

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/units	Back-ward	Q=K/A	SRO Only		
1														S	
2														S	
3							X							U	condition in stem made correct answer incorrect; <i>modified condition</i>
4							X							U	stated answer was incorrect; <i>further info brought by licensee incorporated into correct answer</i>
5														S	<i>editing to make answer more clear</i>
6							X							U	'D' distractor too close to being correct answer; <i>rewrote distractor.</i>
7														S	
8														S	
9														S	
10														S	

Instructions

[Refer to Section D of ES-401 and Appendix B for additional information regarding each of the following concepts.]

- Enter the level of knowledge (LOK) of each question as either (F)undamental or (H)igher cognitive level.
- Enter the level of difficulty (LOD) of each question using a 1 - 5 (easy - difficult) rating scale (questions in the 2 - 4 range are acceptable).
- Check the appropriate box if a psychometric flaw is identified:
 - The stem lacks sufficient focus to elicit the correct answer (e.g., unclear intent, more information is needed, or too much needless information).
 - The stem or distractors contain cues (i.e., clues, specific determiners, phrasing, length, etc).
 - The answer choices are a collection of unrelated true/false statements.
 - More than one distractor is not credible.
 - One or more distractors is (are) partially correct (e.g., if the applicant can make unstated assumptions that are not contradicted by stem).
- Check the appropriate box if a job content error is identified:
 - The question is not linked to the job requirements (i.e., the question has a valid K/A but, as written, is not operational in content).
 - The question requires the recall of knowledge that is too specific for the closed reference test mode (i.e., it is not required to be known from memory).
 - The question contains data with an unrealistic level of accuracy or inconsistent units (e.g., panel meter in percent with question in gallons).
 - The question requires reverse logic or application compared to the job requirements.
- Check questions that are sampled for conformance with the approved K/A and those that are designated SRO-only (K/A and license level mismatches are unacceptable).
- Based on the reviewer's judgment, is the question as written (U)nacceptable (requiring repair or replacement), in need of (E)ditorial enhancement, or (S)atisfactory?
- At a minimum, explain any "U" ratings (e.g., how the Appendix B psychometric attributes are not being met).

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			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/units	Backward	Q=K/A	SRO Only		
11														S	editing; <i>corrected</i>
12														S	
13														S	
14														S	editorial; <i>corrected</i> .
15														S	editorial; <i>corrected</i> .
16														S	
17														S	editorial; <i>corrected</i>
18														S	
19								X						U	question did not reflect realistic situation; <i>question replaced</i> .
20														S	
21														S	
22														S	
23														S	
24														S	
25														S	
26														S	
27								X						U	distractor too close to right answer (minutia related); <i>distractor changed</i>
28														S	
29														S	
30														S	

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation	
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/units	Backward	Q=K/A	SRO Only			
31															S	
32															S	
33															S	
34								X							U	distractor 'D' could be correct sometimes; <i>changed distractor</i>
35															S	
36															S	
37									X						U	procedures have been revised such that question is no longer relevant to job function; <i>question replaced.</i>
38															S	
39															S	initial conditions modified for clarity
40															S	
41															S	
42															S	
43															S	
44									X						U	low operational validity; <i>replaced with better question</i>
45								X							U	distractor 'B' could be correct in some situations, <i>made initial conditions more restrictive to make distractor always wrong</i>
46								X							U	distractor 'C' was not completely incorrect; <i>distractor was changed.</i>
47															S	
48															S	editorial; <i>corrected.</i>
49															S	added initial condition for clarity
50															S	

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			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/units	Back-ward	Q=K/A	SRO Only		
51														S	
52														S	
53									X					U	operator required to know details in RNO column; <i>question was modified</i>
54														S	
55														S	
56														S	
57														S	
58														S	
59														S	
60														S	
61														S	
62														S	
63														S	
64														S	
65														S	
66														S	
67														S	
68														S	
69														S	
70						X								U	Distractor 'C' was partially correct; <i>rewrote distractor; modified otherdistractor for clarity</i>

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation	
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/units	Backward	Q=K/A	SRO Only			
71															S	
72															S	
73															S	
74									X						U	answers required detailed knowledge of procedure steps; <i>refocused answer on broader topic.</i>
75															S	editing; <i>corrected edits</i>
76															S	'D' distractor unclear; <i>reworded 'D' distractor</i>
77															S	
78									X						U	distractors were requiring memorization of MCC loads; <i>distractors rewritten at a broader level</i>
79															S	
80							X								U	Distractor 'D' could be construed as correct; <i>rewrote distractor</i>
81															S	
82															S	
83															S	
84															S	
85															S	
86															S	
87							X								U	distractor 'D' was correct answer; <i>restructured initial conditions to make 'D' incorrect.</i>
88									X						U	distractor C was too close to correct answer; <i>changed distractor</i>
89															S	
90															S	

