

Facility:		Grand Gulf Nuclear Station												Date of Exam:		October 19,2012		
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	3	3	3	N/A			4	3	N/A		4	20			7		
	2	1	1	1				2	1			1	7			3		
	Tier Totals	4	4	4				6	4			5	27			10		
2. Plant Systems	1	3	2	3	2	2	2	3	3	1	2	3	26			5		
	2	1	1	2	1	1	1	0	2	1	1	1	12			3		
	Tier Totals	4	3	5	3	3	3	3	5	2	3	4	38			8		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4	7
					3		3		2		2							
<p>Note:</p> <ol style="list-style-type: none"> 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			Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION: AA1.01 Recirculation System, 55.41(b)(7) & (10)	3.5	15	
295003 Partial or Complete Loss of AC / 6					X		Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER : AA2.04 System lineups 55.41(b)(10)	3.5	14	
295004 Partial or Total Loss of DC Pwr / 6						X	G2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. 55.41(b)(10)	4.4	61	
295005 Main Turbine Generator Trip / 3			X				Knowledge of the reasons for the following responses as they apply to MAIN TURBINE GENERATOR TRIP: AK3.07 Bypass valve operation 55.41(b)(5)	3.8	5	
295006 SCRAM / 1	X						Knowledge of the operational implications of the following concepts as they apply to SCRAM : AK1.01 Decay heat generation and removal 55.41(b)(8) & (10)	3.7	16	
295016 Control Room Abandonment / 7					X		Ability to determine and/or interpret the following as they apply to CONTROL ROOM ABANDONMENT: AA2.02 Reactor water level 55.41(b)(10)	4.2	17	
295018 Partial or Total Loss of CCW / 8			X				Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER : AK3.01 Isolation of non-essential heat loads 55.41(b)(10)	2.9	46	
295019 Partial or Total Loss of Inst. Air / 8		X					Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR and the following: AK2.01 CRD hydraulics 55.41(b)(7) & (10)	3.8	48	
295021 Loss of Shutdown Cooling / 4				X			Ability to operate and/or monitor the following as they apply to LOSS OF SHUTDOWN COOLING: AA1.05 Reactor recirculation 55.41(b)(10)	3.0	49	
295023 Refueling Acc / 8						X	G2.1.27 Knowledge of system purpose and/or function. 55.41(b)(7)	3.9	6	
295024 High Drywell Pressure / 5	X						Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL PRESSURE: EK1.01 Drywell integrity 55.41(b)(8) & (9)	4.1	18	
295025 High Reactor Pressure / 3	X						Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR PRESSURE: EK1.06 Pressure effects on reactor water level 55.41(b)(5)	3.5	47	
295026 Suppression Pool High Water Temp. / 5			X				Knowledge of the reasons for the following responses as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: EK3.05 Reactor SCRAM 55.41(b)(10)	3.9	50	
295027 High Containment Temperature / 5						X	G2.2.38 Knowledge of conditions and limitations in the facility license. 55.41(b)(10)	3.6	7	
295028 High Drywell Temperature / 5		X					Knowledge of the interrelations between HIGH DRYWELL TEMPERATURE and the following: EK2.02 Components internal to the drywell 55.41(b)(7)	3.2	8	

295030 Low Suppression Pool Wtr Lvl / 5					X		Ability to determine and/or interpret the following as they apply to LOW SUPPRESSION POOL WATER LEVEL: EA2.03 Reactor pressure 55.41(b)(10)	3.7	60
295031 Reactor Low Water Level / 2				X			Ability to operate and/or monitor the following as they apply to REACTOR LOW WATER LEVEL: EA1.07 Safety/relief valves 55.41(b)(7)	3.7	52
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1		X					Knowledge of the interrelations between SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN and the following: EK2.07 Neutron monitoring system 55.41(b)(10)	4.0	54
295038 High Off-site Release Rate / 9									
600000 Plant Fire On Site / 8						X	G2.4.49 Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. 55.41(b)(10)	4.6	53
700000 Generator Voltage and Electric Grid Disturbances / 6				X			Ability to operate and/or monitor the following as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES: AA1.01 Grid frequency and voltage 55.41(b)(5) & (10)	3.6	19
K/A Category Totals:	3	3	3	4	3	4	Group Point Total:		20

