Facility: SEQUOYAH Date of Exam: MAY 2013

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

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
007EK1.02	Reactor Trip - Stabilization - Recovery / 1	3.4	3.8	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Shutdown margin
008AK2.01	Pressurizer Vapor Space Accident / 3	2.7	2.7	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Valves
009EK1.02	Small Break LOCA / 3	3.5	4.2	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Use of steam tables
011EG2.1.31	Large Break LOCA / 3	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.
015AG2.1.28	RCP Malfunctions / 4	4.1	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the purpose and function of major system components and controls.
022AK3.05	Loss of Rx Coolant Makeup / 2	3.2	3.4	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Need to avoid plant transients
025AK2.05	Loss of RHR System / 4	2.6	2.6	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Reactor building sump
026AA1.06	Loss of Component Cooling Water / 8	2.9	2.9	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Control of flow rates to components cooled by the CCWS
029EA1.09	ATWS / 1	4	3.6	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Manual rod control
040AA2.02	Steam Line Rupture - Excessive Heat Transfer / 4	4.6	4.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Conditions requiring a reactor trip
054AK1.01	Loss of Main Feedwater / 4	4.1	4.3	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	MFW line break depressurizes the S/G (similar to a steam line break)

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
056AG2.2.4	Loss of Off-site Power / 6	3.6	3.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	(multi-unit) Ability to explain the variations in control board layouts, systems, instrumentation and procedural actions between units at a facility.
062AA2.01	Loss of Nuclear Svc Water / 4	2.9	3.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Location of a leak in the SWS
065AK3.08	Loss of Instrument Air / 8	3.7	3.9	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Actions contained in EOP for loss of instrument air
077AA1.03	Generator Voltage and Electric Grid Disturbances / 6	3.8	3.7	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Voltatge regulator controls
WE04EA2.2	LOCA Outside Containment / 3	3.6	4.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.
WE05EK2.2	Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	3.9	4.2	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	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.
WE11EK3.4	Loss of Emergency Coolant Recirc. / 4	3.6	3.8	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
001AA2.05	Continuous Rod Withdrawal / 1	4.4	4.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Uncontrolled rod withdrawal from available indications
036AK2.02	Fuel Handling Accident / 8	3.4	3.9	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Radiation monitoring equipment (portable and installed)
037AG2.2.44	Steam Generator Tube Leak / 3	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
051AA1.04	Loss of Condenser Vacuum / 4	2.5	2.5	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Rod position
059AK3.02	Accidental Liquid RadWaste Rel. / 9	3.2	4.5	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Implementation of E-plan
074EA2.07	Inad. Core Cooling / 4	4.1	4.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	The difference between a LOCA and inadequate core cooling from trends and indicators
WE03EK1.1	LOCA Cooldown - Depress. / 4	3.4	4.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Components, capacity, and function of emergency systems.
WE14EA1.1	Loss of CTMT Integrity / 5	3.7	3.7	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Components and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes and automatic and manual features.
WE15EK3.1	Containment Flooding / 5	2.7	2.9	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure and reactivity changes and operating limitations and reasons for these operating characteristics.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003K6.02	Reactor Coolant Pump	2.7	3.1	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	RCP seals and seal water supply
004A2.06	Chemical and Volume Control	4.2	4.3	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Inadvertent boration/dilution
004A4.12	Chemical and Volume Control	3.8	3.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Boration/dilution batch control
005A1.03	Residual Heat Removal	2.5	2.6	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Closed cooling water flow rate and temperature
006K5.05	Emergency Core Cooling	3.4	3.8	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Effects of pressure on a solid system
007A3.01	Pressurizer Relief/Quench Tank	2.7	2.9	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Components which discharge to the PRT
007G2.1.20	Pressurizer Relief/Quench Tank	4.6	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to execute procedure steps.
008A3.06	Component Cooling Water	2.5	2.5	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Typical CCW pump operating conditions, including vibration and sound levels and motor current
010K6.01	Pressurizer Pressure Control	2.7	3.1	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Pressure detection systems
010K6.03	Pressurizer Pressure Control	3.2	3.6	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	PZR sprays and heaters
012K2.01	Reactor Protection	3.3	3.7	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	RPS channels, components and interconnections

