

Facility: Hope Creek Generating Station

Form ES-401-2

Exam Date: 05/29/2000

Exam Level: RO

Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	
1. Emergency & Abnormal Plant Evolutions	1	6	2	1				3	1			0	13
	2	3	5	4				4	2			1	19
	3	0	1	1				1	0			1	4
	Totals Tier	9	8	6				8	3			2	36
2. Plant Systems	1	3	2	3	3	2	3	2	3	3	3	1	28
	2	2	1	2	2	2	2	2	2	2	2	0	19
	3	0	0	1	0	0	1	0	0	1	1	0	4
	Tier Totals	5	3	6	5	4	6	4	5	6	6	1	51
3. Generic Knowledge And Abilities					Cat 1		Cat 2		Cat 3		Cat 4		
					3		3		3		4		13

Note:

1. Attempt to distribute topics among all K/A Categories; select at least one topic from every K/A category within each tier.
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category tier.

## BWR RO Examination Outline

Printed: 03/13/2000

Facility: Hope Creek Generating Station

ES - 401

### Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1

Form ES-401-2

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295005	Main Turbine Generator Trip / 3	X						AK1.01 - Pressure effects on reactor power	4.0	1
295007	High Reactor Pressure / 3					X		AA2.01 - Reactor pressure	4.1*	1
295009	Low Reactor Water Level / 2			X				AK3.01 - Recirculation pump run back: Plant-Specific	3.2	1
295010	High Drywell Pressure / 5		X					AK2.05 - Drywell cooling and ventilation	3.7	1
295010	High Drywell Pressure / 5	X						AK1.01 - Downcomer submergence: Mark-I&II	3.0	1
295014	Inadvertent Reactivity Addition / 1		X					AK2.06 - Moderator temperature	3.4	1
295015	Incomplete SCRAM / 1				X			AA1.07 - Neutron monitoring system	3.6	1
295024	High Drywell Pressure / 5	X						EK1.01 - Drywell integrity: Plant-Specific	4.1	1
295025	High Reactor Pressure / 3				X			EA1.08 - †RRCS: Plant-Specific	3.3	1
295031	Reactor Low Water Level / 2	X						EK1.03 - Water level effects on reactor power	3.7	1
295037	SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1	X						EK1.07 - Shutdown margin	3.4	1
295037	SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1	X						EK1.01 - Reactor pressure effects on reactor power	4.1*	1
500000	High Containment Hydrogen Concentration / 5				X			EA1.01 - Primary containment hydrogen instrumentation	3.4	1

**K/A Category Totals: 6 2 1 3 1 0**

**Group Point Total: 13**

## BWR RO Examination Outline

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### Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

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E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295002	Loss of Main Condenser Vacuum / 3		X					AK2.11 - Seal steam: Plant-Specific	2.6	1
295003	Partial or Complete Loss of A.C. Power / 6		X					AK2.04 - A.C. electrical loads	3.4	1
295003	Partial or Complete Loss of A.C. Power / 6			X				AK3.05 - Reactor SCRAM	3.7	1
295004	Partial or Complete Loss of D.C. Power / 6					X		AA2.01 - Cause of partial or complete loss of D.C. power	3.2	1
295008	High Reactor Water Level / 2			X				AK3.05 - HPCI turbine trip: Plant-Specific	3.5	1
295008	High Reactor Water Level / 2				X			AA1.07 - Main turbine: Plant-Specific	3.4	1
295012	High Drywell Temperature / 5					X		AA2.01 - Drywell temperature	3.8	1
295013	High Suppression Pool Temperature / 5						X	2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	1
295016	Control Room Abandonment / 7		X					AK2.02 - Local control stations: Plant-Specific	4.0*	1
295017	High Off-Site Release Rate / 9		X					AK2.09 - Condenser air removal system: Plant-Specific	2.8	1
295017	High Off-Site Release Rate / 9			X				AK3.05 - Control room ventilation: Plant-Specific	3.3	1
295022	Loss of CRD Pumps / 1				X			AA1.01 - CRD hydraulic system	3.1	1
295028	High Drywell Temperature / 5	X						EK1.01 - Reactor water level measurement	3.5	1
295028	High Drywell Temperature / 5			X				EK3.03 - †Drywell spray operation: Mark-I&II	3.6	1
295029	High Suppression Pool Water Level / 5	X						EK1.01 - Containment integrity	3.4	1

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**Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2**

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E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295033	High Secondary Containment Area Radiation Levels / 9		X					EK2.01 - Area radiation monitoring system	3.8	1
295034	Secondary Containment Ventilation High Radiation / 9	X						EK1.01 - Personnel protection	3.8	1
295038	High Off-Site Release Rate / 9				X			EA1.01 - Stack-gas monitoring system: Plant-Specific	3.9	1
600000	Plant Fire On Site / 8				X			AA1.06 - Fire alarm	3.0	1

**K/A Category Totals: 3 5 4 4 2 1**

**Group Point Total: 19**



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Plant Systems - Tier 2 / Group 1

