

**Final Submittal**  
**BROWNS FERRY**  
**EXAM 2002-301**  
**50-259, 50-260, & 50-296**

**DECEMBER 13, 16-19, 2002**

**FINAL SAMPLE PLANS / OUTLINES ✓**

Facility: <b>Browns Ferry</b>		Date of Exam: <b>Dec. 2002</b>		Exam Level: <b>SRO</b>									
Tier	Group	K/A Category Points											Point Total
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	
1. Emergency & Abnormal Plant Evolution	1	4	4	4				5	5			4	26
	2	3	3	3				3	3			2	17
	Tier Totals	7	7	7				8	8			6	43
2. Plant Systems	1	2	2	3	2	2	2	2	2	2	2	2	23
	2	1	0	2	2	2	1	1	1	1	1	1	13
	3	1	0	0	1	1	0	0	0	0	1	0	4
	Tier Totals	4	2	5	5	5	3	3	3	3	4	3	40
3. Generic Knowledge and Abilities							Cat 1	Cat 2	Cat 3	Cat 4	17		
							4	4	3	6			
<p>Note: 1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).</p> <p>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 <math>\pm 1</math> from that specified in the table based on NRC revisions. The final exam must total 100 points.</p> <p>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.</p> <p>4. Systems/evolutions within each group are identified on the associated outline.</p> <p>5. The shaded areas are not applicable to the category/tier.</p> <p>6.* The generic 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.</p> <p>7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the SRO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.</p>													

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
295003 Partial or Complete Loss of AC Pwr / 6	X					X	AK1.02 Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER: Load shedding. *G2.1.12 Ability to apply technical specifications for a system.	3.1/3.4 2.9/4.0	1 1
295006 SCRAM / 1					X		*AA2.03 Ability to determine and/or interpret the following as they apply to SCRAM: Reactor water level.	4.0/4.2	1
295007 High Reactor Pressure / 3	X						AK1.01 Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR PRESSURE: Pump shutoff head.	2.9/3.2	1
295009 Low Reactor Water Level / 2		X					AK2.01 Knowledge of the interrelations between LOW REACTOR WATER LEVEL and the following: Reactor water level indication.	3.9/4.0	1
295010 High Drywell Pressure / 5				X			AA1.01 Ability to operate and/or monitor the following as they apply to HIGH DRYWELL PRESSURE: Drywell ventilation/cooling.	3.8/4.0	1
295013 High Suppression Pool Temp. / 5			X				AK3.02 Knowledge of the reasons for the following responses as they apply to HIGH SUPPRESSION POOL TEMPERATURE: Limiting heat additions.	3.6/3.8	1
295014 Inadvertent Reactivity Addition / 1				X	X		AA1.03 Ability to operate and/or monitor the following as they apply to INADVERTENT REACTIVITY ADDITION: RMCS. *AA2.03 Ability to determine and/or interpret the following as they apply to INADVERTENT REACTIVITY ADDITION: Cause of reactivity addition.	3.5/3.5 4.0/4.3	1 1
295015 Incomplete SCRAM / 1		X					AK2.09 Knowledge of the interrelations between INCOMPLETE SCRAM and the following: RPIS.	3.5/3.6	1
295016 Control Room Abandonment / 7				X		X	AA1.08 Ability to operate and/or monitor the following as they apply to CONTROL ROOM ABANDONMENT: Reactor pressure. *G2.2.3 Knowledge of the design / procedural / and operational differences between units.	4.0/4.0 3.1/3.3	1 1
295017 High Off-site Release Rate / 9					X		*AA2.04 Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE: Source of off-site release.	3.6/4.3	1
295023 Refueling Accidents Cooling Mode / 8			X				AK3.02 Knowledge of the reasons for the following responses as they apply to REFUELING ACCIDENTS: Interlocks associated with fuel handling equipment.	3.4/3.8	1
295024 High Drywell Pressure / 5	X						EK1.01 Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL PRESSURE: Drywell integrity.	4.1/4.2	1
295025 High Reactor Pressure / 3	X				X		EK1.06 Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR PRESSURE: Pressure effects on reactor water level. *EA2.03 Ability to determine and/or interpret the following as they apply to HIGH REACTOR PRESSURE: Suppression pool temperature.	3.9/4.0 3.9/4.1	1 1
295026 Suppression Pool High Water Temp. / 5						X	*G2.1.12 Ability to apply technical specifications for a system.	2.9/4.0	1
295027 High Containment Temperature / 5							<b>Mark III Containment only.</b>		

