Facility: Hope Creek Date of Exam: August 19. 2013

Tier	Group	RO K/A Category Points											SRO-Only Points		
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G* / Total	A2	G*	Total
1. Emergency & Abnormal Plant Evolutions	1	2	5	3	N/A			2	5	N/A		3 / 20	3	4	7
	2	2	1	1				1	1			1 / 7	2	1	3
	Tier Totals	4	6	4				3	6			4 / 27	5	5	10
2. Plant Systems	1	4	2	3	2	3	2	2	2	3	2	1 / 26	2	3	5
	2	0	0	1	2	1	1	3	0	1	2	1 / 12	1	2	3
	Tier Totals	4	2	4	4	4	3	5	2	4	4	2 / 38	3	5	8
3. Generic Knowledge and Abilities Categories		1			2			3			4	10	1	2	3	4	7
		2			3			2			3		2	2	1	2	

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 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 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

ES-401	BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)							Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295003 Partial of Complete Loss of AC / 6						X	**2.4.31** Knowledge of annunciator alarms, indications, or response procedures.	4.1	76
295006 SCRAM / 1						X	**2.4.47** Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	4.2	77
295018 Partial or Total Loss of CCW / 8						X	**2.2.40** Ability to apply Technical Specifications for a system.	4.7	78
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4						X	**2.4.30** Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator.	4.1	79
295026 Suppression Pool High Water Temp. / 5					X		Ability to determine and/or interpret the following as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: **EA2.01** Suppression pool temperature	4.2	80
295031 Reactor Low Water Level / 2					X		Ability to determine and/or interpret the following as they apply to REACTOR LOW WATER LEVEL : **EA2.04** Adequate Core Cooling	4.6	81
700000 Generator Voltage and Electric Grid Disturbances / 6					X		Ability to determine and/or interpret the following as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES: **AA2.07** Operational status of engineered safety features	4.0	82
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4					X		Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION **AA2.03** Actual Core Flow	3.3	1
295003 Partial or Complete Loss of AC / 6					X		Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER **AA2.05** Whether a partial or complete loss of A.C. Power has occurred	3.9	2
295004 Partial or Total Loss of DC Pwr / 6		X					Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF D.C. POWER and the following **AK2.03DC Bus Loads**	3.3	3
295005 Main Turbine Generator Trip / 3	X						Knowledge of the operational implications of the following concepts as they apply to MAIN TURBINE GENERATOR TRIP **AK1.01** Pressure effects on reactor power	4.0	4
295006 SCRAM / 1						X	**2.4.20** Knowledge of the operational implications of EOP warnings, cautions,and notes.	3.8	5
295016 Control Room Abandonment / 7		X					Knowledge of the interrelations between CONTROL ROOM ABANDONMENT and the following **AK2.02** Local control stations: Plant-Specific	4.0	6
295018 Partial or Total Loss of CCW / 8		X					Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER and the Following **AK2.02** Plant operations	3.4	7
295019 Partial or Total Loss of Inst. Air / 8				X			Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR **AA1.03** Instrument Air Compressor power supplies	3.0	8
295021 Loss of Shutdown Cooling / 4					X		Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING **AA2.01** Reactor water heatup/cooldown rate	3.5	9
295023 Refueling Acc / 8			X				Knowledge of the reasons for the following responses as they apply to REFUELING ACCIDENTS **AK3.01** Refueling floor evacuation	3.6	10

