

Facility:		Hope Creek NRC		Date of Exam:		February 2009												
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 & Plant Evolutions	1	3	4	4				3	3			3	20	4	3	7		
	2	1	1	2				1	1			1	7	1	2	3		
	Tier Totals	4	5	6				4	4			4	27	5	5	10		
2. Plant Systems	1	3	2	2	3	3	2	2	1	3	3	2	26	1	4	5		
	2	1	0	1	1	1	1	2	1	2	1	1	12	0	2	3		
	Tier Totals	4	2	3	4	4	3	4	2	5	4	3	38	3	5	8		
3. Generic Knowledge & Abilities Categories					1		2		3		4		10	1	2	3	4	7
					3		3		2		2			2	2	1	2	

Note :

- 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).
- 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.
- 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 section D.1.b of ES-401, for guidance regarding elimination of inappropriate K/A statements.
- 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.
- Absent a plant specific priority, only those KAs 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.
- Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
- 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/A's
- On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) 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.
- 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 10CFR55.43

Hope Creek Written Exam
Written Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
295021 Loss of Shutdown Cooling / 4					X		AA2.01 - Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING : Reactor water heatup/cooldown rate	3.6	76
295023 Refueling Accidents / 8					X		AA2.05 - Ability to determine and/or interpret the following as they apply to REFUELING ACCIDENTS : Entry conditions of Emergency plan	4.6	77
295019 Partial or Total Loss of Inst. Air / 8					X		AA2.02 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : Status of safety-related instrument air system loads	3.7	78
295025 High Reactor Pressure / 3						X	2.1.23 – Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of operation.	4.4	79
295026 Suppression Pool High Water Temp. / 5						X	2.1.7 - Conduct of Operations: Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.7	80
295031 Reactor Low Water Level / 2						X	2.4.3 - Emergency Procedures / Plan: Ability to identify post-accident instrumentation	3.9	81
295028 High Drywell Temperature / 5					X		EA2.03- Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE : Reactor water level	3.9	82
295018 Partial or Total Loss of CCW / 8	X						AK1.01 - Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER : Effects on component/system operations	3.5	39
295006 SCRAM / 1	X						AK1.03 - Knowledge of the operational implications of the following concepts as they apply to SCRAM : Reactivity control	3.7	40
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4	X						AK1.02 - Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION : Power/flow distribution	3.3	41
700000 Generator Voltage and Electric Grid Disturbances		X					AK2.02 - Knowledge of the interrelations between GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES and the following: Breakers, relays.	3.1	42
295030 Low Suppression Pool Water Level / 5		X					EK2.02 - Knowledge of the interrelations between LOW SUPPRESSION POOL WATER LEVEL and the following: RCIC: Plant-Specific	3.7	43

Hope Creek Written Exam
Written Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
295004 Partial or Total Loss of DC Pwr / 6		X					AK2.01 - Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF D.C. POWER and the following: Battery charger	3.1	44
295023 SCRAM Conditions Present and Reactor Power Above APRM Downscale or Unknown / 1			X				AK3.01 - Knowledge of the reasons for the following responses as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : Recirc Pump Trip/Runback	4.1	45
295026 Suppression Pool High Water Temp. / 5			X				EK3.04 - Knowledge of the reasons for the following responses as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: SBLC injection	3.7	46
295025 High Reactor Pressure / 3			X				EK3.05 - Knowledge of the reasons for the following responses as they apply to HIGH REACTOR PRESSURE : RCIC operation: Plant-Specific	3.6	47
295031 Reactor Low Water Level / 2			X				EK3.05 - Knowledge of the reasons for the following responses as they apply to REACTOR LOW WATER LEVEL: Emergency depressurization	4.2	48
295019 Partial or Total Loss of Inst. Air / 8				X			AA1.03 - Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : Instrument air compressor power supplies	3.0	49
295038 High Off-site Release Rate / 9				X			EA1.03 - Ability to operate and/or monitor the following as they apply to HIGH OFF-SITE RELEASE RATE: Process liquid radiation monitoring system	3.7	50
295003 Partial or Complete Loss of AC / 6					X		AA2.04 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER : System lineups	3.5	51
295005 Main Turbine Generator Trip / 3					X		AA2.03 - Ability to determine and/or interpret the following as they apply to MAIN TURBINE GENERATOR TRIP : Turbine valve position	3.1	52
295037 SCRAM Conditions Present and Reactor 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	4.1	53
295021 Loss of Shutdown Cooling / 4						X	2.1.28 - Conduct of Operations: Knowledge of the purpose and function of major system components and controls.	4.1	54
295024 High Drywell Pressure / 5						X	2.4.1 - Emergency Procedures / Plan: Knowledge of EOP entry conditions and immediate action steps.	4.6	55
295016 Control Room Abandonment / 7						X	2.4.46 - Emergency Procedures / Plan: Ability to verify that the alarms are consistent with the plant conditions.	4.2	56
295028 High Drywell Temperature / 5		X					EK2.01 - Knowledge of the interrelations between HIGH DRYWELL TEMPERATURE and the following: Drywell spray: Mark-I&II	3.7	57
600000 Plant Fire On-site / 8				X			AA1.06 - Ability to operate and / or	3.0	58

