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ES-401

BWR Examination Outline

ES-401-2 Rev 9 (Errata)

Facility: Hope Creek		Date of Exam: Date															
Tier	Group	RO K/A Category Points											SRO-Only Points				
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total	
1 Emergency & Abnormal Plant Evolutions	1	4	4	3				2	4				3	20	4	3	7
	2	1	1	2				1	1				1	7	2	1	3
	Tier																
	Totals	5	5	5				3	5				4	27	6	4	10
2 Plant Systems	1	3	2	2	2	2	2	2	3	3	3	2	26	2	3	5	
	2	1	0	1	2	2	1	1	1	1	1	1	12	3	0	3	
	Tier																
	Totals	4	2	3	4	4	3	3	4	4	4	3	38	5	3	8	
3 Generic Knowledge and Abilities Categories		1		2		3		4					1	2	3	4	
		3		3		2		2		10			2	2	1	2	

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each KIA category shall not be less than two).

2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ± 1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.

3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.

4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.

5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 25 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.

6.* Select SRO topics for Tiers 1 and 2 from the shaded systems and KIA categories.

7. The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the KIA Catalog, but the topics must be relevant to the applicable evolution or system.

8. On the following pages, enter the KIA numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2.

9. For Tier 3, select topics from Section 2 of the KIA catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

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ES-401							BWR Examination Outline					ES-401-1 Rev 9 (Errata)	
Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1 (RO)													
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G 2	K/A Topic(s)	Imp.	#				
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4	1.04						Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION : (CFR: 41.8 to 41.10) AK1.04 †Limiting cycle oscillation: Plant-Specific 2.5 3.3	2.5	1				
295003 Partial or Complete Loss of A.C. Power / 6		2.03					Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF A.C. POWER and the following: (CFR: 41.7 / 45.8) AK2.03 A.C. electrical distribution system 3.7 3.9	3.7	2				
295004 Partial or Complete Loss of D.C. Power / 6			3.03				Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER : (CFR: 41.5 / 45.6) AK3.03 Reactor SCRAM: Plant-Specific 3.1 3.5	3.1	3				
295005 Main Turbine Generator Trip / 3				1.07			Ability to operate and/or monitor the following as they apply to MAIN TURBINE GENERATOR TRIP : (CFR: 41.7 / 45.6) AA1.07 A.C. electrical distribution. 3.3 3.3	3.3	4				
295006 SCRAM / 1					2.05		Ability to determine and/or interpret the following as they apply to SCRAM : (CFR: 41.10 / 43.5 / 45.13) AA2.05 Whether a reactor SCRAM has occurred 4.6* 4.6*	4.6*	5				
295016 Control Room Abandonment / 7						2.4.4	2.4.4 Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures. (CFR 41.10 / 43.2 / 45.6)	4.0	6				
295018 Partial or Complete Loss of Component Cooling Water / 8	1.01						Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER : (CFR: 41.8 to 41.10) AK1.01 Effects on component/system operations 3.5 3.6	3.5	7				
295019 Partial or Complete Loss of Instrument Air / 8		2.01					Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR and the following: (CFR: 41.7 / 45.8) AK2.01 CRD Hydraulics 3.8 3.9	3.8	8				
295021 Loss of Shutdown Cooling / 21			3.04				Knowledge of the reasons for the following responses as they apply to LOSS OF SHUTDOWN COOLING : (CFR: 41.5 / 45.6) AK3.04 Maximizing reactor water cleanup flow.3.3 3.4	3.3	9				
295023 Refueling Accidents / 8					2.05		Ability to operate and/or monitor the following as they apply to REFUELING ACCIDENTS : (CFR: 41.7 / 45.6) AA2.05 †Entry conditions of emergency plan 3.2 4.6*	3.2	10				
295024 High Drywell Pressure / 5					2.05		Ability to determine and/or interpret the following as they apply to HIGH DRYWELL PRESSURE: (CFR: 41.10 / 43.5 / 45.13) EA2.05 Suppression chamber air-space temperature: 3.6 3.7	3.6	11				
295025 High Reactor Pressure / 3						2.1.3	2.1.32 Ability to explain and apply all system limits and precautions. (CFR: 41.101431145.12)	3.4	12				
295026 Suppression Pool High Water Temperature / 5	1.01						Knowledge of the operational implications of the concepts as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE : (CFR: 41.8 to 41.301EK1.01 Pump NPSH 3.0 3.4	3.0	13				
295027 High Containment Temperature (Mark III Containment Only) / 5													
295028 High Drywell Temperature / 5		2.02					Knowledge of the interrelations between HIGH DRYWELL TEMPERATURE and the following: (CFR: 41.7 / 45.8) EK2.02 Components internal to the drywell 3.2 3.3	3.2	14				
295030 Low Suppression Pool Water Level / 5			3.06				Knowledge of the reasons for the following responses as they apply to LOW SUPPRESSION POOL WATER LEVEL: (CFR: 41.5 / 45.6) EK3.06 Reactor SCRAM. 3.6 3.8	3.6	15				
295031 Reactor Low Water Level / 2				1.07			Ability to operate and/or monitor the following as they apply to REACTOR LOW WATER LEVEL : (CFR: 41.7 / 45.6) EA1.07 Safety/relief valves 3.7* 3.7*	3.7*	16				
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1					2.04		Ability to determine and/or interpret the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : (CFR: 41.10 / 43.5 / 45.13) EA2.04 Suppression pool temperature 4.0* 4.1*	4.0*	17				
295038 High Off-Site Release Rate / 9						2.1.14	2.1.14 Knowledge of system status criteria which require the notification of plant personnel. (CFR: 43.5 / 45.12)	2.5	18				
600000 Plant Fire On Site / 8	1.01						Knowledge of the operation applications of the following concepts as they apply to Plant Fire On Site: AK1.01 Fire Classifications by type 2.5 2.8	2.5	19				
295023 Refueling Accidents / 8		2.05					Knowledge of the interrelations between REFUELING ACCIDENTS and the following: (CFR: 41.7 / 45.8) AK2.05 Secondary containment ventilation 3.5 3.7	3.5	20				
K/A Category Totals:							4 4 3 2 4 3	Group Point Total:	20 20				