ES-401		BWR Examination Outline - RO Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (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	#	
295002 Loss of Main Condenser Vac / 3										
295007 High Reactor Pressure / 3										
295008 High Reactor Water Level / 2		X					Knowledge of the interrelations between HIGH REACTOR WATER LEVEL and the following: AK2.06 RCIC 55.41(b)(7)	3.4	11	
295009 Low Reactor Water Level / 2										
295010 High Drywell Pressure / 5	X						Knowledge of the operational implications of the following concepts as they apply to HIGH DRYELL PRESSURE: AK1.03 Temperature increases 55.41(b)(10)	3.2	12	
295011 High Containment Temp / 5										
295012 High Drywell Temperature / 5										
295013 High Suppression Pool Temp. / 5						X	G2.4.4 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	20	
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				X			Ability to operate and/or monitor the following as they apply to LOSS OF CRD PUMPS: AA1.02 RPS 55.41(b)(10)	3.6	21	
295029 High Suppression Pool Wtr Lvl / 5										
295032 High Secondary Containment Area Temperature / 5										
295033 High Secondary Containment Area Radiation Levels / 9										
295034 Secondary Containment Ventilation High Radiation / 9					X		Ability to determine and/or interpret the following as they apply to SECONDARY CONTAINMENT VENTILATION HIGH RADIATION: EA2.01 Ventilation radiation levels 55.41(b)(10)	3.8	13	
295035 Secondary Containment High Differential Pressure / 5			X				Knowledge of the reasons for the following responses as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE: EK3.02 Secondary containment ventilation response 55.41(b)(4) & (5)	3.3	22	
295036 Secondary Containment High Sump/Area Water Level / 5				X			Ability to operate and/or monitor the following as they apply to SECONDARY CONTAINMENT HIGH SUMP/AREA WATER LEVEL: EA1.02 Affected systems so as to isolate damaged portions	3.5	71	
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 following will have on the RHR/LPCI: INJECTION MODE: K6.10 Component cooling water systems 55.41(b)(7)	3.0	23
205000 Shutdown Cooling											X	G2.2.12 Knowledge of surveillance procedures. 55.41(b)(10)	3.7	24
206000 HPCI														
207000 Isolation (Emergency) Condenser														
209001 LPCS				X								Knowledge of LOW PRESSURE CORE SPRAY SYSTEM design feature(s) and/or interlocks which provide for the following: K4.02 Prevents water hammer 55.41(b)(7)	3.0	9
						X						Knowledge of the effect that a loss or malfunction of the following will have on the LOW PRESSURE CORE SPRAY SYSTEM: K6.05 ECCS room cooler(s) 55.41(b)(7) & (10)	2.8	25
209002 HPCS			X									Knowledge of the effect that a loss or malfunction of the HIGH PRESSURE CORE SPRAY SYSTEM (HPCS) will have on following: K3.03 Adequate core cooling 55.41(b)(7) & (10)	3.9	26
211000 SLC	X											Knowledge of the physical connections and/or cause-effect relationships between STANDBY LIQUID CONTROL SYSTEM and the following: K1.05 RWCU 55.41(b)(7)	3.4	10
212000 RPS					X							Knowledge of the operational implications of the following concepts as they apply to REACTOR PROTECTION SYSTEM: K5.02 Specific logic arrangements 55.41(b)(5)	3.3	27
215003 IRM														
215004 Source Range Monitor								X				Ability to (a) predict the impacts of the following on the SOURCE RANGE MONITOR (SRM) SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.03 Stuck detector 55.41(b)(5) & (10)	3.0	28
215005 APRM / LPRM	X											Knowledge of the physical connections and/or cause-effect relationships between AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM and the following: K1.09 Reactor recirculation system 55.41(b)(7)	3.6	55
217000 RCIC									X			Ability to monitor automatic operations of the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) including: A3.02 Turbine startup 55.41(b)(7)	3.6	56
										X		Ability to manually operate and/or monitor in the control room: A4.06 Suppression pool level 55.41(b)(7) & (10)	3.6	29

218000 ADS		X														Knowledge of electrical power supplies to the following: K2.01 ADS logic . 55.41(b)(8)	3.1	1
223002 PCIS/Nuclear Steam Supply Shutoff															X	G2.1.28 Knowledge of the purpose and function of major system components and controls. 55.41(b)(7)	4.1	2
239002 SRVs	X															Knowledge of the physical connections and/or cause-effect relationships between RELIEF/SAFETY VALVES and the following: K1.04 Main steam 55.41(b)(8)	3.6	4
				X												Knowledge of RELIEF/SAFETY VALVES design feature(s) and/or interlocks which provide for the following: K4.04 Ensures even distribution of heat load to suppression pool, and adequate steam condensing 55.41(b)(7)	3.4	62
259002 Reactor Water Level Control								X								Ability to predict and/or monitor changes in parameters associated with operating the REACTOR WATER LEVEL CONTROL SYSTEM controls including: A1.03 Reactor power 55.41(b)(5) & (10)	3.8	33
261000 SGTS								X								Ability to predict and/or monitor changes in parameters associated with operating the STANDBY GAS TREATMENT SYSTEM controls including: A1.01 System flow 55.41(b)(7)	2.9	63
262001 AC Electrical Distribution									X							Ability to (a) predict the impacts of the following on the A.C. ELECTRICAL DISTRIBUTION ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.04 Types of loads that, if deenergized, would degrade or hinder plant operation 55.41(b)(5) & (10)	3.8	69
262002 UPS (AC/DC)			X													Knowledge of the effect that a loss or malfunction of the UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) will have on following: K3.02 Recirculation pump speed 55.41(b)(7)	2.9	38
263000 DC Electrical Distribution		X														Knowledge of electrical power supplies to the following: K2.01 Major D.C. loads 55.41(b)(7)	3.1	30
															X	G2.2.22 Knowledge of limiting conditions for operations and safety limits. 55.41(b)(8) & (10)	4.0	34
264000 EDGs								X								Ability to (a) predict the impacts of the following on the EMERGENCY GENERATORS (DIESEL/JET) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.04 Consequences of operating under/over excited 55.41(b)(5) & (10)	2.9	57
			X													Knowledge of the effect that a loss or malfunction of the EMERGENCY GENERATORS (DIESEL/JET) will have on following: K3.03 Major loads powered from electrical buses fed by the emergency generator(s) 55.41(b)(7)	4.1	51
300000 Instrument Air					X											Knowledge of the operational implications of the following concepts as they apply to the INSTRUMENT AIR SYSTEM: K5.01 Air compressors 55.41(b)(4) & (5) & (7)	2.5	35
														X		Ability to manually operate and / or monitor in the control room: A4.01 Pressure gauges 55.41(b)(4)	2.6	3

400000 Component Cooling Water							X					Ability to predict and / or monitor changes in parameters associated with operating the CCWS controls including: A1.03 CCW Pressure 55.41(b)(5) & (10)	2.7	58
K/A Category Point Totals:	3	2	3	2	2	2	3	3	1	2	3	Group Point Total:		26

