

Facility: Grand Gulf Nuclear Station														Date of Exam: December 2, 2011				
Tier	Group	RO K/A Category Points												SRO-Only Points				
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total		
1. Emergency & Abnormal Plant Evolutions	1	1	5	2				4	2				6	20			7	
	2	1	1	1				2	1				1	7			3	
	Tier Totals	2	6	3				6	3				7	27			10	
2. Plant Systems	1	4	3	4	3	1	3	2	2	2	1	1	26			5		
	2	1	0	2	2	1	1	1	1	1	1	1	12			3		
	Tier Totals	5	3	6	5	2	4	3	3	3	2	2	38			8		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4	7
					3		3		2		2							

Note:

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

ES-401		BWR Examination Outline - RO Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO)						Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4						X	2.4.11 Knowledge of abnormal condition procedures. 55.41(b)(10)	4.0	4 F
295003 Partial or Complete Loss of AC / 6				X			Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER: AA1.04 D.C. electrical distribution system 55.41(b)(7)	3.6	35 H
295004 Partial or Total Loss of DC Pwr / 6		X					Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF D.C. POWER and the following: AK2.02 Batteries 55.41(b)(8)	3.0	14 F
295005 Main Turbine Generator Trip / 3				X			Ability to operate and/or monitor the following as they apply to MAIN TURBINE GENERATOR TRIP: AA1.05 Reactor/turbine pressure regulating system 55.41(b)(4) & (10)	3.6	20 H
295006 SCRAM / 1						X	2.4.2 Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions. 55.41(b)(7) & (10)	4.5	25 F
295016 Control Room Abandonment / 7						X	2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. 55.41(b)(10)	3.9	36 H
295018 Partial or Total Loss of CCW / 8						X	2.4.11 Knowledge of abnormal condition procedures. 55.41(b)(10)	4.0	50 F
295019 Partial or Total Loss of Inst. Air / 8				X			Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR: AA1.01 Backup air supply 55.41(b)(4)	3.5	8 H
295021 Loss of Shutdown Cooling / 4		X					Knowledge of the interrelations between LOSS OF SHUTDOWN COOLING and the following: AK2.01 Reactor water temperature 55.41(b)(10) & (14)	3.6	53 H
295023 Refueling Acc / 8			X				Knowledge of the reasons for the following responses as they apply to REFUELING ACCIDENTS: AK3.02 Interlocks associated with fuel handling equipment 55.41(b)(6)	3.4	59 F
295024 High Drywell Pressure / 5		X					Knowledge of the interrelations between HIGH DRYWELL PRESSURE and the following: EK2.02 HPCS 55.41(b)(7)	3.7	24 H
295025 High Reactor Pressure / 3					X		Ability to determine and/or interpret the following as they apply to HIGH REACTOR PRESSURE: EA2.03 Suppression pool temperature 55.41(b)(10)	3.9	15 H
295026 Suppression Pool High Water Temp. / 5						X	2.2.39 Knowledge of less than or equal to one hour Technical Specification action statements for systems. 55.41(b)(10)	3.9	60 F
295027 High Containment Temperature / 5									
295028 High Drywell Temperature / 5	X						Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL TEMPERATURE: EK1.01 Reactor water level measurement 55.41(b)(10)	3.5	58 H
295030 Low Suppression Pool Wtr Lvl / 5		X					Knowledge of the interrelations between LOW SUPPRESSION POOL WATER LEVEL and the following: EK2.02 RCIC 55.41(b)(8) & (10)	3.7	21 F

295031 Reactor Low Water Level / 2				X		Ability to operate and/or monitor the following as they apply to REACTOR LOW WATER LEVEL: EA1.10 Control rod drive 55.41(b)(7) & (10)	3.6	54 F
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1			X			Knowledge of the reasons for the following responses as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: EK3.03 Lowering reactor water level 55.41(b)(10)	4.1	16 H
295038 High Off-site Release Rate / 9		X				Knowledge of the interrelations between HIGH OFF-SITE RELEASE RATE and the following: EK2.05 †Site emergency plan 55.41(b)(10)	3.7	55 F
600000 Plant Fire On Site / 8					X	2.4.49 Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. 55.41(b)(10)	4.6	56 F
700000 Generator Voltage and Electric Grid Disturbances / 6					X	Ability to determine and/or interpret the following as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES: AA2.01 Operating point on the generator capability curve 55.41(b)(10)	3.5	57 H
K/A Category Totals:	1	5	2	4	2	6	Group Point Total:	20

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E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295002 Loss of Main Condenser Vac / 3		X					Knowledge of the interrelations between LOSS OF MAIN CONDENSER VACUUM and the following: AK2.07 Offgas system 55.41(b)(4)	3.1	9 H
295007 High Reactor Pressure / 3									
295008 High Reactor Water Level / 2			X				Knowledge of the reasons for the following responses as they apply to HIGH REACTOR WATER LEVEL: AK3.07 HPCS isolation 55.41(b)(7)	3.2	39 F
295009 Low Reactor Water Level / 2									
295010 High Drywell Pressure / 5									
295011 High Containment Temp / 5									
295012 High Drywell Temperature / 5									
295013 High Suppression Pool Temp. / 5									
295014 Inadvertent Reactivity Addition / 1				X			Ability to operate and/or monitor the following as they apply to INADVERTENT REACTIVITY ADDITION: AA1.06 Reactor/turbine pressure regulating system 55.41(b)(7) & (10)	3.3	52 H
295015 Incomplete SCRAM / 1									
295017 High Off-site Release Rate / 9									
295020 Inadvertent Cont. Isolation / 5 & 7	X						Knowledge of the operational implications of the following concepts as they apply to INADVERTENT CONTAINMENT ISOLATION: AK1.02 Power/reactivity control 55.41(b)(7) & (10)	3.5	40 H
295022 Loss of CRD Pumps / 1				X			Ability to operate and/or monitor the following as they apply to LOSS OF CRD PUMPS: AA1.01 CRD hydraulic system 55.41(b)(7)	3.1	61 H
295029 High Suppression Pool Wtr Lvl / 5									
295032 High Secondary Containment Area Temperature / 5									
295033 High Secondary Containment Area Radiation Levels / 9					X		Ability to determine and/or interpret the following as they apply to HIGH SECONDARY CONTAINMENT AREA RADIATION LEVELS: EA2.01 Area radiation levels 55.41(b)(10)	3.8	10 H
295034 Secondary Containment Ventilation High Radiation / 9									
295035 Secondary Containment High Differential Pressure / 5						X	2.1.28 Knowledge of the purpose and function of major system components and controls. 55.41(b)(7)	4.1	37 H
295036 Secondary Containment High Sump/Area Water Level / 5									
500000 High CTMT Hydrogen Conc. / 5									
K/A Category Point Totals:	1	1	1	2	1	1	Group Point Total:		7

