

Facility: Oyster Creek Nuclear Station

Printed: 03/22/2006

Date Of Exam: 09/18/2006

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

Note:

1. Ensure that at least two topics from every 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 that are not included on the outline should be added. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 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.
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. 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.

Note: This form deviates from the NUREG-1021 Form ES-401-1 by the addition of the K and A column under the SRO Only Points. This allows sampling all Fuel Handling System KAs as required by ES-401.

BWR SRO Examination Outline

Printed: 03/22/2006

Facility: Oyster Creek Nuclear Station

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1 (RO / SRO)

Form ES-401-1

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic(s)	IR	#
295003 Partial or Complete Loss of AC Pwr / 6					X		AA2.01 - Cause of partial or complete loss of A.C. power	3.7	1
295005 Main Turbine Generator Trip / 3						X	2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	1
295006 SCRAM / 1					X		AA2.06 - Cause of reactor SCRAM	3.8	1
295016 Control Room Abandonment / 7						X	2.2.22 - Knowledge of limiting conditions for operations and safety limits.	4.1	1
295021 Loss of Shutdown Cooling / 4					X		AA2.02 - RHR/shutdown cooling system flow	3.4	1
295026 Suppression Pool High Water Temp. / 5					X		EA2.01 - Suppression pool water temperature	4.2*	1
295038 High Off-Site Release Rate / 9						X	2.4.6 - Knowledge symptom based EOP mitigation strategies.	4.0	1
K/A Category Totals:	0	0	0	0	4	3		Group Point Total:	7

BWR SRO Examination Outline

Printed: 03/22/2006

Facility: Oyster Creek Nuclear Station

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2 (RO / SRO)

Form ES-401-1

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic(s)	IR	#
295007 High Reactor Pressure / 3					X		AA2.03 - Reactor water level	3.7	1
295020 Inadvertent Cont. Isolation / 5 & 7						X	2.1.14 - Knowledge of system status criteria which require the notification of plant personnel.	3.3	1
295034 Secondary Containment Ventilation High Radiation / 9					X		EA2.01 - Ventilation radiation levels	4.2	1
K/A Category Totals:	0	0	0	0	2	1	Group Point Total:		3

BWR SRO Examination Outline

Printed: 03/22/2006

Facility: Oyster Creek Nuclear Station

ES - 401

Plant Systems - Tier 2 / Group 1 (RO / SRO)

Form ES-401-1

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	IR	#
205000 Shutdown Cooling								X				A2.05 - System isolation	3.7	1
215004 Source Range Monitor								X				A2.02 - SRM inop condition	3.7	1
218000 ADS											X	2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. <i>2.2.25</i>	4.0	1
239002 SRVs								X				A2.02 - Leaky SRV	3.2	1
300000 Instrument Air											X	2.4.6 - Knowledge symptom based EOP mitigation strategies.	4.0	1
K/A Category Totals:	0	0	0	0	0	0	0	3	0	0	2	Group Point Total:	5	

BWR SRO Examination Outline

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ES - 401

Plant Systems - Tier 2 / Group 2 (RO / SRO)

Form ES-401-1

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	IR	#
201001 CRD Hydraulic								X				A2.03 - Power supply failures	3.1	1
214000 RPIS											X	2.2.22 - Knowledge of limiting conditions for operations and safety limits.	4.1	1
239001 Main and Reheat Steam											X	2.1.32 - Ability to explain and apply system limits and precautions.	3.8	1
K/A Category Totals:	0	0	0	0	0	0	0	1	0	0	2	Group Point Total:	3	

Generic Knowledge and Abilities Outline (Tier 3)

BWR SRO Examination Outline

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Facility: Oyster Creek Nuclear Station

Form ES-401-3

<u>Category</u>	<u>KA #</u>	<u>Topic</u>	<u>IR</u>	<u>#</u>
Conduct of Operations	2.1.4	Knowledge of shift staffing requirements.	3.4	1
	2.1.25	Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.	3.1	1
	Category Total:			2
Equipment Control	2.2.9	Knowledge of the process for determining if the proposed change, test or experiment increases the probability of occurrence or consequences of an accident during the change, test or experiment.	3.3	1
	2.2.31	Knowledge of procedures and limitations involved in initial core loading.	2.9*	1
	Category Total:			2
Radiation Control	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1
	Category Total:			1
Emergency Plan	2.4.27	Knowledge of fire in the plant procedure.	3.5	1
	2.4.46	Ability to verify that the alarms are consistent with the plant conditions.	3.6	1
	Category Total:			2

Generic Total: 7

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1. Emergency & Abnormal Plant Evolutions	1	4	3	3	N/A			4	3	N/A			3	20	0	0	0	0	0
	2	2	1	1	N/A			1	1	N/A			1	7	0	0	0	0	0
	Tier Totals	6	4	4	N/A			5	4	N/A			4	27	0	0	0	0	0
2. Plant Systems	1	2	2	2	3	2	3	3	2	2	2	3	26	0	0	0	0	0	
	2	1	1	1	1	1	1	1	1	2	1	1	12	0	0	0	0	0	
	Tier Totals	3	3	3	4	3	4	4	3	4	3	4	38	0	0	0	0	0	
3. Generic Knowledge And Abilities Categories				1		2		3		4		10		1	2	3	4	0	
				2		3		3		2				0	0	0	0		

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BWR RO Examination Outline

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Facility: Oyster Creek Nuclear Station