Form ES-401-2

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
201001	Control Rod Drive Hydraulic System / 1								X				A2.01 - Pumps trips	3.2	1
201001	Control Rod Drive Hydraulic System / 1										X		A4.05 - Cooling water header pressure control valve	2.7	1
201002	Reactor Manual Control System / 1				X								K4.05 - Notch override rod withdrawal	3.3	1
202002	Recirculation Flow Control System / 1									X			A3.03 - Scoop tube operation: BWR-2, 3, 4	3.1	1
203000	RHR/LPCI: Injection Mode (Plant Specific) / 2				X								K4.07 - Emergency generator load sequencing	3.7	1
203000	RHR/LPCI: Injection Mode (Plant Specific) / 2						X						K6.04 - Keep fill system	3.3	1
206000	High Pressure Coolant Injection System / 2							X					A1.02 - Reactor pressure: BWR-2, 3, 4	4.2*	1
206000	High Pressure Coolant Injection System / 2									X			A3.05 - Reactor water level: BWR-2, 3, 4	4.3*	1
209001	Low Pressure Core Spray System / 2								X				A2.02 - Valve closures	3.2	1
209001	Low Pressure Core Spray System / 2					X							K5.04 - Heat removal (transfer) mechanisms	2.8	1
211000	Standby Liquid Control System / 1			X									K3.01 - †Ability to shutdown the reactor in certain conditions	4.3*	1
212000	Reactor Protection System / 7					X							K5.02 - Specific logic arrangements	3.3	1

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ES - 401 Plant Systems - Tier 2 / Group 1 Form ES-401-2

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
212000	Reactor Protection System / 7						X						K6.04 - D.C. electrical distribution	2.8	1
215004	Source Range Monitor (SRM) System / 7								X				A2.05 - Faulty or erratic operation of detectors/system	3.3	1
215004	Source Range Monitor (SRM) System / 7		X										K2.01 - SRM channels/detectors	2.6	1
215005	Average Power Range Monitor/Local Power Range Monitor System / 7									X			A3.07 - RPS status	3.8	1
216000	Nuclear Boiler Instrumentation / 7											X	2.2.12 - Knowledge of surveillance procedures.	3.0	1
216000	Nuclear Boiler Instrumentation / 7	X											K1.01 - Reactor protection system	3.9	1
217000	Reactor Core Isolation Cooling System (RCIC) / 2										X		A4.08 - System flow	3.7	1
217000	Reactor Core Isolation Cooling System (RCIC) / 2				X								K4.05 - Prevents radioactivity release to auxiliary/reactor building	3.2	1
218000	Automatic Depressurization System / 3		X										K2.01 - ADS logic	3.1*	1
218000	Automatic Depressurization System / 3			X									K3.02 - Ability to rapidly depressurize the reactor	4.5*	1
223001	Primary Containment System and Auxiliaries / 5						X						K6.09 - Drywell vacuum relief system	3.4	1

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ES - 401 Plant Systems - Tier 2 / Group 1 Form ES-401-2

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
223002	Primary Containment Isolation System/Nuclear Steam Supply Shut-Off / 5							X					A1.01 - System indicating lights and alarms	3.5	1
239002	Relief/Safety Valves / 3	X											K1.06 - Drywell instrument air/ drywell pneumatics: Plant-Specific	3.4	1
241000	Reactor/Turbine Pressure Regulating System / 3	X											K1.06 - Bypass valves	3.8	1
259001	Reactor Feedwater System / 2			X									K3.02 - Reactor water level control system	3.8	1
261000	Standby Gas Treatment System / 9										X		A4.03 - Fan	3.0	1

**K/A Category Totals: 3 2 3 3 2 3 2 3 3 3 3 1**

**Group Point Total: 28**

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ES - 401 Plant Systems - Tier 2 / Group 2 Form ES-401-2

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
201003	Control Rod and Drive Mechanism / 1									X			A3.01 - Control rod position	3.7	1
202001	Recirculation System / 1						X						K6.06 - Recirculation system motor-generator sets: Plant-Specific	3.1	1
202001	Recirculation System / 1		X										K2.02 - MG sets: Plant-Specific	3.2	1
214000	Rod Position Information System / 7					X							K5.01 - Reed switches	2.7	1
219000	RHR/LPCI: Torus/Suppression Pool Cooling Mode / 5							X					A1.02 - System flow	3.5	1
226001	RHR/LPCI: Containment Spray System Mode / 5			X									K3.01 - Containment/drywell/suppression chamber pressure	3.6	1
226001	RHR/LPCI: Containment Spray System Mode / 5				X								K4.10 - Spray flow cooling	2.9	1
230000	RHR/LPCI: Torus/Suppression Pool Spray Mode / 5							X					A1.11 - Suppression chamber air temperature	3.6	1
245000	Main Turbine Generator and Auxiliary Systems / 4								X				A2.03 - Loss of condenser vacuum	3.5	1
256000	Reactor Condensate System / 2										X		A4.08 - Reactor water level	3.7	1
256000	Reactor Condensate System / 2								X				A2.01 - Pump trips	3.3	1
262002	Uninterruptable Power Supply (A.C./D.C.) / 6									X			A3.01 - Transfer from preferred to alternate source	2.8	1

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ES - 401 Plant Systems - Tier 2 / Group 2 Form ES-401-2

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
263000	D.C. Electrical Distribution / 6					X							K5.01 - Hydrogen generation during battery charging	2.6	1
271000	Offgas System / 9						X						K6.02 - Process radiation monitoring system	3.0	1
271000	Offgas System / 9	X											K1.06 - Main steam system	2.8	1
272000	Radiation Monitoring System / 7			X									K3.02 - †Station gaseous effluent release monitoring	3.1	1
272000	Radiation Monitoring System / 7				X								K4.02 - Automatic actions to contain the radioactive release in the event that the predetermined release rates are exceeded	3.7	1
290003	Control Room HVAC / 9											X	A4.03 - Reposition dampers	2.8	1
300000	Instrument Air System (IAS) / 8	X											K1.02 - Service air	2.7	1

**K/A Category Totals:**    2    1    2    2    2    2    2    2    2    2    0

**Group Point Total:**    19

**BWR RO Examination Outline**

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ES - 401 Plant Systems - Tier 2 / Group 3 Form ES-401-2