ES-401		BWR Examination Outline - RO Plant Systems - Tier 2/Group 1 (RO)												Form ES-401-1	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#	
203000 RHR/LPCI: Injection Mode			X									Knowledge of the effect that a loss or malfunction of the RHR/LPCI: INJECTION MODE (PLANT SPECIFIC) will have on following: K3.03 Automatic depressurization logic 55.41(b)(7)	4.2	17 H	
							X					Ability to predict and/or monitor changes in parameters associated with operating the RHR/LPCI: INJECTION MODE (PLANT SPECIFIC) controls including: A1.03 System flow 55.41(b)(8)	3.8	38 F	
205000 Shutdown Cooling		X										Knowledge of electrical power supplies to the following: K2.02 Motor operated valves 55.41(b)(8)	2.5	1 F	
206000 HPCI															
207000 Isolation (Emergency) Condenser															
209001 LPCS		X										Knowledge of electrical power supplies to the following: K2.03 Initiation logic 55.41(b)(8)	2.9	41 F	
209002 HPCS								X				Ability to (a) predict the impacts of the following on the HIGH PRESSURE CORE SPRAY SYSTEM (HPCS) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.05 D.C. electrical failure: BWR-5,6 55.41(b)(7) & (10)	2.8	62 H	
211000 SLC											X	2.1.31 Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup. 55.41(b)(6) & (7)	4.6	11 H	
212000 RPS						X						Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR PROTECTION SYSTEM: K6.01 A.C. electrical distribution 55.41(b)(4) & (6) & (7)	3.6	19 H	
215003 IRM				X								Knowledge of INTERMEDIATE RANGE MONITOR (IRM) SYSTEM design feature(s) and/or interlocks which provide for the following: K4.04 Varying system sensitivity levels using range switches 55.41(b)(7)	2.9	2 H	
215004 Source Range Monitor						X						Knowledge of the effect that a loss or malfunction of the following will have on the SOURCE RANGE MONITOR (SRM) SYSTEM: K6.05 Trip units 55.41(b)(7)	2.6	22 H	

215005 APRM / LPRM										X		Ability to manually operate and/or monitor in the control room: A4.06 Verification of proper functioning/ operability 55.41(b)(7)	3.6	42 H
	X											Knowledge of the physical connections and/or cause effect relationships between AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM and the following: K1.16 Flow converter/comparator network 55.41(b)(7)	3.3	63 H
217000 RCIC										X		Ability to monitor automatic operations of the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) including: A3.01 Valve operation 55.41(b)(7)	3.5	18 H
									X			Ability to (a) predict the impacts of the following on the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC); and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.09 Loss of vacuum pump 55.41(b)(7) & (10)	2.9	64 H
218000 ADS				X								Knowledge of AUTOMATIC DEPRESSURIZATION SYSTEM design feature(s) and/or interlocks which provide for the following: K4.02 Allows manual initiation of ADS logic 55.41(b)(7)	3.8	43 F
	X											Knowledge of the physical connections and/or cause-effect relationships between AUTOMATIC DEPRESSURIZATION SYSTEM and the following: K1.05 Remote shutdown system 55.41(b)(7)	3.9	65 H
223002 PCIS/Nuclear Steam Supply Shutoff								X				Ability to predict and/or monitor changes in parameters associated with operating the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF controls including: A1.02 Valve closures 55.41(b)(7)	3.7	66 H
239002 SRVs				X								Knowledge of the effect that a loss or malfunction of the RELIEF/SAFETY VALVES will have on following: K3.01 Reactor pressure control 55.41(b)(7)	3.9	67 H
259002 Reactor Water Level Control										X		Ability to monitor automatic operations of the REACTOR WATER LEVEL CONTROL SYSTEM including: A3.06 Reactor water level setpoint setdown following a reactor scram 55.41(b)(7)	3.0	3 F
261000 SGTS				X								Knowledge of the effect that a loss or malfunction of the STANDBY GAS TREATMENT SYSTEM will have on the following: K3.05 Secondary containment radiation/ contamination levels 55.41(b)(8)	3.2	26 H
262001 AC Electrical Distribution				X								Knowledge of A.C. ELECTRICAL DISTRIBUTION design feature(s) and/or interlocks which provide for the following: K4.01 Bus lockouts 55.41(b)(8)	3.0	72 H
262002 UPS (AC/DC)	X											Knowledge of the physical connections and/or cause effect relationships between UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) and the following: K1.01 Feedwater level control 55.41(b)(4) & (7)	2.8	7 H

263000 DC Electrical Distribution			X										Knowledge of the effect that a loss or malfunction of the D.C. ELECTRICAL DISTRIBUTION will have on following: K3.03 Systems with D.C. components (i.e. valves, motors, solenoids, etc.) 55.41(b)(6) & (7)	3.4	68 H
264000 EDGs					X								Knowledge of the operational implications of the following concepts as they apply to EMERGENCY GENERATORS (DIESEL/JET): K5.05 Paralleling A.C. power sources 55.41(b)(7) & (10)	3.4	27 H
300000 Instrument Air	X												Knowledge of the connections and / or cause effect relationships between INSTRUMENT AIR SYSTEM and the following: K1.04 Cooling water to compressor 55.41(b)(4)	2.8	23 H
		X											Knowledge of electrical power supplies to the following: K2.01 Instrument air compressor 55.41(b)(4)	2.8	69 F
400000 Component Cooling Water						X							Knowledge of the effect that a loss or malfunction of the following will have on the CCWS: K6.07 Breakers, relays, and disconnects 55.41(b)(7)	2.7	70 H
K/A Category Point Totals:	4	3	4	3	1	3	2	2	2	1	1		Group Point Total:		26