295024 High Drywell Pressure / 5					X		Ability to determine and/or interpret the following as they apply to HIGH DRYWELL PRESSURE **EA2.05** Suppression chamber air-space temperature: Plant-Specific	3.6	11
295025 High Reactor Pressure / 3						X	**2.1.28** Knowledge of the purpose and function of major system components and | controls.	4.1	12
295026 Suppression Pool High Water Temp. / 5				X			Ability to operate and/or monitor the following as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE **EA1.03** Temperature monitoring	3.9	13
295027 High Containment Temperature / 5							**Suppressed, no MkIII containment at HC.**	**N/A**	
295028 High Drywell Temperature / 5	X						Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL TEMPERATURE **EK1.01** Reactor water level measurement	3.5	14
295030 Low Suppression Pool Wtr Lvl / 5						X	**2.4.11** Knowledge of abnormal condition procedures.	4.0	15
295031 Reactor Low Water Level / 2					X		Ability to determine and/or interpret the following as they apply to REACTOR LOW WATER LEVEL **EA2.04** Adequate Core Cooling	4.6	16
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1		X					Knowledge of the interrelations between SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN and the following **EK2.02** RRCS: Plant-Specific	4.0	17
295038 High Off-site Release Rate / 9			X				Knowledge of the reasons for the following responses as they apply to HIGH OFF-SITE RELEASE RATE **EK3.02** System Isolations	3.9	18
600000 Plant Fire On Site / 8			X				Knowledge of the reasons for the following responses as they apply to PLANT FIRE ON SITE: **AK3.04** Actions contained in the abnormal procedure for plant fire on site	2.8	19
700000 Generator Voltage and Electric Grid Disturbances / 6		X					Knowledge of the interrelations between GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES and the following **AK2.02** Breakers, relays	3.1	20
K/A Category Totals:	2	5	3	2	5 / 3	3 / 4	Group Point Total:		20/ 7

ES-401	BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)							Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295009 Low Reactor Water Level / 2						X	**2.4.6** Knowledge of EOP Mitigation Strategies.	4.7	83
295022 Loss of CRD Pumps / 1					X		Ability to determine and/or interpret the following as they apply to LOSS OF CRD PUMPS **AA2.02** CRD system status	3.3	84
295029 High Suppression Pool Wtr Lvl / 5					X		Ability to determine and/or interpret the following as they apply to HIGH SUPPRESSION POOL WATER LEVEL **EA2.01** Suppression pool water level	3.9	85
295010 High Drywell Pressure / 5				X			Ability to operate and/or monitor the following as they apply to HIGH DRYWELL PRESSURE **AA1.02** Drywell floor and equipment drain sumps	3.6	21
295017 High Off-Site Release Rate / 9	X						Knowledge of the operational implications of the following concepts as they apply to HIGH OFF-SITE RELEASE RATE **AK1.02** Protection of the general public	3.8	22
295011 High Containment Temp / 5							**Suppressed, no MkIII containment at HC.**	**N/A**	
295020 Inadvertent Cont. Isolation / 5 & 7		X					Knowledge of the interrelations between INADVERTENT CONTAINMENT ISOLATION and the following **AK2.01** Main steam system.	3.6	23
295029 High Suppression Pool Wtr Lvl / 5			X				Knowledge of the reasons for the following responses as they apply to HIGH SUPPRESSION POOL WATER LEVEL **EK3.02** Lowering suppression pool water level	3.6	24
295032 High Secondary Containment Area Temperature / 5					X		Ability to determine and/or interpret the following as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE **EA2.01** Area temperature	3.8	25
295035 Secondary Containment High Differential Pressure / 5						X	**2.2.44** Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.	4.2	26
500000 High CTMT Hydrogen Conc. / 5	X						Knowledge of the operational implications of the following concepts as they apply to HIGH CONTAINMENT HYDROGEN CONCENTRATIONS **EK1.01** Containment integrity	3.3	27
K/A Category Point Totals:	2	1	1	1	1 / 2	1 / 1	Group Point Total:		7/3

ES-401	BWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)											Form ES-401-1		
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
203000 RHR/LPCI: Injection Mode								X				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 correct, control, or mitigate the consequences of those abnormal conditions or operations: **A2.11** Motor operated valve failures	3.4	86
206000 HPCI								X				Ability to (a) predict the impacts of the following on the HIGH PRESSURE COOLANT INJECTION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations **A2.14** Flow controller failure: BWR-2,3,4	3.4	87
215004 Source Range Monitor											X	**2.2.25** Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.	4.2	88
218000 ADS											X	**2.4.18** Knowledge of the specific bases for EOPs.	4.0	89
264000 EDGs											X	**2.4.9** Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.	4.2	90
203000 RHR/LPCI: Injection Mode										X		Ability to manually operate and/or monitor in the control room **A4.01** Pumps	4.3	28
205000 Shutdown Cooling								X				Ability to (a) predict the impacts of the following on the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations **A2.05** System Isolation	3.5	29
206000 HPCI					X							Knowledge of the operational implications of the following concepts as they apply to HIGH PRESSURE COOLANT INJECTION SYSTEM **K5.01** Turbine operation: BWR-2,3,4	3.3	30
207000 Isolation (Emergency) Condenser												**Suppressed, system does not exist at HC.**	**N/A**	
209001 LPCS				X								Knowledge of LOW PRESSURE CORE SPRAY SYSTEM design feature(s) and/or interlocks which provide for the following **K4.01** Prevention of over pressurization of core spray piping.	3.2	31
209002 HPCS												**Suppressed, system does not exist at HC.**	**N/A**	
211000 SLC							X					Ability to predict and/or monitor changes in parameters associated with operating the STANDBY LIQUID CONTROL SYSTEM controls including **A1.01** Tank Level	3.6	32
212000 RPS	X											Knowledge of the physical connections and/or cause effect relationships between REACTOR PROTECTION SYSTEM and the following **K1.14** Main Steam system	3.6	33