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
215001	Traversing In-Core Probe / 7									X			A3.03 - Valve operation: Not-BWR1	2.5*	1
215001	Traversing In-Core Probe / 7						X						K6.04 - Primary containment isolation system: Mark-I&II(Not-BWR1)	3.1	1
233000	Fuel Pool Cooling and Clean-up / 9			X									K3.08 - †Refueling operations	2.9	1
288000	Plant Ventilation Systems / 9										X		A4.01 - Start and stop fans	3.1	1

**K/A Category Totals: 0 0 1 0 0 1 0 0 1 1 0**

**Group Point Total: 4**

## Generic Knowledge and Abilities Outline (Tier 3)

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### BWR RO Examination Outline

Form ES-401-5

**Facility:** Hope Creek Generating Station

Generic Category	KA	KA Topic	Imp.	Points
<b>Conduct of Operations</b>	2.1.8	Ability to coordinate personnel activities outside the control room.	3.8	1
	2.1.22	Ability to determine Mode of Operation.	2.8	1
	2.1.32	Ability to explain and apply system limits and precautions.	3.4	1
<b>Category Total:</b>			<b>3</b>	
<b>Equipment Control</b>	2.2.33	Knowledge of control rod programming.	2.5	1
	2.2.26	Knowledge of refueling administrative requirements.	2.5	1
	2.2.22	Knowledge of limiting conditions for operations and safety limits.	3.4	1
<b>Category Total:</b>			<b>3</b>	
<b>Radiation Control</b>	2.3.9	Knowledge of the process for performing a containment purge.	2.5	1
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9	1
	2.3.11	Ability to control radiation releases.	2.7	1
<b>Category Total:</b>			<b>3</b>	
<b>Emergency Plan</b>	2.4.48	Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions.	3.5	1
	2.4.18	Knowledge of the specific bases for EOPs.	2.7	1
	2.4.11	Knowledge of abnormal condition procedures.	3.4	1
	2.4.20	Knowledge of operational implications of EOP warnings, cautions, and notes.	3.3	1
<b>Category Total:</b>			<b>4</b>	
<b>Generic Total:</b>			<b>13</b>	

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Form ES-401-1

Exam Date: 05/29/2000

Exam Level: SRO

Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	
1. Emergency & Abnormal Plant Evolutions	1	5	4	4				5	5			3	26
	2	3	3	2				3	3			3	17
	Tier Totals	8	7	6				8	8			6	43
2. Plant Systems	1	2	1	2	2	2	3	2	2	2	2	3	23
	2	2	1	1	1	2	1	1	1	1	1	1	13
	3	0	0	0	0	0	1	0	1	1	0	1	4
	Tier Totals	4	2	3	3	4	5	3	4	4	3	5	40
3. Generic Knowledge And Abilities					Cat 1		Cat 2		Cat 3		Cat 4		
					5		4		3		5		17

Note:

1. Attempt to distribute topics among all K/A Categories; select at least one topic from every K/A category within each tier.
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category tier.

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Facility: Hope Creek Generating Station

ES - 401 Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1 Form ES-401-1

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295003	Partial or Complete Loss of A.C. Power / 6		X					AK2.04 - A.C. electrical loads	3.5	1
295003	Partial or Complete Loss of A.C. Power / 6			X				AK3.05 - Reactor SCRAM	3.7	1
295006	SCRAM / 1					X		AA2.03 - Reactor water level	4.2*	1
295007	High Reactor Pressure / 3					X		AA2.01 - Reactor pressure	4.1*	1
295009	Low Reactor Water Level / 2			X				AK3.01 - Recirculation pump run back: Plant-Specific	3.3	1
295010	High Drywell Pressure / 5						X	2.4.45 - Ability to prioritize and interpret the significance of each annunciator or alarm.	3.6	1
295010	High Drywell Pressure / 5	X						AK1.01 - Downcomer submergence: Mark-I&II	3.4	1
295013	High Suppression Pool Temperature / 5						X	2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	1
295014	Inadvertent Reactivity Addition / 1					X		AA2.05 - †Violation of safety limits	4.6*	1
295014	Inadvertent Reactivity Addition / 1		X					AK2.06 - Moderator temperature	3.5	1
295015	Incomplete SCRAM / 1				X			AA1.07 - Neutron monitoring system	3.7	1
295016	Control Room Abandonment / 7		X					AK2.02 - Local control stations: Plant-Specific	4.1*	1
295017	High Off-Site Release Rate / 9		X					AK2.09 - Condenser air removal system: Plant-Specific	2.9	1
295017	High Off-Site Release Rate / 9			X				AK3.05 - Control room ventilation: Plant-Specific	3.6	1



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### Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