ES-401		BWR Examination Outline - RO Plant Systems - Tier 2/Group 2 (RO)												Form ES-401-1	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#	
201001 CRD Hydraulic															
201002 RMCS															
201003 Control Rod and Drive Mechanism															
201004 RSCS															
201005 RCIS					X							Knowledge of the operational implications of the following concepts as they apply to ROD CONTROL AND INFORMATION SYSTEM (RCIS): K5.09 High power setpoints BWR-6 55.41(b)(5) & (7)	3.5	12 H	
201006 RWM															
202001 Recirculation						X						Knowledge of the effect that a loss or malfunction of the following will have on the RECIRCULATION SYSTEM : K6.01 Jet pumps 55.41(b)(2) & (3)	3.5	28 H	
202002 Recirculation Flow Control															
204000 RWCU							X					Ability to predict and/or monitor changes in parameters associated with operating the REACTOR WATER CLEANUP SYSTEM controls including: A1.07 RWCU drain flow 55.41(b)(3) & (10)	2.9	29 H	
214000 RPIS															
215001 Traversing In-core Probe															
215002 RBM															
216000 Nuclear Boiler Inst.			X									Knowledge of the effect that a loss or malfunction of the NUCLEAR BOILER Instrumentation will have on following: K3.24 Vessel level monitoring 55.41(b)(3) & (7)	3.9	30 H	
219000 RHR/LPCI: Torus/Pool Cooling Mode											X	2.4.4 Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures. 55.41(b)(10)	4.5	5 F	
223001 Primary CTMT and Aux.															
226001 RHR/LPCI: CTMT Spray Mode										X		Ability to manually operate and/or monitor in the control room: A4.12 Containment/drywell pressure 55.41(b)(7) & (10)	3.8	13 F	
230000 RHR/LPCI: Torus/Pool Spray Mode															
233000 Fuel Pool Cooling/Cleanup															
234000 Fuel Handling Equipment															
239001 Main and Reheat Steam				X								Knowledge of MAIN AND REHEAT STEAM SYSTEM design feature(s) and/or interlocks which provide for the following: K4.08 Removal of non condensable gases from reactor head area 55.41(b)(3)	2.5	44 F	
239003 MSIV Leakage Control															

241000 Reactor/Turbine Pressure Regulator									X				Ability to monitor automatic operations of the REACTOR/TURBINE PRESSURE REGULATING SYSTEM including: A3.08 Steam bypass valve operation 55.41(b)(4) & (5)	3.8	71 H
245000 Main Turbine Gen. / Aux.			X										Knowledge of the effect that a loss or malfunction of the MAIN TURBINE GENERATOR AND AUXILIARY SYSTEMS will have on following: K3.05 Reactor feedwater pump 55.41(b)(4)	2.7	45 F
256000 Reactor Condensate															
259001 Reactor Feedwater															
268000 Radwaste															
271000 Offgas															
272000 Radiation Monitoring				X									Knowledge of RADIATION MONITORING System design feature(s) and/or interlocks which provide for the following: K4.03 Fail safe tripping of process radiation monitoring logic during conditions of instrument failure 55.41(b)(7) & (11)	3.6	46 F
286000 Fire Protection									X				Ability to (a) predict the impacts of the following on the FIRE PROTECTION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.08 Failure to actuate when required 55.41(b)(4) & (10)	3.2	51 F
288000 Plant Ventilation															
290001 Secondary CTMT															
290003 Control Room HVAC															
290002 Reactor Vessel Internals	X												Knowledge of the physical connections and/or cause effect relationships between REACTOR VESSEL INTERNALS and the following: K1.09 LPCI 55.41(b)(3) & (8)	3.2	6 H
K/A Category Point Totals:	1	0	2	2	1	1	1	1	1	1	1	1	Group Point Total:		12

Facility: Grand Gulf Nuclear Station			Date of Exam: December 2, 2011			
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.1	Knowledge of conduct of operations requirements. 55.41(b)(10)	3.8	31 F		
	2.1.2	Knowledge of operator responsibilities during all modes of plant operation. 55.41(b)(10)	4.1	74 H		
	2.1.44	Knowledge of RO duties in the control room during fuel handling such as responding to alarms from the fuel handling area, communication with the fuel storage facility, systems operated from the control room in support of fueling operations, and supporting instrumentation. 55.41(b)(10)	3.9	47 F		
	Subtotal			3		
2. Equipment Control	2.2.12	Knowledge of surveillance procedures. 55.41(b)(10)	3.7	75 F		
	2.2.35	Ability to determine Technical Specification Mode of Operation. 55.41(b)(5)	3.6	48 H		
	2.2.43	Knowledge of the process used to track inoperable alarms. 55.41(b)(10)	3.0	32 F		
	Subtotal			3		
3. Radiation Control	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions. 55.41(b)(10)	3.2	33 F		
	2.3.13	Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. 55.41(b)(8) & (10)	3.4	49 F		
	Subtotal			2		
4. Emergency Procedures / Plan	2.4.6	Knowledge of EOP mitigation strategies. 55.41(b)(10)	3.7	34 F		
	2.4.29	Knowledge of the emergency plan. 55.41(b)(10)	3.1	73 F		
	Subtotal			2		
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
2/1	263000 A4.02	Could not write a question (#68) for this KA that would not be double-jeopardy with the context of an already-written (and preferred) question (#14). Additionally, we could not write an operationally valid question for either of the two remaining A4 KA's; therefore, we randomly and systematically selected 263000 K3.03 as the replacement KA.
3	2.4.46	Could not write an operationally valid question (#73) for this KA without the question being a "system specific" one. Per ES-401, Section D.2.a (1 st para.) this is unacceptable for Tier 3 questions. Randomly and systematically selected 2.4.29 as the replacement KA.
SYSTEMS DELETED		
201002	Reactor Manual Control System – System is not part of BWR-6 design. Functions of this system are incorporated into the Rod Control & Information System (201005).	
201004	Rod Sequence Control System – System is not part of BWR-6 design. Functions of this system are incorporated into the Rod Control & Information System (201005).	
201006	Rod Worth Minimizer System – System is not part of BWR-6 design. Functions of this system are incorporated into the Rod Control & Information System (201005).	
214000	Rod Position Information System – System is not part of BWR-6 design. Functions of this system are incorporated into the Rod Control & Information System (201005).	
215002	Rod Block Monitor System – System is not part of BWR-6 design. Functions of this system are incorporated into the Rod Control & Information System (201005).	
206000	High Pressure Coolant Injection (HPCI) – System is not part of BWR-6 design.	
207000	Isolation (Emergency) Condenser – System is not part of BWR-6 design.	
230000	RHR/LPCI: Torus/Pool Spray Mode – System is not part of the BWR-6 Mark III Containment design.	

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	2												12	0	3	3
	Tier Totals												38	2	6	8
3. Generic Knowledge and Abilities Categories												10	1	2	3	4
													2	2	1	2
<p>Note:</p> <ol style="list-style-type: none"> 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two). 2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ± 1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points. 3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements. 4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution. 5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively. 6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories. 7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As. 8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams. 9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43. 																