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			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/units	Back-ward	Q=K/A	SRO Only		
91														S	
92														S	
93														S	
94														S	
95														S	
96														S	
97														S	
98														S	
99														S	
100														S	
101														S	
102														S	
103														S	
104														S	
105							X							U	distractor was correct, proposed answer was incorrect; rewrote distractors/answer
106														S	
107														S	
108														S	
109														S	
110														S	

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/units	Back-ward	Q=K/A	SRO Only		
111														S	editing; corrected.
112														S	editing; corrected.
113														S	
114								X						U	initial conditions were not operationally valid; restructured question
115														S	
116														S	
117														S	
118														S	
119														S	
120														S	
121														S	
122														S	
123								X						U	limits in question found to be incorrect; replaced with new limits.
124														S	
125														S	editing; corrected.
126														S	

Tier / Group	Randomly Selected K/A	Reason for Rejection
2/1	001K6.09	NR-45 not used at Seabrook; replaced with 001K6.03
1/1	067AK1.01	Discriminatory question for fire classification that is operationally valid was not possible; replaced with 067AK1.02
1/1	076AA1.04	Discriminatory and operationally valid question not possible; replaced with 076AK3.05
3	2.1.24	Sampled on operating test; replaced with 2.1.11
3 (RO)	2.4.15	Not applicable to Ros at Seabrook; replaced with 2.4.21
1/1	026AK3.01	N/A at Seabrook; replaced with 026AK3.02
2/1	071A3.03	K/A oversampled; replaced with 071A3.02
3	2.3.10	Topic oversampled; replaced with 2.3.1
1 / 2	060 2.4.39	No eplan responsibilities for RO wrt gas radwaste; replaced with 060 2.1.11
1 / 2	061AK1.01	Radiation detector limitations topic is non discriminatory; replaced with 061AA2.05
2 / 1	072A1.01	Non-discriminatory topic; replaced with 072A3.01
2 / 3	034K6.02	Topic oversampled on written exam; replaced with 034K4.01
2 / 1	068k4.01	No discriminatory value; replaced with 068A2.04
2 / 2	011K5.12	No discriminatory value; replaced with 011K5.15
1 / 2	029EK1.03	No discriminatory value ineffects of boration on reactivity during ATWS; replaced with EA2.01
2 / 1	004A2.27	No operational validity with improper RWST boron concentration; replaced with A2.18
3	2.1.21	Sampled on operations exam; replaced with 2.1.1
1 / 2	WE11EK3.3	Rejected to provide for SRO level topic; replaced with EA2.1
2 / 1	003A1.02	K/A rejected to provide for SRO level discriminatory question; replaced with 003K1.10.
2 / 1	015A4.03	K/A rejected to provide for SRO level discriminatory question; replaced with 015A2.02.
1 / 1	051AK3.01	K/A rejected to provide for SRO level discriminatory question; replaced with 051AA2.01
2 / 2	062K4.07	K/A rejected to provide for SRO level discriminatory question; replaced with 062A2.15

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Facility: Seabrook		Date of Exam: 05/30/2003				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	5	4	4				4	5			2	24
	2	1	4	2				2	3			4	16
	3	1	1	0				1	0			0	3
	Tier Totals	7	9	6				7	8			6	43
2. Plant Systems	1	3	0	3	1	2	0	1	3	3	1	2	19
	2	1	1	1	1	1	2	2	3	2	2	1	17
	3	1	1	0	0	0	0	0	0	1	1	0	4
	Tier Totals	5	2	4	2	3	2	3	6	6	4	3	40
3. Generic Knowledge and Abilities					Cat 1		Cat 2		Cat 3		Cat 4		17
					4		4		4		5		
<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. 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 exam must total 100 points.</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 SRO 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 Outline
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