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239001 Main and Reheat Steam		X											Knowledge of electrical power supplies to the following: K2.01 Main steam isolation valve solenoids 55.41(b)(7)	3.2	37
239003 MSIV Leakage Control											X		Ability to manually operate and/or monitor in the control room: A4.03 Main steamline pressures 55.41(b)(7)	3.3	39
241000 Reactor/Turbine Pressure Regulator					X								Knowledge of the operational Implications of the following concepts as they apply to REACTOR/TURBINE PRESSURE REGULATING SYSTEM: K5.05 Turbine inlet pressure vs. turbine load 55.41(b)(5)	2.8	65
245000 Main Turbine Gen. / Aux.															
256000 Reactor Condensate															
259001 Reactor Feedwater											X		G2.1.30 Ability to locate and operate components, including local controls. 55.41(b)(7) & (10)	4.4	66
268000 Radwaste			X										Knowledge of the effect that a loss or malfunction of the RADWASTE will have on following: K3.04 Drain sumps	2.7	70
271000 Offgas															
272000 Radiation Monitoring															
286000 Fire Protection															
288000 Plant Ventilation															
290001 Secondary CTMT										X			Ability to monitor automatic operations of the SECONDARY CONTAINMENT including: A3.01 Secondary containment isolation 55.41(b)(7)	3.9	59
290003 Control Room HVAC						X							Knowledge of the effect that a loss or malfunction of the following will have on the CONTROL ROOM HVAC: K6.04 Fire protection 55.41(b)(7)	2.6	68
290002 Reactor Vessel Internals			X										Knowledge of the effect that a loss or malfunction of the REACTOR VESSEL INTERNALS will have on following: K3.07 Nuclear boiler instrumentation 55.41(b)(7)	3.1	67
K/A Category Point Totals:	1	1	2	1	1	1	0	2	1	1	1	Group Point Total:			12

Facility: Grand Gulf Nuclear Station			Date of Exam: October 19, 2012			
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.2	Knowledge of operator responsibilities during all modes of plant operation. 55.41(b)(10)	4.1	40		
	2.1.36	Knowledge of procedures and limitations involved in core alterations. 55.41(b)(10)	3.0	72		
	2.1.37	Knowledge of procedures, guidelines, or limitations associated with reactivity management. 55.41(b)(1)	4.3	41		
	Subtotal			3		
2. Equipment Control	2.2.22	Knowledge of limiting conditions for operations and safety limits. 55.41(b)(5)	4.0	42		
	2.2.39	Knowledge of less than or equal to one hour Technical Specification action statements for systems. 55.41(b)(10)	3.9	73		
	2.2.41	Ability to obtain and interpret station electrical and mechanical drawings. 55.41(b)(10)	3.5	43		
	Subtotal			3		
3. Radiation Control	2.3.7	Ability to comply with radiation work permit requirements during normal or abnormal conditions. 55.41(b)(12)	3.5	44		
	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities. 55.41(b)(12)	3.4	45		
	Subtotal			2		
4. Emergency Procedures / Plan	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	74		
	2.4.25	Knowledge of fire protection procedures. 55.41(b)(10)	3.3	75		
	Subtotal			2		
Tier 3 Point Total				10		

Tier / Group	Randomly Selected K/A	Reason for Rejection
1 / 1	295016 AA2.05	Cannot create an operationally valid question to associate Control Room Abandonment with the concept of determining or interpreting drywell pressure, for two reasons: 1) neither the Remote Shutdown Panels, nor the Alternate Shutdown Panels have drywell pressure indication; and 2) although drywell pressure indication would still be available via SPDS in the TSC and EOF, once EP-3 (Containment Control) has been entered, there is no “operational” interest in knowing drywell pressure (i.e., EP-3 has no “Drywell Pressure” mitigation leg, nor is there any EP Figure (in EP-1) that uses drywell pressure as a parameter for making any EP related mitigation decisions). Remained within the AA2 subset of 295016 and randomly selected AA2.02 Reactor water level.
2 / 1	209001 K6.11	Cannot create a question that has even slightest discriminatory validity for K6.11 ADS. Once in the EPs (EP-2, or EP-2A), operators manually inhibit ADS auto-initiation, never use Manual ADS initiation, and are permitted to intentionally Emergency Depressurize using at least 7 SRVs (whether they be ADS Valves, or any others among the 20 total SRVs). Remained within the K6 subset of 209001 and randomly selected K6.05 ECCS room cooler(s).
2 / 2	201002 K1.01	The RMCS System (201002) is not applicable for GGNS (BWR-6); see the “Systems Deleted” section below. Randomly re-selected among Tier 2 / Group 2. The CRD Hydraulic System (201001) is the substitute system. Remained within the K1 subset (as was originally selected for RMCS) and randomly selected K1.09.
2 / 1	300000 K5.13	Cannot create a question that has even minimal discriminatory validity, nor one that is operationally valid, for K13 Filters. GGNS has only “branch filters” in each of the major air headers and these filters provide a singular function of keeping corrosion products and dirt within the header piping from reaching safety-related equipment. Procedurally, the Loss of Instrument Air ONEP does not even address these filters. Their only mention is to be found in the Instrument Air System SOI; that being a small section that instructs field operators on how to rotate them when needed. Remained within the K5 subset of 300000 and selected the only other K5 statement with an Importance Rating of at least 2.5...that statement is K5.01 Air compressors.