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1 (RO / SRO)

Form ES-401-1

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic(s)	IR	#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4	X						AK1.04 - †Limiting cycle oscillation: Plant-Specific	2.5	1
295003 Partial or Complete Loss of AC Pwr / 6	X						AK1.02 - Load shedding	3.1	1
295004 Partial or Complete Loss of DC Pwr / 6	X						AK1.02 - Redundant D.C. power supplies: Plant-Specific	3.2	1
295004 Partial or Complete Loss of DC Pwr / 6						X	2.1.28 - Knowledge of the purpose and function of major system components and controls.	3.2	1
295005 Main Turbine Generator Trip / 3		X					AK2.07 - Reactor pressure control	3.6	1
295006 SCRAM / 1		X					AK2.06 - Reactor power	4.2*	1
295016 Control Room Abandonment / 7					X		AA2.06 - Cooldown rate	3.3	1
295018 Partial or Total Loss of CCW / 8				X			AA1.01 - Backup systems	3.3	1
295019 Partial or Total Loss of Instrument Air / 8						X	2.1.33 - Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	3.4	1
295021 Loss of Shutdown Cooling / 4				X			AA1.05 - Reactor recirculation	3.0	1
295023 Refueling Acc / 8				X			AA1.04 - Radiation monitoring equipment	3.4	1
295024 High Drywell Pressure / 5		X					EK2.16 - SPDS/ERIS/CRIDS: Plant-Specific	3.2	1
295025 High Reactor Pressure / 3	X						EK1.03 - Safety/relief valve tailpipe temperature/pressure relationships	3.6	1
295026 Suppression Pool High Water Temp. / 5				X			EA1.01 - Suppression pool cooling	4.1	1
295028 High Drywell Temperature / 5			X				EK3.03 - †Drywell spray operation: Mark-I&II	3.6	1
295030 Low Suppression Pool Wtr Lvl / 5					X		EA2.01 - Suppression pool level	4.1*	1
295031 Reactor Low Water Level / 2						X	2.4.31 - Knowledge of annunciators alarms and indications, and use of the response instructions.	3.3	1
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1					X		EA2.02 - Reactor water level	4.1*	1
295038 High Off-Site Release Rate / 9			X				EK3.03 - Control room ventilation isolation: Plant-Specific	3.7	1
600000 Plant Fire On Site / 8			X				AK3.04 - Actions contained in the abnormal procedure for plant fire on site	2.8	1
K/A Category Totals:	4	3	3	4	3	3		Group Point Total:	20

BWR RO Examination Outline

Printed: 03/22/2006

Facility: Oyster Creek Nuclear Station

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2 (RO / SRO)

Form ES-401-1

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic(s)	IR	#
295002 Loss of Main Condenser Vac / 3				X			AA1.06 - Reactor/turbine pressure regulating system	3.0	1
295008 High Reactor Water Level / 2						X	2.1.27 - Knowledge of system purpose and/or function.	2.8	1
295010 High Drywell Pressure / 5					X		AA2.01 - †Leak rates	3.4	1
295029 High Suppression Pool Wtr Lvl / 5			X				EK3.02 - Lowering suppression pool water level	3.6	1
295032 High Secondary Containment Area Temperature / 5	X						EK1.03 - Secondary containment leakage detection: Plant-Specific	3.5	1
295035 Secondary Containment High Differential Pressure / 5		X					EK2.03 - †Off-site release rate	3.3	1
295036 Secondary Containment High Sump/Area Water Level / 5	X						EK1.02 - Electrical ground/ circuit malfunction	2.6*	1
K/A Category Totals:	2	1	1	1	1	1		Group Point Total:	7

BWR RO Examination Outline

Printed: 03/22/2006

Facility: Oyster Creek Nuclear Station

ES - 401

Plant Systems - Tier 2 / Group 1 (RO / SRO)

Form ES-401-1

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	IR	#
205000 Shutdown Cooling							X					A1.02 - SDC/RHR pump flow	3.3	1
207000 Isolation (Emergency) Condenser				X								K4.01 - Isolation of the system in the event of a line break: BWR-2, 3	4.3*	1
207000 Isolation (Emergency) Condenser										X		A4.04 - Vent line radiation levels: BWR-2, 3 A4.06	3.8*	1
209001 LPCS					X							K5.05 - System venting	2.5	1
211000 SLC					X							K5.03 - Shutdown margin	3.2	1
211000 SLC									X			A3.02 - Tank level: Plant-Specific	3.9	1
212000 RPS								X				A2.11 - Main steamline isolation valve closure	4.0	1
215003 IRM						X						K6.05 - Trip units	3.1	1
215003 IRM											X	2.1.14 - Knowledge of system status criteria which require the notification of plant personnel.	2.5	1
215004 Source Range Monitor						X						K6.05 - Trip units	2.6	1
215005 APRM/LPRM							X					A1.04 - SCRAM and rod block trip setpoints	4.1	1
215005 APRM/LPRM											X	2.1.32 - Ability to explain and apply system limits and precautions.	3.4	1
218000 ADS			X									K3.01 - Restoration of reactor water level after a break that does not depressurize the reactor when required	4.4*	1
223002 PCIS/Nuclear Steam Supply Shutoff	X											K1.14 - Containment drainage system	2.8	1
239002 SRVs						X						K6.01 - Nuclear boiler instrument system (pressure indication)	3.2	1
259002 Reactor Water Level Control				X								K4.09 - Single element control (reactor water level provides the only input)	3.1	1
261000 SGTS							X					A1.06 - Drywell and suppression chamber differential pressure: Mark-I	2.7	1
261000 SGTS									X			A3.01 - System flow	3.2	1
262001 AC Electrical Distribution			X									K3.02 - Emergency generators	3.8	1