215003 IRM	X										Knowledge of the physical connections and/or cause effect relationships between INTERMEDIATE RANGE MONITOR (IRM) SYSTEM and the following **K1.02** Reactor manual control	3.6	34
215004 Source Range Monitor						X					Knowledge of the effect that a loss or malfunction of the following will have on the SOURCE RANGE MONITOR (SRH) SYSTEM **K6.04** Detectors	2.9	35
215005 APRM / LPRM				X							Knowledge of AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM design feature(s) and/or interlocks which provide for the following: **K4.01** Rod withdrawal blocks	2.6	36
217000 RCIC						X					Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) **K6.04** Condensate storage and transfer system	3.5	37
218000 ADS								X			Ability to monitor automatic operations of the AUTOMATIC DEPRESSURIZATION SYSTEM including **A3.09** Reactor vessel water level	4.1	38
223002 PCIS/Nuclear Steam Supply Shutoff	X										Knowledge of the physical connections and/or cause effect relationships between PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF and the Following **K1.01** Main Steam System	3.8	39
239002 SRVs		X									Knowledge of electrical power supplies to the Following **K2.01** SRV solenoids	2.8	40
259002 Reactor Water Level Control							X				Ability to predict and/or monitor changes in parameters associated with operating the REACTOR WATER LEVEL CONTROL SYSTEM controls including **A4.01** Reactor water level	3.8	41
261000 SGTS								X			Ability to (a) predict the impacts of the following on the STANDBY GAS TREATMENT SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations **A2.10** Low reactor water level: Plant-Specific	3.1	42
262001 AC Electrical Distribution					X						Knowledge of the operational implications of the following concepts as they apply to A.C. ELECTRICAL DISTRIBUTION **K5.02** Breaker control	2.6	43
262002 UPS (AC/DC)									X		Ability to manually operate and/or monitor in the control room:**A4.01** Transfer from alternative source to preferred source	2.8	44
263000 DC Electrical Distribution		X									Knowledge of electrical power supplies to the following: **K2.01**: Major D.C. loads	3.1	45
264000 EDGs										X	**2.1.28** Knowledge of the purpose and function of major system components and controls.	4.1	46
300000 Instrument Air					X						Knowledge of the operational implications of the following concepts as they apply to the INSTRUMENT AIR SYSTEM **K5.01** Air compressors	2.5	47
400000 Component Cooling Water								X			Ability to monitor automatic operations of the CCWS including **A3.01** Setpoints on instrument signal levels for normal operations, warnings, and trips that are applicable to the CCWS	3.0	48

206000 HPCI									X			Ability to monitor automatic operations of the HIGH PRESSURE COOLANT INJECTION SYSTEM including **A3.07** Lights and alarms: BWR-2,3,4	3.9	49
215004 Source Range Monitor			X									Knowledge of the effect that a loss or malfunction of the SOURCE RANGE MONITOR (SRM) SYSTEM will have on following **K3.01** RPS	3.4	50
259002 Reactor Water Level Control			X									Knowledge of the effect that a loss or malfunction of the REACTOR WATER LEVEL CONTROL SYSTEM will have on following: **K3.01:** Reactor water level	3.8	51
263000 DC Electrical Distribution			X									Knowledge of the effect that a loss or malfunction of the D.C. ELECTRICAL DISTRIBUTION System will have on the following: **K3.01** Emergency Generators: Plant-Specific	3.4	52
300000 Instrument Air	X											Knowledge of the connections and / or cause effect relationships between INSTRUMENT AIR SYSTEM and the following **K1.04** Cooling water to compressor	2.8	53
K/A Category Point Totals:	4	2	3	2	3	2	2	2 / 2	3	2	1 / 3	Group Point Total:		26/ 5

