

Facility: Columbia Generating Station														Date of Exam:				
Tier	Group	RO 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 and Abnormal Plant Evolutions	1	3	4	4	N/A			3	4	N/A			2	20	5	2	7	
	2	1	2	1				2	1				0	7	2	1	3	
	Tier Totals	4	6	5				5	5				2	27	7	3	10	
2. Plant Systems	1	3	2	3	2	2	2	2	3	2	3	2	26	3	2	5		
	2	2	0	0	2	2	1	1	2	2	0	0	12	3	0	3		
	Tier Totals	5	2	3	4	4	3	3	5	4	3	2	38	6	2	8		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4	7
					3		2		1		4			2	2	1	2	
<ol style="list-style-type: none"> <li>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.</li> <li>The point 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 + or - 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.</li> <li>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.</li> <li>Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for a system or evolution.</li> <li>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.</li> <li>Select SRO topics for Tiers 1 and 2 from the shaded system and K/A categories.</li> <li>*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.</li> <li>On the following page, 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. Use duplicate pages for RO and SRO only exams.</li> <li>For Tier 3, select topics from Section 2 of the K/A Catalog, and enter the K/A number, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.</li> </ol>																		

**BWR RO/SRO EXAM OUTLINE ES-401-1**

EMERGENCY & ABNORMAL PLANT EVOLUTIONS - TIER 1 GROUP I

BWR - RO/SRO

Target: 20

Actual: 20

E / APE # - NAME / SAFETY FUNCTION	K1	K2	K3	A1	A2	G	K/A TOPICS	IMP	#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4				X			AA1.02 Ability to operate and/or monitor the following as they apply to partial or complete loss of forced core flow circulation: RPS	3.3	1 (1)
295003 Partial or Complete Loss of AC / 6		X					AK2.06 Knowledge of the interrelationships between Partial or Complete Loss of AC Power and the following: DC electrical loads	3.4	1 (2)
295004 Partial or Total Loss of DC PWR / 6					X		AA2.02 Ability to determine and/or interpret the following as they apply to Partial or Complete Loss of DC power: Extent of partial or complete loss of DC Power	3.5	1 (3)
295005 Main Turbine Generator Trip / 3			X				AK3.02 Knowledge of the reason for the following responses as they apply to Main Turbine Generator Trip: Recirculation pump downshift/trip	3.4	1 (4)
295006 SCRAM / 1	X						AK1.02 Knowledge of the operational implications of the following as they apply to SCRAM: Shutdown Margin	3.4	1 (5)
295016 Control Room Abandonment / 7		X					AK2.03 Knowledge of the interrelationships between Control Room abandonment and the following: Control room HVAC	2.9	1 (6)
295018 Partial or Complete Loss of CCW / 8					X		AA2.05 Ability to determine and/or interpret the following as they apply to Partial or Complete Loss of Component Cooling Water: system pressure	2.9	1 (7)

295019 Partial or Complete Loss of Inst. Air / 8						X	2.4.10 Partial or complete loss of Inst. Air. Knowledge of Annunciator response procedures	3.0	1 (8)
295021 Loss of Shutdown Cooling / 4						X	2.2.27 Loss of Shutdown Cooling. Knowledge of the refueling	2.6	1 (9)
295023 Refueling Accident / 8			X				AK3.04 Knowledge of the reason for the following responses as they apply to Refueling Accidents: Non-coincident Scram function	3.0	1 (10)
295024 High Drywell Pressure / 5				X			EA1.20 Ability to operate and/or monitor the following as they apply to High Drywell Pressure: Standby Gas Treatment/FRVS	3.5	1 (11)
295025 High Reactor Pressure / 3				X			EA1.07 Ability to operate and/or monitor the following as they apply to High Reactor Pressure: ARI/RPT/ATWS	4.1	1 (12)
295026 Suppression Pool High Water Temperature / 5			X				EK3.05 Knowledge of the reason for the following responses as they apply to Suppression Pool High Water Temperature: Reactor Scram	3.9	1 (13)
295027 High Containment Temperature / 5							N/A MARK III CONTAINMENT ONLY		
295028 High Drywell Temperature / 5	X						EK1.01 Knowledge of the operational implications of the following concepts as they apply to High Drywell Temperature: Reactor water level measurement	3.5	1 (14)
295030 Low Suppression Pool Water Level / 5			X				EK3.01 Knowledge of the reason for the following responses as they apply to Low Suppression Pool Water Level: Emergency Depressurization	3.8	1 (15)
295031 Reactor Low Water Level / 2		X					EK2.08 Knowledge of the interrelationships between Reactor Low Water Level and the following: Automatic Depressurization System	4.2	1 (16)