BWR RO Examination Outline

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Facility: Oyster Creek Nuclear Station

ES - 401

Plant Systems - Tier 2 / Group 1 (RO / SRO)

Form ES-401-1

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	IR	#
262001 AC Electrical Distribution											X	2.4.6 - Knowledge symptom based EOP mitigation strategies.	3.1	1
262002 UPS (AC/DC)	X											K1.14 - Main steam line radiation monitors: Plant-Specific	2.8	1
263000 DC Electrical Distribution		X										K2.01 - Major D.C. loads	3.1	1
264000 EDGs				X								K4.03 - Speed droop control	2.5	1
264000 EDGs										X		A4.03 - Transfer of emergency control between manual and automatic	3.2	1
300000 Instrument Air								X				A2.01 - Air dryer and filter malfunctions	2.9	1
400000 Component Cooling Water		X										K2.02 - CCW valves	2.9	1
K/A Category Totals:	2	2	2	3	2	3	3	2	2	2	3	Group Point Total:	26	

BWR RO Examination Outline

Printed: 03/22/2006

Facility: Oyster Creek Nuclear Station

ES - 401

Plant Systems - Tier 2 / Group 2 (RO / SRO)

Form ES-401-1

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	IR	#
201001 CRD Hydraulic										X		A4.01 - CRD pumps	3.1	1
201002 RMCS									X			A3.04 - Rod movement sequence timer malfunction alarm: Plant-Specific	2.8	1
202001 Recirculation								X				A2.17 - Loss of seal cooling water	3.1	1
202002 Recirculation Flow Control											X	2.1.33 - Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	3.4	1
204000 RWCU						X						K6.07 - SBLC logic	3.3	1
214000 RPIS	X											K1.01 - RWM: Plant-Specific	3.0	1
215001 Traversing In-Core Probe									X			A3.03 - Valve operation: Not-BWR1	2.5*	1
223001 Primary CTMT and Aux.							X					A1.06 - Oxygen concentration	3.1	1
233000 Fuel Pool Cooling/Clean-up				X								K4.06 - Maintenance of adequate pool level	2.9	1
245000 Main Turbine Generator/Aux					X							K5.02 - Turbine operation and limitations	2.8	1
259001 Reactor Feedwater		X										K2.01 - Reactor feedwater pump(s): Motor-Driven-Only	3.3	1
286000 Fire Protection			X									K3.01 - The ability to detect fires	3.2	1
K/A Category Totals:	1	1	1	1	1	1	1	1	2	1	1	Group Point Total:	12	

Generic Knowledge and Abilities Outline (Tier 3)

BWR RO Examination Outline

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Facility: Oyster Creek Nuclear Station

Form ES-401-3

<u>Category</u>	<u>KA #</u>	<u>Topic</u>	<u>IR</u>	<u>#</u>
Conduct of Operations	2.1.8	Ability to coordinate personnel activities outside the control room.	3.8	1
	2.1.19	Ability to use plant computer to obtain and evaluate parametric information on system or component status.	3.0	1
	Category Total:			2
Equipment Control	2.2.1	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.	3.7	1
	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	4.0	1
	2.2.28	Knowledge of new and spent fuel movement procedures.	2.6	1
	Category Total:			3
Radiation Control	2.3.2	Knowledge of facility ALARA program.	2.5	1
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	2.5	1
	2.3.9	Knowledge of the process for performing a containment purge.	2.5	1
	Category Total:			3
Emergency Plan	2.4.2	Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.	3.9	1
	2.4.32	Knowledge of operator response to loss of all annunciators.	3.3	1
	Category Total:			2

Generic Total: 10

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	2	2	1	1	N/A			1	1	N/A			1	7	0	0	0	0	0
	Tier Totals	6	4	4	N/A			5	4	N/A			4	27	0	0	0	0	0
2. Plant Systems	1	2	2	2	3	2	3	3	2	2	2	3	26	0	0	0	0	0	
	2	1	1	1	1	1	1	1	1	2	1	1	12	0	0	0	0	0	
	Tier Totals	3	3	3	4	3	4	4	3	4	3	4	38	0	0	0	0	0	
3. Generic Knowledge And Abilities Categories					1		2		3		4		10	1	2	3	4	0	
					2		3		3		2			0	0	0	0		

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ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1 (RO / SRO)