ES-401	BWR Examination Outline Plant Systems - Tier 2/Group 2 (RO / SRO)												Form ES-401-1	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
290001 Secondary CNTMT								X				Ability to (a) predict the impacts of the following on the SECONDARY CONTAINMENT; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: **A2.02** Excessive outleakage.	3.7	91
239001 Main and Reheat Steam											X	**2.4.11** Knowledge of abnormal condition procedures.	4.2	92
21600 Nuclear Boiler Inst.											X	**2.2.22** Knowledge of limiting conditions for operations and safety limits	4.0	93
201003 Control Rod and Drive Mechanism				X								Knowledge of CONTROL ROD AND DRIVE MECHANISM design feature(s) and/or interlocks which provide for the following **K4.02** Reed Switch Position	3.8	54
201004 RSCS												**Suppressed, system does not exist at HC.**	**N/A**	
201005 RCIS												**Suppressed, system does not exist at HC.**	**N/A**	
202002 Recirculation Flow Control											X	**2.1.7** Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	55
214000 RPIS										X		Ability to manually operate and/or monitor in the control room: **A4.02** Control rod position	3.8	56
215001 Traversing In-core Probe							X					Ability to predict and/or monitor changes in parameters associated with operating the TRAVERSING IN-CORE PROBE controls including **A1.02** Detector Position	2.5	57
219000 RHR/LPCI: Torus/Pool Cooling Mode			X									Knowledge of the effect that a loss or malfunction of the RHR/LPCI: TORUS/SUPPRESSION POOL COOLING MODE will have on following **K3.01** Suppression pool temperature control	3.9	58
223001 Primary CTMT and Aux.					X							Knowledge of the operational implications of the following concepts as they apply to PRIMARY CONTAINMENT SYSTEM AND AUXILIARIES **K5.01** Vacuum breaker/relief operation	3.1	59
226001 RHR/LPCI: CTMT Spray Mode				X								Knowledge of RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE design feature(s) and/or interlocks which provide for the following **K4.12** Prevention of inadvertent containment spray activation.	2.9	60
234000 Fuel Handling Equipment							X					Ability to predict and/or monitor changes in parameters associated with operating the FUEL HANDLING EQUIPMENT controls including: **A1.02** Refuel floor radiation levels/ airborne levels	3.3	61
239003 MSIV Leakage Control												**Suppressed, system does not exist at HC.**	**N/A**	

241000 Reactor/Turbine Pressure Regulator							X					Ability to predict and/or monitor changes in parameters associated with operating the REACTOR/TURBINE PRESSURE REGULATING SYSTEM controls Including **A1.23** Main turbine vibration	2.8	62
259001 Reactor Feedwater									X			Ability to monitor automatic operations of the REACTOR FEEDWATER SYSTEM including **A3.11** Reactor feedpump runbacks: Plant-Specific	3.2	63
272000 Radiation Monitoring						X						Knowledge of the effect that a loss or malfunction of the following will have on the RADIATION MONITORING SYSTEM **K6.01** Reactor protection system	3.0	64
286000 Fire Protection										X		Ability to manually operate and/or monitor from the control room **A4.01** System alarms and indicating lights.	3.3	65
K/A Category Point Totals:	0	0	1	2	1	1	2	1 / 1	1	2	1 / 2	Group Point Total:		12/3