Hope Creek Written Exam
 Written Examination Outline
 Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
							monitor the following as they apply to PLANT FIRE ON SITE: Fire Alarm		
K/A Category Totals:	3	4	4	3	3/4	3/3	Group Point Total:	20/7	

Hope Creek Written Exam
Written Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 2

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
295033 High Secondary Containment Area Radiation Levels / 9					X		EA2.01 - Ability to determine and/or interpret the following as they apply to HIGH SECONDARY CONTAINMENT AREA RADIATION LEVELS: Area Radiation levels	3.9	83
295017 High Offsite Release Rate / 9						X	2.4.21 - Emergency Procedures / Plan: Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.	4.6	84
295015 Incomplete SCRAM / 1						X	2.4.30 – Emergency Procedures / Plan: Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as State, the NRC, or the transmission system operator	4.1	85
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: Mark-I&II	3.0	59
295022 Loss of CRD Pumps		X					AK2.03 - Knowledge of the interrelations between LOSS OF CRD PUMPS the following: Accumulator pressure	3.4	60
295032 High Secondary Containment Area Temperature / 5			X				EK3.02 - Knowledge of the reasons for the following responses as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE : Reactor SCRAM	3.6	61
295029 High Suppression Pool Water Level / 5				X			EA1.01 - Ability to operate and/or monitor the following as they apply to HIGH SUPPRESSION POOL WATER LEVEL : HPCI: Plant-Specific	3.4	62
295012 High Drywell Temperature / 5					X		AA2.02 - Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE : Drywell pressure	3.9	63
295009 Low Reactor Water Level / 2						X	2.1.20 - Conduct of Operations: Ability to interpret and execute procedure steps.	4.6	64
295013 High Suppression Pool Temperature / 5			X				AK3.02 - Knowledge of the reasons for the following responses as they apply to HIGH SUPPRESSION POOL TEMPERATURE : Limiting heat additions	3.6	65
K/A Category Totals:	1	1	2	1	1/1	1/2	Group Point Total:	7/3	

Hope Creek Written Exam
 Written Examination Outline
 Plant Systems – Tier 2 Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G	Imp	Q#
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206000 HPCI											X	2.2.37 – Equipment Control: Ability to determine operability and/or availability of safety related equipment.	4.6	86
209001 LPCS											X	2.2.40 - Ability to apply Technical Specifications for a system.	4.7	87
211000 SLC											X	2.4.47 - Emergency Procedures / Plan: Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	4.2	88
205000 Shutdown Cooling											X	2.2.22 - Equipment Control: Knowledge of limiting conditions for operations and safety limits.	4.7	89
218000 ADS								X				A2.05 - Ability to (a) predict the impacts of the following on the AUTOMATIC DEPRESSURIZATION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of A.C. or D.C. power to ADS valves	3.6	90
205000 Shutdown Cooling	X											K1.04 - Knowledge of the physical connections and/or cause- effect relationships between SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) and the following: Fuel pool cooling assist: Plant-Specific	2.7	1
218000 ADS	X											K1.02 - Knowledge of the physical connections and/or cause- effect relationships between AUTOMATIC DEPRESSURIZATION SYSTEM and the following: Low Pressure Core Spray	4.0	2
215004 Source Range Monitor		X										K2.01 - Knowledge of electrical power supplies to the following: SRM channels/detectors	2.6	3
239002 SRVs		X										K2.01 - Knowledge of electrical power supplies to the following: SRV solenoids	2.8	4
217000 RCIC			X									K3.03 - Knowledge of the effect that a loss or malfunction of the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) will have on following: Decay Heat removal	3.5	5
206000 HPCI			X									K3.03 - Knowledge of the effect that a loss or malfunction of the HIGH PRESSURE COOLANT INJECTION SYSTEM will have on following: Suppression pool level control: BWR-2,3,4	3.4	6