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Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO)										
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#	
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4					X		Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION: AA2.05 Jet pump operability 55.43(b)(2)	3.4	76 F	
295003 Partial or Complete Loss of AC / 6						X	2.4.41 Knowledge of the emergency action level thresholds and classifications. 55.41(b)(10) 55.43(b)(5)	4.6	77 H	
295004 Partial or Total Loss of DC Pwr / 6										
295005 Main Turbine Generator Trip / 3										
295006 SCRAM / 1										
295016 Control Room Abandonment / 7										
295018 Partial or Total Loss of CCW / 8										
295019 Partial or Total Loss of Inst. Air / 8										
295021 Loss of Shutdown Cooling / 4						X	2.2.25 Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits. 55.43(b)(2)	4.2	78 H	
295023 Refueling Acc / 8										
295024 High Drywell Pressure / 5										
295025 High Reactor Pressure / 3						X	2.4.6 Knowledge of EOP mitigation strategies. 55.43(b)(5)	4.7	79 H	
295026 Suppression Pool High Water Temp. / 5										
295027 High Containment Temperature / 5										
295028 High Drywell Temperature / 5										
295030 Low Suppression Pool Wtr Lvl / 5										
295031 Reactor Low Water Level / 2										
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1					X		Ability to determine and/or interpret the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: EA2.01 Reactor power 55.43(b)(5)	4.3	90 H	
295038 High Off-site Release Rate / 9					X		Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE: EA2.03 †Radiation levels 55.43(b)(4)	4.3	80 H	
600000 Plant Fire On Site / 8					X		Ability to determine and interpret the following as they apply to PLANT FIRE ON SITE: AA2.17 Systems that may be affected by the fire 55.43(b)(5)	3.6	81 H	
700000 Generator Voltage and Electric Grid Disturbances / 6										
K/A Category Totals:					4	3	Group Point Total:		7	

ES-401		BWR Examination Outline - SRO Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO)							Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#	
295002 Loss of Main Condenser Vac / 3										
295007 High Reactor Pressure / 3										
295008 High Reactor Water Level / 2										
295009 Low Reactor Water Level / 2										
295010 High Drywell Pressure / 5										
295011 High Containment Temp / 5										
295012 High Drywell Temperature / 5										
295013 High Suppression Pool Temp. / 5										
295014 Inadvertent Reactivity Addition / 1										
295015 Incomplete SCRAM / 1										
295017 High Off-site Release Rate / 9										
295020 Inadvertent Cont. Isolation / 5 & 7										
295022 Loss of CRD Pumps / 1										
295029 High Suppression Pool Wtr Lvl / 5						X	2.2.40 Ability to apply Technical Specifications for a system. 55.43(b)(2)	4.7	93 H	
295032 High Secondary Containment Area Temperature / 5										
295033 High Secondary Containment Area Radiation Levels / 9										
295034 Secondary Containment Ventilation High Radiation / 9										
295035 Secondary Containment High Differential Pressure / 5										
295036 Secondary Containment High Sump/Area Water Level / 5						X	2.4.6 Knowledge of EOP mitigation strategies. 55.43(b)(5)	4.7	82 H	
500000 High CTMT Hydrogen Conc. / 5						X	2.4.6 Knowledge of EOP mitigation strategies. 55.43(b)(5)	4.7	92 H	
K/A Category Point Totals:					0	3	Group Point Total:		3	

ES-401		BWR Examination Outline - SRO Plant Systems - Tier 2/Group 1 (SRO)												Form ES-401-1	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#	
203000 RHR/LPCI: Injection Mode															
205000 Shutdown Cooling															
206000 HPCI															
207000 Isolation (Emergency) Condenser															
209001 LPCS											X	2.2.37 Ability to determine operability and/or availability of safety related equipment. 55.43(b)(5)	4.6	83 H	
209002 HPCS															
211000 SLC											X	2.2.40 Ability to apply Technical Specifications for a system. 55.43(b)(2)	4.7	84 F	
212000 RPS								X				Ability to (a) predict the impacts of the following on the REACTOR PROTECTION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.21 †Failure of individual relays to reposition: Plant-Specific 55.43(b)(2)	3.9	91 H	
215003 IRM															
215004 Source Range Monitor															
215005 APRM / LPRM															
217000 RCIC															
218000 ADS															
223002 PCIS/Nuclear Steam Supply Shutoff															
239002 SRVs															
259002 Reactor Water Level Control															
261000 SGTS								X				Ability to (a) predict the impacts of the following on the STANDBY GAS TREATMENT SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.11 High containment pressure 55.43(b)(5)	3.3	85 H	
262001 AC Electrical Distribution															
262002 UPS (AC/DC)															
263000 DC Electrical Distribution															

264000 EDGs											X	2.4.30 Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator. 55.43(b)(5)	4.1	86 F
300000 Instrument Air														
400000 Component Cooling Water														
K/A Category Point Totals:								2			3	Group Point Total:		5

ES-401		BWR Examination Outline - SRO Plant Systems - Tier 2/Group 2 (SRO)												Form ES-401-1	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#	
201001 CRD Hydraulic															
201002 RMCS															
201003 Control Rod and Drive Mechanism											X	2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. 55.43(b)(2)	4.2	87 H	
201004 RSCS															
201005 RCIS															
201006 RWM															
202001 Recirculation											X	2.4.11 Knowledge of abnormal condition procedures. 55.43(b)(5)	4.2	88 H	
202002 Recirculation Flow Control															
204000 RWCU															
214000 RPIS															
215001 Traversing In-core Probe															
215002 RBM															
216000 Nuclear Boiler Inst.															
219000 RHR/LPCI: Torus/Pool Cooling Mode															
223001 Primary CTMT and Aux.															
226001 RHR/LPCI: CTMT Spray Mode															
230000 RHR/LPCI: Torus/Pool Spray Mode															
233000 Fuel Pool Cooling/Cleanup															
234000 Fuel Handling Equipment															
239001 Main and Reheat Steam															
239003 MSIV Leakage Control															
241000 Reactor/Turbine Pressure Regulator															
245000 Main Turbine Gen. / Aux.															
256000 Reactor Condensate															
259001 Reactor Feedwater															
268000 Radwaste															
271000 Offgas															
272000 Radiation Monitoring															
286000 Fire Protection															
288000 Plant Ventilation															
290001 Secondary CTMT															
290003 Control Room HVAC											X	2.2.40 Ability to apply Technical Specifications for a system. 55.43(b)(2)	4.7	89 F	
290002 Reactor Vessel Internals															
K/A Category Point Totals:								0			3	Group Point Total:		3	