Form ES-401-

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295003 Partial or Complete Loss of AC Pwr / 6	X						AK1.02 - Load shedding	3.1	1
295004 Partial or Complete Loss of DC Pwr / 6	X						AK1.02 - Redundant D.C. power supplies: Plant-Specific	3.2	1
295004 Partial or Complete Loss of DC Pwr / 6						X	2.1.28 - Knowledge of the purpose and function of major system components and controls.	3.2	1
295005 Main Turbine Generator Trip / 3		X					AK2.07 - Reactor pressure control	3.6	1
295006 SCRAM / 1		X					AK2.06 - Reactor power	4.2*	1
295016 Control Room Abandonment / 7					X		AA2.06 - Cooldown rate	3.3	1
295018 Partial or Total Loss of CCW / 8				X			AA1.01 - Backup systems	3.3	1
295019 Partial or Total Loss of Instrument Air / 8						X	2.1.33 - Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	3.4	1
295021 Loss of Shutdown Cooling / 4				X			AA1.05 - Reactor recirculation	3.0	1
295023 Refueling Acc / 8				X			AA1.04 - Radiation monitoring equipment	3.4	1
295024 High Drywell Pressure / 5		X					EK2.16 - SPDS/ERIS/CRIDS: Plant-Specific	3.2	1
295025 High Reactor Pressure / 3	X						EK1.03 - Safety/relief valve tailpipe temperature/pressure relationships	3.6	1
295026 Suppression Pool High Water Temp. / 5				X			EA1.01 - Suppression pool cooling	4.1	1
295028 High Drywell Temperature / 5			X				EK3.03 - †Drywell spray operation: Mark-I&II	3.6	1
295030 Low Suppression Pool Wtr Lvl / 5					X		EA2.01 - Suppression pool level	4.1*	1
295031 Reactor Low Water Level / 2						X	2.4.31 - Knowledge of annunciators alarms and indications, and use of the response instructions.	3.3	1
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1					X		EA2.02 - Reactor water level	4.1*	1
295038 High Off-Site Release Rate / 9			X				EK3.03 - Control room ventilation isolation: Plant-Specific	3.7	1

BWR RO Examination Outline

Printed: 07/28/2006

Facility: Oyster Creek Nuclear Station

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1 (RO / SRO)

Form ES-401-

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic(s)	IR	#
600000 Plant Fire On Site / 8			X				AK3.04 - Actions contained in the abnormal procedure for plant fire on site	2.8	1
K/A Category Totals:	4	3	3	4	3	3	Group Point Total:	20	

BWR RO Examination Outline

Printed: 07/28/2006

Facility: Oyster Creek Nuclear Station

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2 (RO / SRO)

Form ES-401-

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic(s)	IR	#
295002 Loss of Main Condenser Vac / 3				X			AA1.06 - Reactor/turbine pressure regulating system	3.0	1
295008 High Reactor Water Level / 2						X	2.1.27 - Knowledge of system purpose and/or function.	2.8	1
295010 High Drywell Pressure / 5					X		AA2.01 - †Leak rates	3.4	1
295029 High Suppression Pool Wtr Lvl / 5			X				EK3.02 - Lowering suppression pool water level	3.6	1
295032 High Secondary Containment Area Temperature / 5	X						EK1.03 - Secondary containment leakage detection: Plant-Specific	3.5	1
295035 Secondary Containment High Differential Pressure / 5		X					EK2.03 - †Off-site release rate	3.3	1
295036 Secondary Containment High Sump/Area Water Level / 5	X						EK1.02 - Electrical ground/ circuit malfunction	2.6*	1
K/A Category Totals:	2	1	1	1	1	1		Group Point Total:	7

BWR RO Examination Outline

Printed: 07/28/2

Facility: Oyster Creek Nuclear Station

ES - 401

Plant Systems - Tier 2 / Group 1 (RO / SRO)

Form ES-4

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	IR
205000 Shutdown Cooling							X					A1.02 - SDC/RHR pump flow	3.3
207000 Isolation (Emergency) Condenser				X								K4.01 - Isolation of the system in the event of a line break: BWR-2, 3	4.3*
207000 Isolation (Emergency) Condenser										X		A4.06 - Shell side makeup valves: BWR-2, 3	3.8*
209001 LPCS					X							K5.05 - System venting	2.5
211000 SLC					X							K5.03 - Shutdown margin	3.2
211000 SLC									X			A3.02 - Tank level: Plant-Specific	3.9
212000 RPS								X				A2.11 - Main steamline isolation valve closure	4.0
215003 IRM						X						K6.05 - Trip units	3.1
215003 IRM											X	2.1.14 - Knowledge of system status criteria which require the notification of plant personnel.	2.5
215004 Source Range Monitor						X						K6.05 - Trip units	2.6
215005 APRM/LPRM							X					A1.04 - SCRAM and rod block trip setpoints	4.1
215005 APRM/LPRM											X	2.1.32 - Ability to explain and apply system limits and precautions.	3.4
218000 ADS			X									K3.01 - Restoration of reactor water level after a break that does not depressurize the reactor when required	4.4*
223002 PCIS/Nuclear Steam Supply Shutoff	X											K1.14 - Containment drainage system	2.8
239002 SRVs						X						K6.01 - Nuclear boiler instrument system (pressure indication)	3.2
259002 Reactor Water Level Control				X								K4.09 - Single element control (reactor water level provides the only input)	3.1
261000 SGTS							X					A1.06 - Drywell and suppression chamber differential pressure: Mark-I	2.7
261000 SGTS									X			A3.01 - System flow	3.2

BWR RO Examination Outline

Printed: 07/28/2

Facility: Oyster Creek Nuclear Station

ES - 401

Plant Systems - Tier 2 / Group 1 (RO / SRO)