295030 Low Suppression Pool Water Level / 5		X		X			EK2.01 Knowledge of the interrelations between LOW SUPPRESSION POOL WATER LEVEL and the following: HP-CI. EA1.02 Ability to operate and/or monitor the following as they apply to LOW SUPPRESSION POOL WATER LEVEL: RCIC.	3.8/3.9 3.4/3.5	1 1
295031 Reactor Low Water Level / 2			X		X		EK3.05 Knowledge of the reasons for the following responses as they apply to REACTOR LOW WATER LEVEL: Emergency depressurization. *EA2.04 Ability to determine and/or interpret the following as they apply to REACTOR LOW WATER LEVEL: Adequate core cooling.	4.2/4.3 4.6/4.8	1 1
295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1					X		EA1.04 Ability to operate and/or monitor the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: SBLC.	4.5/4.5	1
295038 High Off-site Release Rate / 9			X			X	EK3.01 Knowledge of the reasons for the following responses as they apply to HIGH OFF-SITE RELEASE RATE: Implementation of site emergency plan. *2.3.4 Knowledge of radiation exposure limits and contamination control / including permissible levels in excess of those authorized.	3.6/4.5 2.5/3.1	1 1
500000 High Containment Hydrogen Conc. / 5		X					EK2.04 Knowledge of the interrelations between HIGH CONTAINMENT HYDROGEN CONCENTRATIONS and the following: Drywell recirculating fan.	2.7/2.9	1
							*SRO only questions.		
K/A Category Totals:	4	4	4	4	5	5	Group Point Total:		26

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4					X		*AA2.01 Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION: Power/flow map.	3.5/3.8	1
295002 Loss of Main Condenser Vacuum / 3				X			AA1.09 Ability to operate and/or monitor the following as they apply to LOSS OF MAIN CONDENSER VACUUM: Reactor manual control/rod control and information system.	2.4/2.4	1
295004 Partial or Total Loss of DC Pwr / 6				X			AA1.03 Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER: Reactor SCRAM.	3.1/3.5	1
295005 Main Turbine Generator Trip / 3					X		*AA2.02 Ability to determine and/or interpret the following as they apply to MAIN TURBINE GENERATOR TRIP: Turbine vibration.	2.4/2.7	1
295008 High Reactor Water Level / 2	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR WATER LEVEL: Component erosion/damage.	2.8/2.8	1
295011 High Containment Temperature / 5							Mark III containment only.		
295012 High Drywell Temperature / 5		X					AK2.01 Knowledge of the interrelations between HIGH DRYWELL TEMPERATURE and the following: Drywell ventilation.	3.4/3.5	1
295018 Partial or Total Loss of CCW / 8			X				AK3.03 Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER: Securing individual components (prevent equipment damage.	3.1/3.3	1
295019 Partial or Total Loss of Inst. Air / 8							Not selected.		
295020 Inadvertent Cont. Isolation / 5 & 7				X			AA1.03 Ability to operate and/or monitor the following as they apply to INADVERTENT CONTAINMENT ISOLATION: Containment ventilation system.	2.9/3.1	1
295021 Loss of Shutdown Cooling / 4					X		*AA2.04 Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING: Reactor water temperature.	3.6/3.6	1
295022 Loss of CRD Pumps / 1						X	*G2.1.20 Ability to execute procedure steps.	4.3/4.2	1
295028 High Drywell Temperature / 5			X				EK3.01 Knowledge of the reasons for the following responses as they apply to HIGH DRYWELL TEMPERATURE: Emergency depressurization.	3.6/3.9	1
295029 High Suppression Pool Water Level / 5	X						EK1.01 Knowledge of the operational implications of the following concepts as they apply to HIGH SUPPRESSION POOL WATER LEVEL: Containment integrity.	3.4/3.7	1
295032 High Secondary Containment Area Temperature / 5			X				EK3.03 Knowledge of the reasons for the following responses as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE: Isolating affected systems.	3.8/3.9	1
295033 High Secondary Containment Area Radiation Levels / 9		X					EK2.01 Knowledge of the interrelations between HIGH SECONDARY CONTAINMENT AREA RADIATION LEVELS and the following: Area radiation monitoring system.	3.8/4.0	1