Form ES-401-3

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000001 Continuous Rod Withdrawal / 1		X					AK2.08 Individual rod display lights and indications	3.0	1
000003 Dropped Control Rod / 1				X			AA1.01 Demand position counter and pulse/analog converter	2.9	1
000005 Inoperable/Stuck Control Rod / 1	X						AK1.05 Calculation of minimum shutdown margin	4.1	1
000011 Large Break LOCA / 3	X						EK1.01 Natural circulation and cooling, including reflux boiling.	4.4	1
W/E04 LOCA Outside Containment / 3		X					EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.9	1
W/E01 & E02 Rediagnosis & SI Termination / 3				X			EA1.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.7	1
000015/17 RCP Malfunctions / 4						X	2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.2	1
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4					X		EA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.8	1
000024 Emergency Boration / 1				X			AA1.17 Emergency borate control valve and indicators	3.9	1
000026 Loss of Component Cooling Water / 8			X				AK3.02 PCCW responses to an ESFAS signal.	3.5	1
000029 Anticipated Transient w/o Scram / 1					X		EA2.01 Reactor nuclear instrumentation	4.7	1
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4	X						EK1.2 Normal, abnormal and emergency operating procedures associated with (Uncontrolled Depressurization of all Steam Generators).	3.8	1
CE/A11; W/E08 RCS Overcooling - PTS / 4		X					EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.7	1
000051 Loss of Condenser Vacuum / 4			X				AK3.01 Loss of steam dump capability upon loss of condenser vacuum	3.1	1
000055 Station Blackout / 6				X			EA1.07 Restoration of power from offsite	4.5	1
000057 Loss of Vital AC Elec. Inst. Bus / 6					X		AA2.20 Interlocks in effect on loss of ac vital electrical instrument bus that must be bypassed to restore normal equipment operation	3.9	1
000059 Accidental Liquid RadWaste Rel. / 9					X		AA2.05 The occurrence of automatic safety actions as a result of a high PRM system signal	3.9	1
000062 Loss of Nuclear Service Water / 4					X	X	2.4.12 Knowledge of general operating crew responsibilities during emergency operations. AA2.05 normal values for SWS-header flow rate and the flow rates to the components cooled by the SWS	3.9 2.5	2
000067 Plant Fire On-site / 9	X						AK1.02 Fire Fighting	3.9	1

000069 (W/E14) Loss of CTMT Integrity / 5		X						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.	3.8	1
000074 (W/E06&E07) Inad. Core Cooling / 4	X		X					EK3.3 Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations. EK1.2 Normal, abnormal and emergency operating procedures associated with (Degraded Core Cooling).	3.9 4.1	2
000076 High Reactor Coolant Activity / 9			X					AK3.05 Corrective Actions as a result of high fission product radioactivity in the RCS	3.6	1
K/A Category Totals:	5	4	4	4	5	2		Group Point Total:		24

ES-401	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
000008 Pressurizer Vapor Space Accident / 3			X				AK3.03 Actions contained in EOP for PZR vapor space accident/ LOCA	4.6	1
000009 Small Break LOCA / 3		X					EK2 Knowledge of the interrelations between the small break LOCA and the following: EK2.03 S/Gs	3.3	1
BW/E08; W/E03 LOCA Cooldown - Depress. / 4									
W/E11 Loss of Emergency Coolant Recirc. / 4					X		EA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency conditions	4.2	1
000022 Loss of Reactor Coolant Makeup / 2					X		AA2.02 Charging pump problems	3.7	1
000025 Loss of RHR System / 4						X	2.1.12 Ability to apply technical specifications for a system.	4.0	1
000027 Pressurizer Pressure Control System Malfunction / 3		X					AK2.03 Controllers and positioners	2.8	1
000032 Loss of Source Range NI / 7		X					AK2.01 Power supplies, including proper switch positions	3.1	1
000033 Loss of Intermediate Range NI / 7						X	2.2.1 Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.	3.6	1
000037 Steam Generator Tube Leak / 3						X	2.4.20 Knowledge of operational implications of EOP warnings, cautions, and notes.	4.0	1
000038 Steam Generator Tube Rupture / 3			X				EK3.05 Normal operating precautions to preclude or minimize SGTR	4.3	1
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4				X			EA1.2 Operating behavior characteristics of the facility.	4.0	1
000058 Loss of DC Power / 6	X						AK1.01 Battery charger equipment and instrumentation	3.1	1
000060 Accidental Gaseous Radwaste Rel. / 9						X	2.1.11 Knowledge of conduct of operations requirements.	3.8	1
000061 ARM System Alarms / 7					X		AA2.05 Need for area evacuation; check against existing limits	2.9	1
W/E16 High Containment Radiation / 9		X					EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.3	1
000065 Loss of Instrument Air / 8				X			AA1.02 Components served by instrument air to minimize drain on system	2.8	1
K/A Category Point Totals:	1	4	2	2	3	4	Group Point Total:		16

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PWR SRO Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1/Group 3