1 / 1	295018 AK3.06	Cannot create a question that has even minimal discriminatory validity, nor one that is operationally valid, for AK3.06 Increasing cooling water flow to heat exchangers. Not operationally valid because the Loss of CCW ONEP (abnormal) does not even address the potential for having to increase HX cooling water flow. Not discriminatory valid because no reasonably plausible distracters can be included in the answer choices. Remained within the AK3 subset of 295018 and randomly selected AK3.01 Isolation of non-essential heat loads.
2 / 1	217000 A3.05	Cannot create an operationally valid question for A3.05; operators simply ensure RCIC initiates (automatically or manually) and that once it has level can be restored and maintained in a prescribed band...nothing more to say. Remained within the A3 subset of 217000 and randomly selected A3.02 Turbine startup.
2 / 1	400000 A1.04	Cannot create an operationally valid question for A1.04 for two reasons: 1) at GGNS the only CCW related indication is for CCW Pumps Discharge Pressure, and 2) regarding Surge Tank Level...any question would be developed at the non-licensed operator level, rather than for the RO. Remained within the A1 subset of 400000 and randomly selected A1.03 CCW Pressure.
2 / 1	261000 A1.04	Cannot create a question without unacceptable overlap with the already written Question #6. Remained within the A1 subset of 261000 and randomly selected A1.01 System flow.
2 / 2	233000 A1.03	Cannot create a question that has even minimal discriminatory validity for this KA, for at least two reasons: 1) FPCCU has only three controls (Pump, F/D Bypass Valve, F/D Inlet Valve) and three indicators (Pool Temperature, Cask Pool Temperature, Drain Tank Level) in the control room...a question that asks how pool temperature would respond to stopping one (or both) of the two running FPCCU Pumps lacks any discrimination; a question that asks how pool temperature would respond to closing one (or both) of the F/D Inlet Valves (reducing system flow) lacks any discrimination; 2) manually opening one (or both) of the F/D Bypass Valves has no effect on system flow to the pool (i.e., pool temperature does not change). Similarly, neither Surge Tank Level (A1.01), nor Pool Level (A1.02) are affected by operating any of the three controls. A1.04 and A1.05 have Importance Ratings of 2.4. As such, this Exam Author randomly selected both a new KA Statement, and a specific KA within that subset. The substitute KA is A2.16 Loss of coolant accident signal.
3	2.1.32	Could not write a purely Tier 3 (i.e., non-system specific) question for the originally selected KA. Randomly selected 2.1.36, Knowledge of procedures and limitations involved in core alterations, as its substitute.

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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		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												20	3	4	7		
	2												7	1	2	3		
	Tier Totals												27	4	6	10		
2. Plant Systems	1												26	3	2	5		
	2												12	1	2	3		
	Tier Totals												38	4	4	8		
3. Generic Knowledge and Abilities Categories				1		2		3		4		10		1	2	3	4	7
														2	2	1	2	
<p>Note:</p> <ol style="list-style-type: none"> 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 - SRO							Form ES-401-1	
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	
295003 Partial or Complete Loss of AC / 6										
295004 Partial or Total Loss of DC Pwr / 6						X	2.4.41 Knowledge of the emergency action level thresholds and classifications. 55.43(b)(5)	4.6	88	
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	2.1.20 Ability to interpret and execute procedure steps. 55.43(b)(5)	4.6	100	
295023 Refueling Acc / 8					X		Ability to determine and/or interpret the following as they apply to REFUELING ACCIDENTS: AA2.05 Entry conditions of emergency plan 55.43(b)(5)	4.6	86	
295024 High Drywell Pressure / 5						X	G2.2.25 Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits. 55.43(b)(2)	4.2	87	
295025 High Reactor Pressure / 3										
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						X	G2.2.40 Ability to apply Technical Specifications for a system. 55.43(b)(2)	4.7	77	
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1										
295038 High Off-site Release Rate / 9										
600000 Plant Fire On Site / 8					X		Ability to determine and interpret the following as they apply to PLANT FIRE ON SITE: AA2.14 Equipment that will be affected by fire suppression activities in each zone 55.43(b)(5)	3.6	80	
700000 Generator Voltage and Electric Grid Disturbances / 6										
K/A Category Totals:					3	4	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						X	G2.4.6 Knowledge of EOP mitigation strategies. 55.43(b)(5)	4.7	89
295012 High Drywell Temperature / 5									
295013 High Suppression Pool Temp. / 5						X	G2.2.25 Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits. 55.43(b)(2)	4.2	78
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									
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					X		Ability to determine and/or interpret the following as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE: EA2.01 Secondary containment pressure 55.43(b)(10)	3.9	79
295036 Secondary Containment High Sump/Area Water Level / 5									
500000 High CTMT Hydrogen Conc. / 5									
K/A Category Point Totals:					1	2	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															
209002 HPCS															
211000 SLC															
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: A2.01 RPS motor-generator set failure 55.43(b)(2)	3.9	90	
215003 IRM															
215004 Source Range Monitor															
215005 APRM / LPRM															
217000 RCIC								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: A2.01 System initiation signal 55.43(b)(2)	3.7	93	
218000 ADS											X	2.2.37 Ability to determine operability and/or availability of safety related equipment. 55.43(b)(5)	4.6	91	
223002 PCIS/Nuclear Steam Supply Shutoff															
239002 SRVs															
259002 Reactor Water Level Control															
261000 SGTS															
262001 AC Electrical Distribution															
262002 UPS (AC/DC)											X	2.2.19 Knowledge of maintenance work order requirements. 55.43(b)(5)	3.4	92	

[illegible]

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														
201004 RSCS														
201005 RCIS											X	2.4.4. Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures. 55.43(b)(5)	4.7	95
201006 RWM														
202001 Recirculation														
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								X				Ability to (a) predict the impacts of the following on the REACTOR/TURBINE PRESSURE REGULATING SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.08 Main turbine overspeed 55.43(b)(2)	3.3	97
245000 Main Turbine Gen. / Aux.														
256000 Reactor Condensate											X	G2.4.6 Knowledge of EOP mitigation strategies. 55.43(b)(5)	4.7	81
259001 Reactor Feedwater														
268000 Radwaste														