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		Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO)							
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G 2	K/A Topic(s)	Imp.	#
295018 Partial or Complete Loss of Component Cooling Water / 8						2.03	Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER : (CFR: 41.10 / 43.5 / 45.13) AA2.03 Cause for partial or complete loss 3.2 3.5	3.5	76
295028 High Drywell Temperature / 5						2.2.25	2.2.25 Knowledge of bases in technical specifications for limiting conditions for operations and safety limits. (CFR: 43.2)	3.7	77
295021 Loss of Shutdown Cooling / 2						2.06	Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING : (CFR: 41.10 / 43.5 / 45.13) AA2.06 Reactor pressure 3.2 3.3	3.3	78
295024 High Drywell Pressure / 5						2.4.30	2.4.30 Knowledge of which events related to system operations/status should be reported to outside agencies. (CFR: 43.5 / 45.11)	3.6	79
295016 Control Room Abandonment / 7						2.06	Ability to determine and/or interpret the following as they apply to CONTROL ROOM ABANDONMENT: (CFR: 41.10/43.5/45.13) AA2.06 Cooldown rate 3.3 3.5	3.5	80
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1						2.1.33	2.1.33 Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications. (CFR: 43.2/ 43.3 / 45.3)	4.0	81
295038 High Off-Site Release Rate / 9						2.03	Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE : (CFR: 41.10 / 43.5 / 45.13) AA2.03 †Radiation levels: Plant-Specific 3.1 3.9	3.9	82
K/A Category Totals:		0	0	0	0	4	3	Group Point Total:	7

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BWR Examination Outline									
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G 2	K/A Topic(s)	Imp.	#
295002 Loss of Main Condenser Vacuum / 3									
295007 High Reactor Pressure / 3									
295008 High Reactor Water Level / 2			3.08				Knowledge of the reasons for the following responses as they apply to HIGH REACTOR WATER LEVEL : (CFR: 41.5 / 45.6) AK3.08 RCIC steam supply valve closure: Plant-Specific.3.4 3.5	3.4	21
295009 Low Reactor Water Level / 2				1.03			Ability to operate and/or monitor the following as they apply to LOW REACTOR WATER LEVEL : (CFR: 41.7 / 45.6) AA1.03 Recirculation system: Plant-Specific. 3.0 3.1	3.0	22
295010 High Drywell Pressure / 5									
295011 High Containment Temperature (Mark III Containment Only) / 5									
295012 High Drywell Temperature / 5					2.02		Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE : (CFR: 41.10 / 43.5 / 45.13) AA2.02 Drywell pressure.. 3.9 4.1	3.9	23
295013 High Suppression Pool Temperature / 13									
295014 Inadvertent Reactivity Addition / 1									
295015 Incomplete SCRAM / 1									
295017 High Off-Site Release Rate / 9					2.4.4		2.4.4 Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures. (CFR 41.10 / 43.2 / 45.6)	4.0	24
295020 Inadvertent Containment Isolation / 5&7									
295022 Loss of CRD Pumps / 1	1.01						Knowledge of the operational implications of the following concepts as they apply to LOSS OF CRD PUMPS: (CFR: 41.8 to 41.10) AK1.01 Reactor pressure vs. rod insertion capability. 3.3 3.4	3.3	25
295029 High Suppression Pool Water Level / 5									
295032 High Secondary Containment Area Temperature / 5									
295033 High Secondary Containment Area Radiation Levels / 9		2.02					Knowledge of the interrelations between HIGH SECONDARY CONTAINMENT AREA RADIATION LEVELS and the following: (CFR: 41.7 / 45.8) EK2.02 Process radiation monitoring system. 3.8 4.1	3.8	26
295034 Secondary Containment Ventilation High Radiation / 9									
295035 Secondary Containment High Differential Pressure / 5									
295036 Secondary Containment High Sump/Area Water Level / 5			3.01				Knowledge of the reasons for the following responses as they apply to SECONDARY CONTAINMENT HIGH SUMP/AREA WATER LEVEL : (CFR: 41.5 / 45.6) EK3.01 Emergency depressurization. 2.6 2.8	2.6	27
500000 High Containment Hydrogen Concentration / 5									
K/A Category Totals:	1	1	2	1	1	1	Group Point Total:	7	7