Form ES-401-3

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000028 Pressurizer Level Malfunction / 2		X					AK2.02 Sensors and detectors	2.7	1
000056 Loss of Off-site Power / 6									
W/E13 Steam Generator Over-pressure / 4				X			EA1.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.3	1
W/E15 Containment Flooding / 5	X						EK1.1 Components, capacity, and function of emergency systems.	3.0	1
K/A Category Point Totals:	1	1		1			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							K5.54 Definition and units of reactivity	3.1	1
003 Reactor Coolant Pump	X										X	K1.10 knowledge of the cause-effect relationship b/w the RCPS and the RCS 2.1.27 Knowledge of system purpose and or function.	3.2 2.9	2
004 Chemical and Volume Control								X				A2.18 High VCT level.	3.1	1
013 Engineered Safety Features Actuation									X			A3.01 Input channels and logic	3.9	1
014 Rod Position Indication			X									K3.02 Plant computer	2.8	1
015 Nuclear Instrumentation								X				A2.02 Faulty or erratic operation of detectors or compensating components	3.5	1
017 In-core Temperature Monitor											X	2.1.28 Knowledge of the purpose and function of major system components and controls.	3.3	1
022 Containment Cooling				X								K4.02 Correlation of fan speed and flow-path changes with containment pressure	3.4	1
026 Containment Spray										X		A4.01 CSS controls	4.3	1
056 Condensate	X							X				K1 Knowledge of the physical connections and/or cause-effect relationships between the Condensate system and the following systems: K1.03 MFW A2.04 Loss of condensate pumps	2.6 2.8	2
059 Main Feedwater			X				X					K3.04 RCS A1.07 Feed Pump speed, including normal control speed for SGWLC.	3.8 2.6	2
061 Auxiliary/Emergency Feedwater			X									K3 Knowledge of the effect that a loss or malfunction of the AFW will have on the following: K3.02 S/G	4.4	1
063 DC Electrical Distribution	X											K1.02 AC electrical system	3.2	1
068 Liquid Radwaste					X							K5.04 Biological hazards of radiation and the resulting goal of ALARA	3.5	1
071 Waste Gas Disposal									X			A3.02 pressure-regulating system for WG header	3.8	1
072 Area Radiation Monitoring									X			A3.01 changes in ventilation lineup	3.1	1
K/A Category Point Totals:	3	0	3	1	2	0	1	3	3	1	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 ***								X				A2.03 Loss of forced circulation	4.3	1
006 Emergency Core Cooling							X					A1.14 Reactor vessel level	3.9	1
010 Pressurizer Pressure Control						X						K6.02 PZR	3.5	1
011 Pressurizer Level Control														
012 Reactor Protection														
016 Non-nuclear Instrumentation	X											K1.06 AFW system	3.5	1
027 Containment Iodine Removal					X							K5.01 Purpose of charcoal filters	3.4	1
028 Hydrogen Recombiner and Purge Control														
029 Containment Purge											X	2.4.31 Knowledge of annunciators alarms and indications, and use of the response instructions.	3.4	1
033 Spent Fuel Pool Cooling									X			A3.02 Spent fuel leak or rupture	3.1	1
034 Fuel Handling Equipment								X				A2.01 Dropped Fuel Element	4.4	1
035 Steam Generator										X		A4.06 S/G isolation on steam leak or tube rupture/leak	4.6	1
039 Main and Reheat Steam								X				A2.04 Malfunctioning steam dump	3.7	1
055 Condenser Air Removal			X									K3.01 Main condenser	2.7	1
062 AC Electrical Distribution								X				A2.15 consequences of paralleling AC sources out of phase	3.2	1
064 Emergency Diesel Generator														
073 Process Radiation Monitoring							X					A1.01 Radiation levels	3.5	1
075 Circulating Water		X										K2.03 Emergency/essential SWS pumps	2.7	1
079 Station Air								X				A2.01 Cross-connection with IAS	3.2	1
086 Fire Protection									X			A3.02 Actuation of the FPS	3.3	1
103 Containment							X					A1.01 cntmt pressure, temperature, and humidity	4.1	1
K/A Category Point Totals:	1	1	1	1	1	2	2	3	2	2	1	Group Point Total:		17

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
005 Residual Heat Removal										X		A4.02 Heat exchanger bypass flow control	3.1	1
007 Pressurizer Relief/Quench Tank	X											K1.03 RCS	3.2	1
008 Component Cooling Water		X										K2.02 CCW pump, including emergency backup	3.2	1
041 Steam Dump/Turbine Bypass Control														
045 Main Turbine Generator														
076 Service Water														
078 Instrument Air							X					A3.01 Air pressure	3.2	1
K/A Category Point Totals:														
	1	1										Group Point Total:		4
Plant-Specific Priorities														
System / Topic	Recommended Replacement for...										Reason	Points		
Plant-Specific Priority Total: (limit 10)														