295034 Secondary Containment Ventilation High Radiation / 9	X									EK1.01 Knowledge of the operational implications of the following concepts as they apply to SECONDARY CONTAINMENT VENTILATION HIGH RADIATION: Personnel protection.	3.8/4.1	1	
295035 Secondary Containment High Differential Pressure / 5										Not selected.			
295036 Secondary Containment High Sump/Area Water Level / 5		X								EK2.03 Knowledge of the interrelations between SECONDARY CONTAINMENT HIGH SUMP/AREA WATER LEVEL and the following: Radwaste.	2.8/3.1	1	
600000 Plant Fire On Site / 8									X	*G2.4.27 Knowledge of fire in the plant procedure.	3.0/3.5	1	
K/A Category Point Totals:	3	3	3	3	3	3	2	Group Point Total:					17

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
201005 RCIS												Not applicable to Browns Ferry.		
202002 Recirculation Flow Control											X	G2.2.3 Knowledge of the design / procedural / and operational differences between units.	3.1/3.3	1
203000 RHR/LPCI: Injection Mode			X							X		K3.02 Knowledge of the effect that a loss or malfunction of the RHR/LPCI: INJECTION MODE will have on the following: Suppression pool level. A4.01 Ability to manually operate and/or monitor in the control room: Pumps.	3.5/3.5 4.3/4.1	1 1
206000 HPCI									X			A3.05 Ability to monitor automatic operations of the HIGH PRESSURE COOLANT INJECTION SYSTEM including: Reactor water level.	4.3/4.3	1
207000 Isolation (Emergency) Condenser												Not applicable to Browns Ferry.		
209001 LPCS				X								K5.05 Knowledge of the operational implications of the following concepts as they apply to LOW PRESSURE CORE SPRAY SYSTEM: System venting.	2.5/2.5	1
209002 HPCS												Not applicable to Browns Ferry.		
211000 SLC	X				X							K1.01 Knowledge of the physical connections and/or cause-effect relationships between STANDBY LIQUID CONTROL SYSTEM and the following: Core Spray line break detection. K6.03 Knowledge of the effect that a loss or malfunction of the following will have on the STANDBY LIQUID CONTROL SYSTEM: A.C. power.	3.0/3.3 3.2/3.3	1 1
212000 RPS							X					A1.08 Ability to predict and/or monitor changes in parameters associated with operating the REACTOR PROTECTION SYSTEM controls including: Valve position.	3.4/3.4	1
215004 Source Range Monitor			X									K4.01 Knowledge of SOURCE RANGE MONITOR (SRM) SYSTEM design feature(s) and/or interlocks which provide for the following: Rod withdrawal blocks.	3.7/3.7	1
215005 APRM / LPRM			X									K3.01 Knowledge of the effect that a loss or malfunction of the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM will have on the following: RPS.	4.0/4.0	1

216000 Nuclear Boiler Instrumentation										X								A2.14 Ability to (a) predict the impacts of the following on the NUCLEAR BOILER INSTRUMENTATION; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Recirculation flow.	2.9/2.9	1
217000 RCIC						X												K2.02 Knowledge of electrical power supplies to the following: RCIC initiation signals (logic).	2.8/2.9	1
218000 ADS											X							K6.06 Knowledge of the effect that a loss or malfunction of the following will have on the AUTOMATIC DEPRESSURIZATION SYSTEM: D.C. power.	3.4/3.6	1
223001 Primary CTMT and Auxiliaries																	X	A2.11 Ability to (a) predict the impacts of the following on the PRIMARY CONTAINMENT SYSTEM AND AUXILIARIES; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Abnormal suppression pool level.	3.6/3.8	1
223002 PCIS/Nuclear Steam Supply Shutoff									X									K3.16 Knowledge of the effect that a loss or malfunction of the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF will have on the following: Shutdown cooling system/RHR.	3.2/3.3	1
226001 RHR/LPCI: CTMT Spray Mode																		K1.09 Knowledge of the physical connections and/or cause-effect relationships between RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE and the following: Drywell (spray penetration).	3.0/3.1	1
239002 SRVs												X						K5.04 Knowledge of the operational implications of the following concepts as they apply to RELIEF/SAFETY VALVES: Tail pipe temperature monitoring.	3.3/3.5	1
241000 Reactor/Turbine Pressure Regulator																X		A4.11 Ability to manually operate and/or monitor in the control room: Turbine speed.	3.1/3.1	1
259002 Reactor Water Level Control																	X	*G2.2.22 Knowledge of limiting conditions for operations and safety limits.	3.4/4.1	1
261000 SGTS																		*K2.03 Knowledge of electrical power supplies to the following: Initiation logic.	2.3/2.5	1
262001 AC Electrical Distribution													X					K4.06 Knowledge of A.C. ELECTRICAL DISTRIBUTION design feature(s) and/or interlocks which provide for the following: Redundant power sources to vital buses.	3.6/3.9	1
264000 EDGs																	X	A1.03 Ability to predict and/or monitor changes in parameters associated with operating the EMERGENCY GENERATORS (DIESEL/JET) controls including: Operating voltages, currents, and temperatures.	2.8/2.9	1