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295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1					X		EA1.10 Ability to operate and/or monitor the following as they apply to Scram Condition Present and Reactor Power Above APRM Downscale or Unknown: Alternate boron injection methods	3.7	1 (17)
295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1	X						EK1.05 Knowledge of the operational implications of the following concepts as they apply to Scram Condition Present And Reactor Power Above APRM Downscale or Unknown; Cold Shutdown Boron Weight	3.4	1 (20)
295038 High Off-site Release Rate / 9		X					EK2.02 Knowledge of the interrelationships between High Off-Site Release Rate and the following: Offgas System	3.6	1 (18)
600000 Plant Fire On Site / 8					X		AA2.04 Ability to determine and interpret the following as they apply to Plant Fire On Site: The fire's extent of potential operational damage to plant equipment	2.8	1 (19)
Category Point Totals:	3	4	4	3	4	2	Group Point Totals: 20/7		20

**BWR RO/SRO EXAM OUTLINE ES-401-1**

EMERGENCY & ABNORMAL PLANT EVOLUTIONS - TIER 1 GROUP II

BWR - RO/SRO

Target: 7

Actual: 7

E / APE # - NAME / SAFETY FUNCTION	K1	K2	K3	A1	A2	G	K/A TOPICS	IMP	#
295002 Loss of Main Condenser Vacuum / 3		X					AK2.05 Knowledge of the interrelations between Loss of Main Condenser Vacuum and the following: Feedwater system	2.7	1 (21)
295007 High Reactor Pressure / 3									
295008 High Reactor Water Level / 2					X		AA2.02 Ability to determine and/or interpret the following as they apply to High Reactor Water Level: Steam flow/Feed Flow Mismatch	3.4	1 (27)
295009 Low Reactor Water Level / 2									
295010 High Drywell Pressure / 5	X						AK1.01 Knowledge of the operational implications of the following concepts as they apply to High Drywell Pressure: Downcomer submergence	3.0	1 (23)
295011 High Containment Temperature							N/A MARK III CONTAINMENT ONLY		
295012 High Drywell Temperature / 5									
295013 High Suppression Pool Temperature / 5									
295014 Inadvertent Reactivity Addition / 1				X			AA1.07 Ability to operate and or monitor the following as they apply to Inadvertent Reactivity Addition: Cold Water Injection	4.0	1 (26)
295015 Incomplete SCRAM / 1									
295017 High Off-site Release Rate / 9									

295020 Inadvertent Containment Isolation / 5 & 7									
295022 Loss of CRD Pumps / 1									
295029 High Suppression Pool Water Level / 5				X			EA1.04 Ability to operate and/or monitor the following as they apply to High Suppression Pool Water Level: RCIC	3.4	1 (25)
295032 High Secondary Containment Area Temperature / 5									
295033 High Secondary Containment Area Radiation Levels / 9									
295034 Secondary Containment Ventilation High Radiation / 9		X					EK2.06 Knowledge of the interrelations between Secondary Containment Ventilation High Radiation and the following: PCIS/NSSS	3.9	1 (22)
295035 Secondary Containment High Differential Pressure / 5									
295036 Secondary Containment High Sump/Area Water Level / 5									
500000 High Containment Hydrogen Concentration / 5			X				EK3.04 Knowledge of the reasons for the following responses as they apply to High Primary Containment Hydrogen Concentrations: Emergency Depressurization	3.1	1 (24)
Category Point Totals:	1	2	1	2	1	0	Group Point Totals: 7/3		7