Facility: Seabrook Station Exam Level (circle one): RO / SRO(I) / SRO(U)		Date of Examination: 6/02/03-6/06/03 Operating Test No.:	
B.1 Control Room Systems			
System / JPM Title		Type Code*	Safety Function
a. 001 Control Rod Drive / 1/M Plot performance. Identify that the reactor goes critical below -500 pcm value.		N, A, S, L	1
b. 006 ECCS / Transfer SI to Cold Leg Recirculation (CBS-V14 fails) (SRO-U)		D, A, S	2
c. 010 Primary Pressure Control System / Depressurize the RCS during a natural circulation cooldown with letdown unavailable IAW ES-0.2. (SRO-U)		N, A, S	3
d. 062 AC Electrical distribution / Loss of All AC Power; failure of EDG output breaker and charging pump auto start.		N, A, S	6
e. 028 Hydrogen Recombiners / Start hydrogen recombiners. (SRO-U)		D, S	5
f. 012 RPS Power Range NI Failure		D, S	7
g. 076 Service Water System / Transfer Service Water to the Cooling Tower		D, S	4(sec)
B.2 Facility Walk-Through			
a. 005 RHR / Manual Operation of RHR TCV for mid-loop operations. (SRO-U)		D, R	4(pri)
b. 064 EDG / Local EDG Normal Start and Load (SRO-U)		D	6
c. 061 EFW / Reset the TDEFW pump turbine trip throttle valve.		D	4(sec)
* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA			

Facility: <u>Seabrook Station</u>		Date of Examination: _____
Examination Level: SRO		Operating Test Number: _____
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Loss of RHR Cooling	2.1.25 Ability to obtain and interpret station reference materials such as as graphs, monographs, and tables which contain performance data. SRO: 3.1. JPM: Evaluate loss of cooling conditions and determine time to boiling from chart.
	SDM Calculation Review	2.1.25 Ability to obtain and interpret station reference materials such as as graphs, monographs, and tables which contain performance data. SRO: 3.1. JPM: Review a SDM calculation for Natural Circulation Cooldown.
A.2	Tagouts	2.2.13 Knowledge of tagging and clearance procedures. SRO: 3.8. JPM: Review a tagout request.
A.3	Radiation control	2.3.4 Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized. SRO: 3.1 JPM: Contaminated injured man actions.
A.4	Emergency Classification, Notifications, and PAR. JPM	2.4.38 Ability to take actions called for in the facility emergency plan, including (if required) supporting or acting as emergency coordinator. SRO: 4.0 JPM: Given a set of conditions, the applicant will make an EAL determination, PAR, and make required notifications.

Facility: Seabrook Station Exam Level (circle one): RO / SRO(I) / SRO(U)		Date of Examination: 6/02/03-6/06/03 Operating Test No.:	
B.1 Control Room Systems			
System / JPM Title		Type Code*	Safety Function
a. 001 Control Rod Drive / 1/M Plot performance. Identify that the reactor goes critical below -500 pcm value.		N, A, S, L	1
b. 006 ECCS / Transfer SI to Cold Leg Recirculation (CBS-V14 fails) (SRO-U)		D, A, S	2
c. 010 Primary Pressure Control System / Depressurize the RCS during a natural circulation cooldown with letdown unavailable IAW ES-0.2. (SRO-U)		N, A, S	3
d. 062 AC Electrical distribution / Loss of All AC Power; failure of EPS on shutting EDG output breaker.		N, A, S	6
e. 028 Hydrogen Recombiners / Start hydrogen recombiners. (SRO-U)		D, S	5
f. 012 RPS Power Range NI Failure		D, S	7
g. 076 Service Water System / Transfer Service Water to the Cooling Tower		D, S	4(sec)
B.2 Facility Walk-Through			
a. 005 RHR / Manual Operation of RHR TCV for mid-loop operations. (SRO-U)		D, R	4(pri)
b. 064 EDG / Local EDG Normal Start and Load (SRO-U)		D	6
c. 061 EFW / Reset the TDEFW pump turbine trip throttle valve.		D	4(sec)
* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA			