Hope Creek Written Exam
 Written Examination Outline
 Plant Systems – Tier 2 Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	Imp	Q#
300000 Instrument Air				X								3.0	7
262001 AC Electrical Distribution				X								3.4	8
264000 EDGs					X							3.4	9
212000 RPS					X							3.3	10
263000 DC Electrical Distribution						X						3.2	11
215003 IRM						X						3.1	12
203000 RHR/LPCI: Injection Mode							X					4.2	13
261000 SGTS							X					3.0	14
211000 SLC								X				3.1	15

Hope Creek Written Exam
 Written Examination Outline
 Plant Systems – Tier 2 Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G	Imp	Q#
223002 PCIS/Nuclear Steam Supply Shutoff	X											3.0	16
262002 UPS (AC/DC)									X			2.8	17
209001 LPCS									X			3.5	18
215005 APRM / LPRM										X		3.2	19
400000 Component Cooling Water										X		3.1	20
218000 ADS											X	3.2	21
239002 SRVs											X	4.2	22
203000 RHR/LPCI: Injection Mode										X		4.1	23
209001 LPCS				X								3.3	24
259002 Reactor Water Level Control					X							3.1	25
261000 SGTS									X			3.9	26
K/A Category Totals:	3	2	2	3	3	2	2	1/1	3	3	2/4	Group Point Total: 26/5	

Hope Creek Written Exam
 Written Examination Outline
 Plant Systems – Tier 2 Group 2

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G	Imp.	Q #
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245000 Main Turbine Gen. / Aux.								X				A2.02 - 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: Loss of lube oil	3.5	91
202001 Recirculation										X		2.4.49 - Emergency Procedures / Plan: Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.4	92
215001 TIPS								X				A2.07 - Ability to (a) predict the impacts of the following on the TIPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Failure to retract during accident conditions	3.7	93
201003 Control Rod and Drive Mechanism	X											K1.01 - Knowledge of the physical connections and/or cause- effect relationships between CONTROL ROD AND DRIVE MECHANISM and the following: CRD Hydraulic system	3.2	27
226001 RHR/LPCI: CTMT Spray Mode									X			A3.01 - Ability to monitor automatic operations of the RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE including: Valve operation	3.0	28
234000 Fuel Handling Equipment			X									K3.03 - Knowledge of the effect that a loss or malfunction of the FUEL HANDLING EQUIPMENT will have on following: Fuel handling operations	3.1	29
214000 RPIS				X								K4.01 - Knowledge of (ROD POSITION INFORMATION SYSTEM) design feature(s) and or interlocks which provide for the following: Reed switch locations	3.0	30
245000 Main Turbine Generator and Auxiliary Systems					X							K5.07- Knowledge of the operational implications of the following concepts as they apply to MAIN TURBINE GENERATOR AND AUXILIARIES SYTEMS: Generator operations and limitations	2.6	31
204000 RWCU						X						K6.08 - Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR WATER CLEANUP SYSTEM : PCIS/NSSSS	3.5	32

Hope Creek Written Exam
Written Examination Outline
Plant Systems – Tier 2 Group 2

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G	Imp.	Q #
201001 CRD Hydraulic							X					2.8	33
239001 Main and Reheat Steam								X				4.2	34
215002 RBM									X			3.1	35
241000 Reactor/Turbine Pressure Regulator										X		3.5	36
223001 Primary CTMT and Aux.											X	3.4	37
259001 Reactor Feedwater							X					2.7	38
K/A Category Totals:	1	0	1	1	1	1	2	1/2	2	1	1/1	Group Point Total: 12/3	