Form ES-4

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	IR
262001 AC Electrical Distribution			X									K3.02 - Emergency generators	3.8
262001 AC Electrical Distribution											X	2.4.6 - Knowledge symptom based EOP mitigation strategies.	3.1
262002 UPS (AC/DC)	X											K1.14 - Main steam line radiation monitors: Plant-Specific	2.8
263000 DC Electrical Distribution		X										K2.01 - Major D.C. loads	3.1
264000 EDGs				X								K4.03 - Speed droop control	2.5
264000 EDGs										X		A4.03 - Transfer of emergency control between manual and automatic	3.2
300000 Instrument Air								X				A2.01 - Air dryer and filter malfunctions	2.9
400000 Component Cooling Water		X										K2.02 - CCW valves	2.9
K/A Category Totals:	2	2	2	3	2	3	3	2	2	2	3	Group Point Total: 28.3	

BWR RO Examination Outline

Printed: 07/28/2

Facility: Oyster Creek Nuclear Station

ES - 401

Plant Systems - Tier 2 / Group 2 (RO / SRO)

Form ES-4/

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	IR
201001 CRD Hydraulic										X		A4.01 - CRD pumps	3.1
201002 RMCS									X			A3.04 - Rod movement sequence timer malfunction alarm: Plant-Specific	2.8
202001 Recirculation								X				A2.17 - Loss of seal cooling water	3.1
202002 Recirculation Flow Control											X	2.1.33 - Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	3.4
204000 RWCU						X						K6.07 - SBLC logic	3.3
214000 RPIS	X											K1.01 - RWM: Plant-Specific	3.0
215001 Traversing In-Core Probe									X			A3.03 - Valve operation: Not-BWR1	2.5*
223001 Primary CTMT and Aux.							X					A1.06 - Oxygen concentration	3.1
233000 Fuel Pool Cooling/Clean-up				X								K4.06 - Maintenance of adequate pool level	2.9
245000 Main Turbine Generator/Aux					X							K5.02 - Turbine operation and limitations	2.8
259001 Reactor Feedwater		X										K2.01 - Reactor feedwater pump(s): Motor-Driven-Only	3.3
286000 Fire Protection			X									K3.01 - The ability to detect fires	3.2
K/A Category Totals:	1	1	1	1	1	1	1	1	2	1	1	Group Point Total:	

Generic Knowledge and Abilities Outline (Tier 3)

BWR RO Examination Outline

Printed: 07/28/2006

Facility: Oyster Creek Nuclear Station

Form ES-401-3

<u>Category</u>	<u>KA #</u>	<u>Topic</u>	<u>IR</u>	<u>#</u>
Conduct of Operations	2.1.8	Ability to coordinate personnel activities outside the control room.	3.8	1
	2.1.19	Ability to use plant computer to obtain and evaluate parametric information on system or component status.	3.0	1
	Category Total:			2
Equipment Control	2.2.1	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.	3.7	1
	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	4.0	1
	2.2.28	Knowledge of new and spent fuel movement procedures.	2.6	1
	Category Total:			3
Radiation Control	2.3.2	Knowledge of facility ALARA program.	2.5	1
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	2.5	1
	2.3.9	Knowledge of the process for performing a containment purge.	2.5	1
	Category Total:			3
Emergency Plan	2.4.2	Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.	3.9	1
	2.4.32	Knowledge of operator response to loss of all annunciators.	3.3	1
	Category Total:			2

Generic Total: 10

Facility: <u>Oyster Creek</u>		Date of Examination: <u>9/18/2006</u>
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: <u>NRC 2006-1</u>
Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, S	Perform Manual Heat Balance Calculation (G2.1.7)
Conduct of Operations	N, S	Perform Core Daily Checks (G2.1.2)
Equipment Control	N, R	Plan a Clearance (Tagout) (G2.2.13)
Radiation Control	M, R	Determine Radiation/Contamination Area Access Requirements Based on Current Exposure, Survey Map, and Administrative Limits (G2.3.1)
Emergency Plan		
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 5 are required.		
* Type Codes & Criteria:		
(C)ontrol room, (S)imulator, or Class(R)oom		
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)		
(N)ew or (M)odified from bank (≥ 1)		
(P)revious 2 exams (≤ 1 ; randomly selected)		

Facility: <u>Oyster Creek</u>		Date of Examination: <u>9/18/2006</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: <u>NRC 2006-1</u>
Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M, R	Review/Approve Manual Heat Balance Calculation (G2.1.7)
Conduct of Operations	M, R	Determine Shift Operating Compliment (G2.1.4)
Equipment Control	M, R	Evaluate Surveillance Acceptance Criteria (Containment Spray System IST) (G2.2.12)
Radiation Control	N, R	Determine if Plant Operator Can Access Radiation Area Based on Current Exposure and Emergency Limits (G2.3.1)
Emergency Plan	M, R	Make an Emergency Plan Classification and Complete Notification Form (G2.4.41)
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: <ul style="list-style-type: none"> (C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) (N)ew or (M)odified from bank (≥ 1) (P)revious 2 exams (≤ 1; randomly selected) 		