271000 Offgas													
272000 Radiation Monitoring													
286000 Fire Protection													
288000 Plant Ventilation													
290001 Secondary CTMT													
290003 Control Room HVAC													
290002 Reactor Vessel Internals													
K/A Category Point Totals:								1			2	Group Point Total:	3

Facility: Grand Gulf Nuclear Station			Date of Exam: December 7, 2012			
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.5	Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc. 55.43(b)(5)			3.9	96
	2.1.34	Knowledge of primary and secondary plant chemistry limits. 55.43(b)(2)			3.5	98
	Subtotal					2
2. Equipment Control	2.2.14	Knowledge of the process for controlling equipment configuration or status. 55.43(b)(3)			4.3	83
	2.2.40	Ability to apply Technical Specifications for a system.			4.7	85
	Subtotal					2
3. Radiation Control	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. 55.43(b)(4)			3.8	84
	Subtotal					1
4. Emergency Procedures / Plan	2.4.29	Knowledge of the emergency plan. 55.43(b)(5)			4.4	99
	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	82
	Subtotal					2
Tier 3 Point Total						7

Tier / Group	Randomly Selected K/A	Reason for Rejection
1 / 1	295006 AA2.06	Given the GGNS body of procedures, could not create an SRO-only question for this AA2 KA (nor any other AA2), nor for any of the eligible Generics. Had to randomly re-sample another KA Category; after doing so, remained within the AA2s and randomly selected AA2.05. The substitute KA is: 295023 AA2.05.
1 / 1	295024 2.1.23	GGNS has no system specific procedures (SOIs), nor any Integrated Operations Procedures (IOIs) that address a High Drywell Pressure condition, much less at the SRO-only level of responsibility. Remained within the 295024 Category and randomly re-sampled within the Generics. The substitute KA is: 295024 2.2.25.
1 / 1	295026 EA2.03	Could not create an SRO-only question for this KA. At GGNS, essentially all EA2's are RO level knowledge and have historically been used on the RO Exam. Examples include: Question #60 on this RO exam; Question #15 on the 2011 RO exam; Question #24 on the 2010 RO exam. GGNS expects all RO Applicants to understand (to the cognitive level of analysis) all EP figures, as well as an SRO Applicant does. After examining all potential Generics (as listed in ES-401, page 4 of 33), recognized that no SRO-only function exists at GGNS for 295026. As such, randomly re-sampled within Tier 1 / Group 1 and then within the Generics. The substitute KA is: 295004 2.4.41.
1 / 2	295011 2.1.28	There is no way to create an SRO-only question for this Generic (2.1.28). The "knowledge of purposes and functions" is an RO exam item. Randomly re-sampled within the Generics. The substitute KA is: 295011 2.4.6.
2 / 1	212000 A2.14	Could not create an SRO-only question for this KA, even when considering the possibility of an item that focuses only on part b). Randomly re-sampled within the A2s. The substitute KA is: 212000 A2.01.
2 / 1	218000 2.1.31	There is no way to create an SRO-only question for this Generic (2.1.31). The "ability to locate control room switches, etc..." is an RO exam item. Randomly re-sampled within the Generics. The substitute KA is: 218000 2.2.37.
2 / 1	262002 2.4.45	There is no way to create an SRO-only question for this Generic (2.4.45). The "ability to prioritize and interpret...each annunciator or alarm" is an RO-exam item. If the KA were to read "prioritize and/or interpret...", it would be possible to create an SRO-only item that involves the SRO-only responsibility of prioritizing within a group of alarms that have been received and deciding which to designate as the highest priority for the crew. Randomly re-sampled within the Generics. The substitute KA is: 262002 2.2.19.

2 / 1	400000 A2.02	Could not create an SRO-only question for this KA, even when considering the possibility of an item that focuses only on part b). In fact, we could not create even an RO question for this KA. None of the GGNS operating procedures, other than the alarm response instruction (ARI) for CCW SURGE TK LVL HI/LO, address a surge tank condition. Choosing to enter the ARI is an RO exam item; but even so, the detail in this ARI is beyond a reasonable expectation for recall. Randomly re-sampled within the A2s. The substitute KA is: 400000 A2.03.
2 / 2	214000 2.4.4	214000 (RPIS) is not a BWR-6 system (see SYSTEMS DELETED, below). Substituted 201005 (RC&IS).
2 / 2	241000 A2.07	Could not create an SRO-only question for this KA, even when considering another “ONEP Entry” type of question (similar to #94 and #95). The reason for this is that at GGNS we train all SROs and SRO Applicants <u>not</u> to the enter Loss of Condenser Vacuum ONEP simply because of <u>any</u> amount of loss of vacuum or loss of generator output. Rather, the CRS is permitted to draw his own “line-in-the- sand” (in terms of what vacuum is) for ONEP entry. Randomly re-sampled within the A2s. The substitute KA is: 241000 A2.08
3	2.1.4	Could not create an SRO-only question for this KA. At GGNS, this KA has always been an RO exam item. Randomly re-sampled within all Tier 3 Generics. The substitute KA is: 2.1.5.
3	2.1.13	Could not create an SRO-only question for this KA. At GGNS, this KA has always been an RO exam item (i.e., as much an RO’s responsibility as it is an SRO’s). Randomly re-sampled within the 2.1 (Conduct of Operations) Generics. The substitute KA is: 2.1.34.
3	2.4.1	Could not create an SRO-only question for this KA. Knowledge of EOP entry conditions and immediate action steps has always been an RO exam item at GGNS. Randomly re-sampled within the 2.4 (Emergency Procedures /Plan) Generics. The substitute KA is:
1 / 1	295027 2.4.21	Could not create an SRO-only question for this KA. Unlike Question #85 on this exam, there is no connection between a High Containment Temperature condition and the performance of a Tech Spec Safety Function Determination. Also, while the “knowledge of the parameters and logic used to assess the status of...containment conditions” does lend itself to a question involving one of the EOP Figures that include Containment Temperature as one of its parameters (i.e., Figures 2 and 3), this is an RO exam item at GGNS (see RO Exam Question #60 as an example). Also, refer to the justification (above) for the swap of 295026 EA2.03. Randomly re-sampled within the Tier 1/Group 1 KAs and then within the Generics. The substitute KA is: 295021 2.1.20.