Facility:		Hope Creek Written Exam		Date:			
Category	K/A #	Topic	RO		SRO-Only		
			IR	Q#	IR	Q#	
1. Conduct of Operations	2.1.34	<i>Knowledge of primary and secondary plant chemistry limits.</i>			3.5	100	
	2.1.35	<i>Knowledge of fuel-handling responsibilities of SROs</i>			3.9	94	
	2.1.3	Knowledge of shift or short-term relief turnover practices	3.7	71			
	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.	3.3	67			
	2.1.30	Ability to locate and operate components, including local controls.	4.4	66			
		Subtotal		3		2	
2. Equipment Control	2.2.7	<i>Knowledge of the process for conducting special or infrequent tests.</i>			3.6	95	
	2.2.18	<i>Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.</i>			3.9	96	
	2.2.6	Knowledge of the process for making changes to procedures	3.0	68			
	2.2.12	Knowledge of surveillance procedures	3.7	69			
	2.2.13	Knowledge of tagging and clearance procedures	4.1	74			
		Subtotal		3		2	
3. Radiation Control							
	2.3.12	<i>Knowledge of Radiological Safety Principles pertaining to licensed operator duties such as containment entry requirements, fuel handling responsibilities, access to high radiation areas, aligning filters, etc.</i>			3.7	99	
	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	3.2	70			

	2.3.13	Knowledge of Radiological Safety Procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.4	75		
	Subtotal			2		1
4. Emergency Procedures / Plan	2.4.6	<i>Knowledge of EOP mitigation strategies.</i>			4.7	97
	2.4.40	<i>Knowledge of SRO responsibilities in emergency plan implementation</i>			4.5	98
	2.4.18	Knowledge of the specific bases for EOPs. (terminating DW spray at 0 psig)	3.3	73		
	2.4.43	Knowledge of emergency communications systems and techniques.	3.2	72		
	Subtotal			2		2
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
2 / 1	264000 / K5.05 Knowledge of the operational implications of the following concepts as they apply to EMERGENCY GENERATORS (DIESEL/JET) : Paralleling A.C. power sources	(#9) Same topic as #8 (parallel of AC sources). Randomly selected K5.06
2 / 1	223002 /A2.03 Ability to (a) predict the impacts of the following on the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: system logic failures	(#16) Double jeopardy/similar topic as #34 (system actuation logic). Randomly selected K1.03
2 / 1	259002 / 2.2.25 Reactor Water Level control - Equipment Control: Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	(#21) System does not have related TS bases or LCOs. Randomly selected 218000 ADS.
2 / 1	203000 / A4.08 RHR/LPCI Injection Mode - Ability to manually operate and/or monitor in the control room: Reactor pressure	(#23) This is very similar in concept to #13 due to interrelations between reactor pressure & level regarding injection. Randomly selected A4.02
2 / 1	209001 / A1.05 Ability to predict and/or monitor changes in parameters associated with operating the LOW PRESSURE CORE SPRAY SYSTEM controls including: Torus/suppression pool water level	(#24) same concept as tested in question #13 for the RHR system. Randomly selected K4.09
2 / 2	214000 / K4.02 Knowledge of ROD POSITION INFORMATION SYSTEM design feature(s) and/or interlocks which provide for the following: Thermocouple	(#30) Could not write a discriminating question for the topic. Randomly selected K4.01