Facility: <u>Oyster Creek</u>		Date of Examination: <u>9/18/2006</u>
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test Number: <u>NRC 2006-1</u>
Control Room Systems [@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. Respond to a Power Oscillation (Recirc Flow Oscillations) w/ Recirc Pump Discharge Valve Failure to Close (202002 A2.01)	M, A, S	1
b. Place a Second RWCU Pump in Service (204000 A4.01)	D, S	2
c. Perform EMRV Operability Test w/ Stuck Open EMRV (239002 A2.03)	N, A, S, L	3
d. Shutdown Core Spray After an Inadvertent Initiation w/ CS Booster Pump Failure to Trip (209001 A4.01)	D, A, S	4
e. Vent the Torus for Hydrogen Control (500000 EA1.03)	N, S, L	5
f. Perform Emergency Diesel Generator Load Test w/ Engine High Temperature Alarm (264000 A4.04)	M, A, S	6
g. Bypass RPS Scram Logic Trips (295037 EA1.01)	D, S	7
h. Shutdown SGTS After Auto Initiation w/ Reactor Building Supply Fan Trip (288000 A4.01)	M, A, S	9
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Align Core Spray to the CST for Emergency Operations (295030 EA1.01)	D, E, R	2
j. Remove Static Charger C1 From Service (263000 K1.02)	D, R	6
k. Lineup Firewater to "A" Isolation Condenser (286000 G2.4.35)	D, E, R	8
<p>[@] All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.</p>		
*Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path	4-6 / 4-6 / 2-3	
(C)ontrol room		
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4	
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1	
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1	
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	
(R)CA	≥ 1 / ≥ 1 / ≥ 1	
(S)imulator		

Facility: <u>Oyster Creek</u>		Date of Examination: <u>9/18/2006</u>
Exam Level: RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test Number: <u>NRC 2006-1</u>
Control Room Systems [@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. Respond to a Power Oscillation (Recirc Flow Oscillations) w/ Recirc Pump Discharge Valve Failure to Close (202002 A2.01)	M, A, S	1
b.		
c. Perform EMRV Operability Test w/ Stuck Open EMRV (239002 A2.03)	N, A, S, L	3
d. Shutdown Core Spray After an Inadvertent Initiation w/ CS Booster Pump Failure to Trip (209001 A4.01)	D, A, S	4
e. Vent the Torus for Hydrogen Control (500000 EA1.03)	N, S, L	5
f. Perform Emergency Diesel Generator Load Test w/ Engine High Temperature Alarm (264000 A4.04)	M, A, S	6
g. Bypass RPS Scram Logic Trips (295037 EA1.01)	D, S	7
h. Shutdown SGTS After Auto Initiation w/ Reactor Building Supply Fan Trip (288000 A4.01)	M, A, S	9
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Align Core Spray to the CST for Emergency Operations (295030 EA1.01)	D, E, R	2
j. Remove Static Charger C1 From Service (263000 K1.02)	D, R	6
k. Lineup Firewater to "A" Isolation Condenser (286000 G2.4.35)	D, E, R	8
<p>[@] All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.</p>		
*Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path	4-6 / 4-6 / 2-3	
(C)ontrol room		
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4	
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1	
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1	
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	
(R)CA	≥ 1 / ≥ 1 / ≥ 1	
(S)imulator		

Facility: <u>Oyster Creek</u>		Date of Examination: <u>9/18/2006</u>
Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>		Operating Test Number: <u>NRC 2006-1</u>
Control Room Systems [®] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a.		
b.		
c. Perform EMRV Operability Test w/ Stuck Open EMRV (239002 A2.03)	N, A, S, L	3
d. Shutdown Core Spray After an Inadvertent Initiation w/ CS Booster Pump Failure to Trip (209001 A4.01)	D, A, S	4
e.		
f.		
g.		
h. Shutdown SGTS After Auto Initiation w/ Reactor Building Supply Fan Trip (288000 A4.01)	M, A, S	9
In-Plant Systems [®] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Align Core Spray to the CST for Emergency Operations (295030 EA1.01)	D, E, R	2
j.		
k. Lineup Firewater to "A" Isolation Condenser (286000 G2.4.35)	D, E, R	8
® All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		
*Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path	4-6 / 4-6 / 2-3	
(C)ontrol room		
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4	
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1	
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1	
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	
(R)CA	≥ 1 / ≥ 1 / ≥ 1	
(S)imulator		

Facility: Oyster CreekScenario No.: NRC 1Op Test No.: NRC 2006-1

Examiners: _____ Operators: _____

Initial Conditions:

- The reactor is starting up, after a 5-day forced outage, with the MODE SWITCH in STARTUP.
- Cleanup Pump B is out of service for motor replacement, and is expected to return to service tomorrow.
- Isolation Condenser System A was removed from service two hours ago and is isolated, due to motor operated valve torque switch replacement. Technical Specifications applicability has been reviewed. The system is expected to return to an operable status in 4 hours.
- IRM 14 failed during the control rod withdrawal to critical, and is BYPASSED. Technical Specifications applicability has been reviewed and an IR has been generated.
- Surveillance test 607.4.004, Containment Spray and Emergency Service Water System/Pump Operability and Comprehensive/Preservice/Post-Maintenance Inservice Test, is in progress at step 6.14 for a normal surveillance. The system has been in operation for 15 minutes.
- Instrument Maintenance is calibrating the drywell wide range pressure transmitters IAW 604.3.018, Wide Range Drywell Pressure Calibration.

Turnover:

- Transfer from the Low Flow Regulating Valve (LFRV) to the Main Flow Regulating Valve (MFRV), then continue raising power IAW procedure 201, Plant Startup.