**Knowledge and Ability Record Form**  
 ref: NUREG - 1021 rev 9  
**BWR RO/SRO EXAM OUTLINE ES-401-1**

PLANT SYSTEMS - TIER 2 GROUP I

BWR - RO/SRO

Target: 26

Actual: 26

SYSTEM #/NAME	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A TOPICS	IMP	#
203000 RHR/LPCI: Injection Mode									X			A3.08 Ability to monitor automatic operation of the RHR/LPCI Injection Mode including System initiation sequence	4.1	1 (28)
205000 Shutdown Cooling		X										K2.01 Knowledge of the electrical power supplies to the following: Pump Motors	3.1	1 (29)
206000 HPCI												N/A AT CGS		
207000 Iso (Emerg) Cond												N/A AT CGS		
209001 LPCS			X									K3.02 Knowledge of the effect that a loss or malfunction of the Low Pressure Core Spray System will have on the following: ADS logic	3.8	1 (30)

209002 HPCS								X				A2.12 Ability to predict the impacts of the following on the High Pressure Core Spray System and based on those predictions, use procedures to correct, or mitigate the consequences of those abnormal conditions or operations: High Suppression Pool Water Level	3.3	1 (31)
209002 HPCS												X 2.4.2 Knowledge of system set points / interlocks and automatic actions associated with EOP entry conditions	3.9	1 (49)
211000 SLC												X G 2.1.29 Knowledge of how to conduct and verify valve lineups	3.4	1 (32)
212000 RPS					X							K5.02 Knowledge of the operational implications of the following concepts as they apply to Reactor Protection System: Specific logic arrangements	3.3	1 (33)
212000 RPS		X										K2.02 Knowledge of the electrical power supplies to the following: RPS Trp System Logic Cabinets	2.7	1 (52)

215003 IRM						X					A1.05 Ability to predict and/or monitor parameters associated with the Intermediate Range Monitoring System controls including: scram and rod block trip setpoints	3.9	1 (34)
215004 SRM			X								K4.06 Knowledge of Source Range Monitor (SRM) System design feature(s) and/or interlocks which provide for the following: IRM/SRM interlock	3.2	1 (35)
215005 APRM/LPRM				X							K5.06 Knowledge of the operational implications of the following concepts as they apply to Average Power Range Monitor/ Local Power Range Monitor System: Assignment of LPRMs to specific APRM Channels	2.5	1 (36)
215005 APRM/LPRM					X						K6.07 Knowledge of the effect that a loss of the following will have on APRM System: Flow converter/comparator network	3.2	1 (50)

217000 RCIC								X				A2.01 Ability to predict the impacts of the following on the Reactor Core Isolation Cooling System (RCIC); and based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: System initiation signal	3.8	1 (37)
218000 ADS	X											K1.05 Knowledge of the physical connections and/or cause-effect relationships between Automatic Depressurizing System and the following: Remote Shutdown System	3.9	1 (38)
223002 PCIS/ Nuclear Steam Supply Shutoff									X			A3.02 Ability to monitor automatic operations of the Primary Containment Isolation System/Nuclear Steam Supply Shut-Off including: Valve Closures	3.5	1 (39)
239002 SRVs						X						K6.05 Knowledge of the effect that a loss or malfunction of the following will have on Relief/Safety Valves: Discharge Vacuum Breaker	3.0	1 (40)

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259002 Reactor Water Level Control			X									K3.06 Knowledge of the effect that a loss or malfunction of the Reactor Water Level Control System will have on the following: Main Turbine	2.8	1 (41)
261000 SGTS										X		A4.02 Ability to manually operate and/or monitor in the control room: Suction Valves	3.1	1 (42)
261000 SGTS									X			A1.03 Ability to predict and/or monitor changes in parameters associated with operation of the Standby Gas Treatment System controls including: Off-Site Release Levels	3.2	1 (51)
262001 AC Elect Dist								X				A2.05 Ability to predict the impacts of the following on the AC Electrical Distribution; and based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Bus Grounds	2.9	1 (43)
262002 UPS (AC/DC)	X											K1.16 Knowledge of the physical connections and/or cause relationships between Uninterruptible Power Supply (A.C./D.C.) and the following: MSIVs	3.1	1 (44)