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
013K4.07	Engineered Safety Features Actuation	3.7	4.1	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Power supply loss
022K4.03	Containment Cooling	3.6	4.0	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Automatic containment isolation
025A4.02	Ice Condenser	2.7	2.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Containment vent fans
026A1.05	Containment Spray	3.1	3.4	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Chemical additive tank level and concentration
026K1.01	Containment Spray	4.2	4.2	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	ECCS
039K3.06	Main and Reheat Steam	2.8	3.1	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	SDS
039K5.08	Main and Reheat Steam	3.6	3.6	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Effect of steam removal on reactivity
059A3.04	Main Feedwater	2.5	2.6	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Turbine driven feed pump
061K2.01	Auxiliary/Emergency Feedwater	3.2	3.3	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	AFW system MOVs
062A2.09	AC Electrical Distribution	2.7	3.0	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Consequences of exceeding current limitations
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:
063K3.02	DC Electrical Distribution	3.5	3.7	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Components using DC control power
064K3.03	Emergency Diesel Generator	3.6	3.9	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	ED/G (manual loads)
073K1.01	Process Radiation Monitoring	3.6	3.9	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Those systems served by PRMs
076A4.02	Service Water	2.6	2.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	SWS valves
078G2.4.35	Instrument Air	3.8	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of local auxiliary operator tasks during emergency and the resultant operational effects
103K1.01	Containment	3.6	3.9	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	CCS

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
002K5.07	Reactor Coolant	3.6	3.9	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Reactivity effects of RCS boron, pressure and temperature
015A1.02	Nuclear Instrumentation	3.5	3.6	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	SUR
016A3.01	Non-nuclear Instrumentation	2.9	2.9	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Automatic selection of NNIS inputs to control systems
027K2.01	Containment Iodine Removal	3.1	3.4	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Fans
033A2.01	Spent Fuel Pool Cooling	3.0	3.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Inadequate SDM
034K6.02	Fuel Handling Equipment	2.6	3.3	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Radiation monitoring systems
071K3.05	Waste Gas Disposal	3.2	3.2	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	ARM and PRM systems
072A4.01	Area Radiation Monitoring	3.0	3.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Alarm and interlock setpoint checks and adjustments
079K4.01	Station Air	2.9	3.2	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Cross-connect with IAS
086K1.03	Fire Protection	3.4	3.5	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	AFW system

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.15	Conduct of operations	2.7	3.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of administrative requirements for temporary management directives such as standing orders, night orders, Operations memos, etc.
G2.1.43	Conduct of operations	4.1	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to use procedures to determine the effects on reactivity of plant changes
G2.2.22	Equipment Control	4.0	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of limiting conditions for operations and safety limits.
G2.2.42	Equipment Control	3.9	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to recognize system parameters that are entry-level conditions for Technical Specifications
G2.2.43	Equipment Control	3.0	3.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the process used to track inoperable alarms
G2.3.11	Radiation Control	3.8	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to control radiation releases.
G2.3.5	Radiation Control	2.9	2.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to use radiation monitoring systems
G2.4.26	Emergency Procedures/Plans	3.1	3.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of facility protection requirements including fire brigade and portable fire fighting equipment usage.
G2.4.3	Emergency Procedures/Plans	3.7	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to identify post-accident instrumentation.
G2.4.9	Emergency Procedures/Plans	3.8	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of low power / shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
007EA2.02	Reactor Trip - Stabilization - Recovery / 1	4.3	4.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Proper actions to be taken if the automatic safety functions have not taken place
011EA2.08	Large Break LOCA / 3	3.4	3.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Conditions necessary for recovery when accident reaches stable phase
025AA2.05	Loss of RHR System / 4	3.1	3.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Limitations on LPI flow and temperature rates of change
026AG2.4.45	Loss of Component Cooling Water / 8	4.1	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to prioritize and interpret the significance of each annunciator or alarm.
056AG2.2.40	Loss of Off-site Power / 6	3.4	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to apply technical specifications for a system.
062AG2.1.23	Loss of Nuclear Svc Water / 4	4.3	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to perform specific system and integrated plant procedures during all modes of plant operation.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003AG2.2.36	Dropped Control Rod / 1	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
028AG2.4.50	Pressurizer Level Malfunction / 2	4.2	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.
068AA2.06	Control Room Evac. / 8	4.1	4.3	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	RCS pressure
WE10EA2.2	Natural Circ. With Seam Void/ 4	3.4	3.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003G2.4.34	Reactor Coolant Pump	4.2	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects
010A2.02	Pressurizer Pressure Control	3.9	3.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Spray valve failures
012A2.05	Reactor Protection	3.1	3.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Faulty or erratic operation of detectors and function generators
025G2.2.25	Ice Condenser	3.2	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.
073A2.03	Process Radiation Monitoring	2.4	2.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Calibration drift

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
014A2.04	Rod Position Indication	3.4	3.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Misaligned rod
028A2.03	Hydrogen Recombiner and Purge Control	3.4	4.0	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	The hydrogen air concentration in excess of limit flame propagation or detonation with resulting equipment damage in containment
055G2.1.31	Condenser Air Removal	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.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.4	Conduct of operations	3.3	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license statur, 10CFR55 etc.
G2.2.17	Equipment Control	2.6	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the process for managing maintenance activities during power operations.
G2.2.3	Equipment Control	3.8	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	(multi-unit license) Knowledge of the design, procedural and operational differences between units.
G2.3.6	Radiation Control	2.0	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to aprove release permits
G2.3.7	Radiation Control	3.5	3.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to comply with radiation work permit requirements during normal or abnormal conditions
G2.4.22	Emergency Procedures/Plans	3.6	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.
G2.4.29	Emergency Procedures/Plans	3.1	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the emergency plan.