Facility: Hope Creek		Date of Exam: August 19, 2013				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.1	Knowledge of conduct of operations requirements.	3.8	66		
	2.1.25	Ability to interpret reference materials, such as graphs, curves, tables, etc.	3.9	67		
	2.1.41	Knowledge of the refueling process.			3.7	94
	2.1.4	Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license status, 10CFR55, etc.			3.8	95
	Subtotal			2		2
2. Equipment Control	2.2.22	Knowledge of limiting conditions for operations and safety limits.	4.0	68		
	2.2.42	Ability to recognize system parameters that are entry-level conditions for Technical Specifications.	3.9	69		
	2.2.13	Knowledge of tagging and clearance procedures.	4.1	70		
	2.2.5	Knowledge of the process for making design or operating changes to the facility.			3.2	96
	2.2.37	Ability to determine operability and/or availability of safety related equipment.			4.6	97
	Subtotal			3		2
3. Radiation Control	2.3.12	Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.2	71		
	2.3.11	Ability to control radiation releases.	3.8	72		
	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.			3.7	98
	Subtotal			2		1
4. Emergency Procedures / Plan	2.4.17	Knowledge of EOP terms and definitions.	3.9	73		
	2.4.3	Ability to identify post-accident instrumentation.	3.7	74		
	2.4.11	Knowledge of abnormal condition procedures.	4.0	75		
	2.4.32	Knowledge of operator response to loss of all annunciators.			4.0	99
	2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm.			4.3	100
	Subtotal			3		2
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
T1/G1	295023 AK3.01	Changed to AK3.03 – could not write suitable Q for original KA. (Q#10)
T2/G1	262002 A1.02	Changed to A4/01- could not write suitable Q for original KA. (Q#44)
T2/G2	226001 K4.04	Changed to K4.12 - could not write suitable Q for original KA. (Prevention of water hammer K/A @ 2.6) (Q #60)
T2/G2	286000 K6.06	Changed to A4.01 - could not write suitable Q for original KA. (Q#65)
T1/G1	600000 A1.05	Changed to K3.04 - could not write suitable Q for original KA. (Q#19)
T2/G2	214000 A2.03	Changed to A4.02 - could not write suitable Q for original KA. (Q#56)
T2/G2	234000 A4.01	Changed to A1.02 - could not write suitable Q for original KA. (Q#61)
T2/G1	263000 A2.02	Could not write a Q with sufficient level of difficulty for selected KA (Q#52)
T1/G1	295038 A2.03	Changed to 295031 EA2.01- Could not write suitable Q for original KA. (Q#81)
Gen	2.4.22	Generic KA unsuitable for RO level question (Q#75)
T2/G1	2.2.12	Changed to 2.1.28 could not write suitable Q for original KA. (Q#46)
Gen	2.4.32	Generic KA overlaps with Admin JPMs and scenarios (Q#99)

Facility: Hope Creek Date of Examination: 8/19/13

Examination Level: RO X SRO ☐ Operating Test Number: 1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
RO A-1 Conduct of Operations	R,D	Monitor, Log and Control the Drywell and Suppression Chamber Purge System Valves *(Bank – HC ZZ001)*
RO A-2 Conduct of Operations	S,D	Perform a Reactor Recirculation Pump Quick Restart *(Bank – HC ZZ011)*
RO A-3 Equipment Control	R,N	Identify Core Spray Leak Isolation, Vent & Drain Paths *(New – NRC Generated)*
Radiation Control	N/A	N/A
RO A-4 Emergency Procedures/Plan	S,D	Respond to an Abnormal Release of Gaseous Radioactivity – Calculate Noble Gas Release Rates *(Bank – HC ZZ019)*

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 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: Hope Creek Date of Examination: 8/19/13

Examination Level: RO ☐ SRO X☐ Operating Test Number: 1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
SRO A-1 Conduct of Operations	R,D	Verify Compliance With Gaseous Release Permit *(Bank – HC ZZ003)*
SRO A-2 Conduct of Operations	R,D	Initiate and Review System Lineup Sheets *(Modified – HC ZZ031)*
SRO A-3 Equipment Control	R,N	Identify Core Spray Leak Isolations, Vent & Drain Paths and Determine Applicable Tech Spec Requirements *(New - NRC Generated)*
SRO A-4 Radiation Control	S,D	Determine Liquid Radwaste Rad Monitor CTB Weir Flow *(Bank – HC ZZ038)*
SRO A-5 Emergency Procedures/Plans	R,N	Utilize the ECG to Determine the Emergency Classification and/or Reportability of an Event and/or Plant Condition *(Bank – HC ECG005)*

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 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: Hope Creek Date of Examination: 8/19/2013