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Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO)										
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G 2	K/A Topic(s)	Imp.	#	
295013 High Suppression Pool Temperature / 13					2.02		Ability to determine and/or interpret the following as they apply to HIGH SUPPRESSION POOL TEMPERATURE : (CFR: 41.10 / 43.5 / 45.13) AA2.02 Localized heating/stratification.3.2 3.5	3.5	83	
295010 High Drywell Pressure / 5					2.4.6		2.4.6 Knowledge symptom based EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13)	4.0	84	
500000 High Containment Hydrogen Concentration / 5					2.03		Ability to determine and / or interpret the following as they apply to HIGH PRIMARY CONTAINMENT HYDROGEN CONCENTRATIONS: (CFR: 41.10 / 43.5 / 45.13) EA2.03 Combustible limits for drywell 3.3 3.8	3.8	85	
K/A Category Totals:	0	0	0	0	2	1	Group Point Total:	3	3	

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BWR Examination Outline													
Plant Systems - Tier 2 Group 1 (RO)													
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G 2	K/A Topic(s)	Imp. #
203000 RHR/LPCI: Injection Mode								2.01				Ability to (a) predict the impacts of the following on the RHR/LPCI: INJECTION MODE (PLANT SPECIFIC); and (b) based on those predictions, use procedures to control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6) A2.01 Inadequate net positive suction head 3.23.4	3.2 28
205000 Shutdown Cooling System (RHR Shutdown Cooling Mode)									3.01			Ability to monitor automatic operations of the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) including: (CFR: 41.7 / 45.7) A3.01 Valve operation 3.2 3.1	3.2 29
206000 High Pressure Coolant Injection System										4.03		Ability to manually operate and/or monitor in the control room: (CFR: 41.7 145.5 to 45.8) A4.03 Turbine temperatures: BWR-2,3,4 3.1 3.0	3.1 30
207000 Isolation (Emergency) Condenser												not applicable	
209001 Low Pressure Core Spray System	1.03											Knowledge of the physical connections and/or cause effect relationships between LOW PRESSURE CORE SPRAY SYSTEM and the following: (CFR: 41.2 to 41.9 145.7 to 45.8) K1.03 Keep fill system 2.9 3.0	2.9 31
209002 High Pressure Core Spray System (HPCS)												not applicable	
211000 Standby Liquid Control System			3.02									Knowledge of the effect that a loss or malfunction of the STANDBY LIQUID CONTROL SYSTEM will have on following: (CFR: 41.7 / 45.4) K3.02 Core spray line break detection system: Plant-Specific 3.0* 3.2*	3.0* 32
212000 Reactor Protection System				4.04								Knowledge of REACTOR PROTECTION SYSTEM design feature(s) and/or interlocks which provide for the following: (CFR: 41.7) K4.04 The prevention of supplying both RPS buses simultaneously from the alternate power source: Plant-Specific 3.1 3.1	3.1 33
215003 Intermediate Range Monitor (IRM) System					5.01							Knowledge of the operational implications of the following concepts as they apply to INTERMEDIATE RANGE MONITOR (IRM) SYSTEM: (CFR: 41.5 / 45.3) K5.01 Detector operation 2.6 2.7	2.6 34
215004 Source Range Monitor (SRM) System						6.02						Knowledge of the effect that a loss or malfunction of the following will have on the SOURCE RANGE MONITOR (SRM) SYSTEM: (CFR: 41.7 145.7) K6.02 24/48 volt D.C. power 3.1 3.3	3.1 35
215005 Average Power Range Monitor/Local Power Range Monitor System							1.02					Ability to predict and/or monitor changes in parameters associated with operating the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM controls including: (CFR: 41.5 / 45.5) A1.02 RPS status 3.9 4.0	3.9 36
217000 Reactor Core Isolation Cooling System (RCIC)								2.03				REACTOR CORE ISOLATION COOLING SYSTEM (RCIC); and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6) A2.03 Valve closures 3.4 3.3	3.4 37
218000 Automatic Depressurization System									3.04			Ability to monitor automatic operations of the AUTOMATIC DEPRESSURIZATION SYSTEM including: (CFR: 41.7 / 45.7) A3.04 Primary containment pressure 3.7 3.8	3.7 38
223002 Primary Containment Isolation System/Nuclear Steam Supply Shut-Off										4.05		Ability to manually operate and/or monitor in the control room: (CFR: 41.7 145.5 to 45.8) M. WSPDS/ERIS/CRIDS/GDS: Plant-Specific 2.5 2.5	2.5* 39
239002 Relief/Safety Valves											2.4.49	2.4.49 Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. (CFR: 41.10 / 43.2 / 45.6)	4.0 40
259002 Reactor Water Level Control System	1.09											Knowledge of the physical connections and/or cause effect relationships between REACTOR WATER LEVEL CONTROL SYSTEM and the following: (CFR: 41.2 to 41.9 145.7 to 45.8) K1.09 P and T seal (compensation). 2.9 3.0	2.9 41
261000 Standby Gas Treatment System			3.04									Knowledge of the effect that a loss or malfunction of the STANDBY GAS TREATMENT SYSTEM will have on following: (CFR: 41.7 / 45.6) K3.04 High pressure coolant injection system: Plant-Specific 3.1 3.1	3.1 42
226001 A.C. Electrical Distribution		2.01										Knowledge of electrical power supplies to the following: (CFR: 41.7) K2.01 Off-site sources of power 3.3 3.6	3.3 43
262002 Uninterruptable Power Supply (A.C./D.C.)				4.01								Knowledge of UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) design feature(s) and/or interlocks which provide for the following: (CFR: 41.7) K4.01 Transfer from preferred power to alternate power supplies 3.1 3.4	3.1 44
263000 D.C. Electrical Distribution					5.01							Knowledge of the operational implications of the following concepts as they apply to D.C. ELECTRICAL DISTRIBUTION: (CFR: 41.6 145.3) K5.01 Hydrogen generation during battery charging. 2.6 2.9	2.6 45
264000 Emergency Generators (Diesel/Jet)						6.02						Knowledge of the effect that a loss or malfunction of the following will have on the EMERGENCY GENERATORS (DIESEL/JET): (CFR: 41.7 / 45.7) K6.02 Fuel oil pumps 3.6 3.6	3.6 46