1 / 1	295031 / EA1.12 - Ability to operate and/or monitor the following as they apply to REACTOR LOW WATER LEVEL : Feedwater	(#21) Ability to operate plant equipment in the event of low RPV level is tested frequently in the operating exam. Randomly selected EK3.05
1 / 1	295023 / AK3.02 - Knowledge of the reasons for the following responses as they apply to REFUELING ACCIDENTS : Interlocks associated with fuel handling equipment	(#45) Refueling topic is oversampled (#29, #94). Randomly selected 295037 K3.01
1 / 1	600000 / 2.2.38 Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	(#58) This is an SRO function at HC. Randomly selected AA1.06
1 / 2	226001 / K2.01 Knowledge of electrical power supplies to the following: Knowledge of electrical power supplies to the following: Valves	(#28) Not a discriminating topic at the RO level (valve power supply) reselected A3.03
1 / 2	500000 / EK2.09 Knowledge of the interrelations between HIGH CONTAINMENT HYDROGEN CONCENTRATIONS the following: Drywell nitrogen purge system	(#60) Guidance is contained in SAGs for this event. Could not write an operational valid question for this topic at the RO level. Randomly selected 295022 AK2.03
2 / 2	215005 / 2.1.19 APRMs - Ability to use plant computers to evaluate system or component status.	(#26) System (NIs) & Topic oversampled (see #19). Randomly selected 261000 A3.02
3	2.1.21 - Ability to verify the controlled procedure copy.	(#67) Topic oversampled (see #68 & #69). Randomly selected 2.1.4
3	2.2.43 - Knowledge of the process to track inoperable alarms	(#74) Could not write a discriminating question for the topic. Randomly selected 2.2.13
1 / 1	295012 / AA2.02 Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE : Drywell Pressure	(#83) Same K/A as # 63. Randomly selected 295033 EA2.01

<p>1 / 1</p>	<p>295030 / 2.4.20 - Emergency Procedures / Plan: Knowledge of operational implications of EOP warnings, cautions, and notes. (Low Suppression Pool Level)</p>	<p>(#80) System & Topic have very limited EOP notes/cautions for a discriminating question at the SRO level. Randomly selected 295026 2.1.7</p>
<p>1 / 2</p>	<p>295008 / 2.4.21 - Emergency Procedures / Plan: Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc. (High Reactor Water Level)</p>	<p>(#84) Topic did not lend itself to a discriminating SRO level question. Randomly selected 295017</p>
<p>2 / 1</p>	<p>263000 / A2.02 - Ability to (a) predict the impacts of the following on the D.C. ELECTRICAL DISTRIBUTION ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of ventilation during charging</p>	<p>(#86) Topic (DC Power) is portions of questions 3,4,11 & 44. Additionally the topic does not lend itself to a discriminating SRO level question and has very limited procedural guidance. Randomly selected 206000 G2.2.37</p>
<p>2 / 2</p>	<p>268000 / A2.02 Ability to (a) predict the impacts of the following on the RADWASTE ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: High Turbidity Water</p>	<p>(#93) Does not apply at HC. Randomly selected 215001 A2.07</p>
<p>3</p>	<p>2.2.1- Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.</p>	<p>(#95) Not SRO level due to "operating controls" part of KA. Randomly selected 2.2.7</p>

HC ILT 2009 NRC EXAM

ES-301

Administrative Topics Outline

Form ES-301-1

Facility: <u>Hope Creek</u>	Date of Examination: <u>2/2/09</u>
Examination Level: <input type="checkbox"/> RO <input checked="" type="checkbox"/> SRO	Operating Test Number: <u>NRC 2009</u>

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, R, A	2.1.5 Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc. RO: 2.9 SRO: 3.9 ZZ009 Ensure Shift is Adequately Manned (RO will exceed guidelines. Requires Authorization Form)
Conduct of Operations	D, R	2.1.18 Ability to make accurate, clear and concise logs, records, status boards, and reports. RO: 3.9 SRO: 4.0 ZZ017 Initiate the Daily Surveillance Log (Shiftly Routine. Due to Plant Conditions, three optional attachments are required)
Equipment Control	N, R	2.2.12 Knowledge of surveillance procedures RO: 3.7 SRO: 4.1 Authorize the Start of a Surveillance Test (One Hour ST.ZZ-0001 for Inoperable EDG)
Radiation Control	D, R, A	2.3.11 Ability to control radiation releases RO: 3.8 SRO: 4.3 ZZ032 Determine RCS Pressure Boundary Leak Rate (Review of completed surveillance determines math error made and actual leakage exceeds Tech Spec. Determine required actions)
Emergency Plan	D, R	2.4.38 Ability to take actions called for in the facility emergency plan, including supporting or acting as emergency coordinator if required RO: 2.4 SRO: 4.4 ECG006 Classify Loss of All Barriers & Determine PAR