Facility: Seabrook		Date of Exam: 05/30/03		Exam Level: SRO	
Category	K/A #	Topic	Imp.	Points	
Conduct of Operations	2.1.2	Knowledge of operator responsibilities during all modes of plant operation.	4.0	1	
	2.1.10	Knowledge of conditions and limitations in the facility license.	3.9	1	
	2.1.11	Knowledge of less-than-1-hour technical specification statements for systems	3.8	1	
	2.1.4	Knowledge of shift staffing requirements.	3.4	1	
	Total				4
Equipment Control	2.2.12	Knowledge of surveillance procedures.	3.4	1	
	2.2.25	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.7	1	
	2.2.11	Knowledge of the process for controlling temporary changes.	3.4	1	
	2.2.13	Knowledge of tagging and clearance procedures.	3.8	1	
	Total				4
Radiation Control	2.3.2	Knowledge of facility ALARA program.	2.9	1	
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	3.1	1	
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1	
	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	3.0	1	
	Total				4
Emergency Procedures/ Plan	2.4.1	Knowledge of EOP entry conditions and immediate action steps.	4.6	1	
	2.4.10	Knowledge of annunciator response procedures.	3.1	1	
	2.4.15	Knowledge of communications procedures associated with EOP implementation.	3.5	1	
	2.4.2	Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.	4.1	1	
	2.4.11	Knowledge of abnormal condition procedures.	3.6	1	
	Total				5
Tier 3 Point Total					17

Facility: Seabrook Date of Exam: 05/30/03 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	3	3	4				2	2			2	16
	2	1	4	3				3	4			2	17
	3	1	1	0				1	0			0	3
	Tier Totals	5	8	7				6	6			4	36
2. Plant Systems	1	2	2	2	1	2	2	2	3	3	2	2	23
	2	2	2	2	2	1	2	2	2	2	2	1	20
	3	1	1	0	1	1	0	1	1	1	1	0	8
	Tier Totals	5	5	4	4	4	4	5	6	6	5	3	51
3. Generic Knowledge and Abilities					Cat 1		Cat 2		Cat 3		Cat 4		13
					3		3		3		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. 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 exam must total 100 points.</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 SRO 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 RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1							Form ES-401-4	
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000005 Inoperable/Stuck Control Rod / 1	X						AK1.05 Calculation of minimum shutdown margin	3.3	1
000015/17 RCP Malfunctions / 4						X	2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	3.7	1
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4					X		EA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.1	1
000024 Emergency Boration / 1				X			AA1.17 Emergency borate control valve and indicators	3.9	1
000026 Loss of Component Cooling Water / 8			X				AK3.02 PCCW responses to an ESFAS signal.	3.2	1
000027 Pressurizer Pressure Control System Malfunction / 3		X					AK2.03 Controllers and positioners	2.6	1
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4	X						EK1.2 Normal, abnormal and emergency operating procedures associated with (Uncontrolled Depressurization of all Steam Generators).	3.5	1
CE/A11; W/E08 RCS Overcooling - PTS / 4		X					EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.4	1
000051 Loss of Condenser Vacuum / 4			X				AA2.01 cause for low vacuum condition	2.7	1
000055 Station Blackout / 6				X			EA1.07 Restoration of power from offsite	4.3	1
000057 Loss of Vital AC Elec. Inst. Bus / 6					X		AA2.20 Interlocks in effect on loss of ac vital electrical instrument bus that must be bypassed to restore normal equipment operation	3.6	1
000062 Loss of Nuclear Service Water / 4						X	2.4.12 Knowledge of general operating crew responsibilities during emergency operations.	3.4	1
000067 Plant Fire On-site / 9	X						AK1.02 Fire Fighting	3.1	1
000069 (W/E14) Loss of CTMT Integrity / 5		X					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.	3.4	1
000074 (W/E06&E07) Inad. Core Cooling / 4			X				EK3.3 Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.	4.0	1
000076 High Reactor Coolant Activity / 9			X				AK3.05 Corrective Actions as a result of high fission product radioactivity in the RCS	2.9	1
K/A Category Totals:	3	3	4	2	2	2	Group Point Total:		16