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: 12/10/2012
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: LOT-2012

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations		
Conduct of Operations	P-R	Review Cooldown Record GJPM-OPS-2012AR1 2.1.23 (4.3)
Equipment Control	M-R	Determine Tagging Requirements GJPM-OPS-2012AR2 2.2.41 (3.5)
Radiation Control	N-R	Emergency Exposure Limits GJPM-OPS-2012AR3 2.3.4 (3.2)
Emergency Procedures/Plan	N-R	Reactor Water Level Determination GJPM-OPS-2012AR4 2.4.34 (4.2)

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: 12/10/2012
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: LOT-2012

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N-R	Reactor Water Chemistry Required Actions GJPM-OPS-2012AS1 2.1.34 (3.5)
Conduct of Operations	M-R	Manual Risk Assessment GJPM-OPS-2012AS2 K/A 2.1.20 (4.6)
Equipment Control	N-R	Tagout approval GJPM-OPS-2012AS3 2.2.41(3.9)
Radiation Control	N-R	Rad limits for Emergency GJPM-OPS-2012AS4 2.3.4 (3.7)
Emergency Procedures/Plan	N-R	Protective Action Recommendation Determination GJPM-OPS-2012AS5 2.4.44 (4.4)

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: 12/10/2012
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: <u>LOT-2012</u>
Control Room Systems [@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. 201001 A4.01 (3.1/3.1) / Rotate Operating CRD Pumps GJPM-OPS-2012CR1	A-D-S	1
b. 209001 A4.02 (3.5/3.4) / Quarterly Valve Surveillance GJPM-OPS-2012CR2	M-S	2
c. 239001 2.1.30 (4.4/4.0) / Close and Open a MSIV GJPM-OPS-2012CR3	D-S	3
d. 245000 700000 AA1.03 (3.8/3.7) / Adjust Generator VARs GJPM-OPS-2012CR4	A-N-S	4
e. 219000 295026 EA1.01 (4.1/4.1) / Shift RHR System to Suppression Pool Cooling GJPM-OPS-2012CR5	A-M-S-EN-L	5
f. 264000 A4.05 (3.6/3.7) / Parallel Diesel Generator with the Grid GJPM-OPS-2012CR6	D-S	6
g. 212000 A2.03 (3.3/3.5) / Reactor Manual Scram Switch Test GJPM-OPS-2012CR7	A-P-S	7
h. 272000 A4.02 (3.0/3.0) / Area Radiation Monitor Functional Test GJPM-OPS-2012CR8	D-S	9
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. 295019 AA1.01 (3.5/3.3) / Install Nitrogen Bottle on ADS Air Supply GJPM-OPS-2012PS1	P-E-L-R	3
j. 212000 2.1.20 (4.6/4.6) / Energize RPS Alternate Feed GJPM-OPS-2012PS2	D	7
k. 286000 2.4.25 (3.3/3.7) / Manually Initiate Fire Protection GJPM-OPS-2012PS3	A-D	8
@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	4-6 / 4-6 / 2-3 $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / ≥ 1 (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$	

Facility: GRAND GULF NUCLEAR STATION		Date of Examination: 12/10/2012
Exam Level: RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: <u>LOT-2012</u>
Control Room Systems [@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. 201001 A4.01 (3.1/3.1) / Rotate Operating CRD Pumps GJPM-OPS-2012CR1	A-D-S	1
b.		
c. 239001 2.1.30 (4.4/4.0) / Close and Open a MSIV GJPM-OPS-2012CR3	D-S	3
d. 245000 700000 AA1.03 (3.8/3.7) / Adjust Generator VARs GJPM-OPS-2012CR4	A-N-S	4
e. 219000 295026 EA1.01 (4.1/4.1) / Shift RHR System to Suppression Pool Cooling GJPM-OPS-2012CR5	A-M-S-EN-L	5
f. 264000 A4.05 (3.6/3.7) / Parallel Diesel Generator with the Grid GJPM-OPS-2012CR6	D-S	6
g. 212000 A2.03 (3.3/3.5) / Reactor Manual Scram Switch Test GJPM-OPS-2012CR7	A-P-S	7
h. 272000 A4.02 (3.0/3.0) / Area Radiation Monitor Functional Test GJPM-OPS-2012CR8	D-S	9
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. 295019 AA1.01 (3.5/3.3) / Install Nitrogen Bottle on ADS Air Supply GJPM-OPS-2012PS1	P-E-L-R	3
j. 212000 2.1.20 (4.6/4.6) / Energize RPS Alternate Feed GJPM-OPS-2012PS2	D	7
k. 286000 2.4.25 (3.3/3.7) / Manually Initiate Fire Protection GJPM-OPS-2012PS3	A-D	8
<p>[@] All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.</p>		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	4-6 / 4-6 / 2-3 $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / ≥ 1 (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$	