Facility: Sequoyah Nuclear Station 1 & 2 Date of Examination: 05/13/2013

Exam Level: RO ☑ SRO ☐ Operating Test No: 2013-301

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R, M	2.1.43 Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc. (4.1/4.3) Given plant data, perform an RCS Deboration Calculation.
Conduct of Operations	R, D	2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. (3.9/4.2) Given plant data, calculate Maximum Reactor Vessel Vent Time.
Equipment Control	R, M	2.2.14 Knowledge of the process for controlling equipment configuration or status. (3.9/4.3) Perform a System Operability Checklist when the 1A RHR becomes inoperable and determine the required protected train tag placement for configuration control.
Radiation Control		Not examined
Emergency Procedures/Plan	R, N	2.4.39 Knowledge of RO responsibilities in emergency plan implementation. (3.9/3.8) Determine the required Operator allocation and make a report to the SM for an Emergency Plan turnover to the OSC Ops Advisor SRO.

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)

A.1.a

Given that Unit 1 is in MODE 1 at End of Life Conditions and that preparations are being made to place a fresh Mixed Bed CVCS Purification Ion Exchanger in service. The examinee will perform an RCS Deboration Calculation using 1-SO-62-9, CVCS PURIFICATION SYSTEM for two cases, one with a 75 gpm Letdown orifice in service and the other with the 120 gpm Letdown orifice in service so that proper boron loading on the Mixed Bed Ion Exchanger may be accomplished with minimal impact on plant reactivity.

A.1.b

Given plant data during a plant emergency, the examinee will determine by calculating and interpreting graphs the time required to vent the Reactor Vessel while maintaining containment hydrogen concentration below 3% using EA-0-7 Calculating Maximum Reactor Vessel Vent Time.

A.2

Given an emergent condition the 1A RHR pump is declared to be INOPERABLE. The examinee will identify the equipment required to be administratively protected to maintain configuration control and determine the placement of protected train tags using 0-GO-16 SYSTEM OPERABILITY CHECKLISTS.

A.3

Not examined.

A.4

Given a major plant fire is in progress in the Auxiliary Building 690 elevation penetration room with the Site Emergency Plan in progress. The examinee will direct Assistant Unit Operators (AUO) to perform local actions as required by the location of the fire. The examinee will select the correct appendix based on location for the AUO task assignment and will determine which AUO will perform the specified task based on the level of AUO qualification using AOP-N.08 APPENDIX R FIRE SAFE SHUTDOWN. The examinee will prepare a report to the Shift Manager the choices made when the Shift Manager gives a turnover for personnel accountability during the Emergency Plan when the Operations Support Center is activated.

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Exam Level: RO ☐ SRO ☑ Operating Test No: 2013-301

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R, M	2.1.37 Knowledge of procedures, guidelines, or limitations associated with reactivity management. (4.3/4.6) Determine Actions Required Following a Reactivity Management Event When at Power.
Conduct of Operations	R, D	2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. (3.9/4.2) Given plant data, calculate Maximum Reactor Vessel Vent Time.
Equipment Control	R, N	2.2.18 Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc. (2.6/3.9) Determine Switchyard Access Requirements During an Outage Condition.
Radiation Control	R, D	2.3.6 Ability to approve release permits. (2.0./3.8) Approve a Monitor Tank Release with 0-RE-90-122 INOPERABLE.
Emergency Procedures/Plan	R, M	2.4.41 Knowledge of the emergency action level thresholds and classifications. (4.6) Classify The Event Using The EPIP-1 and Complete a State Notification Form.

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)

A.1.a

Given a sequence of events while acting as the Unit Supervisor when a CVCS Purification mixed bed ion exchanger was placed in service with insufficient boron loading, the examinee will determine the following:

- The severity of the event as a Minor Reactivity Management Event using NPG-SPP-10.4 Reactivity Management Program.
- That site operations management and duty plant manager are the required internal notifications using NPG-SPP-3.5 Regulatory Reporting Requirements.

This task is based on a Sequoyah internal operating event.

A.1.b

Given plant data during a plant emergency, the examinee will determine by calculating and interpreting graphs the time required to vent the Reactor Vessel while maintaining containment hydrogen concentration below 3% using EA-0-7 Calculating Maximum Reactor Vessel Vent Time.