Facility: Grand Gulf Nuclear Station			Date of Exam: December 2, 2011			
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.1	Knowledge of conduct of operations requirements. 55.41(b)(10)			4.2	97 F
	2.1.36	Knowledge of procedures and limitations involved in core alterations. 55.43(b)(6)			4.1	94 H
	Subtotal					2
2. Equipment Control	2.2.18	Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc. 55.43(b)(5)			3.9	98 H
	2.2.23	Ability to track Technical Specification limiting conditions for operations. 55.43(b)(5)			4.6	95 F
	Subtotal					2
3. Radiation Control	2.3.11	Ability to control radiation releases. 55.43(b)(5)			4.3	100 F
	Subtotal					1
4. Emergency Procedures / Plan	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines. 55.43(b)(5)			4.4	99 H
	2.4.38	Ability to take actions called for in the facility emergency plan, including supporting or acting as emergency coordinator if required. 55.43(b)(5)			4.4	96 F
	Subtotal					2
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
3	2.3.4	Per Chief Examiner's direction, de-selected this KA. Reason: same Tier 3 KA was selected on both of the last two NRC SRO exams. Randomly and systematically replaced this KA with 2.3.11.
SYSTEMS DELETED		
201002	Reactor Manual Control System – System is not part of BWR-6 design. Functions of this system are incorporated into the Rod Control & Information System (201005).	
201004	Rod Sequence Control System – System is not part of BWR-6 design. Functions of this system are incorporated into the Rod Control & Information System (201005).	
201006	Rod Worth Minimizer System – System is not part of BWR-6 design. Functions of this system are incorporated into the Rod Control & Information System (201005).	
214000	Rod Position Information System – System is not part of BWR-6 design. Functions of this system are incorporated into the Rod Control & Information System (201005).	
215002	Rod Block Monitor System – System is not part of BWR-6 design. Functions of this system are incorporated into the Rod Control & Information System (201005).	
206000	High Pressure Coolant Injection (HPCI) – System is not part of BWR-6 design.	
207000	Isolation (Emergency) Condenser – System is not part of BWR-6 design.	
230000	RHR/LPCI: Torus/Pool Spray Mode – System is not part of the BWR-6 Mark III Containment design.	

Facility: Grand Gulf Nuclear Station		Date of Examination: 12/05/2011
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N-R	Fire Door Surveillance GJPM-OPS-2011AR1 2.1.20 (4.6)
Conduct of Operations	N-R	Operator Qualification Verification GJPM-OPS-2011AR2 2.1.4 (3.3)
Equipment Control	N-R	Prepare a Tagout GJPM-OPS-2011AR3 2.2.13 (4.1)
Radiation Control		
Emergency Procedures/Plan	P-R	Primary CTMT Water Lvl Determination EOP Att 29 GJPM-OPS-2011AR4 2.4.21 (4.0)

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:

- (C)ontrol room, (S)imulator, or Class(R)oom
- (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
- (N)ew or (M)odified from bank (≥ 1)
- (P)revious 2 exams (≤ 1 ; randomly selected)

Facility: Grand Gulf Nuclear Station		Date of Examination: 12/05/2011
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N-R	Determine Fire Watch Requirements GJPM-OPS-2011AS1 K/A 2.1.2 (4.0)
Conduct of Operations	M-S	Plant Safety Index GJPM-OPS-2011AS2 K/A 2.1.19 (3.8)
Equipment Control	N-R	Review Adequacy of a Tagout GJPM-OPS-2011AS3 K/A 2.2.13 (4.3)
Radiation Control	N-R	Review Liquid Radwaste Discharge Permit GJPM-OPS-2011AS4 K/A 2.3.6 (3.8)
Emergency Procedures/Plan	N-R	EPP Classification GJPM-OPS-2011AS5 K/A 2.4.41 (4.6)

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:

(C)ontrol room, (S)imulator, or Class(R)oom

(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)

(N)ew or (M)odified from bank (≥ 1)

(P)revious 2 exams (≤ 1 ; randomly selected)

Facility: GRAND GULF NUCLEAR STATION		Date of Examination: 12/05/2011
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: _____

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. 202001 A4.01 (3.7/3.7) / Shifting Reactor Recirc Pumps to Fast Speed (GJPM-OPS-B3306)	A-D-S	1
b. 217000 A4.04 (3.6/3.6) / RCIC Manual Startup (GJPM-OPS-E5102)	A-D-S	2
c. 241000 A2.06 (3.1/3.2) / Rotate EHC Pumps (GJPM-OPS-N3201)	A-D-S	3
d. 205000 A4.01 (3.7/3.7) / Startup Shutdown Cooling B (GJPM-OPS-E1201)	D-L-S	4
e. 223001 A2.11 (3.6/3.8) / Manually Initiate Suppression Pool Make Up (GJPM-OPS-E3013)	D-S	5
f. 212000 A2.03 (3.3/3.5) / Reactor Manual Scram Switch Test (Not yet added to JPM bank GJPM-OPS-C7105)	A-N-S	7
g. 400000 A4.01 (3.1/3.0) / Rotate CCW Pumps (GJPM-OPS-P4271)	A-D-S	8
h. 261000 A4.03 (3.0/3.0) / Secure SSTG With One Train In Standby Mode Following Automatic Initiation (GJPM-OPS-T4803)	D-S	9

In-Plant Systems® (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. 295015 AA1.01 (3.8/3.9) / Manually Venting the Scram Air Header (GJPM-OPS-EOP23)	D-E-R	1
j. 219000 A4.01 (3.8/3.7) / Startup RHR In Suppression Pool Cooling From the Remote Shutdown Panel (GJPM-OPS-C6101)	D-E	5
k. 262002 A4.01 (2.8/3.1) / Startup an ESF Static Inverter (Not yet added to JPM bank GJPM-OPS-L62-3)	N	6

@ 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.		
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* 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	$\leq 9 / \leq 8 / \leq 4$
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$
(EN)gineered safety feature	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	$\geq 1 / \geq 1 / \geq 1$
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)
(R)CA	$\geq 1 / \geq 1 / \geq 1$
(S)imulator	

Facility: GRAND GULF NUCLEAR STATION		Date of Examination: 12/05/2011
Exam Level: RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: _____