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)
- (A)lternate Path

Facility: Hope Creek

Date of Examination: 2/2/09

Exam Level: RO SRO-I SRO-U

Operating Test No.: NRC2009

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. Place The Control Room Emergency Filter Unit System In Standby (GK001)	C, D, S	9
b. Manually Start The Core Spray System (BE005)	A, C, D, EN, L, S	2
c. Open The MSIVs With The Reactor Pressurized (>200 Psig) (AB006)	C, N, S	3
d. Place B RHR Loop In Suppression Pool Cooling From The Remote Shutdown Panel (RSP) (BC009)	C, D, L, S	4
e. Respond To A Containment Isolation (SM002)	A, C, N, L, S	5
f. Perform Non-Emergency Operation Of The Diesel Generator (KJ008)	C, D, S	6
g. Respond To A Reactor Auxiliary Cooling Malfunction (ED002) (NRC 2005)	A, C, D, P, S	8
h. Perform Scoop Tube Positioner Lockup Operation (BB002) RO ONLY	C, D, S	1

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

i. Conduct Emergency Makeup To The RPV Using Two CRD Pumps (BF013)	D, E, R	1
j. Perform Torus Makeup Via Core Spray System (BE002)	D, E, R	5
k. Transfer RPS Bus A/B Power From Alternate Source To RPS MG Set (SB015)	A, D	7

[@] 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: 2/2/09
 Exam Level: RO SRO-I SRO-U Operating Test No.: NRC2009

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. Place The Control Room Emergency Filter Unit System In Standby (GK001)	C, D, S	9
b. Manually Start The Core Spray System (BE005)	A, C, D, EN, L, S	2
c. Open The MSIVs With The Reactor Pressurized (>200 Psig) (AB006)	C, N, S	3
d. Place B RHR Loop In Suppression Pool Cooling From The Remote Shutdown Panel (RSP) (BC009)	C, D, L, S	4
e. Respond To A Containment Isolation (SM002)	A, C, N, L, S	5
f. Perform Non-Emergency Operation Of The Diesel Generator (KJ008)	C, D, S	6
g. Respond To A Reactor Auxiliary Cooling Malfunction (ED002) (NRC 2005)	A, C, D, P, S	8
h. NA		

In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Conduct Emergency Makeup To The RPV Using Two CRD Pumps (BF013)	D, E, R	1
j. Perform Torus Makeup Via Core Spray System (BE002)	D, E, R	5
k. Transfer RPS Bus A/B Power From Alternate Source To RPS MG Set (SB015)	A, D	7

@ 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: 2/2/09

Exam Level: RO SRO-I SRO-U

Operating Test No.: NRC2009

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. NA		
b. Manually Start The Core Spray System (BE005)	A, C, D, EN, L, S	2
c. NA		
d. Place B RHR Loop In Suppression Pool Cooling From The Remote Shutdown Panel (RSP) (BC009)	C, D, L, S	4
e. Respond To A Containment Isolation (SM002)	A, C, N, L, S	5
f. NA		
g. NA		
h. NA		

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

i. Conduct Emergency Makeup To The RPV Using Two CRD Pumps (BF013)	D, E, R	1
j. NA		
k. Transfer RPS Bus A/B Power From Alternate Source To RPS MG Set (SB015)	A, D	7

[@] 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.: NRC2009

Examiners: J. D'Antonio
 B. Fuller
 G. Johnson

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

Initial Conditions:
 Plant is operating at 4% power. Startup in progress.

Turnover:
 Withdraw Control Rods.
 Inert the Containment.
 Continue startup.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (RO) N (SRO)	Raise Reactor Power with Control Rods
2	N/A	N (BOP)	Inerting the Containment
3	CD033843	C (RO) C (SRO)	Stuck Control Rod
4	RM9511	I (SRO)	Main Steam Line RMS "A" failure (TS)
5	ED09A2	C (BOP) C (SRO)	Loss of 1AD482 inverter (TS)
6	MS04	C (ALL)	Steam leak in the steam tunnel
7	RR31A1 RH07	M (ALL)	Small break LOCA/RHR pump room flooding (Failure to isolate)
8	AD01	C (BOP)	Emergency Depressurization SRV Failure to open

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

Facility: Hope Creek Scenario No.: 2 Op-Test No.: NRC2009

Examiners: J. D'Antonio
B. Fuller
G. Johnson

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

Initial Conditions:

Plant is operating at 51% power.