Event No.	Malf. No.	Event Type*		Event Description
1		N	BOP	Transfers from Low Flow Regulating Valve (LFRV) to the Main Feed Regulating Valve (MFRV).
2		R	RO	Withdraw control rods.
3		TS	SRO	Respond to inoperability of Wide Range Drywell Pressure Monitor (PT-53).
4		C	RO	Respond to Control Rod Drive Flow Control Valve (CRD FCV) failed closed.
5		C TS	BOP SRO	Respond to Emergency Service Water (ESW) trouble alarm. <i>END ALARM MONITOR - DEALING</i>
6		C	RO	Respond to Intermediate Range Monitor (IRM) which fails low.
7		C	BOP	Respond to Electronic Pressure Regulator (EPR) fluctuations.
8		M	Crew	Respond to failure of the Mechanical Pressure Regulator (MPR) and Anticipated Trip Without Scram (ATWS) (electric).
9		M	Crew	Respond to a LOCA.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor Transient, (TS) Tech Spec

Total Malfunctions (5-8):	8
Malfunctions after EOP entry (1-2)	1
Abnormal Events (2-4)	3
Major Transients (1-2)	2
EOPs entered requiring substantive actions (1-2)	2
EOP Contingencies w/ substantive actions (0-2)	0
Critical Tasks (2-3)	2

Event	Type	Position	Description
2	R	RO	Withdraw control rods
4	C	RO	Loss of CRD FCV
6	C	RO	Drifting low IRM

Event	Type	Position	Description
1	N	BOP	LFRV to MFRV transfer
5	C	BOP	ESW pump high amps
7	C	BOP	EPR Fluctuations

Event	Type	Position	Description
8	M	Crew	MPR failure plus ATWS
9	M	Crew	Small steam LOCA in primary containment

Event	Type	Position	Description
3	TS	SRO	Loss of DW wide range pressure transmitter (3.13.E)
5	TS	SRO	Loss of ESW Pump (3.4.C.4)

Scenario Summary

The scenario will begin with the Containment Spray and Emergency Service Water System/Pump Operability and Comprehensive/Preservice/Post-Maintenance Inservice Test in progress (607.4.004). The test is at step 6.14, waiting for the system run time of 1 hour. Also, Instrument Maintenance is calibrating the drywell wide range pressure transmitters PT-53 (IAW 604.3.018, Wide Range Drywell Pressure Calibration).

1. The BOP will successfully transfer from the LFRV to the MFRV per procedure (This will be directed by procedure 201, step 6.57, and performed in procedure 317, step 6.3.15) **(NORMAL EVOLUTION)**
2. The RO will withdraw control rods (a noticeable change in reactor power) IAW procedure 201, Plant Startup. **(REACTIVITY MANIPULATION)**
3. The SRO will receive a call from the field that drywell wide range pressure transmitter (PT-53) cannot be left in-spec per the calibration procedure. The SRO will declare the instrument inoperable and apply TS 3.13.E. **(TS)**
4. The CRD FCV (NC30A) will fail closed. Several panel indications are available to diagnose the problem. The RO will swap to the alternate FCV IAW procedure 302.1 (Control Rod Drive System), step 4.3.3. ABN-6, Control Rod Drive System may be entered. **(COMPONENT FAILURE) (ABN)**
5. The ESW pump will develop high amps (70 amps gives B6a alarm, and trip at 160 amps). It is expected that the BOP will secure the pump prior to the trip IAW the RAP. If not, the pump will trip. SRO applies Tech Specs 3.4.5C.4. The BOP is expected to shutdown the containment spray surveillance. **(COMPONENT FAILURE) (TS) (ABN)**
6. An IRM will fail low causing a rodblock (RAP-G1e, G2e). The IRM can be bypassed, and the rodblock cleared. The SRO will verify TS, and that no actions are required. (TS 3.1.1) **(COMPONENT FAILURE)**
7. Small oscillations in the EPR begins, which affect power, level and pressure. (ABN-34, Power Oscillations, may be entered.) ABN-9, EPR Malfunctions, should be entered. It is expected that the BOP will transfer to the Mechanical Pressure Regulator (MPR) IAW 315.4, Transferring Pressure Regulators. **(COMPONENT FAILURE) (ABN)**
8. The MPR will fail causing all turbine bypass valves (TBVs) to go closed, causing RPV pressure to increase. The RO may attempt to scram prior to the

RPV high pressure scram setpoint, but an electrical ATWS will occur and no control rods will insert. The crew will enter RPV Control – With ATWS. The crew will insert control rods by venting the scram air header (IAW SP-21, Alternate Insertion of Control Rods). RPV pressure control will be available with one loop of isolation condensers and electromatic relief valves (EMRVs). **(EOP) (MAJOR)**

9. A small steam LOCA in the primary containment will require the Crew to enter the Primary Containment Control EOP. The operator will spray the containment (IAW SP-29, Initiation of the Containment Spray System for Drywell Sprays). **(EOP) (MAJOR)**

Facility: Oyster CreekScenario No.: NRC 2Op Test No.: NRC 2006-1

Examiners: _____

Operators: _____

Initial Conditions:

- The plant is in 4-loop operation at 100% power.
- Cleanup Pump B is out of service for motor replacement, and is expected to return to service tomorrow.
- Isolation Condenser System A was removed from service two hours ago and is isolated, due to motor operated valve torque switch replacement. Technical Specifications applicability has been reviewed. The system is expected to return to an operable status in 4 hours.
- IRM 14 failed during the control rod withdrawal to critical, and is **BYPASSED**. Technical Specifications applicability has been reviewed and an IR has been generated.
- Surveillance procedure 604.4.016, Torus to Drywell Vacuum Breaker Operability and In-Service Test, is in-progress for a normal surveillance.
- The main generator is in manual voltage control. The amplidyne is ready to be placed back into service following minor maintenance, IAW 336.1, 24 KV Main Generator Electrical System.