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. 202001 A4.01 (3.7/3.7) / Shifting Reactor Recirc Pumps to Fast Speed (GJPM-OPS-B3306)	A-D-S	1
b. 217000 A4.04 (3.6/3.6) / RCIC Manual Startup (GJPM-OPS-E5102)	A-D-S	2
c. 241000 A2.06 (3.1/3.2) / Rotate EHC Pumps (GJPM-OPS-N3201)	A-D-S	3
d. 205000 A4.01 (3.7/3.7) / Startup Shutdown Cooling B (GJPM-OPS-E1201)	D-L-S	4
e. 223001 A2.11 (3.6/3.8) / Manually Initiate Suppression Pool Make Up (GJPM-OPS-E3013)	D-S	5
f. 212000 A2.03 (3.3/3.5) / Reactor Manual Scram Switch Test (Not yet added to JPM bank GJPM-OPS-C7105)	A-N-S	7
g. 400000 A4.01 (3.1/3.0) / Rotate CCW Pumps (GJPM-OPS-P4271)	A-D-S	8
h. NA		

In-Plant Systems® (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. 295015 AA1.01 (3.8/3.9) / Manually Venting the Scram Air Header (GJPM-OPS-EOP23)	D-E-R	1
j. 219000 A4.01 (3.8/3.7) / Startup RHR In Suppression Pool Cooling From the Remote Shutdown Panel (GJPM-OPS-C6101)	D-E	5
k. 262002 A4.01 (2.8/3.1) / Startup an ESF Static Inverter (Not yet added to JPM bank GJPM-OPS-L62-3)	N	6

@ 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.		
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* 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	$\leq 9 / \leq 8 / \leq 4$
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$
(EN)gineered safety feature	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	$\geq 1 / \geq 1 / \geq 1$
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)
(R)CA	$\geq 1 / \geq 1 / \geq 1$
(S)imulator	

Facility: GGNS		Date of Exam: 12/5/2011									Operating Test No.: LOT-2011						
A P P L I C A N T	E V E N T T Y P E	Scenarios (Backup TBD during NRC validations)												T O T A L	M I N I M U M(*)		
		1			2			3			4 – Alternate						
		C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P		R	I	U
RO-1 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U	RX		1				0			0				1	1	1	0
	NOR		0				2			1				3	1	1	1
	I/C		2				3			2				7	4	4	2
	MAJ		2				2			2				6	2	2	1
	TS														0	2	2
RO-2 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U	RX			1		2								3	1	1	0
	NOR			2		0								2	1	1	1
	I/C			1		3								4	4	4	2
	MAJ			2		2								4	2	2	1
	TS														0	2	2
RO-3 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U	RX		1				0			0				1	1	1	0
	NOR		0				2			1				3	1	1	1
	I/C		2				3			2				7	4	4	2
	MAJ		2				2			2				6	2	2	1
	TS														0	2	2
RO-4 <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U	RX			1		2								3	1	1	0
	NOR			2		0								2	1	1	1
	I/C			1		3								4	4	4	2
	MAJ			2		2								4	2	2	1
	TS														0	2	2
RO-5 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U	RX		1				0			0				1	1	1	0
	NOR		0				2			1				3	1	1	1
	I/C		2				3			2				7	4	4	2
	MAJ		2				2			2				6	2	2	1
	TS														0	2	2
RO-6 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U	RX			1		2								3	1	1	0
	NOR			2		0								2	1	1	1
	I/C			1		3								4	4	4	2
	MAJ			2		2								4	2	2	1
	TS														0	2	2

RO <input type="checkbox"/> SRO-I-1 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>	RX	0			0				1					1	1	1	0
	NOR	2			2				0					4	1	1	1
	I/C	3			4				1					8	4	4	2
	MAJ	3			2				2					7	2	2	1
	TS	1			2									3	0	2	2
RO <input type="checkbox"/> SRO-I-2 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>	RX	0			0				1					1	1	1	0
	NOR	2			2				0					4	1	1	1
	I/C	3			4				1					8	4	4	2
	MAJ	3			2				2					7	2	2	1
	TS	1			2									3	0	2	2
RO <input type="checkbox"/> SRO-I-3 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>	RX	0			0				1					1	1	1	0
	NOR	2			2				0					4	1	1	1
	I/C	3			4				1					8	4	4	2
	MAJ	3			2				2					7	2	2	1
	TS	1			2									3	0	2	2
RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX											2	0		1	1	0
	NOR										2	0	2		1	1	1
	I/C										3	1	2		4	4	2
	MAJ										2	2	2		2	2	1
	TS										2				0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Notes:

1. Applicants are identified as they appear on the proposed examination schedule.
2. The event type count will be different if the alternate Scenario 4 is used.
3. RO candidates may be used as appropriate on the 3rd event in order to meet minimum event type counts.

Facility: Grand Gulf Nuclear Station Scenario No.: 1 Op-Test No.: 12/11

Examiners: _____ Operators: _____

Objectives: To evaluate the candidates' ability to operate the facility in response to the following evolutions:

1. Inoperable Primary Containment Air Lock
2. Rotate CRD Pumps.
3. Respond to a CRD Pump Trip.
4. Lower reactor power using Recirc Flow Control.
5. Respond to a Recirc Pump Trip.
6. Respond to ST-11 and 15AA lockout.
7. Take actions for RPS fails to scram.
8. Take actions for an ATWS.
9. Respond to a FW Line A Break in the Drywell.

Initial Conditions: Operating at 100% power.

Inoperable Equipment: None

Turnover:

The plant is at rated power. Rotate CRD pumps in accordance with the C11-1 SOI in preparation for CRD pump "A" maintenance. There is no out of service equipment and EOOS is GREEN. It is a division 1 work week.

Scenario Notes:

This scenario was written from lesson plan GSMS-RO-EP033 revision 6. Attributes have been altered in order to meet the requirements of NUREG 1021 ES-301 section D.5.b, and is considered significantly modified.