BWR SRO Examination Outline Plant Systems - Tier 2/Group 3													Form ES-401-1 (R8, S1)	
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
201003 Control Rod and Drive Mechanism												Not selected.		
215001 Traversing In-core Probe												Not selected.		
233000 Fuel Pool Cooling and Cleanup	X											K1.02 Knowledge of the physical connections and/or cause-effect relationships between FUEL POOL COOLING AND CLEAN-UP and the following: Residual heat removal system.	2.9/3.0	1
239001 Main and Reheat Steam					X							K5.08 Knowledge of the operational implications of the following concepts as they apply to MAIN AND REHEAT STEAM SYSTEM: Solenoid operated valves.	2.6/2.7	1
256000 Reactor Condensate												Not selected.		
268000 Radwaste										X		A4.01 Ability to manually operate and/or monitor in the control room: Sump integrators.	3.4/3.6	1
288000 Plant Ventilation												Not selected.		
290002 Reactor Vessel Internals				X								K4.03 Knowledge of REACTOR VESSEL INTERNALS design feature(s) and/or interlocks which provide for the following: Core orificing.	3.2/3.3	1
												*SRO only questions.		
K/A Category Point Totals:	1	0	0	1	1	0	0	0	0	1	0	Group Point Total:		4
Plant-Specific Priorities														
System / Topic	Recommended Replacement for...										Reason	Points		
Plant-Specific Priority Total (limit 10):														

Facility: <u>Browns Ferry</u> Date of Exam: <u>Dec. 2002</u> Exam Level: <u>RO</u>													
Tier	Group	K/A Category Points											Point Total
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	
1. Emergency & Abnormal Plant Evolutions	1	3	3	1				3	2			1	13
	2	4	3	4				5	2			1	19
	3	1	1	2				0	0			0	4
	Tier Totals	8	7	7				8	4			2	36
2. Plant Systems	1	3	2	3	3	2	3	3	3	2	2	2	28
	2	2	1	2	4	3	1	1	1	2	1	1	19
	3	1	0	0	1	1	0	0	0	0	1	0	4
	Tier Totals	6	3	5	8	6	4	4	4	4	4	3	51
3. Generic Knowledge and Abilities							Cat 1	Cat 2	Cat 3	Cat 4	13		
							3	3	3	4			
<p>Note: 1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).</p> <p>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 <math>\pm 1</math> from that specified in the table based on NRC revisions. The final exam must total 100 points.</p> <p>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.</p> <p>4. Systems/evolutions within each group are identified on the associated outline.</p> <p>5. The shaded areas are not applicable to the category/tier.</p> <p>6.* The generic 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.</p> <p>7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the SRO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.</p>													

BWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1											Form ES-401-2 (R8, S1)
ES-401	E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)		Imp.	Points
295005	Main Turbine Generator Trip / 3						X	G2.1.20 Ability to execute procedure steps.		4.3/4.2	1
295006	SCRAM / 1					X		AA2.01 Ability to determine and/or interpret the following as they apply to SCRAM: Reactor power.		4.5/4.6	1
295007	High Reactor Pressure / 3	X						AK1.01 Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR PRESSURE: Pump shutoff head.		2.9/3.2	1*
295009	Low Reactor Water Level / 2		X					AK2.01 Knowledge of the interrelations between LOW REACTOR WATER LEVEL and the following: Reactor water level indication.		3.9/4.0	1*
295010	High Drywell Pressure / 5				X			AA1.01 Ability to operate and/or monitor the following as they apply to HIGH DRYWELL PRESSURE: Drywell ventilation/cooling.		3.8/4.0	1*
295014	Inadvertent Reactivity Addition / 1				X			AA1.03 Ability to operate and/or monitor the following as they apply to INADVERTENT REACTIVITY ADDITION: RMCS.		3.5/3.9	1*
295015	Incomplete SCRAM / 1		X					AK2.09 Knowledge of the interrelations between INCOMPLETE SCRAM and the following: RPIS.		3.5/3.6	1*
295024	High Drywell Pressure / 5	X				X		EK1.01 Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL PRESSURE: Drywell integrity. AA2.03 Ability to determine and/or interpret the following as they apply to HIGH DRYWELL PRESSURE: Suppression pool level.		4.1/4.2 3.8/3.8	1* 1
295025	High Reactor Pressure / 3	X						EK1.06 Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR PRESSURE: Pressure effects on reactor water level.		3.9/4.0	1*
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.		4.2/4.3	1*
295037	SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1				X			EA1.04 Ability to operate and/or monitor the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: SBLC.		4.5/4.5	1*
500000	High Containment Hydrogen Conc. / 5		X					EK2.04 Knowledge of the interrelations between HIGH CONTAINMENT HYDROGEN CONCENTRATIONS and the following: Drywell recirculating fan.		2.7/2.9	1*
								*Also on SRO exam.			
K/A Category Totals:		3	3	1	3	2	1	Group Point Total:			13



BWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2											Form ES-401-2 (R8, S1)
ES-401	E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)		Imp.	Points
295001	Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4							<b>Not selected.</b>			
295002	Loss of Main Condenser Vacuum / 3				X			AA1.09 Ability to operate and/or monitor the following as they apply to LOSS OF MAIN CONDENSER VACUUM: Reactor manual control/rod control and information system.		2.4/2.4	1*
295003	Partial or Complete Loss of AC Pwr / 6	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER: Load shedding.		3.1/3.4	1*
295004	Partial or Complete Loss of DC Pwr / 6				X			AA1.03 Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER: Reactor SCRAM.		3.1/3.5	1*
295008	High Reactor Water Level / 2	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR WATER LEVEL: Component erosion/damage.		2.8/2.8	1*
295011	High CTMT Temperature / 5							<b>Mark III containment only.</b>			
295012	High Drywell Temperature / 5		X					AK2.01 Knowledge of the interrelations between HIGH DRYWELL TEMPERATURE and the following: Drywell ventilation.		3.4/3.5	1*
295013	High Suppression Pool Temp. / 5			X				AK3.02 Knowledge of the reasons for the following responses as they apply to HIGH SUPPRESSION POOL TEMPERATURE: Limiting heat additions.		3.6/3.8	1*
295016	Control Room Abandonment / 7				X			AA1.08 Ability to operate and/or monitor the following as they apply to CONTROL ROOM ABANDONMENT: Reactor pressure.		4.0/4.0	1*
295017	High Off-site Release Rate / 9						X	G2.3.11 Ability to control radiation releases.		2.7/3.2	1
295018	Partial or Complete Loss of CCW / 8			X				AK3.03 Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER: Securing individual components (prevent equipment damage).		3.1/3.3	1*
295019	Part. or Comp. Loss of Inst. Air / 8							<b>Not selected.</b>			
295020	Inadvertent Cont. Isolation / 5 & 7				X			AA1.03 Ability to operate and/or monitor the following as they apply to INADVERTENT CONTAINMENT ISOLATION: Containment ventilation system.		2.9/3.1	1*
295022	Loss of CRD Pumps / 1							<b>Not selected.</b>			
295026	High Suppression Pool Water Temp. / 5					X		EA2.03 Ability to determine and/or interpret the following as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: Reactor pressure.		3.9/4.0	1
295027	High Containment Temperature / 5							<b>Mark III Containment only.</b>			
295028	High Drywell Temperature / 5			X				EK3.01 Knowledge of the reasons for the following responses as they apply to HIGH DRYWELL TEMPERATURE: Emergency depressurization.		3.6/3.9	1*

295029 High Suppression Pool Water Level / 5	X								EK1.01 Knowledge of the operational implications of the following concepts as they apply to HIGH SUPPRESSION POOL WATER LEVEL: Containment integrity.	3.4/3.7	1*
295030 Low Suppression Pool Water Level / 5		X			X				EK2.01 Knowledge of the interrelations between LOW SUPPRESSION POOL WATER LEVEL and the following: HPCI. EA1.02 Ability to operate and/or monitor the following as they apply to LOW SUPPRESSION POOL WATER LEVEL: RCIC.	3.8/3.9 3.4/3.5	2*
295033 High Sec. Cont. Area Rad. Levels / 9		X							EK2.01 Knowledge of the interrelations between HIGH SECONDARY CONTAINMENT AREA RADIATION LEVELS and the following: Area radiation monitoring system.	3.8/4.0	1*
295034 Sec. Cont. Ventilation High Rad. / 9	X								EK1.01 Knowledge of the operational implications of the following concepts as they apply to SECONDARY CONTAINMENT VENTILATION HIGH RADIATION: Personnel protection.	3.8/4.1	1*
295038 High Off-site Release Rate / 9				X					EK3.01 Knowledge of the reasons for the following responses as they apply to HIGH OFF-SITE RELEASE RATE: Implementation of site emergency plan.	3.6/4.5	1*
600000 Plant Fire On Site / 8							X		AA2.13 Ability to determine and interpret the following as they apply to PLANT FIRE ON SITE: Need for emergency plant shutdown.	3.2/3.8	1
K/A Category Point Totals:		4	3	4	5	2	1		Group Point Total:		19