Turnover:

- Restore the amplidyne to service and transfer the main generator from manual voltage control to automatic voltage control IAW 336.1.

Event No.	Malf. No.	Event Type*		Event Description
1		N	BOP	Restore the amplidyne to service and transfer the main generator from manual voltage control to automatic voltage control.
2		TS	SRO	Respond to Drywell-Torus vacuum breaker fail to close.
3		R C TS	RO BOP SRO	Respond to Reactor Recirculation Pump alarms.
4		I	RO	Respond to failure of RPV water level input to Feed Water Level Control System (LT ID13A and LT ID13C). LEAK
5		C	BOP RO	Respond to indications of low TBCCW pressure.
6		C	RO	Respond to failure of Average Power Range Monitor (APRM).
7		M	Crew	Respond to main generating overheating.
8		M	BOP	Respond to steam leak in the primary containment with failure of the Containment Spray system.
9		C	Crew	Respond to failure of primary containment to automatically isolate.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor Transient, (TS) Tech Specs

Total Malfunctions (5-8):	8
Malfunctions after EOP entry (1-2)	2
Abnormal Events (2-4)	4
Major Transients (1-2)	2
EOPs entered requiring substantive actions (1-2)	1
EOP Contingencies w/ substantive actions (0-2)	1
Critical Tasks (2-3)	2

Event	Type	Position	Description
3	R	RO	Respond to recirculation pump alarms
4	I	RO	Respond to failure of RPV level input to FWLC (LT ID13A and LT ID13C).
6	C	RO	Respond to failure of APRM.

Event	Type	Position	Description
1	N	BOP	Restore amplidyne
3	C	BOP	Respond to recirculation pump alarms
5	C	BOP	Respond to indications of low TBCCW pressure

Event	Type	Position	Description
7	M	Crew	Respond to main generating overheating
8	M	Crew	Respond to steam leak in the drywell with failure of containment spray
9	C	RO/BOP	Respond to failure of drywell equipment drain isolation valves to auto close on the primary containment isolation signal (V-22-1, V-22-2)

Event	Type	Position	Description
2	TS	SRO	Respond to vacuum breaker failure
3	TS	SRO	Respond to recirculation pump alarms

Scenario Summary

The scenario will begin with field personnel continuing the drywell-torus vacuum breaker surveillance test. No actions are taken by control room operators except communicating with the field personnel and annunciation acknowledgement. The last valve is to be tested. Field personnel will continue with the surveillance after being notified by the control room that the test may reconvene (after placing the amplidyne in service).

1. The BOP will swap from main generator manual voltage control to automatic voltage control IAW 336.1, 24 KV Main Generator Electrical System. **(NORMAL EVOLUTION)**

2. Operators in the field are performing the DW/Torus vacuum breaker exercise test. The last vacuum breaker tested, opens with a little more resistance than the others, makes a strange noise when fully opened, then remains open after being allowed to close. Alarms of the open valve are present in the control room. The SRO will declare the valve inoperable and applies TS 3.5.A.5 **(TS)**

3. The operators will respond to alarms for a recirculation pump. Alarms for low oil and high vibrations (RAP-E2d, RAP-E6d) will require an immediate pump trip by the BOP. The RO will make changes to power to ensure recirc pump limitations and power/flow considerations are met (recirc flow and/or CRAM rods). The SRO will apply TS 3.3.F, Recirc Loop Operability, and 3.10.A, Core Limits (as required by the Core Operating Limits Report). **(COMPONENT FAILURE) (REACTIVITY MANIPULATION) (TS) (ABN)**

4. The RO will respond to a leak in the common leg to RPV water level transmitters ID13A and ID13C which input to feed water level control. The crew will enter ABN-17, Feedwater System Abnormal Conditions. The RO will take manual control of feed water and return water level to the normal band. (The RO may swap level transmitters to Feedwater Level Control IAW procedure 317, Feedwater System (Feed Pumps to Reactor Vessel)). **(INSTRUMENT FAILURE)**

5. One of the operating TBCCW pumps will develop a sheared shaft, and the low system pressure switch to start the standby pump will not function. The H2 System Trouble annunciator will alarm. The BOP will deduct the reduced system pressure and start another TBCCW pump IAW ABN-20, TBCCW Failure Response. **(COMPONENT FAILURE) (ABN)**

6. The next event is a loss of an APRM causing the APRM to be INOP. The RO will bypass the APRM and reset the ½ scram. The SRO will verify compliance with Tech Specs. **(COMPONENT FAILURE)**

7. The crew will receive the Generator Core Monitor annunciator (RAP-R8c). Local indications will require tripping the generator (although the SRO may direct power reductions first). **(MAJOR) (ABN)**

8. A steam leak in the primary containment occurs and the crew will enter the Primary Containment Control EOP. Because a drywell-to-torus vacuum breaker is open, the pressure suppression function of the torus is lost/reduced. The containment spray system will not function. The SRO will direct emergency depressurization (IAW Emergency Depressurization – No ATWS) as primary suppression pressure limits are approached. **(MAJOR) (EOP) (COMPONENT FAILURE) (EOP CONTINGENCY)**

9. The Operators will recognize that the drywell equipment drain isolation valves failed to close on a primary containment isolation signal and will manually close the valves (V-22-1 and V-22-2) (**COMPONENT FAILURE**)