Form ES-401-1

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295002	Loss of Main Condenser Vacuum / 3		X					AK2.11 - Seal steam: Plant-Specific	2.7	1
295004	Partial or Complete Loss of D.C. Power / 6						X	2.2.10 - Knowledge of the process for determining if the margin of safety, as defined in the basis of any technical specification is reduced by a proposed change, test or experiment.	3.3	1
295005	Main Turbine Generator Trip / 3					X		AA2.02 - Turbine vibration	2.7	1
295005	Main Turbine Generator Trip / 3	X						AK1.01 - Pressure effects on reactor power	4.1	1
295008	High Reactor Water Level / 2				X			AA1.07 - Main turbine: Plant-Specific	3.4	1
295008	High Reactor Water Level / 2			X				AK3.05 - HPCI turbine trip: Plant-Specific	3.6	1
295018	Partial or Complete Loss of Component Cooling Water / 8					X		AA2.02 - Cooling water temperature	3.2	1
295021	Loss of Shutdown Cooling / 4						X	2.2.17 - Knowledge of the process for managing maintenance activities during power operations.	3.5	1
295022	Loss of CRD Pumps / 1						X	2.2.18 - Knowledge of the process for managing maintenance activities during shutdown operations.	3.6	1
295022	Loss of CRD Pumps / 1				X			AA1.01 - CRD hydraulic system	3.2	1
295028	High Drywell Temperature / 5	X						EK1.01 - Reactor water level measurement	3.7	1
295028	High Drywell Temperature / 5			X				EK3.03 - †Drywell spray operation: Mark-I&II	3.9	1
295029	High Suppression Pool Water Level / 5					X		EA2.03 - Drywell/containment water level	3.5	1
295032	High Secondary Containment Area Temperature / 5		X					EK2.04 - PCIS/NSSSS	3.8	1



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Plant Systems - Tier 2 / Group 1

Form ES-401-1

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
202002	Recirculation Flow Control System / 1									X			A3.03 - Scoop tube operation: BWR-2, 3, 4	3.0	1
203000	RHR/LPCI: Injection Mode (Plant Specific) / 2						X						K6.04 - Keep fill system	3.5	1
206000	High Pressure Coolant Injection System / 2							X					A1.02 - Reactor pressure: BWR-2, 3, 4	4.2	1
206000	High Pressure Coolant Injection System / 2									X			A3.05 - Reactor water level: BWR-2, 3, 4	4.3*	1
209001	Low Pressure Core Spray System / 2					X							K5.04 - Heat removal (transfer) mechanisms	2.9	1
209001	Low Pressure Core Spray System / 2								X				A2.02 - Valve closures	3.2	1
211000	Standby Liquid Control System / 1											X	2.1.34 - Ability to maintain primary and secondary plant chemistry within allowable limits.	2.9	1
211000	Standby Liquid Control System / 1			X									K3.01 - †Ability to shutdown the reactor in certain conditions	4.4*	1
212000	Reactor Protection System / 7					X							K5.02 - Specific logic arrangements	3.4	1
212000	Reactor Protection System / 7						X						K6.04 - D.C. electrical distribution	3.1	1
215004	Source Range Monitor (SRM) System / 7		X										K2.01 - SRM channels/detectors	2.8	1
215004	Source Range Monitor (SRM) System / 7								X				A2.05 - Faulty or erratic operation of detectors/system	3.5	1

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Plant Systems - Tier 2 / Group 1

Form ES-401-1

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
216000	Nuclear Boiler Instrumentation / 7	X											K1.01 - Reactor protection system	4.1	1
217000	Reactor Core Isolation Cooling System (RCIC) / 2				X								K4.05 - Prevents radioactivity release to auxiliary/reactor building	3.5	1
217000	Reactor Core Isolation Cooling System (RCIC) / 2										X		A4.08 - System flow	3.6	1
223001	Primary Containment System and Auxiliaries / 5						X						K6.09 - Drywell vacuum relief system	3.6	1
223002	Primary Containment Isolation System/Nuclear Steam Supply Shut-Off / 5							X					A1.01 - System indicating lights and alarms	3.5	1
226001	RHR/LPCI: Containment Spray System Mode / 5			X									K3.01 - Containment/drywell/suppression chamber pressure	3.7	1
226001	RHR/LPCI: Containment Spray System Mode / 5				X								K4.10 - Spray flow cooling	3.0	1
241000	Reactor/Turbine Pressure Regulating System / 3											X	2.4.36 - Knowledge of chemistry / health physics tasks during emergency operations.	2.8	1
241000	Reactor/Turbine Pressure Regulating System / 3	X											K1.06 - Bypass valves	3.9	1
261000	Standby Gas Treatment System / 9										X		A4.03 - Fan	3.0	1
264000	Emergency Generators (Diesel/Jet) / 6											X	2.2.24 - Ability to analyze the affect of maintenance activities on LCO status.	3.8	1

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Plant Systems - Tier 2 / Group 1

Form ES-401-1

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
	<b>K/A Category Totals:</b>	2	1	2	2	2	3	2	2	2	2	3		<b>Group Point Total:</b>	<b>23</b>

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Printed: 03/13/2000

Facility: Hope Creek Generating Station

ES - 401

Plant Systems - Tier 2 / Group 2

Form ES-401-1

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
201001	Control Rod Drive Hydraulic System / 1								X				A2.01 - Pumps trips	3.3	1
201001	Control Rod Drive Hydraulic System / 1										X		A4.05 - Cooling water header pressure control valve	2.8	1
201002	Reactor Manual Control System / 1	X											K1.08 - †Refueling interlocks: Plant-Specific	3.6	1
201006	Rod Worth Minimizer System (RWM) (Plant Specific) / 7											X	2.2.25 - Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.7	1
202001	Recirculation System / 1		X										K2.02 - MG sets: Plant-Specific	3.3	1
214000	Rod Position Information System / 7					X							K5.01 - Reed switches	2.8	1
230000	RHR/LPCI: Torus/Suppression Pool Spray Mode / 5							X					A1.11 - Suppression chamber air temperature	3.6	1
259001	Reactor Feedwater System / 2			X									K3.02 - Reactor water level control system	3.8	1
262002	Uninterruptable Power Supply (A.C./D.C.) / 6									X			A3.01 - Transfer from preferred to alternate source	3.1	1
263000	D.C. Electrical Distribution / 6					X							K5.01 - Hydrogen generation during battery charging	2.9	1
271000	Offgas System / 9						X						K6.02 - Process radiation monitoring system	3.2	1
271000	Offgas System / 9	X											K1.06 - Main steam system	2.9	1