Exam Level: **RO** X☐ SRO-I ☐ SRO-U ☐ Operating Test Number: 1

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
S-1 Reset the Reactor Recirc 'B' Scoop Tube Positioner (Alt Path) *(Bank – HC JPM BB003)*	A,D,S	1 (Reactivity Control)
S-2 Manually Start the Core Spray System (Alt Path) *(Bank – HC JPM BE005)*	A,D,E,EN,L,S	2 (Reactor Water Inventory Control)
S-3 Place HPCI In Full Flow Recirc *(Bank – HC JPM BJ006)*	D,E,L,S	3 (Reactor Pressure Control)
S-4 Transfer Shutdown Cooling to the Standby Shutdown Cooling Loop (Alt Path) *(Bank – HC JPM BC015)*	A,D,L,S	4 (Heat Removal From the Core)
S-5 Suppression Chamber Makeup From Service Water Loop B *(New)*	N, S, E	5 (Containment Integrity)
S-6 Synchronize and Load Main Generator to the Grid (Alt Path) *(New)*	N, A, S	6 (Electrical)
S-7 Defeat RPS Interlocks *(Bank – HC JPM SB012)*	D,E,EN,L,S	7 (Instrumentation)
S-8 Vent the Containment via the Hard Torus Vent (Alt Path) *(Bank – HCJPM GS005)*	A,D,EN,L,S	9 (Radioactivity Release)
In-Plant Systems@ **(3 for RO)**; (3 for SRO-I); (3 or 2 for SRO-U)		
P-1 Line up for Alternate Injection Using Fire Water *(Bank – HC JPM BC007)*	D,E,EN,L	8 (Plant Service Systems)
P-2 Manually Start 'A' EDG From the Local Panel *(Bank – HC JPM KJ002)*	D,E,EN,L,P	6 (Electrical)
P-3 Isolate and Vent the SCRAM Air Header *(Bank-HC JPM BD0004)*	R,L,D,E	4 (Heat Removal From the Core)

@	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
(EN)gineered safety feature	- / - / ≥1 (control room system)
(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 Creek Date of Examination: 8/19/2013

Exam Level: RO ☐ **SRO-I** X☐ SRO-U ☐ Operating Test Number: 1

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
S-1 Reset the Reactor Recirc 'B' Scoop Tube Positioner (Alt Path) *(Bank – HC JPM BB003)*	A,D,S	1 (Reactivity Control)
S-2 Manually Start the Core Spray System (Alt Path) *(Bank – HC JPM BE005)*	A,D,E,EN,L,S	2 (Reactor Water Inventory Control)
S-3 Place HPCI into the Full Flow Test Mode in order to commence a plant cooldown *(Bank – HC JPM BJ006)*	D,E,L,S	3 (Reactor Pressure Control)
S-4 Transfer Shutdown Cooling to the Standby Shutdown Cooling Loop (Alt Path) *(Bank – HC JPM BC015)*	A,D,L,S	4 (Heat Removal From the Core)
S-5 Suppression Chamber Makeup From Service Water Loop B *(New)*	N, S, E	5 (Containment Integrity)
S-6 Synchronize and Load EDG (Alt Path) *(New)*	N, A, S	6 (Electrical)
S-8 Vent the Containment via the Hard Torus Vent (Alt Path) *(Bank – HCJPM GS005)*	A,D,EN,L,S	9 (Radioactivity Release)
In-Plant Systems@ (3 for RO); **(3 for SRO-I);** (3 or 2 for SRO-U)		
P-1 Line up for Alternate Injection Using Fire Water *(Bank – HC JPM BC007)*	D,E,EN,L	8 (Plant Service Systems)
P-2 Manually Start 'A' EDG From the Local Panel *(Bank – HC JPM KJ002)*	D,E,EN,L,P	6 (Electrical)
P-3 Isolate and Vent the SCRAM Air Header *(Bank-HC JPM BD0004)*	R,L,D,E	4 (Heat Removal From the Core)

@	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
(EN)gineered safety feature	- / - / ≥1 (control room system)
(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	