Validation Time: 60 minutes

Event No.	Malf. No.	Event Type [†]	Event Description
1		TS (CRS)	Primary Containment Air Lock seal fails to inflate (TS 3.6.1.2)
2		N (BOP)	Rotate CRD pumps (SOI 04-1-01-C11-1 section 5.5)
3	C11028b	C (BOP) A (CREW)	CRD pump Trip (CRD Malfunctions (05-1-02-IV-1) ONEP section 2.1.2)
4		N (BOP) R (ACRO)	Lower generator load by 200 MWe using FCV's (IOI 03-1-01-2 Attachment VIII)
5	rr012a	C (ACRO) R (BOP) A (CREW)	Recirc Pump Trip (Reduction in Recirc Flow (05-1-02-III-3) ONEP)
6	r21133a r21139e	M (CRS, BOP)	Service Transformer 11 and ESF 15AA bus lockout (Loss of AC Power (05-1-02-I-4) ONEP)
7	c71076	I (ACRO)	RPS fails to scram the reactor when the second Recirc pump trips and the Exclusion Region of the power to flow map is entered (Reduction in Recirc Flow (05-1-02-III-3) ONEP) * Second Recirculation pump trips. Crew inserts manual reactor scram as observed by control rods inserted and scram annunciators received. Criterion is to give the highest priority to insert a manual scram.

8	c11164 e51044	M (All)	<p>ATWS <4% power with reduced feed capability (EP-2A)</p> <p>* When EP-2A requires Emergency Depressurization, Crew terminates and prevents all injection except boron, CRD, and RCIC per 02-S-01-27 Operations Philosophy. Feedwater and ECCS system alignments prevent injection into the RPV as evidenced by available instrumentation. Criterion is to give the highest priority to prevent all injection except boron, CRD, and RCIC until reaching MSCP.</p> <p>* Reactor pressure decreases to MSCP. Crew commences and slowly raises injection utilizing available EP-2A Table 4 and/or Table 5 systems with RPV level restored and maintained to greater than -191". Criterion is to give the highest priority to restore RPV level greater than -191".</p>
9	fw171a rr063a	M (ACRO)	Feedwater Line A rupture inside the Drywell.
† (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (A)bnormal (TS) Tech Spec * Critical Task (As defined in NUREG 1021 Appendix D)			
Quantitative Attributes Table			
Normal Events	2	Abnormal Events	2
Reactivity Manipulations	2	Total Malfunctions	7
Instrument/Component Failures	3	EP Entries (Requiring substantive action)	1
Major Transients	3	EP Contingencies	1
Tech Spec Calls	1	Critical Tasks	4

Facility: Grand Gulf Nuclear Station Scenario No.: 2 Op-Test No.: 12/11

Examiners: _____ Operators: _____

Objectives: To evaluate the candidates' ability to operate the facility in response to the following evolutions:

1. Place SSW "A" in STANDBY.
2. Raise reactor power using Recirc Flow Control.
3. RPS "A" MG failure.
4. Electric Power Monitoring Assembly INOPERABLE.
5. Two APRM channel failures.
6. Fuel cladding leak.
7. RCIC fails to start on initiation.
8. RCIC room unisolable steam leak.

Initial Conditions: Operating at 85% power.

Inoperable Equipment: APRM "F" is failed downscale and bypassed.

Turnover:

A plant startup is in progress with all steps complete up to step 6.8 of Attachment II in 03-1-01-2 (Power Ascension From 60% to Full Power). The crew will place SSW "A" in STANDBY upon assuming the shift. When SSW "A" is in STANDBY, raise reactor power to 100% of rated.

Scenario Notes:

This scenario was written from lesson plan GSMS-RO-EP015 rev. 8. Attributes have been altered in order to meet the requirements of NUREG 1021 ES-301 section D.5.b, but is not considered significantly modified.

Validation Time: 50 minutes

Event No.	Malf. No.	Event Type [†]	Event Description
1		N (BOP)	Place SSW "A" in Standby (SOI 04-1-01-P41-1 section 4.6)
2		N (BOP) R (ACRO)	Raise Reactor power using FCV's (IOI 03-1-01-2 Att. 2 step 6.8)
3	c71077a	C (BOP) A (CREW)	RPS "A" MG failure (Loss of One or Both RPS Buses (05-1-02-III-2) ONEP)
4		TS (CRS)	Electric Power Monitoring Assembly INOPERABLE (TS 3.3.8.2)
5	c51010f c51010d	I (ACRO) TS (CRS) A (CREW)	Two APRM channel failures (ARI/TS 3.3.1.1)
6	rr071 rm157a rrd21k648a_d rrd21k648b_d rrd21k648c_d rrd21k648d_d	M (CREW) R (ACRO)	Fuel cladding leak (Off-Gas Activity High (05-1-02-II-2) and SCRAM (05-1-02-I-1) ONEP) * Fuel failure is occurring and main steam line radiation is greater than 3 times normal full power background as indicated by MSL B / MSL C RAD HI-HI or MSL A / MSL D RAD HI-HI alarms, the crew closes MSIVs and MSL drains per EP-4. The crew closes the MSIVs and MSL drains and observes valve position indications and lowering pressure trend downstream of the MSIVs. Criterion is to give the highest priority to close the four inboard MSIVs or the four outboard MSIVs and MSL drains when MSL radiation is greater than 3 times normal full power background.
7	e51043 DI_1E51M625D	I (ACRO / BOP)	RCIC fails to start on initiation (SOI 04-1-01-E51-1)

8	e51187a e51187b rrd21k603 rrd21k613	M (CREW) I/C (ACRO / BOP)	<p>RCIC room unisolable steam leak (EP-4)</p> <p>* A primary system is discharging outside primary containment and area temperatures, radiation levels, or water levels are above their max safe values in two or more areas. The crew opens 8 ADS/SRVs and observes lowering pressure trend and valve position indications (tailpipe pressure indication lamps or solenoid valve energized). Criterion is to give the highest priority to open at least seven SRVs when area temperatures, radiation levels, or water levels are above their maximum safe values in two or more areas.</p>
† (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (A)bnormal (TS) Tech Spec * Critical Task (As defined in NUREG 1021 Appendix D)			
Quantitative Attributes Table			
Normal Events	2	Abnormal Events	2
Reactivity Manipulations	2	Total Malfunctions	5
Instrument/Component Failures	4	EP Entries (Requiring substantive action)	2
Major Transients	2	EP Contingencies	1
Tech Spec Calls	2	Critical Tasks	2

Facility: Grand Gulf Nuclear Station Scenario No.: 3 Op-Test No.: 12/11

Examiners: _____ Operators: _____

Objectives: To evaluate the candidates' ability to operate the facility in response to the following evolutions:

1. Place the Mode Switch in Run.
2. Start a second Condensate Booster Pump.
3. Suppression Pool level transmitter failure.
4. Spurious Division 1 ECCS initiation.
5. LPCS pump trips on ECCS initiation.
6. Loss of Main Condenser Vacuum.
7. Suppression Pool leak in the RHR C Room.
8. Startup Level Controller C34-R602 automatic control fails.