**BWR SRO Examination Outline**

Printed: 03/13/2000

Facility: Hope Creek Generating Station

ES - 401 Plant Systems - Tier 2 / Group 2 Form ES-401-1

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
272000	Radiation Monitoring System / 7				X								K4.02 - Automatic actions to contain the radioactive release in the event that the predetermined release rates are exceeded	4.1	1

**K/A Category Totals:**    2    1    1    1    2    1    1    1    1    1    1

**Group Point Total:**    13

**BWR SRO Examination Outline**

Printed: 03/13/2000

Facility: Hope Creek Generating Station

ES - 401 Plant Systems - Tier 2 / Group 3 Form ES-401-1

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
201003	Control Rod and Drive Mechanism / 1									X			A3.01 - Control rod position	3.6	1
215001	Traversing In-Core Probe / 7						X						K6.04 - Primary containment isolation system: Mark-I&II(Not-BWR1)	3.4	1
256000	Reactor Condensate System / 2								X				A2.01 - Pump trips	3.3	1
290002	Reactor Vessel Internals / 5											X	2.3.10 - Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1

**K/A Category Totals:**    0   0   0   0   0   1   0   1   1   0   1

**Group Point Total:**    4

## Generic Knowledge and Abilities Outline (Tier 3)

Printed: 03/13/2000

### BWR SRO Examination Outline

Form ES-401-5

**Facility:** Hope Creek Generating Station

Generic Category	KA	KA Topic	Imp.	Points
<b>Conduct of Operations</b>	2.1.11	Knowledge of less than one hour technical specification action statements for systems.	3.8	1
	2.1.12	Ability to apply technical specifications for a system.	4.0	1
	2.1.5	Ability to locate and use procedures and directives related to shift staffing and activities.	3.4	1
	2.1.32	Ability to explain and apply system limits and precautions.	3.8	1
	2.1.33	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	4.0	1
<b>Category Total:</b>				<b>5</b>
<b>Equipment Control</b>	2.2.23	Ability to track limiting conditions for operations.	3.8	1
	2.2.24	Ability to analyze the affect of maintenance activities on LCO status.	3.8	1
	2.2.22	Knowledge of limiting conditions for operations and safety limits.	4.1	1
	2.2.26	Knowledge of refueling administrative requirements.	3.7	1
<b>Category Total:</b>				<b>4</b>
<b>Radiation Control</b>	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	3.1	1
	2.3.11	Ability to control radiation releases.	3.2	1
	2.3.9	Knowledge of the process for performing a containment purge.	3.4	1
<b>Category Total:</b>				<b>3</b>

**Generic Knowledge and Abilities Outline (Tier 3)**

Printed: 03/13/2000

**BWR SRO Examination Outline**

**Form ES-401-5**

**Facility:** Hope Creek Generating Station

Generic Category	KA	KA Topic	Imp.	Points
<b>Emergency Plan</b>	2.4.5	Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions.	3.6	1
	2.4.18	Knowledge of the specific bases for EOPs.	3.6	1
	2.4.48	Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions.	3.8	1
	2.4.11	Knowledge of abnormal condition procedures.	3.6	1
	2.4.20	Knowledge of operational implications of EOP warnings, cautions, and notes.	4.0	1

**Category Total: 5**

**Generic Total: 17**

Facility: <u>HOPE CREEK</u>		Date of Examination: <u>5/29/00</u>
Examination Level: <input checked="" type="checkbox"/> RO <input type="checkbox"/> SRO		Operating Test Number: _____
Administrative Topic/Subject Description		Describe method of evaluation:
		1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Plant Parameter Verification	2.1.19 Ability to use plant computer to obtain and evaluate parametric information on system or component status.(3.0)  JPM-Obtain and evaluate Periodic Core Edit, P-1, information.
	Shift Turnover	2.1.3 Knowledge of shift turnover practices.(3.0)  JPM-Complete shift turnover Attachment as off-going RO. (Simulator perform)
A.2	Surveillance Procedures	2.2.12 Knowledge of surveillance procedures.(3.0)  JPM-Perform Single Loop Recirculation System Daily Surveillance procedure and evaluate the results. (Simulator perform)
A.3	Radiation Exposure Control	2.3.4 Knowledge of radiation exposure limits and contamination control/including permissible levels in excess of those authorized.(2.5) Given an emergency condition, determine allowable stay times.
		2.3.4 Knowledge of radiation exposure limits and contamination control/including permissible levels in excess of those authorized.(2.5) Specify the limitations on personnel entering a High Radiation Area without RP escort.
A.4	Emergency Action Levels and Classifications	2.4.39 Knowledge of the RO's responsibilities in emergency plan implementation.  JPM-Complete a Major Equipment and Electrical Status Form (Simulator perform)

Facility: <u>HOPE CREEK</u>		Date of Examination: <u>5/29/00</u>
Examination Level: <input type="checkbox"/> RO <input checked="" type="checkbox"/> SRO		Operating Test Number: _____
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Reactor Startup Requirements	2.1.11 Knowledge of less than one hour technical specification action statements for systems.(3.8)  JPM-Review and evaluate a Reactor Coolant System heat-up rate Attachment, and initiate necessary actions.
	Plant Parameter Verification	2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics/reactor behavior/and instrument interpretation.(4.4)  Given chemistry sampling results, determine required changes to the operational condition and notification requirements. 2.1.25 Ability to obtain and interpret station reference materials such as graphs/monographs/and tables which contain performance data.(3.1)  Given plant conditions, determine the expected condenser backpressure expected following CW pump removal.
A.2	Surveillance Testing	2.2.12 Knowledge of surveillance procedures.(3.4)  JPM-Review and evaluate a completed Surveillance Procedure and initiate necessary actions.
A.3	Radiation Exposure Limits	2.3.4 Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.(3.1)  Given an emergency condition, determine allowable stay times.
		2.3.1 Knowledge of 10CFR20 and related facility radiation control requirements.(3.0)  Apply the NBU radiation exposure limits for a Declared Pregnant Worker with existing exposure.
A.4	Emergency Action Levels and Classifications	2.4.41 Knowledge of the Emergency Action Level thresholds and classifications.  JPM-Given a set of conditions, classify an event and complete the Initial Contact Message Form.