ES-301 **Control Room/In-Plant Systems Outline** **Form ES-301-2**

Facility: Hope Creek Date of Examination: 8/19/2013

Exam Level: RO ☐ SRO-I ☐ **SRO-U** X☐ Operating Test Number: 1

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
S-2 Manually Start the Core Spray System (Alt Path) *(Bank – HC JPM BE005)*	A,D,E,EN,L,S	2 (Reactor Water Inventory Control)
S-5 Suppression Chamber Makeup From Service Water Loop B *(New)*	N, S, E	5 (Containment Integrity)
S-6 Synchronize and Load EDG (Alt Path) *(New)*	N, A, S	6 (Electrical)
In-Plant Systems@ (3 for RO); (3 for SRO-I); **(3 or 2 for SRO-U)**		
P-1 Line up for Alternate Injection Using Fire Water *(Bank – HC JPM BC007)*	D,E,EN,L	8 (Plant Service Systems)
P-3 Isolate and Vent the SCRAM Air Header *(Bank-HC JPM BD0004)*	R,L,D,E	4 (Heat Removal From the Core)

@ 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
(EN)gineered safety feature	- / - / ≥1 (control room system)
(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 Creek Scenario No.: 1 Op-Test No.: NRC2013

Examiners: _____ Operators: _____(CRS)
_____(ATC)
_____(BOP)

Initial Conditions: 100% reactor power, RCIC C/T for a leak on the steam line drain pot.

Turnover: RACS pumped are to be swapped to support an oil change on the 'B' RACS pump. Lower power to 90% using recirc pumps to support rod pattern adjustment.

Event No.	Malf. No.	Event Type*	Event Description
1.	See SEG	N-BOP	Swap 'A' and 'B' RACS pumps
2.	See SEG	C-BOP TS-CRS	Loss of RBVS
3.	See SEG	C-All R-ATC TS-CRS	Loss of 10A120
4.	See SEG	C-All	Recirc Pump High Vibrations
5.	See SEG	M-All	Feedwater Line Break Inside Containment
6.	See SEG	C-BOP	RHR pumps fail to auto start
7.	See SEG	C-BOP	BPV jack failure
8.	See SEG	C-All	DW spray valve failure

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: Hope Creek Scenario No.: 2 Op-Test No.: NRC2013

Examiners: _____ Operators: _____(CRS)
_____(ATC)
_____(BOP)

Initial Conditions: 100% power, 'A' EHC Pump out of service for planned maintenance.

Turnover: N2 Makeup to Primary Containment is Required.

Event No.	Malf. No.	Event Type*	Event Description
1.	See SEG	N-BOP	N2 Makeup to Primary Containment
2.	See SEG	R-ATC	Lower power using recirculation flow
3.	See SEG	C-BOP TS-CRS	1CD481 Inverter Failure w/ TACS failure to Auto swap
4.	See SEG	C-ATC TS-CRS	'A' Recirc Pump Seal Failure
5.	See SEG	C-ATC	Power Oscillations
6.	See SEG	M-All	Electrical ATWS/ARI Failure
7.	See SEG	C-ATC	RWCU Failure to Isolate Upon SLC Initiation
8.	See SEG	C-All	'B' EHC Pump Trip
9.	See SEG	C-BOP	RHR Torus Cooling Valve failure

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: Hope Creek Scenario No.: 3 Op-Test No.: NRC2013

Examiners: _____ Operators: _____(CRS)
_____ _____(ATC)
_____ _____(BOP)

Initial Conditions: The scenario begins with the plant at 75% power and TACS on the 'B' SACS loop. The DK111 Turbine Chiller is C/T for a freon leak and CP161 is C/T for a bearing oil leak

Turnover: Raise power 5% using recirculation flow.

Event No.	Malf. No.	Event Type*	Event Description
1.	See SEG	R-ATC	Raise Power Using Recirculation Flow
2.	See SEG	I -ATC TS-CRS	APRM Channel C Upscale w/Single Rod Scram
3.	See SEG	C-BOP	Loss of TB Chilled Water/Drywell Cooling
4.	See SEG	C-ATC TS-CRS	Loss of 10B430
5.	See SEG	C-BOP TS-CRS	HPCI Inadvertent Actuation/HPCI Steam Leak
6.	See SEG	M –ALL	HPCI Steam Leak w/Failure to Isolate
7.	See SEG	C-BOP	"A" FRVS fan trip
8.	See SEG	C-ATC	Mode Switch & RPS Failure to SCRAM (ARI successful)
9.	See SEG	C-BOP	FW Htr #2 isolation post-scram
10.	See SEG	C-All	RCIC Pump Room high temperature

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor