Draft Sample Plan

Facility: **Date of Exam:**

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			3	3	N/A		3	18	3	3	6
	2	1	2	1				1	2			2	9	2	2	4
	Tier Totals	4	5	4				4	5			5	27	5	5	10
2. Plant Systems	1	3	3	2	3	2	3	3	3	2	2	2	28	2	3	5
	2	1	1	1	1	1	1	1	1	1	1	0	10	0	2	3
	Tier Totals	4	4	3	4	3	4	4	4	3	3	2	38		5	8
3. Generic Knowledge and Abilities Categories		1			2			3			4		10	1	2	3	4	7
		3			2			3			2			2	2	2	1	

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 ATier 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 ⋈ from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to 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 KAs.
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..

ES-401 PWR Examination Outline Form ES-401-2

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

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1					X		EA2.06		
000008 Pressurizer Vapor Space Accident / 3						X	AG2.4.41		
000009 Small Break LOCA / 3		X					EK2.03		
000011 Large Break LOCA / 3		X					EK2.02		
000015/17 RCP Malfunctions / 4				X			AA1.04		
000022 Loss of Rx Coolant Makeup / 2			X				AK3.01		
000025 Loss of RHR System / 4						X	AG2.4.30		
000026 Loss of Component Cooling Water / 8					X		AA2.06		
000027 Pressurizer Pressure Control System Malfunction / 3		X					AK2.03		
000029 ATWS / 1						X	EG2.4.34		
000038 Steam Gen. Tube Rupture / 3					X		EA2.05		
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4						X	AG2.2.36		
000054 (CE/E06) Loss of Main Feedwater / 4				X			AA1.02		
000055 Station Blackout / 6	X						EK1.02		
000056 Loss of Off-site Power / 6	X						AK1.01		
000057 Loss of Vital AC Inst. Bus / 6			X				AK3.01		
000058 Loss of DC Power / 6					X		AA2.03		
000062 Loss of Nuclear Svc Water / 4						X	AG2.2.12		
000065 Loss of Instrument Air / 8					X		AA2.08		
W/E04 LOCA Outside Containment / 3	X						EK1.3		
W/E11 Loss of Emergency Coolant Recirc. / 4					X	X	EG2.2.4 EA2.2		
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4				X			EA1.2		
000077 Generator Voltage and Electric Grid Disturbances / 6			X				AK3.02		
K/A Category Totals:	3	3	3	3	3	3	Group Point Total:		18/6
					3	3			

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
007EA2.06	Reactor Trip - Stabilization - Recovery / 1	4.3	4.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Occurrence of a reactor trip
009EK2.03	Small Break LOCA / 3	3	3.3	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	S/Gs
011EK2.02	Large Break LOCA / 3	2.6	2.7	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Pumps
015AA1.04	RCP Malfunctions / 4	2.5	2.5	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	RCP ventilation cooling fan run indicators
022AK3.01	Loss of Rx Coolant Makeup / 2	2.7	3.1	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Adjustment of RCP seal backpressure regulator valve to obtain normal flow
027AK2.03	Pressurizer Pressure Control System Malfunction / 3	2.6	2.8	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Controllers and positioners
029EG2.4.34	ATWS / 1	4.2	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects
038EA2.05	Steam Gen. Tube Rupture / 3	2.8	2.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Causes and consequences of shrink and swell in S/Gs
040AG2.2.36	Steam Line Rupture - Excessive Heat Transfer / 4	3.1	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions of operations
054AA1.02	Loss of Main Feedwater / 4	4.4	4.4	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Manual startup of electric and steam-driven AFW pumps
055EK1.02	Station Blackout / 6	4.1	4.4	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Natural circulation cooling

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
056AK1.01	Loss of Off-site Power / 6	3.7	4.2	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Principle of cooling by natural convection
057AK3.01	Loss of Vital AC Inst. Bus / 6	4.1	4.4	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Actions contained in EOP for loss of vital ac electrical instrument bus
065AA2.08	Loss of Instrument Air / 8	2.9	3.3	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Failure modes of air-operated equipment
077AK3.02	Generator Voltage and Electric Grid Disturbances / 6	3.6	3.9	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Actions contained in abnormal operating procedures for voltage and grid disturbances
WE04EK1.3	LOCA Outside Containment / 3	3.5	3.9	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Annunciators and conditions indicating signals, and remedial actions associated with the (LOCA Outside Containment).
WE05EA1.2	Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	3.7	4.0	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Operating behavior characteristics of the facility.
we11EG2.2.4	Loss of Emergency Coolant Recirc. / 4	3.4	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to apply technical specifications for a system.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
008AG2.4.41	Pressurizer Vapor Space Accident / 3	2.9	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the emergency action level thresholds and classifications.
025AG2.4.30	Loss of RHR System / 4	2.7	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of events related to system operations/status that must be reported to internal orginizations or outside agencies.
026AA2.06	Loss of Component Cooling Water / 8	2.8	3.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	The length of time after the loss of CCW flow to a component before that component may be damaged
058AA2.03	Loss of DC Power / 6	3.5	3.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	DC loads lost; impact on ability to operate and monitor plant systems
062AG2.2.12	Loss of Nuclear Svc Water / 4	3.7	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of surveillance procedures.
WE11EA2.2	Loss of Emergency Coolant Recirc. / 4	3.4	4.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)						Form ES-401-2		
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1					X		AA2.04		
000003 Dropped Control Rod / 1									
000005 Inoperable/Stuck Control Rod / 1			X				AK3.05		
000024 Emergency Boration / 1						X	AG2.2.22		
000028 Pressurizer Level Malfunction / 2						X	AG2.4.8		
000032 Loss of Source Range NI / 7					X		AA2.03		
000033 Loss of Intermediate Range NI / 7						X	AG2.2.44		
000036 (BW/A08) Fuel Handling Accident / 8									
000037 Steam Generator Tube Leak / 3									
000051 Loss of Condenser Vacuum / 4									
000059 Accidental Liquid RadWaste Rel. / 9		X					AK2.02		
000060 Accidental Gaseous Radwaste Rel. / 9									
000061 ARM System Alarms / 7					X		AA2.03		
000067 Plant Fire On-site / 8									
000068 (BW/A06) Control Room Evac. / 8									
000069 (W/E14) Loss of CTMT Integrity / 5					X		AA2.02		
000074 (W/E06&E07) Inad. Core Cooling / 4									
000076 High Reactor Coolant Activity / 9						X	AG2.4.47		
W/EO1 & E02 Rediagnosis & SI Termination / 3				X			EA1.3		
W/E13 Steam Generator Over-pressure / 4									
W/E15 Containment Flooding / 5									
W/E16 High Containment Radiation / 9		X					EK2.2		
BW/A01 Plant Runback / 1									
BW/A02&A03 Loss of NNI-X/Y / 7									
BW/A04 Turbine Trip / 4									
BW/A05 Emergency Diesel Actuation / 6									
BW/A07 Flooding / 8									
BW/E03 Inadequate Subcooling Margin / 4									
BW/E08; W/E03 LOCA Cooldown - Depress. / 4									
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4									
BW/E13&E14 EOP Rules and Enclosures									
CE/A11; W/E08 RCS Overcooling - PTS / 4	X						EK1.2		
CE/A16 Excess RCS Leakage / 2									
CE/E09 Functional Recovery									
K/A Category Point Totals:	1	2	1	1	2	2	Group Point Total:		9/4

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KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
005AK3.05	Inoperable/Stuck Control Rod / 1	3.4	4.2	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Power limits on rod misalignment
024AG2.2.22	Emergency Boration / 1	4.0	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of limiting conditions for operations and safety limits.
033AG2.2.44	Loss of Intermediate Range NI / 7	4.2	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions
059AK2.02	Accidental Liquid RadWaste Rel. / 9	2.7	2.7	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Radioactive-gas monitors
061AA2.03	ARM System Alarms / 7	3	3.3	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Setpoints for alert and high alarms
069AA2.02	Loss of CTMT Integrity / 5	3.9	4.4	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Verification of automatic and manual means of restoring integrity
WE02EA1.3	SI Termination / 3	3.8	4.0	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Desired operating results during abnormal and emergency situations.
WE08EK1.2	RCS Overcooling - PTS / 4	3.4	4.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Normal, abnormal and emergency operating procedures associated with (Natural Circulation Operations).
WE16EK2.2	High Containment Radiation / 9	2.6	3.0	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems and relations between the proper operation of these systems to the operation of the facility.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
001AA2.04	Continuous Rod Withdrawal / 1	4.2	4.3	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Reactor power and its trend
028AG2.4.8	Pressurizer Level Malfunction / 2	3.8	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of how abnormal operating procedures are used in conjunction with EOPs.
032AA2.03	Loss of Source Range NI / 7	2.8	3.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Expected values of source range indication when high voltage is automatically removed
076AG2.4.47	High Reactor Coolant Activity / 9	4.2	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.

ES-401 PWR Examination Outline Form ES-401-2
Plant Systems - Tier 2/Group 1 (RO / SRO)

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	#
003 Reactor Coolant Pump									X		X	A3.04 G2.4.3		
004 Chemical and Volume Control						X					X	K6.09 G2.2.44		
005 Residual Heat Removal					X			X				A2.02 K5.09		
006 Emergency Core Cooling							X				X	A1.06 G2.4.47		
007 Pressurizer Relief/Quench Tank								X				A2.02		
008 Component Cooling Water							X	X				A1.03 A2.02		
010 Pressurizer Pressure Control						X			X			A3.02 K6.04		
012 Reactor Protection					X							K5.01		
013 Engineered Safety Features Actuation						X						K6.01		
022 Containment Cooling			X								X	K3.02 G2.1.19		
025 Ice Condenser														
026 Containment Spray	X	X										K1.01 K2.02		
039 Main and Reheat Steam				X								K4.02		
059 Main Feedwater				X						X		A4.03 K4.19		
061 Auxiliary/Emergency Feedwater		X										K2.01		
062 AC Electrical Distribution			X	X								K3.02 K4.07		
063 DC Electrical Distribution							X					A1.01		
064 Emergency Diesel Generator											X	G2.1.31		
073 Process Radiation Monitoring	X											K1.01		
076 Service Water		X						X				K2.04 A2.02		
078 Instrument Air										X		A4.01		
103 Containment	X							X				A2.03 K1.08		
K/A Category Point Totals:	3	3	2	3	2	3	3	3	2	2	2	Group Point Total:		28/5

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KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003A3.04	Reactor Coolant Pump	3.6	3.6	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	RCS flow
004K6.09	Chemical and Volume Control	2.8	3.1	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Purpose of VCT divert valve
005A2.02	Residual Heat Removal	3.5	3.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Pressure transient protection during cold shutdown
005K5.09	Residual Heat Removal	3.2	3.4	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Dilution and boration considerations
006A1.06	Emergency Core Cooling	3.6	3.9	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Subcooling margin
006G2.4.47	Emergency Core Cooling	4.2	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.
007A2.02	Pressurizer Relief/Quench Tank	2.6	3.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Abnormal pressure in the PRT
008A1.03	Component Cooling Water	2.7	2.9	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	CCW pressure
010A3.02	Pressurizer Pressure Control	3.6	3.5	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	PZR pressure
010K6.04	Pressurizer Pressure Control	2.9	3.2	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	PRT
012K5.01	Reactor Protection	3.3	3.8	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	DNB

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
013K6.01	Engineered Safety Features Actuation	2.7	3.1	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Sensors and detectors
022K3.02	Containment Cooling	3.0	3.3	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Containment instrumentation readings
026K1.01	Containment Spray	4.2	4.2	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	ECCS
026K2.02	Containment Spray	2.7	2.9	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	MOVs
039K4.02	Main and Reheat Steam	3.1	3.2	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Utilization of T-ave. program control when steam dumping through atmospheric relief/dump valves, including T-ave. limits
059A4.03	Main Feedwater	2.9	2.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Feedwater control during power increase and decrease
059K4.19	Main Feedwater	3.2	3.4	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Automatic feedwater isolation of MFW
061K2.01	Auxiliary/Emergency Feedwater	3.2	3.3	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	AFW system MOVs
062K3.02	AC Electrical Distribution	4.1	4.4	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	ED/G
062K4.07	AC Electrical Distribution	2.7	3.1	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	One-line diagram of 4kV to 480V distribution, including sources of normal and alternative power
063A1.01	DC Electrical Distribution	2.5	3.3	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Battery capacity as it is affected by discharge rate

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
064G2.1.31	Emergency Diesel Generator	4.6	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.
073K1.01	Process Radiation Monitoring	3.6	3.9	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Those systems served by PRMs
076K2.04	Service Water	2.5	2.6	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Reactor building closed cooling water
078A4.01	Instrument Air	3.1	3.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Pressure gauges
103A2 03	Containment	3.5	3.8	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Phase A and B isolation
103K1.08	Containment	3.6	3.8	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	SIS, including action of safety injection reset

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003G2.4.3	Reactor Coolant Pump	3.7	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to identify post-accident instrumentation.
004G2.2.44	Chemical and Volume Control	4.2	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions
008A2.02	Component Cooling Water	3.2	3.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	High/low surge tank level
022G2.1.19	Containment Cooling	3.9	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to use plant computer to evaluate system or component status.
076A2.02	Service Water	2.7	3.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Service water header pressure

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO / SRO)											Form ES-401-2		
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	#
001 Control Rod Drive											X	G2.1.19		
002 Reactor Coolant														
011 Pressurizer Level Control						X						K6.03		
014 Rod Position Indication							X					A1.02		
015 Nuclear Instrumentation								X				A2.04		
016 Non-nuclear Instrumentation														
017 In-core Temperature Monitor														
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control	X											K1.01		
029 Containment Purge														
033 Spent Fuel Pool Cooling								X				A2.03		
034 Fuel Handling Equipment										X		A4.01		
035 Steam Generator														
041 Steam Dump/Turbine Bypass Control														
045 Main Turbine Generator					X							K5.17		
055 Condenser Air Removal											X	G2.4.42		
056 Condensate														
068 Liquid Radwaste														
071 Waste Gas Disposal									X			A3.03		
072 Area Radiation Monitoring			X									K3.02		
075 Circulating Water		X										K2.03		
079 Station Air														
086 Fire Protection				X								K4.02		
K/A Category Point Totals:	1	1	1	1	1	1	1	1	1	1	0	Group Point Total:		10/3

1 2

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
011K6.03	Pressurizer Level Control	2.9	3.3	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Relationship between PZR level and PZR heater control circuit
014A1.02	Rod Position Indication	3.2	3.6	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Control rod position indication on control room panels
015A2.04	Nuclear Instrumentation	3.3	3.8	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Effects on axial flux density of control rod alignment and sequencing, xenon production and decay, and boron vs. control rod reactivity changes
028K1.01	Hydrogen Recombiner and Purge Control	2.5	2.5	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Containment annulus ventilation system (including pressure limits)
034A4.01	Fuel Handling Equipment	3.3	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Radiation levels
045K5.17	Main Turbine Generator	2.5	2.7	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Relationship between moderator temperature coefficient and boron concentration in RCS as T/G load increases
071A3.03	Waste Gas Disposal	3.6	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Radiation monitoring system alarm and actuating signals
072K3.02	Area Radiation Monitoring	3.1	3.5	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Fuel handling operations
075K2.03	Circulating Water	2.6	2.7	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Emergency/essential SWS pumps
086K4.02	Fire Protection	3.0	3.4	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Maintenance of fire header pressure

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
001G2.1.19	Control Rod Drive	3.9	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to use plant computer to evaluate system or component status.
033A2.03	Spent Fuel Pool Cooling	3.1	3.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Abnormal spent fuel pool water level or loss of water level
055G2.2.42	Condenser Air Removal	3.9	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to recognize system parameters that are entry-level conditions for Technical Specifications

Facility: Date of Exam:

Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1. 14					
	2.1. 28					
	2.1. 8					
	2.1. 34					
	2.1. 37					
	2.1.					
	Subtotal			3		2
2. Equipment Control	2.2. 15					
	2.2. 23					
	2.2. 20					
	2.2. 25					
	2.2.					
	2.2.					
	Subtotal			2		2
3. Radiation Control	2.3. 13					
	2.3. 15					
	2.3. 5					
	2.3. 4					
	2.3. 7					
	2.3.					
	Subtotal			3		2
4. Emergency Procedures / Plan	2.4. 25					
	2.4. 45					
	2.4. 46					
	2.4.					
	2.4.					
	2.4.					
	Subtotal			2		1
Tier 3 Point Total				10		7

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.14	Conduct of operations	3.1	3.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of criteria or conditions that require plant-wide announcements, such as pump starts, reactor trip, mode changes, etc.
G2.1.28	Conduct of operations	4.1	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the purpose and function of major system components and controls.
G2.1.8	Conduct of operations	3.4	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to coordinate personnel activities outside the control room.
G2.2.15	Equipment Control	3.9	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to determine the expected plant configuration using design and configuration control documentaion
G2.2.23	Equipment Control	3.1	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to track Technical Specification limiting conditions for operations.
G2.3.13	Radiation Control	3.4	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiological safety procedures pertaining to licensed operator duties
G2.3.15	Radiation Control	2.9	3.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiation monitoring systems
G2.3.5	Radiation Control	2.9	2.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to use radiation monitoring systems
G2.4.25	Emergency Procedures/Plans	3.3	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of fire protection procedures.
G2.4.45	Emergency Procedures/Plans	4.1	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to prioritize and interpret the significance of each annunciator or alarm.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.34	Conduct of operations	2.7	3.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of primary and secondary chemistry limits
G2.1.37	Conduct of operations	4.3	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of procedures, guidelines or limitations associated with reactivity management
G2.2.20	Equipment Control	2.6	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the process for managing troubleshooting activities.
G2.2.25	Equipment Control	3.2	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.
G2.3.4	Radiation Control	3.2	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiation exposure limits under normal and emergency conditions
G2.3.7	Radiation Control	3.5	3.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to comply with radiation work permit requirements during normal or abnormal conditions
G2.4.46	Emergency Procedures/Plans	4.2	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to verify that the alarms are consistent with the plant conditions.

RO Draft Admin Outline

Facility: Vogtle 1 & 2 Date of Examination: 05/12/2014

Examination Level: RO ☑ SRO Operating Test Number: 2014-301

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations (a)	R, M	**a. V-NRC-JP-19263-HL19: Determine Maximum Allowable Venting Time for Venting Voids in the Reactor Vessel** **Description:** Unit 2 tripped due to a LOCA. RCS pressure is recovering and the crew is responding to voids in the reactor vessel. Using provided data, the candidate will be required to calculate the maximum allowable venting time using 19263-C, Attachment 3, "Instructions for Determining Venting Time." G2.1.25 RO 3.9
Conduct of Operations (b)	R, D	**b. V-NRC-JP-19001-HL19: Calculate Amount of Boric Acid Required for Three Stuck Rods** **Description:** A reactor trip has occurred. Candidate is required to determine the required increase in boric acid concentration (ppm) and the total volume of boric acid (gallons) to be added to the RCS for a reactor trip with three stuck rods. A low RCS temperature will require the use of a correction factor in the calculation. G2.1.23 RO 4.3
Equipment Control (c)	R, M	**c. V-NRC-JP-14915-HL19: Perform Quadrant Power Tilt Ratio Surveillance for Inoperable QPTR Monitor Alarm** **Description:** The QPTR Monitor Alarm is inoperable. With data provided, the candidate will complete 14915-1, "Special Conditions Surveillance Logs," Data Sheet 7, to calculate Quadrant Power Tilt Ratio for the inoperable QPTR Monitor Alarm. G2.2.12 RO 3.7
Radiation Control (d)	N/A	N/A

Emergency Procedures/Plan (e)	S, D	**d. V-NRC-JP-NMP-EP-111-HL19: Perform ERO Recall and ENN Notification** **Description:** Candidate will perform an ERO recall and an ENN roll call, and will confirm receipt of the Emergency Notification by State and Local Authorities by reading the first five lines of the Emergency Notification Form over the ENN and requesting acknowledgement. Task is Time Critical. G2.4.43 RO 3.2

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)

SRO Draft Admin Outline

Facility: Vogtle 1 & 2 Date of Examination: 05/12/2014
Examination Level: RO SRO ☑ SROU ☑ Operating Test Number: 2014-301

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations (a)	R, M	**a. V-NRC-JP-19263-HL19: Determine Maximum Allowable Venting Time for Venting Voids in the Reactor Vessel** **Description:** Unit 2 tripped due to a LOCA. RCS pressure is recovering and the crew is responding to voids in the reactor vessel. Using provided data, the candidate will be required to calculate the maximum allowable venting time using 19263-C, Attachment 3, "Instructions for Determining Venting Time." Same as RO Admin JPM a. G2.1.25 SRO 4.2
Conduct of Operations (b)	R, D	**b. V-NRC-JP-19001-HL19: Calculate Amount of Boric Acid Required for Three Stuck Rods** **Description:** A reactor trip occurred. Candidate is required to determine the required increase in boric acid concentration (ppm) and the total volume of boric acid (gallons) to be added to the RCS for a reactor trip with three stuck rods. A low RCS temperature will require the use of a correction factor in the calculation. Same as RO Admin JPM b. G2.1.23 SRO 4.4
Equipment Control (c)	R, M	**c. V-NRC-JP-14915-HL19: Perform and Evaluate Quadrant Power Tilt Ratio Surveillance for Inoperable QPTR Monitor Alarm** **Description:** The QPTR Monitor Alarm is inoperable. With data provided, the candidate will complete 14915-1, "Special Conditions Surveillance Logs," Data Sheet 7, to calculate Quadrant Power Tilt Ratio for an inoperable QPTR Monitor Alarm, evaluate the data, and determine appropriate Tech Spec actions. G2.2.12 SRO 4.1

Radiation Control (d)	R, M	**d. V-NRC-JP-91301-HL19: Assess Radiological Conditions in an Emergency and Determine if a Task Can be Performed** **Description:** During a General Emergency, a Systems Operator is to be dispatched to operate equipment. The candidate must determine the appropriate Emergency Exposure Limit based on the given conditions and assigned task, and then assess the radiological data provided to determine if the task can be completed without exceeding the applicable Emergency Exposure Limit of 91301-C. G2.3.14 SRO 3.8
Emergency Procedures/Plan (e)	R, M	**e. V-NRC-JP-NMP-EP-110-HL19: Classify an Emergency Event and Complete the Emergency Notification Form** **Description:** Based on the given conditions, the candidate will use NMP-EP-110 to determine the highest emergency classification level. WebEOC will not be available, which will require the candidate to manually complete the Emergency Notification Form from NMP-EP-111-F10. G2.4.41 SRO 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)

RO/SRO-I/SRO-U Draft Systems Outline

Facility: Vogtle 1 & 2 Date of Examination: 05/12/2014

Exam Level: RO ☑ SRO-I ☑ SRO-U ☑ Operating Test Number: 2014-301

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. **V-NRC-JP-13009-HL19: Perform a Manual Makeup to the VCT** **Description:** The unit is at 100% power with the VCT level at 32%. Automatic makeup to the VCT is not available due to a level control circuit malfunction. The candidate is directed to perform a manual makeup to raise VCT level to 50% using 13009-1. During the manual makeup, the BA FLOW DEVIATION alarm will be received, which will require the candidate to manually stop the makeup to limit the effects of a dilution event. (RO / SRO-I / SRO-U) 004A4.12 RO 3.8 SRO 3.3	A, M, S	1
b. **V-NRC-JP-19014-HL19: Transfer ECCS Pumps to Hot Leg Recirculation** **Description:** A large break LOCA occurred approximately 7.5 hours ago. The ECCS pumps are currently operating in the cold leg recirculation mode. The candidate is directed to transfer the ECCS pumps to the hot leg recirculation mode using 19014-C. The SI pump 'B' to the hot legs isolation valve will not open, so SI pump 'B' will have to be realigned to cold leg injection. All other ECCS pumps will be aligned for hot leg injection. (RO / SRO-I / SRO-U) 011EA1.11 RO 4.2 SRO 4.2	A, EN, L, M, S	3
c. **V-NRC-JP-19012-HL19: Isolate Accumulators During Post-LOCA Cooldown** **Description:** The reactor was tripped following a LOCA, and a cooldown and depressurization were performed. Adequate RCS subcooling and pressurizer level are available to isolate the SI accumulators. The candidate is directed to isolate the SI accumulators using 19012-C. One accumulator isolation valve will fail to close, which will require the candidate to vent the non-isolable accumulator. (RO / SRO-I) WE03EA1.1 RO 4.0 SRO 4.0	A, EN, L, M, S	4P

d.	**V-NRC-JP-13610-HL19: Restore TDAFW Flow with Actuation Signal Present** **Description:** A reactor trip occurred due to a loss of main feedwater, which led to a loss of heat sink. All SG WR levels are less than 9%, and RCS bleed and feed has been initiated. The TDAFW pump tripped on overspeed and is ready to be returned to service. The candidate will be required to reset and restart the TDAFW pump and restore AFW flow to the SGs using 19231-C. (RO / SRO-I) WE05EA1.1 RO 4.1 SRO 4.0	D, EN, L, S	4S
e.	**V-NRC-JP-13125-HL19: Reduce Containment Pressure Following an Inadvertent CVI** **Description:** A containment pressure relief using the purge system was in progress when an inadvertent CVI occurred due to a faulty slave relay. Following repair and testing of the faulty relay, the candidate will be required to re-initiate containment pressure relief and lower containment pressure to zero ±0.1 psig using 13125-1. (RO / SRO-I) 103A1.01 RO 3.7 SRO 4.1	M, S	5
f.	**V-NRC-JP-13830-HL19: Synchronize Main Generator to the Grid** **Description:** The unit is starting up following a refueling outage. The main turbine is at 1800 rpm and generator excitation has been established. The candidate will use 13830-1 to synchronize the main generator to the grid. One phase will not indicate current, which will require tripping the main turbine. (RO / SRO-I) 062A4.07 RO 3.1* SRO 3.1*	A, D, S	6
g.	**V-NRC-JP-13301-HL19: Manually Align Control Room Isolation on High Radiation** **Description:** The unit is at 100% power when high radiation is detected in the control room ventilation. Control Room Isolation (CRI) fails to automatically actuate, so the candidate will be required to manually align the control room ventilation system using 13301-C. (RO / SRO-I / SRO-U) 061AA1.01 RO 3.6 SRO 3.6	D, EN, S	7

h. **V-NRC-JP-19253-HL19: Respond to Containment High Radiation** **Description:** The unit was at 100% power when a LOCA occurred. While performing the actions for the loss of reactor coolant, the containment area radiation monitors indicate greater than 750 mrem/hour. To respond to the high containment radiation level, the candidate will be required to perform the actions of 19253-C to isolate containment and to place the required containment ventilation units in service. (RO) WE16EA1.1 RO 3.1	D, L, S	9 **RO ONLY**

In-Plant Systems[@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. **V-NRC-JP-13405-HL19: Place Train 'B' Battery Charger 1BD1CA in Service** **Description:** Unit 1 experienced a loss of 125 VDC bus 1BD1 due to an electrical fault. After repairs to bus 1BD1 are complete and battery 1BD1B is placed in service, the candidate will be directed to locally place battery charger 1BD1CA in service using 13405-1. (RO / SRO-I) 058AA1.03 RO 3.1 SRO 3.3	D, E, L	6
j. **V-NRC-JP-18038-HL19: Locally Energize Train 'A' Switchgear Following Local Diesel Start** **Description:** The control room has been evacuated and control has been established at the shutdown panels. DG2A has been locally started. The candidate will locally energize Unit 2, Train 'A' 4160 VAC and 480 VAC buses, two NSCW pumps, and one MDAFW pump using Attachment B of 18038-2. (RO / SRO-I / SRO-U) 068AA1.21 RO 3.9 SRO 4.1	D, E, L	8
k. **V-NRC-JP-17213-HL19: Respond to 1-RE-0018 Alarm During a Liquid Radwaste Release** **Description:** During a liquid radwaste release, a high alarm is received on 1-RE-0018. The candidate will be directed to respond to the Waste Process Liquid Panel (PLPP) and take the appropriate actions per 17213-1. 1-RE-0018 will not close, so manual isolation will be required. (RO / SRO-I / SRO-U) 059AA2.05 RO 3.6 SRO 3.9	A, D, E, P, R	9

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	