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300000 Instrument Air System (IAS)										2.01		Ability to (a) predict the impacts of the following on the INSTRUMENT AIR SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.01 Air dryer and filter malfunctions . 2.9 2.8	2.9	47
400000 Component Cooling Water System (CCWS)										1.03		Ability to predict and / or monitor changes in parameters associated with operating the CCWS controls including: (CFR: 41.5 / 45.5) A1.03 CCW Pressure 2.7 2.7	2.7	48
206000 High Pressure Coolant Injection System											3.02	Ability to monitor automatic operations of the HIGH PRESSURE COOLANT INJECTION SYSTEM including: (CFR: 41.7 / 45.7) A3.02 System Flow: BWR-2,3,4 3.8 3.8	3.8	49
217000 Reactor Core Isolation Cooling System (RCIC)											4.02	Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8) A4.02 Turbine trip throttle valve reset 3.9 3.9	3.9	50
215000 Shutdown Cooling System (RHR Shutdown Cooling Mode)											2.1.28	2.1.28 Knowledge of the purpose and function of major system components and controls. (CFR: 41.7)	3.2	51
263000 D.C. Electrical Distribution										2.01		Knowledge of electrical power supplies to the following: (CFR: 41.7) K2.01 Major D.C. loads . 3.1 3.4	3.1	52
262002 Uninterruptable Power Supply (A.C./D.C.)											1.01	Knowledge of the physical connections and/or cause effect relationships between UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) and the following: K1.01 Feedwater level control: Plant-Specific . 2.8 3.0	2.8	53
K/A Category Totals:	3	2	2	2	2	2	2	3	3	3	2	Group Point Total:	26	26

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Plant Systems - Tier 2 Group 1 (SRO)															
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G 2	K/A Topic(s)	Imp.	#	
264000 Emergency Generators (Diesel/Jet)											2.2.22	2.2.22 Knowledge of limiting conditions for operations and safety limits. (CFR: 43.2 145.2) 3.4 4.1	4.1	93	
215003 Intermediate Range Monitor (IRM) System											2.1.12	2.1.12 Ability to apply technical specifications for a system. (CFR: 43.2 143.51 45.3)	4.0	87	
206000 High Pressure Coolant Injection System								2.17				Ability to (a) predict the impacts of the following on the HIGH PRESSURE COOLANT INJECTION SYSTEM; and (b) based on these predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 145.6) A2.17 HPCI Inadvertent initiation: BWR-2,3,4 3.9 4.3	4.3	92	
215004 Source Range Monitor (SRM) System											2.4.49	2.4.49 Ability to perform without reference to procedures those actions that require immediate operation of system components and controls: (CFR: 41.10 / 43.2 / 45.6)	4.0	89	
223002 Primary Containment Isolation System/Nuclear Steam Supply Shut-Off								2.10				Ability to (a) predict the impacts of the following on the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF; and (b) based on these predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 145.6) A2.10 Loss of coolant accidents 3.9 4.2	4.2	91	
K/A Category Totals:	0	0	0	0	0	0	0	0	2	0	0	3	Group Point Total:	5	5

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Plant Systems - Tier 2 Group 2 (RO)														
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G 2	K/A Topic(s)	Imp.	#
201001 Control Rod Drive Hydraulic System					5.02							Knowledge of the operational implications of the following concepts as they apply to CONTROL ROD DRIVE HYDRAULIC SYSTEM : (CFR:41.5 / 45.3) K5.02 Flow indication 2.6 2.6	2.6	54
201002 Reactor Manual Control System														
201003 Control Rod and Drive Mechanism					6.02							Knowledge of the effect that a loss or malfunction of the following will have on the CONTROL ROD AND DRIVE MECHANISM : (CFR: 41.7 / 45.7) K6.02 Reactor pressure 3.0 3.0	3.0	55
201004 Rod Sequence Control System (Plant Specific)														
201005 Rod Control and Information System (RCIS)														
201006 Rod Worth Minimizer System (RWM) (Plant Specific)														
202001 Recirculation System														
202002 Recirculation Flow Control System						1.07						Ability to predict and/or monitor changes in parameters associated with operating the RECIRCULATION FLOW CONTROL SYSTEM controls including: (CFR: 41.5 / 45.5) A1.07 Recirculation loop flow: Plant-Specific 3.1 3.1	3.1	56
204000 Reactor Water Cleanup System							2.14					Ability to (a) predict the impacts of the following on the REACTOR WATER CLEANUP SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6) A2.14 System high temperature 3.2 3.2	3.2	57
214000 Rod Position Information System								3.01				Ability to monitor automatic operations of the ROD POSITION INFORMATION SYSTEM including: (CFR: 41.7 / 45.7) A3.01 Full core display 3.4 3.3	3.4	58
215001 Traversing In-Core Probe														
215002 Rod Block Monitor System														
216000 Nuclear Boiler Instrumentation														
219000 RHR/LPCI: Torus/Suppression Pool Cooling Mode														
223001 Primary Containment System and Auxiliaries														
226001 RHR/LPCI: Containment Spray System Mode														
230000 RHR/LPCI: Torus/Suppression Pool Spray Mode									4.02			Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8) A4.02 Spray valves 3.8 3.6	3.8	59
233000 Fuel Pool Cooling and Clean-up										2.1.30		2.1.30 Ability to locate and operate components, including local controls. (CFR: 41.7 / 45.7) 3.9 3.4	3.9	60
234000 Fuel Handling Equipment														
239001 Main and Reheat Steam System	1.07											Knowledge of the physical connections and/or cause effect relationships between MAIN AND REHEAT STEAM SYSTEM and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.07 Offgas system 3.1 3.1	3.1	61
239003 MSIV Leakage Control System														
241000 Reactor/Turbine Pressure Regulating System														
245000 Main Turbine Generator and Auxiliary Systems														
256000 Reactor Condensate System														
259001 Reactor Feedwater System				4.10								Knowledge of REACTOR FEEDWATER SYSTEM design feature(s) and/or interlocks which provide for the following: (CFR: 41.7) K4.10 Feedpump runbacks: Plant-Specific 3.1 3.4	3.1	62
268000 Radwaste														

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271000 Offgas System			3.01													Knowledge of the effect that a loss or malfunction of the OFFGAS SYSTEM will have on following: (CFR: 41.5 / 45.3) K3.01 Condenser vacuum 3.5 3.5	3.5	63
272000 Radiation Monitoring System																		
285000 Fire Protection System																		
288000 Plant Ventilation Systems				4.02												Knowledge of PLANT VENTILATION SYSTEMS design feature(s) and/or interlocks which provide for the following: (CFR: 41.7) K4.02 Secondary containment isolation. 3.7 3.8	3.7	64
290001 Secondary Containment					5.01											Knowledge of the operational implications of the following concepts as they apply to SECONDARY CONTAINMENT: (CFR: 41.5 / 45.3) K5.01 Vacuum breaker operation: BWR-4, 3.3* 3.4*	3.3*	65
290003 Control Room HVAC																		
290002 Reactor Vessel Internals																		
K/A Category Totals:	1	0	1	2	2	1	1	1	1	1	1	1				Group Point Total:	12	12