\*Also on SRO exam



ES-401		BWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 3						Form ES-401-2 (R8, S1)	
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
295021 Loss of Shutdown Cooling / 4	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to LOSS OF SHUTDOWN COOLING: Thermal stratification.	3.3/3.4	1
295023 Refueling Accidents / 8			X				AK3.02 Knowledge of the reasons for the following responses as they apply to REFUELING ACCIDENTS: Interlocks associated with fuel handling equipment.	3.4/3.8	1*
295032 High Secondary Containment Area Temperature / 5			X				EK3.03 Knowledge of the reasons for the following responses as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE: Isolating affected systems.	3.8/3.9	1*
295035 Secondary Containment High Differential Pressure / 5							Not selected.		
295036 Secondary Containment High Sump/Area Water Level / 5		X					EK2.03 Knowledge of the interrelations between SECONDARY CONTAINMENT HIGH SUMP/AREA WATER LEVEL and the following: Radwaste.	2.8/3.1	1*
K/A Category Point Totals:	1	1	2	0	0	0	Group Point Total:		4

BWR RO Examination Outline Plant Systems - Tier 2/Group 1														Form ES-401-2 (R8, S1)	
ES-401	System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
201001 CRD Hydraulic									X			X	A2.01 Ability to (a) predict the impacts of the following on the CONTROL ROD DRIVE HYDRAULIC SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Pump trips. G2.1.28 Knowledge of the purpose and function of major system components and controls.	3.2/3.3	1*
201002 RMCS													Not applicable to Browns Ferry.	3.2/3.3	1
201005 RCIS													Not applicable to Browns Ferry.		
202002 Recirculation Flow Control										X		X	G2.2.3 Knowledge of the design / procedural / and operational differences between units. A3.03 Ability to monitor automatic operations of the RECIRCULATION FLOW CONTROL SYSTEM including: Scoop tube operation.	3.1/3.3 3.1/3.0	1*
203000 RHR/LPCI: Injection Mode				X							X		K3.02 Knowledge of the effect that a loss or malfunction of the RHR/LPCI: INJECTION MODE will have on the following: A4.01 Ability to manually operate and/or monitor in the control room: Pumps.	3.5/3.5 4.3/4.1	2*
206000 HPCI										X			A3.05 Ability to monitor automatic operations of the HIGH PRESSURE COOLANT INJECTION SYSTEM including: Reactor water level.	4.3/4.3	1*
207000 Isolation (Emerg.) Condenser													Not applicable to Browns Ferry.		
209001 LPCS						X	X						K5.05 Knowledge of the operational implications of the following concepts as they apply to LOW PRESSURE CORE SPRAY SYSTEM: System venting. K6.05 Knowledge of the effect that a loss or malfunction of the following will have on the LOW PRESSURE CORE SPRAY SYSTEM: ECCS room coolers.	2.5/2.5 2.8/2.9	1*
209002 HPCS													Not applicable to Browns Ferry.		
211000 SLC		X					X						K1.01 Knowledge of the physical connections and/or cause-effect relationships between STANDBY LIQUID CONTROL SYSTEM and the following: Core Spray line break detection. K6.03 Knowledge of the effect that a loss or malfunction of the following will have on the STANDBY LIQUID CONTROL SYSTEM: A.C. power.	3.0/3.3 3.2/3.3	2*

212000 RPS										X								A1.08 Ability to predict and/or monitor changes in parameters associated with operating the REACTOR PROTECTION SYSTEM controls including: Valve position.	3.4/3.4	1*
215003 IRM	X								X									K1.02 Knowledge of the physical connections and/or cause-effect relationships between INTERMEDIATE RANGE MONITOR (IRM) SYSTEM and the following: Reactor manual control. K4.04 Knowledge of INTERMEDIATE RANGE MONITOR (IRM) SYSTEM design feature(s) and/or interlocks which provide for the following: Varying system sensitivity levels using range switches.	3.6/3.6 2.9/2.9	2
215004 SRM														X				K4.01 Knowledge of SOURCE RANGE MONITOR (SRM) SYSTEM design feature(s) and/or interlocks which provide for the following: Rod withdrawal blocks.	3.7/3.7	1*
215005 APRM / LPRM								X										K3.01 Knowledge of the effect that a loss or malfunction of the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM will have on the following: RPS.	4.0/4.0	1*
216000 Nuclear Boiler Instrumentation																X		A2.14 Ability to (a) predict the impacts of the following on the NUCLEAR BOILER INSTRUMENTATION; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Recirculation flow.	2.9/2.9	1*
217000 RCIC														X				K2.02 Knowledge of electrical power supplies to the following: RCIC initiation signals (logic).	2.8/2.9	1*
218000 ADS													X					K6.06 Knowledge of the effect that a loss or malfunction of the following will have on the AUTOMATIC DEPRESSURIZATION SYSTEM: D.C. power.	3.4/3.6	1*
223001 Primary CTMT and Auxiliaries																X		A2.11 Ability to (a) predict the impacts of the following on the PRIMARY CONTAINMENT SYSTEM AND AUXILIARIES; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Abnormal suppression pool level.	3.6/3.8	1*
223002 PCIS/Nuclear Steam Supply Shutoff								X										K3.16 Knowledge of the effect that a loss or malfunction of the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF will have on the following: Shutdown cooling system/RHR.	3.2/3.3	1*
239002 SRVs												X						K5.04 Knowledge of the operational implications of the following concepts as they apply to RELIEF/SAFETY VALVES: Tail pipe temperature monitoring.	3.3/3.5	1*



BWR RO Examination Outline Plant Systems - Tier 2/Group 2														Form ES-401-2 (R8, S1)	
ES-401	System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
201003	Control Rod and Drive Mechanism							X					A1.02 Ability to predict and/or monitor changes in parameters associated with operating the CONTROL ROD AND DRIVE MECHANISM controls including: CRD drive pressure.	2.8/2.8	1
201004	RSCS												Not selected.		
201006	RWM			X									K3.01 Knowledge of the effect that a loss or malfunction of the ROD WORTH MINIMIZER SYSTEM (RWM) will have on the following: Reactor manual control system.	3.2/3.5	1*
202001	Recirculation												Not selected.		
204000	RWCU					X							K5.05 Knowledge of the operational implications of the following concepts as they apply to REACTOR WATER CLEANUP SYSTEM: Flow controllers.	2.6/2.6	1*
205000	Shutdown Cooling									X			A4.05 Ability to manually operate and/or monitor in the control room: Minimum flow valves.	3.3/3.2	1*
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.	3.0/3.1	1*
215002	RBM												Not selected.		
219000	RHR/LPCI: Torus/Pool Cooling Mode								X				A2.02 Ability to (a) predict the impacts of the following on the RHR/LPCI: TORUS/SUPPRESSION POOL COOLING MODE; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Pump trips.	3.3/3.3	1
226001	RHR/LPCI: CTMT Spray Mode	X											K1.09 Knowledge of the physical connections and/or cause-effect relationships between RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE and the following: Drywell (spray penetration).	3.0/3.1	1*
230000	RHR/LPCI: Torus/Pool Spray Mode				X								K4.04 Knowledge of RHR/LPCI: TORUS/SUPPRESSION POOL SPRAY MODE design feature(s) and/or interlocks which provide for the following: Prevention of piping overpressurization.	3.0/3.2	1

239001 Main and Reheat Steam								X									K5.08 Knowledge of the operational implications of the following concepts as they apply to MAIN AND REHEAT STEAM SYSTEM: Solenoid operated valves.	2.6/2.7	1*
245000 Main Turbine Gen. and Auxiliaries								X									K5.03 Knowledge of the operational implications of the following concepts as they apply to MAIN TURBINE GENERATOR AND AUXILIARY SYSTEMS: Hydraulically operated valve operation.	2.6/2.6	1*
256000 Reactor Condensate			X														K2.01 Knowledge of the electrical power supplies to the following: System pumps.	2.7/2.8	1
262001 AC Electrical Distribution							X										K4.06 Knowledge of A.C. ELECTRICAL DISTRIBUTION design feature(s) and/or interlocks which provide for the following: Redundant power sources to vital buses.	3.6/3.9	1*
262002 UPS (AC/DC)											X						K6.02 Knowledge of the effect that a loss or malfunction of the following will have on the UNINTERRUPTIBLE POWER SUPPLY (A.C./D.C.): D.C. electrical power.	2.3/3.1	1*
263000 DC Electrical Distribution	X																K1.04 Knowledge of the physical connections and/or cause-effect relationships between D.C. ELECTRICAL DISTRIBUTION and the following: Ground detection.	2.6/2.9	1*
271000 Offgas				X													K3.02 Knowledge of the effect that a loss or malfunction of the OFFGAS SYSTEM will have on the following: Off-site radioactive release rate.	3.3/3.9	1*
272000 Radiation Monitoring																	Not selected.		
286000 Fire Protection													X				A3.01 Ability to monitor automatic operations of the FIRE PROTECTION SYSTEM including: Fire water pump start.	3.4/3.4	1*
290001 Secondary CTMT													X				A3.01 Ability to monitor automatic operations of the SECONDARY CONTAINMENT including: Secondary containment isolation.	3.9/4.0	1*
290003 Control Room HVAC															X		G2.3.11 Ability to control radiation releases.	2.7/3.2	1
300000 Instrument Air							X										K4.03 Knowledge of (INSTRUMENT AIR SYSTEM) design feature(s) and/or interlocks which provide for the following: Securing of IAS upon loss of cooling water.	2.8/2.8	1*
400000 Component Cooling Water																	Not selected.		
K/A Category Point Totals:	2	1	2	4	3	1	1	1	1	2	1	1					Group Point Total:		19