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000001 Continuous Rod Withdrawal / 1									
000003 Dropped Control Rod / 1				X			AA1.01 Demand position counter and pulse/analog converter	2.9	1
000008 Pressurizer Vapor Space Accident / 3			X				AK3.03 Actions contained in EOP for PZR vapor space accident/ LOCA	4.1	1
000009 Small Break LOCA / 3		X					EK2 Knowledge of the interrelations between the small break LOCA and the following: EK2.03 S/Gs	3.0	1
000011 Large Break LOCA / 3	X						EK1.01 Natural circulation and cooling, including reflux boiling.	4.1	1
W/E04 LOCA Outside Containment / 3		X					EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.5	1
BW/E08; W/E03 LOCA Cooldown/Depress. / 4									
W/E11 Loss of Emergency Coolant Recirc. / 4			X				EK3.3 Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.	3.8	1
W/E01 & E02 Rediagnosis & SI Termination / 3				X			EA1.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.7	1
000022 Loss of Reactor Coolant Makeup / 2					X		AA2.02 Charging pump problems	3.2	1
000025 Loss of RHR System / 4						X	2.1.12 Ability to apply technical specifications for a system.	2.9	1
000029 Anticipated Transient w/o Scram / 1					X		EA2.01 Reactor nuclear instrumentation	4.4	1
000032 Loss of Source Range NI / 7		X					AK2.01 Power supplies, including proper switch positions	2.7	1
000033 Loss of Intermediate Range NI / 7									
000037 Steam Generator Tube Leak / 3									
000038 Steam Generator Tube Rupture / 3			X				EK3.05 Normal operating precautions to preclude or minimize SGTR	4.0	1
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4				X			EA1.2 Operating behavior characteristics of the facility.	3.7	1
000058 Loss of DC Power / 6									
000059 Accidental Liquid RadWaste Rel. / 9					X		AA2.05 The occurrence of automatic safety actions as a result of a high PRM system signal	3.6	1
000060 Accidental Gaseous Radwaste Rel. / 9						X	2.1.11 Knowledge of conduct of operations requirements.	3.0	1
000061 ARM System Alarms / 7					X		AA2.05 Need for area evacuation; check against existing limits	3.5	1
W/E16 High Containment Radiation / 9		X					EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.0	1
GE/E09 Functional Recovery									
K/A Category Point Totals:	1	4	3	3	4	2	Group Point Total:		17

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PWR RO Examination Outline
 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					AK2.02 Sensors and detectors	2.6	1
000056 Loss of Off-site Power / 6									
000065 Loss of Instrument Air / 8									
W/E13 Steam Generator Over-pressure / 4				X			EA1.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.1	1
W/E15 Containment Flooding / 5	X						EK1.1 Components, capacity, and function of emergency systems.	2.8	1
K/A Category Point Totals:	1	1		1			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	X						K5.54 Definition and units of reactivity K6.03 Reactor Trip Breakers, including controls.	2.8 3.7	2
003 Reactor Coolant Pump							X				X	A1.02 RCP pump and motor bearing temperatures 2.1.27 Knowledge of system purpose and or function.	2..9 2.8	2
004 Chemical and Volume Control		X						X				K2 Knowledge of bus power supplies to the following: K2.05 MOVs A2.18 High VCT level.	2.7 3.1	2
013 Engineered Safety Features Actuation									X			A3.01 Input channels and logic	3.7	1
015 Nuclear Instrumentation										X		A4.03 Trip bypasses	3.8	1
017 In-core Temperature Monitor										X	X	A4.02 Temperature values used to determine RCS/RCP operation during inadequate core cooling (i.e., if applicable, average of five highest values) 2.1.28 Knowledge of the purpose and function of major system components and controls.	3.8 3.2	2
022 Containment Cooling		X		X								K2.01 Containment cooling fans K4.02 Neutralized boric acid to reduce corrosion and remove inorganic fission product iodine from steam (NAOH) in containment spray	3.0 3.1	2
056 Condensate	X							X				K1 Knowledge of the physical connections and/or cause-effect relationships between the Condensate system and the following systems: K1.03 MFW A2 Ability to (a) predict the impacts of the following malfunctions or operations on the Condensate System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: A2.04 Loss of condensate pumps	2.6 2.6	2
059 Main Feedwater			X				X					K3 Knowledge of the effect that a loss or malfunction of the MFW will have on the following: K3.04 RCS A1.07 Feed Pump speed, including normal control speed for ICS	3.6 2.5	2
061 Auxiliary/Emergency Feedwater			X			X						K6 Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: K6.02 Pumps K3 Knowledge of the effect that a loss or malfunction of the AFW will have on the following: K3.02 S/G	2.6 4.2	2

068 Liquid Radwaste					X				X				A2.04 failure of automatic isolation. K5.04 Biological hazards of radiation and the resulting goal of ALARA	3.3 3.2	2
071 Waste Gas Disposal	X									X			K1.06 ARM and PRM systems A3.02 pressure-regulating system for waste gas vent header.	3.1 2.8	2
072 Area Radiation Monitoring										X			A3.01 changes in ventilation alignment	2.9	1
K/A Category Point Totals:	2	2	2	1	2	2	2	3	3	2	2	Group Point Total:		23	