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ES-401-1/m

ES-401		BWR Examination Outline											11-2 Rev 9 (Errata)		
		Plant Systems - Tier 2 Group 2 (SRO)													
System # / Name		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G 2	K/A Topic(s)	Imp.	#
245000 Main Turbine Generator and Auxiliary Systems									2.09				Ability to (a) predict the impacts of the following on the MAIN TURBINE GENERATOR AND AUXILIARY SYSTEMS ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6) A2.09 Turbine vibration 2.5 2.8	2.8	86
202001 Recirculation System									2.10				Ability to (a) predict the impacts of the following on the RECIRCULATION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6) A2.10 †Recirculation pump seal failure 3.5 3.9	3.9	88
226001 RHR/LPCI: Containment Spray System Mode									2.15				Ability to (a) predict the impacts of the following on the RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6) A2.15 High containment / drywell pressure 3.6 3.8	3.8	90
K/A Category Totals:		0	0	0	0	0	0	0	3	0	0	0	Group Point Total:	3	3

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ES-401		Generic Knowledge and Abilities Outline (Tier 3)			ES-401-2 Rev 9 (Errata)
Facility:	Hope Creek	Date of Exam: Date			Level: RO
Category	K/A #	Topic	Imp.	#	
1 Conduct of Operations	2.1.12	2.1.12 Ability to apply technical specifications for system. (CFR: 43.2 143.5 145.3) IMPORTANCE RO 2.9 SRO 4.0	2.9	66	
	2.1.10	2.1.10 Knowledge of conditions and limitations in the facility license. (CFR: 43.1 / 45.13) IMPORTANCE RO 2.7 SRO 3.9	2.7	67	
	2.1.29	2.1.29 Knowledge of how to conduct and verify valve lineups. (CFR: 41.10 / 45.1 / 45.12) IMPORTANCE RO 3.4 SRO 3.3	3.4	68	
		Subtotal	3	3	
2 Equipment Control	2.2.12	2.2.12 Knowledge of surveillance procedures. (CFR: 41.10 145.13) IMPORTANCE RO 3.0 SRO 3.4	3.0	69	
	2.2.24	2.2.24 Ability to analyze the effect of maintenance activities on LCO status. (CFR: 43.2 / 45.13) IMPORTANCE RO 2.6 SRO 3.8	2.6	70	
	2.2.33	2.2.33 Knowledge of control rod programming. (CFR: 43.6) IMPORTANCE RO 2.5 SRO 2.9	2.9	71	
		Subtotal	3	3	
3 Radiation Protection	2.3.10	2.3.10 Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure. (CFR: 43.4 145.10) IMPORTANCE RO 2.9 SRO 3.3	2.9	72	
	2.3.4	2.3.4 Knowledge of radiation exposure limits and contamination control including permissible levels in excess of those authorized. (CFR: 43.4 145.10) IMPORTANCE RO 2.5 SRO 3.1	2.5	73	
		Subtotal	2	2	
4 Emergency Procedures and Plan	2.4.15	2.4.15 Knowledge of communications procedures associated with EOP implementation. (CFR: 41.10 145.13) IMPORTANCE RO 3.0 SRO 3.5	3.0	74	
	2.4.46	2.4.46 Ability to verify that the alarms are consistent with the plant conditions. (CFR: 43.5 145.3 145.12) IMPORTANCE RO 3.5 SRO 3.6	3.5	75	
		Subtotal	2	2	
Tier 3 Point Total			10	10	

ES-401		Generic Knowledge and Abilities Outline (Tier 3)			ES-401-3 Rev 9
Facility:	Hope Cree	Date of Exam:		Date	Level: SRO
Category	K/A #	Topic	Imp.	#	
1 Conduct of Operations	2.1.22	2.1.22 Ability to determine Mode of Operation. (CFR: 43.5 / 45.13) IMPORTANCE RO 2.8 SRO 3.3	3.3	94	
	2.1.4	2.1.4 Knowledge of shift staffing requirements. (CFR: 41.10 / 43.2) IMPORTANCE RO 2.3 SRO 3.4	3.4	95	
		Subtotal	2	2	
2 Equipment Control	2.2.5	2.2.5 Knowledge of the process for making changes in the facility as described in the safety analysis report. (CFR: 43.3 / 45.13) IMPORTANCE RO 1.6 SRO 2.7	2.7	96	
	2.2.11	2.2.11 Knowledge of the process for controlling temporary changes. (CFR: 41.10 / 43.3 / 45.13) IMPORTANCE RO 2.5 SRO 3.4 *	3.4	97	
		Subtotal	2	2	
3 Radiation Protection	2.3.1	2.3.1 Knowledge of 10 CFR: 20 and related facility radiation control requirements. (CFR: 41.12 / 43.4. 45.9 / 45.10) IMPORTANCE RO 2.6 SRO 3.0	3.0	98	
		Subtotal	1	1	
4 Emergency Procedures and Plan	2.4.38	2.4.38 Ability to take actions called for in the facility emergency plan / including (if required)supporting or acting as emergency coordinator. (CFR: 43.5 / 45.11) IMPORTANCE RO 2.2 SRO 4.0	4.0	99	
	2.4.43	2.4.43 Knowledge of emergency communications systems and techniques. (CFR: 45.13) IMPORTANCE RO 2.8 SRO 3.5	3.5	100	
		Subtotal	2	2	
Tier 3 Point Total			7	7	

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Tier and Group	Randomly Selected KIA	Reason for Rejection
T1 G1(RO)	295019.K2.02	Q.08: This was not a rejection. The question was developed based on the randomly selected K/A, but after question review, it was determined that K/A K2.01 was a closer fit to the question, so the sample plan was revised.
T2 G2 (RO)	201001.K5.02	Q.54: Could not develop a question related to CRD Pump runout . Randomly selected K5.02 as a replacement.
T2 G2 (RO)	230000.A4.03	Q.59: Already had a question (31) dealing with keep-fill. Randomly selected A4.02 as a replacement.
T2 G2 (RO)	233000.G2.1.2	Q.60: Could not develop a discriminating question for this topic. Randomly selected 2.1.30 as a replacement.
T2 G2 (RO)	259001.K2.01	Q.62: Hope Creek does not have motor driven Feed Pumps. Could not select another K2 topic since all were less than 2.5 importance. Randomly selected K4.10 as a replacement.
T3 C1 (RO)	G2.1.16	Q.67: Low operational validity (plant phones and paging system). Randomly selected 2.1.10 as a replacement.
T1 G2 (SRO)	295034.A2.02	Q.85: Too many other questions related to secondary containment / high rad. Randomly selected new system and topic 500000.A2.03.
T2 G1(SRO)	215003.G2.1.33	Q.87: Could not develop an SRO level question for this topic. Randomly selected G2.1.12 as a replacement.
T3 C1 (SRO)	G2.1.25	Q.95: Chief Examiner directed reselection since topic requires giving a reference that will most likely be a direct look up. Randomly selected G2.1.4 as a replacement.
T3 C2 (SRO)	G2.2.15	Q.97: Could not develop a question for this topic. Randomly selected 2.2.1.1 as a replacement.
T3 C3 (SRO)	G2.3.3	Q.98: Could not develop a question for this topic. Randomly selected 2.3.1 as a replacement.
T2 G1(SRO)	223002.A2.03	Q.91: This was not a rejection. The question was developed based on the randomly selected WA, but after question review, it was determined that WA K2.10 was a closer fit to the question , so the sample plan was revised.
T2 G1(SRO)	263000.A2.01	Q.93: Could not develop an SRO question related to DC grounds. There was only one other A2 K/A left and a similar question already existed (Q.45). Randomly selected 264000.G2.2.22 as a replacement.
T2 G2 (SRO)	205000.A2.04	Q.92: Could not develop an SRO level question. In addition, other questions on the exam cover SDC. Randomly selected 206000.A2.17 as a replacement.
T2 G2 (SRO)	215001.G2.2.25	Q.86: This was a TIP related K/A and a similar topic was already covered in question 91 under WA 223002.A2.10 for the NSSSS isolation function. In addition, G2.2.25 is related to Tech Specs and TIPs are now covered in the TRM not Tech Specs. Randomly selected 245000.A2.09 as a replacement.
T2 G2 (SRO)	239003.A2.04	Q.88 HC does not have MSIV Leakage Control. Randomly selected 202001.A2.10 as a replacement.
T2 G2 (SRO)	226001.A2.15	Q.90 Tech Spec related questions are already heavily sampled in the exam. Randomly selected WA A2.15 for better balance.

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Facility: Hope CreekDate of Examination: 9/24/2007Examination Level: RO ☐ SRO ☒Operating Test Number: NRC2007

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M, S	Complete the Daily Surveillance Logs & identify any applicable Technical Specification Actions. (G2.1.18) Modified HC JPM ZZ016
Conduct of Operations	D, S	Perform required operations in preparation for plant startup / NI checks IAW IO.ZZ-002 Attachment 2. (G2.1.23) HC JPM ZZ028
Equipment Control	D, R	Complete an Action Statement Log Sheet. (G2.2.23) HC JPM ZZ029
Radiation Control	D, S	Calculate Total Noble Gas Release Rate IAW AB.CONT-0004. (G2.3.10) HC JPM ZZ020
Emergency Plan	N, S	ERP Classification and Reporting after each simulator scenario. (G2.4.41) New
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 5 are required.		
* Type Codes & Criteria: (C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) (N)ew or (M)odified from bank (≥ 1) (P)revious 2 exams (≤ 1 ; randomly selected)		