Turnover:

Place D Circ Water Pump in service.

Raise power to 60% by withdrawing control rods and Recirc IAW IO-3 and RE guidance.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP)	Start D Circ Water Pump.
2	N/A	R (RO) N (SRO)	Raise power with control rods.
3	CD10A	C (RO) C (SRO)	CRD Pump Trip (TS)
4	I/O 1A175	C (BOP) C (SRO)	Rx Building Ventilation Supply Damper fails. (TS) Place FRVS in service
5	TC07A TC16 TC07B TC01-10	C (ALL)	Trip of EHC Pump EHC Filter Clogging Manual Scram Loss of EHC/ TBVs fail closed
6	RP07	M (All)	ATWS
7	SL04A SL01B	C (BOP)	A SLC Pump Auto Start Failure B SLC Pump Trip
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: Hope CreekScenario No.: 3Op-Test No.: NRC2009Examiners: J. D'Antonio
B. Fuller
G. JohnsonOperators: _____(SRO)
_____ (RO)
_____ (BOP)

Initial Conditions: Reactor power is 90%.

Turnover:

Reduce power from 90% to 84.5% by inserting control rods IAW IO-6 and RE guidance to remove A RFPT from service.

Swap TACS to the B SACS Loop IAW HC.OP-SO.EG-0001.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (RO) N (SRO)	Reduce power with control rods.
2	N/A	N (BOP)	Swap TACS to B SACS Loop
3	RZ02A	I (SRO)	PT-N403A RRCS Pressure Transmitter will fail downscale. (TS)
4	CU03 CU11A CU11B	C (RO) C (SRO)	RWCU leak. Automatic isolation valve failure. (TS)
5	TC02-1 TC02-2 TC02-3 TC02-4 TC01-10	C (RO)	EHC logic failure. TCV's drift closed. TBVs fail closed.
6	RZ03A RZ03C	I (ALL)	RPS and RRCS High Pressure logic failures. Manual Scram due to rising RPV pressure.
7	RR31B1 RR31B2 PC04	M (All)	LOCA with downcomer failure.
8	PC03E PC03G	C (BOP)	PT-N094E/G will fail to respond to High Drywell Pressure.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: Hope Creek Scenario No.: 4 Op-Test No.: NRC2009

Examiners: J. D'Antonio
B. Fuller
G. Johnson

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

Initial Conditions:

Plant is operating at 84.5% power following repair of B RFPT.

Turnover:

Raise power to 90% by increasing Reactor Recirc IAW IO-6 and RE guidance.

Place B RFPT in service to feed the RPV.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP)	Place 'B' RFPT in service to feed the RPV.
2	N/A	R (RO) N (SRO)	Raise power with recirculation flow.
3	AD04H	I (SRO)	'H' SRV Tailpipe Temperature fails high. (TS)
4	NM12C	I (RO)	Recirc Loop Flow Summer failure.
5	PC07B RC09 RC10	C (BOP) C (SRO)	Seismic Event >SSE RCIC Steam Leak RCIC Fail to Isolate (TS)
6	IA01A	C (BOP)	Trip of Service Air Compressor
7	IA01 CD011427 CD011827 CD012227 CD062627	C (RO) C (SRO)	Air Leak w/Multiple Rod Drift/ Manual Scram Control Rod Drift In 14-27 Control Rod Drift In 18-27 Control Rod Drift In 22-27 Control Rod Scram 26-27
8	EG12 HP04 DG01C DG02B DG02D	M (All)	LOP HPCI Failure 'C' EDG Failure to Start (Auto or Man) (recoverable) Failure of 'B' EDG Failure of 'D' EDG
9	RR31A2	M (All)	LOCA 'A' RHR Pump Trip 'A' EDG Trip (recoverable)
10	RH08C	C (BOP)	'C' RHR Failure to Auto-Start/Inject
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			