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262002 UPS (AC/DC)										X		A4.01 Ability to manually operate or monitor in the control room: Transfer from alternate source to preferred source	2.8	1 (53)
263000 DC Elect Dist			X									K3.03 Knowledge of the effect that a loss or malfunction of the D.C. Electrical Distribution will have on the following: Systems with DC components	3.4	1 (45)
264000 EDGs										X		A4.01 Ability to manually operate and/or monitor in the Control Room: Adjustment of voltage	3.3	1 (46)
300000 Instrument Air				X								K4.02 Knowledge of the Instrument Air design features and/or interlocks which provide for the following: Cross-over to other air systems	3.0	1 (47)
400000 Component Cooling Water	X											K1.04 Knowledge of the physical connections and/or cause-effect relationships between CCWS and the following: Reactor Coolant System in order to determine source (s) of RCS leakage into CCWS	2.9	1 (48)
Category Point Totals:	3	2	3	2	2	2	2	3	2	3	2	Group Point Total: 26/5		26

**Knowledge and Ability Record Form**  
 ref: NUREG - 1021 rev 9  
**BWR RO/SRO EXAM OUTLINE ES-401-1**

PLANT SYSTEMS - TIER 2 GROUP II

BWR - RO/SRO

Target: 12

Actual: 12

SYSTEM #/NAME	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A TOPICS	IMP	#
201001 CRD Hydraulic								X				A2.01 Ability to predict the impacts of the following on the Control Rod Drive Hydraulic System and based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Pump Trips	3.2	1 (54)
201002 RMCS														
201003 CRD Mechanism														
201004 RSCS					X							K5.03 Knowledge of the operational implications of the following concepts as the apply to Rod Sequence Control System: Group notch control limits and rod density	3.3	1 (55)
201005 RCIS												N/A AT CGS		
201006 RWM	X											K1.04 Knowledge of the physical connections and/or cause-effect relationships between Rod Worth Minimizer and the following: Steam flow/Reactor power	3.1	1 (63)
202001 Recirculation														

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202002 Recirc Flow Control				X							K4.07 Knowledge of the Recirculation Flow Control System design features and/or interlocks which provide for the following: Minimum and maximum pump speed setpoint	2.9	1 (56)
204000 RWCU													
214000 RPIS													
215001 TIP													
215002 RBM													
216000 Nuclear Boiler Inst								X			A3.01 Ability to monitor automatic operation of the Nuclear Boiler Instrumentation including: Relationship between meter/recorder readings and actual parameter valves: Plant Specific	3.4	1 (57)
219000 RHR/LPCI: Pool Cooling Mode													
223001 Pri Containment and Aux				X							K4.06 Knowledge of the Primary Containment System and Auxiliaries design feature(s) and/or interlocks which provide for the following: Maintains proper containment/secondary containment to drywell differential pressure	3.1	1 (58)

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226001 RHR/LPCI: CTMT Spray Mode						X						Knowledge of the effect that a loss or malfunction of the following will have on the RHR/LPCI Containment Spray System Mode: Suction Flow Path	3.2	1 (65)
230000 RHR/LPCI: Pool Spray Mode														
233000 FPC														
234000 Fuel Handling Eq.														
239001 Main and Reheat Steam							X					A2.10 Ability to predict the impacts of the following on the Main And Reheat Steam System and based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Closure of one or more MSIVs at power	3.8	1 (59)
239003 MSLC														
241000 Reactor/Turbine Pressure Regulator														
245000 Main Turbine Generator/Aux														
256000 Reactor Condensate							X					A1.01 Ability to predict and/or monitor changes in parameters associated with operating the Reactor Condensate System controls including: System Flow	2.9	1 (61)