Facility: <u>Hope Creek</u>		Date of Examination: <u>9/24/2007</u>
Exam Level: RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test Number: <u>NRC2007</u>
Control Room Systems [@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. Respond to an uncoupled control rod (HC JPM BF011)	D, A, S	1
b. Respond to RPV level unknown / RPV Flooding (New)	N, A, S, L	2
c. Roll the Main Turbine (HC JPM AC004)	D, A, S	3
d. Respond to a loss of Shutdown Cooling (HC JPM BC003)	D, L, S	4
e. Place a water seal on the "A" & "B" Feedwater headers (HC JPM AE004)	D, A, S	5
f. Respond to a RPS malfunction (HC JPM SB010)	D, S	7
g. Manually Place FRVS In Service (Modified HC JPM GU001)	M, A, S	9
h.		
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Defeat the PCIS Isolation of the Non-1E Instrument Gas header (HC JPM KL002)	D, E, R	5
j. Perform a DC load shed during Station Blackout IAW AB.ZZ-0135 Attachment 3 (New)	N, E, R	6
k. Respond to a SACS malfunction (HC JPM EG003)	D, R	8
<p>[@] All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.</p>		
*Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path	4-6 / 4-6 / 2-3	
(C)ontrol room		
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4	
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1	
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1	
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	
(R)CA	≥ 1 / ≥ 1 / ≥ 1	
(S)imulator		

Facility: Hope CreekDate of Examination: 9/24/2007Exam Level: RO ☐ SRO-I ☐ SRO-U ☒Operating Test Number: NRC2007Control Room Systems[@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. Respond to RPV level unknown / RPV Flooding (New)	N, A, S, L	2
b. Roll the Main Turbine (HC JPM AC004)	D, A, S	3
c. Place a water seal on the "A" & "B" Feedwater headers (HC JPM AE004)	D, A, S	5
d.		
e.		
f.		
g.		
h.		

In-Plant Systems[@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

i. Perform a DC load shed during Station Blackout IAW AB.ZZ-0135 Attachment 3 (New)	N, E, R	6
j. Respond to a SACS malfunction (HC JPM EG003)	D, R	8
k.		

[@] All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

*Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: Hope CreekScenario No.: 1Op-Test No.: NRC2007

Examiners: J. D'Antonio
T. Fish
B. Haagensen

Operators: _____ (SRO)
_____ (RO)
_____ (BOP)

Initial Conditions: 95% power.

Turnover: Raise reactor power to 100% per Load Dispatcher request.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R/N (RO/SRO)	Raise power to 100% with recirculation flow
2	MS09A	I (SRO)	PT-N076A MSL Pressure Fails Upscale (TS)
3	CD10A	C (RO/SRO)	"A" CRD Pump Trip
4	PC07A ED16	C (All)	OBE Earthquake w/ 10A403 Bus Fault & Lockout (TS)
5	PC07B EG12 DG08B DG02A DG02C DG02D	M (All)	Aftershock w/ LOP, Main Generator Lockout, "B" EDG Start Failure (recoverable), "A" & "D" EDG fail resulting in unrecoverable loss of 10A401 & 10A404 Buses
6	HP01 HP06M RC02 RC05	C (RO/PRO)	HPCI & RCIC auto start failure (RCIC recoverable)
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: Hope CreekScenario No.: 2Op-Test No.: NRC2007

Examiners: J. D'Antonio
T. Fish
B. Haagensen

Operators: _____ (SRO)
_____ (RO)
_____ (BOP)

Initial Conditions: Startup is in progress with the unit at about 19% power just after Main Generator Synchronization.

Turnover: Raise power by withdrawing control rods IAW IO-3 and RE guidance.

Event No.	Malfunction No.	Event Type*	Event Description
1	N/A	R/N (RO/SRO)	Raise power by withdrawing control rods
2	NM21A	I (RO/SRO)	"A" APRM fails upscale after 1 st rod is withdrawn (TS)
3	CD23	C (RO/SRO)	Stuck control rod
4	FW29A	I (SRO)	DFCS LT-N004A fails upscale (TS)
5	MS04A MS04D	C (All)	Steam Leak in steam tunnel
6	Multiple I/O Overrides	M (All)	Hydraulic ATWS when operators attempt to scram due to rising steam tunnel temperatures
7	CU11A CU11B	C (All)	Failure of RWCU to isolate on manual SLC initiation
8	MS19D MS20D	C (All)	Failure of "D" Steam Line to auto isolate
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			