Facility: GRAND GULF NUCLEAR STATION		Date of Examination: 12/10/2012
Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>		Operating Test No.: <u>LOT-2012</u>
Control Room Systems [@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a.		
b.		
c.		
d. 245000 700000 AA1.03 (3.8/3.7) / Adjust Generator VARs GJPM-OPS-2012CR4	A-N-S	4
e. 219000 295026 EA1.01 (4.1/4.1) / Shift RHR System to Suppression Pool Cooling GJPM-OPS-2012CR5	A-M-S-EN-L	5
f.		
g.		
h. 272000 A4.02 (3.0/3.0) / Area Radiation Monitor Functional Test GJPM-OPS-2012CR8	D-S	9
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. 295019 AA1.01 (3.5/3.3) / Install Nitrogen Bottle on ADS Air Supply GJPM-OPS-2012PS1	P-E-L-R	3
j.		
k. 286000 2.4.25 (3.3/3.7) / Manually Initiate Fire Protection GJPM-OPS-2012PS3	A-D	8
<p>[@] All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.</p>		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	4-6 / 4-6 / 2-3 $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / ≥ 1 (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$	

Scenario 2

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

Examiners: _____ Operators: _____

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

1. Start a Condensate Pump.
2. Withdraw Control Rods to Establish Main Turbine BCV's 10% open.
3. RPS "A" MG failure (Electric Power Monitoring Assembly INOPERABLE).
4. One IRM channel fails upscale.
5. Loss of TBCW.
6. Loss of ESF Transformer 21.
7. CST Rupture to CST/RWST Dike / Reactor Scram and Recirc Line Break.
8. RCIC fails to start on initiation.
9. Failure of automatic HPCS suction swap.

Initial Conditions: Reactor startup in progress.

- Reactor pressure is 400 psig
- Reactor power is 5%

Inoperable Equipment: None

Turnover:

- Crane operations are in progress on the south side of the Unit 1 Auxiliary Building.
- A reactor startup is in progress.
 - Step 135 of Control Rod Movement Sequence is complete
 - SJAE 'B' is in warm up 04-01-N62-1 step 4.2.2r
 - Step 6.2.13 of 03-1-01-1
- The Condensate system is lined up as follows:
 - CFFF is in service
 - Precoat Filters are not in service
 - 4 Deepbed demins are in service

Scenario Notes:

This is a new scenario. It was developed in part from plant OE found in CR-GGN-1996-00517 (Low CST Level).

Validation Time (60-90 min): 70 min

Event No.	Malf. No.	Event Type [†]	Event Description
1		N (BOP)	Start a Condensate Pump (04-1-01-N19-1 Condensate System)
2		R (ATC)	Withdraw Control Rods to Establish Main Turbine BCV's 10% open (04-1-01-C11-2 Rod Control and Information System)
3	c71077a	I (BOP, ATC) A (CREW) TS (CRS)	RPS "A" MG failure (05-1-02-III-2 Loss of One or Both RPS Buses) Electric Power Monitoring Assembly INOPERABLE (TS 3.3.8.2)
4	c51004g	I (ATC)	One IRM channel fails upscale
5	p43152b	I (BOP)	Loss of TBCW (05-1-02-V-2 Loss of Turbine Building Cooling Water)
6	r21180 r21218	C (BOP) A (CREW) TS (CRS)	Loss of ESF Transformer 21 (05-1-02-I-4, Loss of AC Power) Division 2 LSS Failure (TS 3.8.1)
7	fw273 rr063a fw226a fw115a r21139b r21139e e12188e	M (Crew)	CST Rupture to CST/RWST Dike / Reactor Scram and Recirc Line Break (05-1-02-IV-1 Control Rod/Drive Malfunctions, EP-2, EP-3) * With no CRD pumps operating and reactor pressure less than 600 psig, when one scram accumulator associated with a withdrawn Control Rod is declared INOP, place the reactor mode switch to SHUTDOWN. Criterion is to give the highest priority to place the mode switch to SHUTDOWN when any HCU Accumulator Fault associated with a withdrawn control rod is verified to be due to low accumulator pressure.
8	e51043 DI_IE51M625D	C (Crew)	RCIC fails to start on initiation (SOI 04-1-01-E51-1)
9	e22f015_j	I (Crew)	Failure of automatic HPCS suction swap * When CST level is less than 5ft, OPEN E22-F015 (HPCS Suction from Suppression Pool). Criterion is to OPEN E22-F015 before reactor water level lowers to -191".
[†] (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	1	Abnormal Events	2
Reactivity Manipulations	1	Total Malfunctions	7
Instrument/Component Failures	6	EP Entries (Requiring substantive action)	1
Major Transients	1	EP Contingencies	0
Tech Spec Calls	2	Critical Tasks	2

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

Examiners: _____ Operators: _____

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

1. Secure the Division 1 Diesel Generator
2. Raise reactor power to 1450 MWe (100% RTP)
3. HPCS spurious initiation (DW Press)
4. RFPT 'B' Manual/Auto Controller Failure
5. Suppression Pool Leak
6. Loss of ESF 11 Transformer
7. ADS Valve fails to open

Initial Conditions: 95% power

Inoperable Equipment: B21-PIS-N667C , Drywell press hi, is failed high (TS 3.3.5.1 Condition B entered)

Turnover: Division 1 DG is running tied to the grid. 06-OP-1P75-M-0001, Standby Diesel Generator (SDG) 11 Functional Test is in progress ready for step 5.2.25.

Scenario Notes:

This is a new scenario. HPCS and Division 1 Diesel Generator are ranked in the top 10 important systems of the GGNS PRA analysis.