259001 Reactor Feedwater									X			A3.09 Ability to monitor operation of the Reactor Feedwater System including: Lights and Alarms	3.0	1 (62)
268000 Radwaste	X											K1.09 Knowledge of the physical connections and/or cause-effect relationship between Radwaste and the following: ECCS Systems	2.6	1 (60)
271000 Offgas														
272000 Radiation Monitoring														
286000 Fire Protection														
288000 Plant Ventilation					X							K3.05 Knowledge of the effect that a loss or malfunction of the Plant Ventillation System will have on the following: Reactor Building pressure	3.1	1 (64)
290001 Secondary Containment														
290002 Reactor Vessel Int														
290003 Control Room HVAC														
Category Point Totals:	2	0	0	2	2	1	1	2	2	0	0	Group Point Total: 12/3		12

**Knowledge and Ability Record Form**  
 ref: NUREG - 1021 rev 9  
**BWR RO/SRO EXAM OUTLINE ES-401-3 (Tier 3)**

**PLANT-WIDE GENERIC RESPONSIBILITIES TIER 3**

BWR - RO/SRO

Target: 10

Actual: 10

Category	K/A	TOPICS	RO		SRO	
			IMP	#	IMP	#
1. Conduct of Operations	2.1.8	Ability to coordinate personnel activities outside the control room.	3.8	1 (75)		
	2.1.18	Ability to make accurate / clear and concise logs / records / status boards / and reports	2.9	1 (69)		
	2.1.19	Ability to use plant computer to obtain and evaluate parametric information on system or component status.	3.0	1 (66)		
	Subtotal			3		

**BWR RO/SRO EXAM OUTLINE ES-401-3 (Tier 3)**

**PLANT-WIDE GENERIC RESPONSIBILITIES TIER 3**

BWR - RO/SRO

Category	K/A	TOPICS	RO		SRO	
			IMP	#	IMP	#
2. Equipment Control	2.2.13	Knowledge of tagging and clearance procedure.	3.6	1 (72)		
	2.2.25	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	2.5	1 (67)		
	Subtotal			2		

**BWR RO/SRO EXAM OUTLINE ES-401-3 (Tier 3)**

**PLANT-WIDE GENERIC RESPONSIBILITIES TIER 3**

BWR - RO/SRO

Category	K/A	TOPICS	RO		SRO	
			IMP	#	IMP	#
3. Radiation Control	2.3.11	Ability to control radiation releases.	2.7	1 (68)		
	Subtotal			1		

**BWR RO/SRO EXAM OUTLINE ES-401-3 (Tier 3)**

**PLANT-WIDE GENERIC RESPONSIBILITIES TIER 3**

BWR - RO/SRO

Category	K/A	TOPICS	RO		SRO	
			IMP	#	IMP	#
4. Emergency Procedures Plan	2.4.3	Ability to identify post-accident instrumentation.	3.5	1 (70)		
	2.4.17	Knowledge of EOP terms and definitions.	3.1	1 (74)		
	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions including: 1. Reactivity Control; 2. Core cooling and heat removal; 3. Reactor Coolant System integrity; 4. Containment Conditions, 5. Radioactivity release control.	3.7	1 (73)		
	2.4.49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	1 (71)		
	Subtotal			4		
Group point totals: 10/7				10		

**BWR RO/SRO EXAM OUTLINE ES-401-1**

EMERGENCY & ABNORMAL PLANT EVOLUTIONS - TIER 1 GROUP I

BWR - SRO

Target: 7

Actual: 7

E / APE # - NAME / SAFETY FUNCTION	K1	K2	K3	A1	A2	G	K/A TOPICS	IMP	#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4									
295003 Partial or Complete Loss of AC / 6					X		AA2.05 Ability to determine and/or interpret the following as they apply to Partial or Complete loss of A.C. Power: Whether a partial or complete loss of A.C. power has occurred	4.2	1
295004 Partial or Total Loss of DC PWR / 6									
295005 Main Turbine Generator Trip / 3									
295006 SCRAM / 1									
295016 Control Room Abandonment / 7						X	2.4.16 Knowledge of EOP implementation hierarchy and coordination with other support procedures	4.0	1
295018 Partial or Complete Loss of CCW / 8									
295019 Partial or Complete Loss of Inst. Air / 8									
295021 Loss of Shutdown Cooling / 4						X	2.2.26 Loss of Shutdown Cooling - Knowledge of Refueling administrative requirements	3.7	1