Facility: Browns Ferry		Date of Exam: Dec. 2002		Exam Level: SRO	
Category	K/A #	Topic	Imp.	Points	
Conduct of Operations	2.1.3	Knowledge of shift turnover practices.	3.0/3.4	1	
	2.1.10*	Knowledge of conditions and limitations in the facility license.	2.7/3.9	1	
	2.1.12*	Ability to apply technical specifications for a system.	2.9/4.0	1	
	2.1.28	Knowledge of the purpose and function of major system components and controls.	3.2/3.3	1	
Total				4	
Equipment Control	2.2.3	Knowledge of the design / procedural / and operational differences between units.	3.1/3.3	1	
	2.2.5*	Knowledge of the process for making changes in the facility as described in the safety analysis report.	1.6/2.7	1	
	2.2.12	Knowledge of surveillance procedures.	3.0/3.4	1	
	2.2.14*	Knowledge of the process for making configuration changes.	2.1/3.0	1	
Total				4	
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	2.6/3.0	1	
	2.3.4*	Knowledge of radiation exposure limits and contamination control - including permissible levels in excess of those authorized.	2.5/3.1	1	
	2.3.9*	Knowledge of the process for performing a containment purge.	2.5/3.4	1	
Total				3	
Emergency Procedures/ Plan	2.4.1	Knowledge of EOP entry conditions and immediate action steps.	4.3/4.6	1	
	2.4.3	Ability to identify post-accident instrumentation.	3.5/3.8	1	
	2.4.10	Knowledge of annunciator response procedures.	3.0/3.1	1	
	2.4.11	Knowledge of abnormal condition procedures.	3.4/3.6	1	
	2.4.26*	Knowledge of facility protection requirements including fire brigade and portable fire fighting equipment usage.	2.9/3.3	1	
	2.4.41*	Knowledge of the emergency action level thresholds and classifications.	2.3/4.1	1	
Total				6	
Tier 3 Point Total (RO/SRO)				13/17	

Facility: Browns Ferry		Date of Exam: <i>Dec. 2002</i>		Exam Level: RO	
Category	K/A #	Topic	Imp.	Points	
Conduct of Operations	2.1.3	Knowledge of shift turnover practices.	3.0/3.4	1	
	2.1.27	Knowledge of system purpose and or function.	2.8/2.9	1*	
	2.1.28	Knowledge of the purpose and function of major system components and controls.	3.2/3.3	1	
	Total				
Equipment Control	2.2.3	Knowledge of the design / procedural / and operational differences between units.	3.1/3.3	1	
	2.2.11	Knowledge of the process for controlling temporary changes.	2.5/3.4	1*	
	2.2.12	Knowledge of surveillance procedures.	3.0/3.4	1	
	Total				
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	2.6/3.0	1	
	2.3.2	Knowledge of facility ALARA program.	2.5/2.9	1*	
	2.3.5	Knowledge of use and function of personnel monitoring equipment.	2.5/3.1	1*	
	Total				
Emergency Procedures/ Plan	2.4.1	Knowledge of EOP entry conditions and immediate action steps.	4.3/4.6	1	
	2.4.3	Ability to identify post-accident instrumentation.	3.5/3.8	1	
	2.4.10	Knowledge of annunciator response procedures.	3.0/3.1	1	
	2.4.11	Knowledge of abnormal condition procedures.	3.4/3.6	1	
	Total			6	