Initial Conditions: Operating at 5% power.

Inoperable Equipment: None

Turnover:

A plant startup is in progress with all steps complete up to step 6.2.16.b in 03-1-01-1 (Cold Shutdown to Generator Carrying Minimum Load) and step 1.3.17 of Attachment 1 in 03-1-01-1 and step 163A of the cycle 18 BOC rod sequence movement sheet. The Crew will pull control rods to complete step 163B of the rod sequence movement sheet and then place the Mode Switch in RUN. When the Mode Switch is in Run, the Crew will give priority to starting a second Condensate Booster Pump prior to continuing with the Turbine Startup Procedure.

Scenario Notes:

This is a new scenario.

Validation Time: 60 minutes

Event No.	Malf. No.	Event Type [†]	Event Description
1		R (ACRO)	Place the Mode Switch to RUN (IOI 03-1-01-1 section 6.2.16.b-h)
2		N (BOP)	Start a second Condensate Booster Pump (SOI 04-1-01-N19-1 section 4.3)
3	1te30n003b_b	TS (CRS) A (CREW)	Suppression Pool Level Transmitter Failure (TS 3.3.3.1 Condition A)
4	e21_lpcs	I (BOP) A (CREW)	Spurious Division 1 ECCS initiation (SOI 04-1-01-E12-1 Attachment IX) * When Division 1 ECCS spuriously initiates, the crew secures the Division 1 Drywell Purge Compressor prior to the Drywell reaching 1.23 psig causing a reactor scram.
5	e21051	TS (CRS)	LPCS pump trips on ECCS initiation (TS 3.5.1 Condition A)
6	fw163c	M (Crew)	Loss of Main Condenser Vacuum (Loss of Condenser Vacuum (05-1-02-V-8) ONEP)
7	ct218e ct219b	M (Crew)	Suppression Pool Leak in RHR C Room (EP-3) * When it is determined that Suppression Pool level cannot be maintained above 14.5', the crew opens 8 SRVs and observes lowering pressure trend and valve position indications (tailpipe pressure indication lamps or solenoid valve energized). Criterion is to open at least seven SRVs prior to Suppression Pool level reaching 14.5'.
8	c34r602_b	I (ACRO)	Startup Level Controller C34-R602 automatic control fails (Ops Philosophy 02-S-01-27 section 6.1.1.d)
[†] (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (A)bnormal (TS) Tech Spec * Critical Task			
Quantitative Attributes Table			
Normal Events	1	Abnormal Events	2
Reactivity Manipulations	1	Total Malfunctions	6
Instrument/Component Failures	2	EP Entries (Requiring substantive action)	2
Major Transients	2	EP Contingencies	1
Tech Spec Calls	2	Critical Tasks	2

Facility: Grand Gulf Nuclear Station Scenario No.: 4 Op-Test No.: 12/11

Examiners: _____ Operators: _____

Objectives: To evaluate the candidates' ability to operate the facility in response to the following evolutions:

1. Place Suppression Pool Cooling in service.
2. Lower main generator output to 1280 MWe with +100 MVAR.
3. Trip of the 16BB3 electric bus.
4. Control Rod drift.
5. Unisolable LOCA with limited injection capabilities.
6. Division 3 Diesel Generator failure to start.
7. Division 2 Diesel Generator running without cooling water.
8. Loss of power to E22-F004 HPCS injection valve.

Initial Conditions: Operating at 100% power.

Inoperable Equipment: None

Turnover:

A plant is operating at rated power. Suppression Pool temperature is elevated due to a weeping SRV. The Crew will start Suppression Pool Cooling on RHR B using the 04-1-01-E12-1 RHR system SOI. When Suppression Pool Cooling is in service, the Crew will lower generator output to 1280 MWe with +100 MVAR.

Scenario Notes:

This is a new scenario.

Validation Time: Not Validated

Event No.	Malf. No.	Event Type [†]	Event Description
1		N (BOP) TS (CRS)	Place Suppression Pool Cooling in Service (SOI 04-1-01-E12-1 section 5.2, TS 3.5.1 Condition A)
2		R (ACRO) N (BOP / ACRO)	Lower main generator output to 1280 MWe with +100 MVAR (IOI 03-1-01-2 Attachment VIII, 04-1-01-N40-1 section 4.4)
3	r21142z	TS (CRS) A (CREW)	Trip of the 16BB3 electric bus (TS 3.6.1.3 Condition A, TS 3.5.1 Condition C, TS 3.6.4.3 Condition A, TS 3.6.3.2 Condition A)
4	z161161_24_33 z022022_24_33 z021021_28_33	R (ACRO) M (CREW)	Control Rod Drift (Control Rod/Drive Malfunctions (05-1-02-IV-1) ONEP)
5	rr063a r21139e xml1r21191 xml1r21192 e12050c	M (Crew)	Unisolable LOCA with limited injection capabilities (Scram (05-1-02-I-1) and Turbine Trip (05-1-02-I-2) ONEPs, EP-2, EP-3) * The crew injects HPCS to the reactor before reactor water level lowers to -191”.
6	n41140c	C (BOP)	Division 3 Diesel Generator failure to start (Loss of AC Power (05-1-02-I-4) ONEP) * When Division 3 Diesel Generator fails to start, the crew re-energizes the 17AC bus with an alternate feeder (ESF 12). HPCS is the only recoverable system and power to this bus is required to run the HPCS pump.

7	p41f018b_i	C (BOP)	Division 2 Diesel Generator running without cooling water (02-S-01-27 Ops Philosophy section 6.1.1.c)
8	e22159a	C (ACRO)	<p>Loss of power to E22-F004 HPCS injection valve (02-S-01-27 Ops Philosophy section 6.1.1.d)</p> <p>* When E22-F004 loses power, the crew sends an operator to manually open the valve. HPCS is the only recoverable system and this valve must be manually opened in order to allow injection to the reactor. Criteria is that this valve is opened prior to reactor water level reaching -191”.</p>
† (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (A)bnormal (TS) Tech Spec * Critical Task (As defined in NUREG 1021 Appendix D)			
Quantitative Attributes Table			
Normal Events	2	Abnormal Events	1
Reactivity Manipulations	2	Total Malfunctions	6
Instrument/Component Failures	3	EP Entries (Requiring substantive action)	1
Major Transients	2	EP Contingencies	1
Tech Spec Calls	2	Critical Tasks	3