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295023 Refueling Accident / 8					X		AA2.01 Ability to determine and/or interpret the following as they apply to Refueling Accidents: Area Radiation Levels	4.0	1
295024 High Drywell Pressure / 5					X		AA2.04 Ability to determine and/or interpret the following as they apply to High Drywell Pressure: Suppression Chamber Pressure	3.9	1
295025 High Reactor Pressure / 3					X		EA2.02 Ability to determine and/or interpret the following as they apply to High Reactor Pressure: Reactor Power	4.2	1
295026 Suppression Pool High Water Temperature / 5									
295027 High Containment Temperature / 5							N/A AT CGS		
295028 High Drywell Temperature / 5									
295030 Low Suppression Pool Water Level / 5									
295031 Reactor Low Water Level / 2									
295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1					X		EA2.02 Ability to determine and/or interpret the following as they apply to Scram Condition Present and Reactor Power above APRM Downscale or Unknown: Reactor Water Level	4.2	1
295038 High Off-site Release Rate / 9									
600000 Plant Fire On Site / 8									
Category Point Totals:					5	2			7

**BWR RO/SRO EXAM OUTLINE ES-401-1**

EMERGENCY & ABNORMAL PLANT EVOLUTIONS - TIER 1 GROUP II

BWR - SRO

Target: 3

Actual: 3

E / APE # - NAME / SAFETY FUNCTION	K1	K2	K3	A1	A2	G	K/A TOPICS	IMP	#
295002 Loss of Main Condenser Vacuum / 3						X	2.4.49 Ability to perform without reference to procedures those actions that require immediate operation of system components and controls	4.0	1
295007 High Reactor Pressure / 3									
295008 High Reactor Water Level / 2									
295009 Low Reactor Water Level / 2									
295010 High Drywell Pressure / 5									
295011 High Containment Temperature							N/A AT CGS		
295012 High Drywell Temperature / 5									
295013 High Suppression Pool Temperature / 5									
295014 Inadvertent Reactivity Addition / 1									
295015 Incomplete SCRAM / 1									
295017 High Off-site Release Rate / 9									
295020 Inadvertent Containment Isolation / 5 & 7									
295022 Loss of CRD Pumps / 1									

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295029 High Suppression Pool Water Level / 5									
295032 High Secondary Containment Area Temperature / 5					X		EA2.02 Ability to determine and/or interpret the following as they apply to High Secondary Containment Area Temperature; Equipment Operability	3.5	1
295033 High Secondary Containment Area Radiation Levels / 9									
295034 Secondary Containment Ventilation High Radiation / 9									
295035 Secondary Containment High Differential Pressure / 5									
295036 Secondary Containment High Sump/Area Water Level / 5									
500000 High Containment Hydrogen Concentration / 5					X		EA2.03 Ability to determine and/or interpret the following as they apply to High Primary Containment Hydrogen Concentrations: Combustible limits for Wetwell	3.3	1
Category Point Totals:					2	1	Group Point Totals: 7/3		3

**BWR RO/SRO EXAM OUTLINE ES-401-1**

PLANT SYSTEMS - TIER 2 GROUP I

BWR - SRO

Target: 5

Actual: 5

SYSTEM #/NAME	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A TOPICS	IMP	#
203000 RHR/LPCI: Injection Mode								X				A2.17 Ability to (a) predict the impacts of the following on RHR/LPCI Injection Mode and 9b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Keepfill System Failure	3.5	1
205000 Shutdown Cooling														
206000 HPCI												N/A AT CGS		
207000 Iso (Emerg) Cond												N/A AT CGS		
209001 LPCS														

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209002 HPCS									X				A2.01 Ability to (a) predict the impacts of the following on High Pressure Core Spray System and b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: System Initiation	3.8	1
211000 SLC															
212000 RPS															
215003 IRM															
215004 SRM												X	215004 2.2.24 SRM System – Ability to analyze the affect of maintenance activities on LCO status	3.8	1
215005 APRM/LPRM															
217000 RCIC															
218000 ADS															
223002 PCIS/ Nuclear Steam Supply Shutoff															
239002 SRVs												X	2.4.7 SRVs Knowledge of event based EOP mitigation strategies	3.8	1