Facility: HOPE CREEK Date of Examination: 5/29/00  
 Examinations Developed by:  Facility  NRC  
 Examination Level:  RO  SRO Operating Test Number: \_\_\_\_\_

**B.1 Control Room Systems**

System / JPM Title	Type Code*	Safety Function
a. RCIC-Return RCIC to Full Flow Recirc	N, S	4
b. HPCI-Manual Initiation Failure	D, A, S	2
c. EHC-Failure of Turbine Speed Circuit during Startup	N, L, A, S	3
d. CRD Hydraulic System-Pump trip, RPV Pressure <900 psig	N, L, A, S	1
e. H2/O2-Place in service post LOCA	D, S	5
f. RPS-Reset Full Scram, Rod at Over Travel	M, A, S	7
g. FRVS-Place system in service	D, S	9

**B.2 Facility Walk-Through**

a. CRD-Swap Stabilizing Valves	D, P, R	6
b. RMCS-Bypass a control rod	D, P	1
c. HPCI-Bypass Core Spray Injection Valve During ATWS	D, P	2

\* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (P)lant, (R)CA

Operating Test Number: \_\_\_\_\_

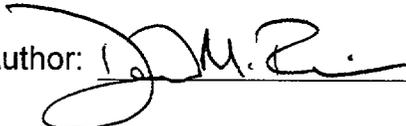
Applicant Type	Evolution Type	Minimum Number	Scenario Number			
			1	2	3	4
RO[1]	Reactivity	1	1			
	Normal	1			1	
	Instrument	2	4		8	
	Component	2	2		2,6	
	Major	1	6		7	

As RO	Reactivity	1		1		
	Normal	0				
	Instrument	1		3		
	Component	1		4		
	Major	1		6		
SRO-I[1]						
As SRO	Reactivity	0				
	Normal	1	1,3			
	Instrument	1	4			
	Component	1	2,5,7			
	Major	1	6			

SRO-U	Reactivity	0				
	Normal	1				
	Instrument	1				
	Component	1				
	Major	1				

Applicant number inside[ ]

- Instructions:
- (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
  - (2) Reactivity manipulations may be conducted under normal or controlled abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author:  \_\_\_\_\_

Chief Examiner: \_\_\_\_\_

Operating Test Number: \_\_\_\_\_

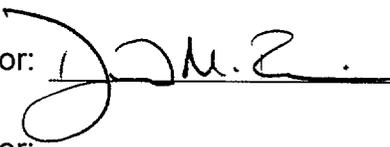
Applicant Type	Evolution Type	Minimum Number	Scenario Number			
			1	2	3	4
RO[2]	Reactivity	1	1			
	Normal	1		2		
	Instrument	2	4	5		
	Component	2	2	7		
	Major	1	6	6		

As RO	Reactivity	1			5	
	Normal	0				
	Instrument	1			4	
	Component	1			3	
	Major	1			7	
SRO-I[2]						
As SRO	Reactivity	0				
	Normal	1		1,2		
	Instrument	1		3,5		
	Component	1		4,7		
	Major	1		6		

SRO-U	Reactivity	0				
	Normal	1				
	Instrument	1				
	Component	1				
	Major	1				

Applicant number inside[ ]

- Instructions:
- (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
  - (2) Reactivity manipulations may be conducted under normal or controlled abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: 

Chief Examiner: \_\_\_\_\_

Operating Test Number: \_\_\_\_\_

Applicant Type	Evolution Type	Minimum Number	Scenario Number			
			1	2	3	4
RO[3]	Reactivity	1		1		
	Normal	1			1	
	Instrument	2		3	8	
	Component	2		4	2,6	
	Major	1		6	7	

As RO	Reactivity	1			5	
	Normal	0				
	Instrument	1			4	
	Component	1			3	
	Major	1			7	
SRO-I[(3)]						
As SRO	Reactivity	0				
	Normal	1	1,3			
	Instrument	1	4			
	Component	1	2,5,7			
	Major	1	6			

SRO-U	Reactivity	0				
	Normal	1				
	Instrument	1				
	Component	1				
	Major	1				

Applicant number inside[ ]

- Instructions:
- (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
  - (2) Reactivity manipulations may be conducted under normal or controlled abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: J.M.P.