Validation Time (60-90 min): 60 min

Event No.	Malf. No.	Event Type [†]	Event Description
1	DI_1R21M608A DI_1P75M601A p864_1a_b_2	I (BOP) TS (CRS)	Secure the Division 1 Diesel Generator (04-1-01-P75-1, Standby Diesel Generator System section 4.4; TS 3.8.1 condition B)
2		R (ATC) N (BOP)	Raise reactor power to 1450 MWe (100% RTP) (03-1-01-2 attachment VIII, Power Operations – Temporary Downpower)
3	e22055 e22159a	I (BOP) TS (CRS)	HPCS spurious initiation (02-S-01-27, Operation's Philosophy section 6.6.3 – Spurious HPCS Initiation; TS 3.5.1 condition B)
4	fw121b p680_2a_e_12	A (Crew) I (ATC)	RFPT 'B' Manual/Auto Controller Failure (05-1-02-V-7, Feedwater System Malfunctions)
5	ct218d ct219a	M (Crew)	Suppression Pool Leak (EP-4 Aux Building Control; EP-3 Containment Control; EP-2 RPV Control) * Crew manually scrams the reactor before SP level drops below 14.5'
6	r21134g	C (Crew)	Loss of ESF 11 Transformer (05-1-02-I-4, Loss of AC Power)
7	DI_1B21M605D	I (Crew)	ADS Valve fails to open (EP-2, RPV Control Emergency Depressurization) * 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' (In cases where Emergency Depressurization is anticipated, Rapid Depressurization with the BPVs satisfies this critical task).
[†] (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	1	Abnormal Events	1
Reactivity Manipulations	1	Total Malfunctions	6
Instrument/Component Failures	5	EP Entries (Requiring substantive action)	2
Major Transients	1	EP Contingencies	1
Tech Spec Calls	2	Critical Tasks	2

Scenario 4

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

Examiners: _____ Operators: _____

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

1. Place RHR 'A' in Standby Mode
2. Heater Drain Pump 'A' high vibration
3. High Pressure Heater 6A tube leak
4. Spurious Division 1 ECCS initiation
5. Single Control Rod Drift
6. Multiple Control Rod Drifts / ATWS
7. Failure of RCIC to initiate
8. Failure of EHC Pressure Control Systems

Initial Conditions: 86% power

Inoperable Equipment: B21-PT-N094E , Drywell Pressure, is failed high (TS 3.3.5.1 Conditions B and F, 3.3.6.1 Condition A, 3.3.6.3 Condition B, and 3.3.6.4 Condition B were entered)

Turnover:

- B21-PT-N094E has failed last shift.
 - Annunciators P601-21A-E7 (DRWL PRESS HI) and P601-18A-B2 (ADS A HI DRWL PRESS SEALED IN)
 - TS 3.3.5.1 Conditions B and F, 3.3.6.1 Condition A, 3.3.6.3 Condition B, and 3.3.6.4 Condition B were entered (no other actions are required at this time).
- RHR 'A' is lined up for Suppression Pool Cooling.
 - TS 3.5.1 Condition A was entered.

Scenario Notes:

This is a new scenario. The Condenser is a power conversion system (PCS) important to events leading to core damage of the GGNS PRA analysis. This scenario takes the Condenser away as a heat sink early in a high power ATWS. This event will challenge the crew to maintain the containment within the limits of HCTL.

Validation Time (60-90 min): 75 min

Event No.	Malf. No.	Event Type [†]	Event Description
1		N (BOP) TS (CRS)	Place RHR 'A' in Standby Mode (04-1-01-E12-1, Residual Heat Removal System section 5.2.2, TR 6.8.2 condition A)
2	fw126c	I (BOP) R (ATC)	Heater Drain Pump 'A' high vibration (Alarm Response Instruction 04-1-02-1H13-P680-1A-E7)
3	fw129c	C (ATC/BOP) A (Crew)	High Pressure Heater 6A tube leak (05-1-02-V-5, Loss of Feedwater Heating)
4	ptb21n094e_a ltb21n091a_b	I (BOP) TS (CRS)	Spurious Division 1 ECCS initiation (04-1-01-E12-1, Attachment IX; TS 3.5.1 Condition C) * 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	z021021_20_21	I (ATC) A (CREW)	Single Control Rod Drift (05-1-02-IV-1, Control Rod/Drive Malfunctions)
6	z021021_40_53 c11164 c11027 c41263	M (Crew)	Multiple Control Rod Drifts (05-1-02-IV-1, Control Rod/Drive Malfunctions) ATWS (EP-2A, ATWS RPV Control) * Entry into EP2A step L8. 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 terminate and prevent all injection except boron, CRD, and RCIC until reaching criteria specified in EP2A step L8. * Criteria specified in EP2A step L-9 are satisfied. Crew restores injection using Condensate/Feedwater as evidenced by feedwater flow to RPV or RPV level trend. Criterion is to give the highest priority to reinitiate injection flow and establish the appropriate level band. IF Emergency Depressurization is Entered: * 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. * 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".

Event No.	Malf. No.	Event Type [†]	Event Description
7	e51043 DI_1E51M625	C (CREW)	Failure of RCIC to initiate (04-1-01-E51-1, Reactor Core Isolation Cooling System Attachment VI)
8	tc079 DI_1N32M624	C (CREW)	<p>Failure of EHC Pressure Control Systems (EP-3, Containment Control)</p> <p>* When it is determined that Suppression Pool temperature and RPV pressure cannot be maintained below HTCL, 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 a sufficient number of SRV's to active lower reactor pressure to prevent exceeding HCTL and opens at least 8 SRV's prior to exceeding HCTL.</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	1	Abnormal Events	2
Reactivity Manipulations	1	Total Malfunctions	7
Instrument/Component Failures	6	EP Entries (Requiring substantive action)	2
Major Transients	1	EP Contingencies	1 - 2
Tech Spec Calls	2	Critical Tasks	4 - 6