**BWR RO/SRO EXAM OUTLINE ES-401-1**

PLANT SYSTEMS - TIER 2 GROUP II

BWR - SRO

Target: 3

Actual: 3

SYSTEM #/NAME	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A TOPICS	IMP	#
201001 CRD Hydraulic														
201002 RMCS														
201003 CRD Mechanism								X				A2.02 Ability to (a) predict the impacts of the following on the Control Rod And Drive Mechanism and b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Uncoupled Rod	3.8	1
201004 RSCS														
201005 RCIS												N/A AT CGS		
201006 RWM														
202001 Recirculation														
202002 Recirc Flow Control														
204000 RWCU														

**BWR RO/SRO EXAM OUTLINE ES-401-1**

214000 RPIS								X				A2.01 Ability to (a) predict the impacts of the following on the Rod Position Information System and b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Failed Reed Switches	3.3	1
215001 TIP														
215002 RBM														
216000 Nuclear Boiler Inst														
219000 RHR/LPCI: Pool Cooling Mode														
223001 Pri Containment and Aux														

**BWR RO/SRO EXAM OUTLINE ES-401-1**

226001 RHR/LPCI: CTMT Spray Mode								X				A2.11 Ability to (a) predict the impacts of the following on the RHR/LPCI: Containment Spray Mode and b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Motor Operated Valve Failures	3.0	1
230000 RHR/LPCI: Pool Spray Mode														
233000 FPC														
234000 Fuel Handling Eq.														
239001 Main and Reheat Steam														
239003 MSLC														
241000 Reactor/Turbine Pressure Regulator														
245000 Main Turbine Generator/Aux														
256000 Reactor Condensate														
259001 Reactor Feedwater														
268000 Radwaste														
271000 Offgas														

**BWR RO/SRO EXAM OUTLINE ES-401-1**

272000 Radiation Monitoring														
286000 Fire Protection														
288000 Plant Ventilation														
290001 Secondary Containment														
290002 Reactor Vessel Int														
290003 Control Room HVAC														
Category Point Totals:												Group Point Total: 12/3		3

**BWR RO/SRO EXAM OUTLINE ES-401-3 (Tier 3)**

**PLANT-WIDE GENERIC RESPONSIBILITIES TIER 3**

BWR - SRO

Target: 7

Actual: 7

Category	K/A	TOPICS	RO		SRO	
			IMP	#	IMP	#
1. Conduct of Operations	2.1.20	Ability to execute procedure steps			4.2	1
	2.1.14	Knowledge of system status criteria which require the notification of plant personnel			3.3	1
	Subtotal					2

**BWR RO/SRO EXAM OUTLINE ES-401-3 (Tier 3)**

**PLANT-WIDE GENERIC RESPONSIBILITIES TIER 3**

BWR - SRO

Category	K/A	TOPICS	RO		SRO	
			IMP	#	IMP	#
2. Equipment Control	2.2.28	Knowledge of new and spent fuel movement procedures			3.5	1
	2.2.24	Ability to analyze the affect of maintenance activities on LCO status			3.8	1
	Subtotal					2

**BWR RO/SRO EXAM OUTLINE ES-401-3 (Tier 3)**

**PLANT-WIDE GENERIC RESPONSIBILITIES TIER 3**

BWR - SRO

Category	K/A	TOPICS	RO		SRO	
			IMP	#	IMP	#
3. Radiation Control	2.3.4	Knowledge of the radiation exposure limits and contamination control / including permissible levels in excess of those authorized			3.1	1
	Subtotal					1

**BWR RO/SRO EXAM OUTLINE ES-401-3 (Tier 3)**

**PLANT-WIDE GENERIC RESPONSIBILITIES TIER 3**

BWR - SRO

Category	K/A	TOPICS	RO		SRO	
			IMP	#	IMP	#
4. Emergency Procedures Plan	2.4.44	Knowledge of the Emergency Plan Protective Action Recommendations			4.0	1
	2.4.32	Knowledge of operator response to loss of all annunciators			3.5	1
	Subtotal					2
Group point totals: 10/7						7