Chief Examiner: \_\_\_\_\_

Operating Test Number: \_\_\_\_\_

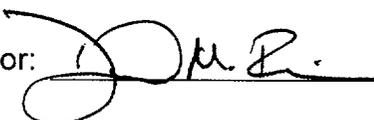
Applicant Type	Evolution Type	Minimum Number	Scenario Number			
			1	2	3	4
RO[4]	Reactivity	1	1			
	Normal	1			1	
	Instrument	2	4		8	
	Component	2	2		2,6	
	Major	1	6		7	

As RO	Reactivity	1			5	
	Normal	0				
	Instrument	1			4	
	Component	1			3	
	Major	1			7	
SRO-I[4]						
As SRO	Reactivity	0				
	Normal	1	1,3			
	Instrument	1	4			
	Component	1	2,5,7			
	Major	1	6			

SRO-U	Reactivity	0				
	Normal	1				
	Instrument	1				
	Component	1				
	Major	1				

Applicant number inside[ ]

- Instructions:
- (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
  - (2) Reactivity manipulations may be conducted under normal or controlled abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author:  \_\_\_\_\_

Chief Examiner: \_\_\_\_\_

Operating Test Number: \_\_\_\_\_

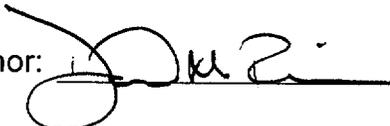
Applicant Type	Evolution Type	Minimum Number	Scenario Number			
			1	2	3	4
RO[5]	Reactivity	1		1		
	Normal	1				1
	Instrument	2		3		5
	Component	2		4		8
	Major	1		6		7

As RO	Reactivity	1				2
	Normal	0				
	Instrument	1				3
	Component	1				4,6
	Major	1				7
SRO-I[5]	Reactivity	0				
	Normal	1		1,2		
	Instrument	1		3,5		
	Component	1		4,7		
	Major	1		6		

SRO-U	Reactivity	0				
	Normal	1				
	Instrument	1				
	Component	1				
	Major	1				

Applicant number inside[ ]

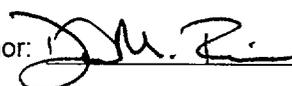
- Instructions:
- (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
  - (2) Reactivity manipulations may be conducted under normal or controlled abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author:  \_\_\_\_\_

Chief Examiner: \_\_\_\_\_

Competencies	Applicant #1 RO SRO-I/SRO-U				Applicant #2 RO SRO-I/SRO-U				Applicant #3 RO SRO-I/SRO-U			
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4
Understand and Interpret Annunciators and Alarms	4,6		2,6,7		4,6	2,6				3,4,6	2,6,7	
Diagnose Events and Conditions	2,6		2,6,7,8		2,6	6,7				3,4,6	2,6,7,8	
Understand Plant and System Response	4,6		6,7,8		4,6	6,7				3,4,6	6,7,8	
Comply With and Use Procedures (1)	1,2,4		1,6		1,2,4	2,7				1,2,3	1,6	
Operate Control Boards (2)	1,2,4,6		1,2,6,7,8		1,2,4,6	1,5,6,7				1,2,3,6	1,2,6,7,8	
Communicate and Interact With the Crew	2,4,6		2,6,7,8		2,4,6	2,5,6,7				3,4,6	2,6,7,8	
Demonstrate Supervisory Ability (3)												
Comply With and Use Tech. Specs. (3)												
Notes:												
(1) Includes Technical Specification compliance for an RO.												
(2) Optional for an SRO-U.												
(3) Only applicable to SROs.												

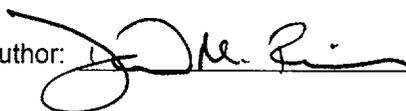
Instructions: Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author: 

Chief Examiner: \_\_\_\_\_

Competencies	Applicant #4 RO SRO-I/SRO-U				Applicant #5 RO SRO-I/SRO-U				Applicant #6 RO SRO-I/SRO-U				
	SCENARIO				SCENARIO				SCENARIO				
	1	2	3	4	1	2	3	4	1	2	3	4	
Understand and Interpret Annunciators and Alarms	4,6		2,6,7			3,4,6		5,7		4,5,6	3,4,6		
Diagnose Events and Conditions	2,6		2,6,7,8			3,4,6		5,7,8		2,5,6	3,4,6		
Understand Plant and System Response	4,6		6,7,8			3,4,6		6,7		4,5,6,7	3,4,6		
Comply With and Use Procedures (1)	1,2,4		1,6			1,2,3		1,5		1,2,4,5,6	1,2,3		
Operate Control Boards (2)	1,2,4,6		1,2,6,7,8			1,2,3,6		1,5,7,8			1,2,3,6		
Communicate and Interact With the Crew	2,4,6		2,6,7,8			3,4,6		5,7,8		1,2,3,4,5,6	3,4,6		
Demonstrate Supervisory Ability (3)										2,4,5,6			
Comply With and Use Tech. Specs. (3)										4,5			
Notes:													
(1) Includes Technical Specification compliance for an RO.													
(2) Optional for an SRO-U.													
(3) Only applicable to SROs.													

Instructions: Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author: 

Chief Examiner: \_\_\_\_\_

Competencies	Applicant #7 RO (SRO-I) SRO-U				Applicant #8 RO (SRO-I) SRO-U				Applicant #9 RO (SRO-I) SRO-U			
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4
Understand and Interpret Annunciators and Alarms		3,4,6	3,4,5,6,7		4,5,6		3,4,5,6,7		4,5,6		3,4,5,6,7	
Diagnose Events and Conditions		3,6	3,4,5,6,7		2,5,6		3,4,5,6,7		2,5,6		3,4,5,6,7	
Understand Plant and System Response		3,4,6	3,4,5,7		4,5,6,7		3,4,5,7		4,5,6,7		3,4,5,7	
Comply With and Use Procedures (1)		1,3,4,6	3,4,5		1,2,4,5,6		3,4,5		1,2,4,5,6		3,4,5	
Operate Control Boards (2)			3,4,5,7				3,4,5,7				3,4,5,7	
Communicate and Interact With the Crew		2,3,4,5,6,7	3,4,5,6,7		1,2,3,4,5,6		3,4,5,6,7		1,2,3,4,5,6		3,4,5,6,7	
Demonstrate Supervisory Ability (3)		1,2,3,4,5,6,7			2,4,5,6				2,4,5,6			
Comply With and Use Tech. Specs. (3)		2,4			4,5				4,5			
Notes:												
(1) Includes Technical Specification compliance for an RO.												
(2) Optional for an SRO-U.												
(3) Only applicable to SROs.												