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

Form ES-401-4

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
002 Reactor Coolant								X				A2.03 Loss of forced circulation	4.1	1
006 Emergency Core Cooling							X					A1.14 Reactor vessel level	3.5	1
010 Pressurizer Pressure Control						X						K6.02 PZR	3.2	1
011 Pressurizer Level Control					X							K5.15 PZR level indication when RCS is saturated.	3.6	1
012 Reactor Protection				X								K4.07 First-out indication	3.0	1
014 Rod Position Indication			X									K3.02 Plant computer	2.5	1
016 Non-nuclear Instrumentation	X											K1.06 AFW system	3.6	1
026 Containment Spray										X		A4.01 CSS controls	4.5	1
029 Containment Purge											X	2.4.31 Knowledge of annunciators alarms and indications, and use of the response instructions.	3.3	1
033 Spent Fuel Pool Cooling									X			A3.02 Spent fuel leak or rupture	2.9	1
035 Steam Generator										X		A4.06 S/G isolation on steam leak or tube rupture/leak	4.5	1
039 Main and Reheat Steam								X				A2.04 Malfunctioning steam dump	3.4	1
055 Condenser Air Removal			X									K3.01 Main condenser	2.5	1
062 AC Electrical Distribution				X								K4.07 One-line diagram of 4kV to 480V distribution, including sources of normal and alternative power	2.7	1
063 DC Electrical Distribution	X											K1.02 AC electrical system	2.7	1
064 Emergency Diesel Generator						X						K6.07 Air receivers	2.7	1
073 Process Radiation Monitoring							X					A1.01 Radiation levels	3.2	1
075 Circulating Water		X										K2.03 Emergency/essential SWS pumps	2.6	1
079 Station Air		X										A2.01 Cross-connection with IAS	2.9	1
086 Fire Protection									X			A3.02 Actuation of the FPS	2.9	1
K/A Category Point Totals:	2	2	2	2	1	2	2	2	2	2	1	Group Point Total:		20

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PWR RO Examination Outline
Plant Systems - Tier 2/Group 3

Form ES-401-4

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
005 Residual Heat Removal										X		A4.02 Heat exchanger bypass flow control	3.4	1
007 Pressurizer Relief/Quench Tank	X											K1.03 RCS	3.0	1
008 Component Cooling Water		X										K2.02 CCW pump, including emergency backup	3.0	1
027 Containment Iodine Removal					X							K5.01 Purpose of charcoal filters	3.1	1
028 Hydrogen Recombiner and Purge Control								X				A2.02 LOCA condition and related concern over hydrogen	3.5	1
034 Fuel Handling Equipment				X								K4.01 Fuel protection from dropping or binding.	2.6	1
041 Steam Dump/Turbine Bypass Control														
045 Main Turbine Generator							X					A1.06 Expected response of secondary plant parameters following T/G trip	3.3	1
076 Service Water														
078 Instrument Air									X			A3.01 Air pressure	3.1	1
403 Containment														
K/A Category Point Totals:	1	1	0	1	1	0	1	1	1	1	0	Group Point Total:		8

Plant-Specific Priorities

System / Topic	Recommended Replacement for...	Reason	Points

Plant-Specific Priority Total: (limit 10)

Facility: Seabrook		Date of Exam: 06/02/03		Exam Level: RO	
Category	K/A #	Topic	Imp.	Points	
Conduct of Operations	2.1.2	Knowledge of operator responsibilities during all modes of plant operation.	3.0	1	
	2.1.1	Knowledge of conduct of operations requirements.	3.7	1	
	2.1.11	Knowledge of less than one-hour technical specification action statement for systems.	3.0	1	
	Total				3
Equipment Control	2.2.12	Knowledge of surveillance procedures.	3.0	1	
	2.2.25	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	2.5	1	
	2.2.11	Knowledge of shift turnover practices.	2.5	1	
	Total				3
Radiation Control	2.3.2	Knowledge of facility ALARA program.	2.5	1	
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	2.5	1	
	2.3.1	Knowledge of 10CFR20 and related facility radiation control requirements.	2.6	1	
	Total				3
Emergency Procedures/ Plan	2.4.1	Knowledge of EOP entry conditions and immediate action steps.	4.3	1	
	2.4.10	Knowledge of annunciator response procedures.	3.0	1	
	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions.	3.7	1	
	2.4.2	Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.	3.9	1	
	Total				4
Tier 3 Point Total					13