025 Ice Condenser														
056 Condensate	X											K1.03 MFW	2.6/2.6	1
059 Main Feedwater			X	X								K3.03 S/Gs K4.16 Automatic MFW pump trips RO ONLY	3.5/3.7 3.1/3.2	2
061 Auxiliary/Emergency Feedwater	X			X								K1.07 Emergency Water Source (CEP-912) K4.06 AFW Startup Permissives	3.6/3.8 4.0/4.2	2
068 Liquid Radwaste					X							K5.03 Units of Radiation RO ONLY	2.6/2.6	1
071 Waste Gas Disposal								X		X		A2.02 Gas Release Monitors. Flow rate A4.25 Process rad monitor setpoint adjustment RO ONLY	3.3/3.6 3.2/3.2	2
072 Area Radiation Monitoring				X				X				A2.02 Detector Failure RO ONLY K4.01 Release Termination	2.8/2.9 3.3/3.6	2
K/A Category Point Totals:	3	2	3	4	2	0	2	3	2	1	1	Group Point Total:		23

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System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
002 Reactor Coolant					X							K5.01 Basic Heat Transfer Concepts RO ONLY	3.1/3.4	1
006 Emergency Core Cooling									X			A3.05 SI Pumps	3.4/3.9	1
010 Pressurizer Pressure Control					X							K5.01 Fluid condition in PZR	3.5/4.0	1
011 Pressurizer Level Control										X		A4.05 Letdown flow controller	3.2/2.9	1
012 Reactor Protection		X										K2.01 RPS BUS Power Supply	3.3/3.7	1
014 Rod Position Indication					X							K5.01 Differences between RPIS and Step Counter	2.7/3.0	1
016 Non-nuclear Instrumentation								X				A2.03 Interruption of signal	3.0/3.3	1
026 Containment Spray			X									K3.01 Cont Cooling System (CEP-908)	39/4.1	1
029 Containment Purge														
033 Spent Fuel Pool Cooling								X				A2.01 Inadequate Shutdown Margin RO ONLY	3.0/3.5	1
035 Steam Generator						X						K6.03 S/G Level Det	2.6/3.0	1
039 Main and Reheat Steam								X				A2.04 Malfunctioning Steam Dumps	3.4/3.7	1
055 Condenser Air Removal			X									K3.01 Main Condenser RO ONLY	2.5/2.7	1
062 AC Electrical Distribution										X		A4.03 Synchroscope	2.8/2.9	1
063 DC Electrical Distribution							X					A1.01 Charging rate vs Battery Capacity	2.5/3.3	1
064 Emergency Diesel Generator						X						K6.08 Fuel oil Storage Tanks	3.2/3.3	1
073 Process Radiation Monitoring	X											K1.01 Systems Served by PRM	3.6/3.9	1
075 Circulating Water								X			X	A2.02 Loss of Circ Water Pumps (CEP-904) G 2.1.32 System Limits and Precautions	2.5/2.7 3.4/3.8	2
079 Station Air										X		A4.01 X tie with IA	2.7/2.7	1
086 Fire Protection											X	G 2.4.27 Plant Fire Procedures RO ONLY	3.0/3.5	1
K/A Category Point Totals:	1	1	2	0	3	2	1	4	1	3	2	Group Point Total:		20

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
005 Residual Heat Removal						X						K6.03 RHR Heat Exchanger (CEP-923)	2.5/2.6	1
007 Pressurizer Relief/Quench Tank			X									K3.01 Effects on Containment	3.3/3.6	1
008 Component Cooling Water								X				A2.02 High/Low Surge Tank Level	3.2/3.5	1
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control		X										K2.01 H2 Recombiner Power Sup RO ONLY	2.5/2.8	1
034 Fuel Handling Equipment							X					A1.02 Water Level in Refueling Canal	2.9/3.7	1
041 Steam Dump/Turbine Bypass Control														
045 Main Turbine Generator				X								K4.11 T/G Rx Trip	3.6/3.9	1
076 Service Water														
078 Instrument Air				X								K4.02 Crossover to other air sys RO ONLY (CEP-906)	3.2/3.5	1
103 Containment											X	G 2.1.32 System Precautions and limits	3.4/3.8	1
K/A Category Point Totals:	0	1	1	2	0	1	1	1	0	0	1	Group Point Total:		8

Plant-Specific Priorities

System / Topic	Recommended Replacement for...	Reason	Points

Plant-Specific Priority Total: (limit 10)

Facility: Surry Date of Exam: September 2000 Exam Level: RO

Category	K/A #	Topic	Imp.	Points
Conduct of Operations	2.1.20	Execute Procedure Steps	4.3/4.2	1
	2.1.22	Ability To Determine Mode of Operation RO ONLY	2.8/3.3	1
	2.1.25	Interpret Sation Reference Materials RO ONLY	2.8/3.1	1
	2.1.8	Ability to Coordinate Activities outside the CR RO ONLY	3.8/3.6	1
	2.1.			
	2.1.			
	Total			4
Equipment Control	2.2.			
	2.2.1	Pre-Start-up Procedures	3.7/3.6	1
	2.2.13	Tagging and Clearance	3.6/3.8	1
	2.2.30	RO Duties in CR during fuel handling RO ONLY	3.5/3.3	1
	2.2.			
	2.2.			
	Total			3
Radiation Control	2.3.10	Reduce excessive levels of radiation	2.9/3.3	1
	2.3.4	Radiation Exposure Limits/Contamination Control RO ONLY	2.5/3.1	1
	2.3.2	ALARA	2.5/2.9	1
	2.3.			
	2.3.			
	2.3.			
	Total			3
Emergency Procedures/ Plan	2.4.1	EOP Entry Conditions RO ONLY	4.3/4.6	1
	2.4.10	Annunciator Response Procedures	3.0/3.1	1
	2.4.21	Safety Function parameters and logic	3.7/4.3	1
	2.4.			
	2.4.			
	2.4.			
	Total			3
Tier 3 Point Total (RO)				13