Instructions: Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author: 

Chief Examiner: \_\_\_\_\_

Competencies	Applicant #10 RO <u>SRO-I</u> / SRO-U											
	SCENARIO											
	1	2	3	4								
Understand and Interpret Annunciators and Alarms		3,4,6		3,4,6,7								
Diagnose Events and Conditions		3,6		3,4,6,7								
Understand Plant and System Response		3,4,6		3,4,6,7								
Comply With and Use Procedures (1)		1,3,4,6		2,3,4,6,7								
Operate Control Boards (2)				2,3,4,6,7								
Communicate and Interact With the Crew		2,3,4,5,6,7		2,3,4,6,7								
Demonstrate Supervisory Ability (3)		1,2,3,4,5,6,7										
Comply With and Use Tech. Specs. (3)		2,4										
Notes:												
(4) Includes Technical Specification compliance for an RO.												
(5) Optional for an SRO-U.												
(6) Only applicable to SROs.												

Instructions: Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author: 

Chief Examiner: \_\_\_\_\_

Facility: Hope Creek Scenario Number: 1 Operating Test Number:       
 Examinees: \_\_\_\_\_ Evaluators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Objectives:

Initial Conditions: Plant is at approximately 35% power during Reactor startup.

Turnover: Continue the startup, raise power, and place necessary equipment in service.

Event Number	Malf. Number	Event Type*	Event Description
1.		R(RO) N(SRO)	Raise reactor power with rods
2.	CD03	C(RO) (SRO)	Stuck Control Rod, recoverable
3.		N(SRO)	Place RFP in service
4.	NM11	I(RO) (SRO)	APRM Failure
5.	CW05	C(SRO)	Loss of SSW Pump, failure to auto start of standby SSW
6.	TC03/ RP06(7)/ TC1-10	M(RO) (SRO)	Turbine Trip/ATWS/Failure of Turbine Bypass Valves to Open
7.	RC09	C(SRO)	RCIC steam line break and automatic isolation failure

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

Facility: Hope Creek Scenario Number: 2 Operating Test Number: \_\_\_\_\_  
 Examinees: \_\_\_\_\_ Evaluators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Objectives:

Initial Conditions: Plant is operating at 93% power following a Minimum Generation Alert. Preparations are complete for a Core Spray In-Service Test.

Turnover: Raise Reactor power to 100%. Complete Core Spray In-Service Test.

Event Number	Malf. Number	Event Type*	Event Description
1.		R(RO) N(SRO)	Raise Reactor power with Recirculation flow
2.	CS01	N(PO) (SRO)	Perform Core Spray In Service Test with pump trip
3.	ANNC6F2/ D3017	I(RO) (SRO)	CRD flow element failure in AUTO
4.	RR11	C(RO) (SRO)	Recirculation pump trip
5.	MC13	I(PO) (SRO)	Condenser level transmitter failure
6.	RR31B2	M(ALL)	Recirculation loop leak/Loss of power to A and B vital busses
7.	RH05	C(PO) (SRO)	C RHR Pump suction strainer clogging
8.			

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

Facility: Hope Creek Scenario Number: 3 Operating Test Number: \_\_\_\_\_  
 Examiners: \_\_\_\_\_ Evaluators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Objectives:

Initial Conditions: Plant is operating at 10 MWE less than 100% power. Preparations are complete for HPCI In-Service Test.

Turnover: Complete HPCI In-Service Test. Return power to 100%.

Event Number	Malf. Number	Event Type*	Event Description
1.		N(PO)	HPCI In-service Test
2.	HP06M	C(PO)	HPCI oil leak
3.	CD10	C(RO)	CRD pump trip
4.	RR19	I(RO)	Recirculation Flow transmitter failure
5.	RR01	R(RO)	Recirculation Pump Speed signal error requiring power reduction
6.	ED09C2	C(PO)	Loss of 1CD482/TACS recovery
7.	MS15	M(RO) (PO)	MSIV closure/Reactor scram/stuck control rods
8.	RC03	I(RO)	RCIC flow controller failure in Auto

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

Facility: Hope Creek Scenario Number: 4 Operating Test Number: \_\_\_\_\_  
 Examinees: \_\_\_\_\_ Evaluators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Objectives:

Initial Conditions: Plant is operating at 22% power. A Reactor startup is in progress. Preparations are complete to synchronize the Main Generator.

Turnover: Synchronize the Main Generator. Continue with the startup. Raise Reactor power with control rods.

Event Number	Malf. Number	Event Type*	Event Description
1.		N(PO)	Synchronize Main Generator
2.		R(RO)	Raise Reactor power with control rods
3.	RS01	I(RO)	RWM Failure
4.	CD02	C(RO)	Control Rod Drift Out
5.	EG02	I(PO)	False Main Generator Core Monitor alarm
6.	CU03/ CU11A(B)	C(RO)	RWCU System leak/Failure to isolate
7.	MS01/ PC04	M(RO) (PO)	Steam leak inside the drywell/Downcomer failure/ Emergency Depressurization
8.	AD02B(B)C	C(PO)	2 ADS SRVs fail to open

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