A.2

Given a situation while acting as the Work Control Center (WCC) Supervisor, the examinee will determine the following prior to allowing a work group access to the switchyard using OPDP-2 Switchyard Access and Switching Order Execution:

- Pre-job brief requirements.
- Switchyard access gate requirements.
- Vehicle speed limit.
- Vehicle escort requirement.
- "Defense in Depth" concept requirements during a refueling outage condition.

The requirements listed are necessary to maintain switchyard integrity during switchyard entry and are the responsibility if a Sequoyah Senior Reactor Operator. Additionally more stringent requirements are imposed during outage conditions to ensure core cooling capability is maintained.

This task is based on a Sequoyah internal operating event.

A.3

Given a situation while acting as the Unit Supervisor when a Waste Disposal System Monitor tank liquid release is planned with Radiation Monitor 0-RE-90-122 INOPERABLE, the examinee will determine the following prior to authorizing the release using 0-SO-77-1 WASTE DISPOSAL SYSTEM (LIQUID):

- Valves required to be Independently Verified.
- Location of jumper placement to allow for 0-RCV-77-43 operation.

Additionally the examinee will determine the following additional Chemistry Department requirements prior to authorizing the release using 0-SI-CEM-077-400.1 Liquid Waste Effluent Batch Release:

- Independent sample requirement
- Independent analysis requirement
- Independent release rate verification.

The requirements listed are necessary to demonstrate the appropriate administrative controls that are in place to preclude the possibility of an inadvertent release radioactive in excess of limits to the public.

A.4

Acting as the Site Emergency Director and given data for a plant emergency, the examinee will interpret the data from a major gaseous effluent release event within the Exclusion Area Boundary (EAB) and determine the correct Emergency Classification of Site Area Emergency, and subsequently complete a state notification form.

Facility: Sequoyah Nuclear Station 1 & 2	Date of Examination: 05/13/2013
Exam Level: RO √ SRO-I ☐ SRO-U ☐	Operating Test No: 2013-301

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. Perform a 0-SI-OPS-085-011.0 Reactivity Control Systems Moveable Control Assemblies Test. K/A 001.A2.11 (4.4/4.7)	M, A, S	1
b. Align ECCS & CS Pumps to the Containment Sump K/A 006 A4.07 (4.4/4.4)	M, A, EN, L, S	2
c. Terminate SI and establish Normal Charging. K/A EPE E02 EA1.1 (4.0/3.9)	D, A, EN, S	3
d. Respond to a High RCP Stator Temperature Alarm. K/A APE 015/017 AA1.03 (3.7/3.8)	M, A, L,S	4P
e. Align ERCW to the AFW Pumps. K/A EPE E05 EA 1.1 (4.1/4.0)	N, L, S	4S
f. Start up of the A Hydrogen Recombiner K/A 028 A4.01 (4.0/4.0)	D, L, S	5
g. Transfer 1A-A 6.9 KV SD Board from Alternate to Normal Supply. 064 A4.01 (4.0/4.3)	D, A, S	6
h. Shutdown Containment Purge. 029 A1.03 (3.0 / 3.3)	N, L, S	8
In-Plant Systems (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Perform a Local EDG Start with a Failure of ERCW Valve to Auto Open. K/A 064 A4.01 (4.0/4.3)	D, A, E	6
j. Perform a Local Alignment of U-2 TDAFW Level Control Valves. K/A 061A2.07 (3.4/3.5)	M, R, E,L	4S
k. Respond to Loss of Control Air System. K/A APE 065 AA1.04 (3.5/3.4)	D, E, L	8

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

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(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	

a. The examinee will perform a control rod testing in MODE 1 using 0-SI-OPS-085-011.0 Reactivity Control Systems Moveable Control Assemblies starting with Control Bank C. During the test an uncontrolled rod movement occurs, the examinee will use the alternate path and transition to AOP-C.01, Rod Control System Malfunctions to initiate a manual Reactor trip.

b. The examinee will assume the shift with a LOCA is in progress and ECCS pumps are running with the suction path aligned from the RWST. After assuming the shift, an RWST Low Level condition occurs and the examinee will transition to ES-1.3, Transfer to Cold Leg Recirculation to align Cold Leg Recirculation. While performing ES-1.3, RHR suction valve 74-21 fails to auto close, the examinee will use the alternate path and manually close RHR suction valve 74-21. The examinee will subsequently complete the alignment of Cold Leg Recirculation with the ECCS pumps suction path aligned to the containment sump.

c. The examinee will assume the shift in MODE 3 following a spurious Safety Injection. The examinee will terminate safety injection by stopping one charging pump, isolating the CCPIT and will attempt to establish charging flow using E-0, REACTOR TRIP OR SAFETY INJECTION. While aligning Charging flow, Normal Charging Isolation valve 62-85 will not operate, the examinee will use the alternate path and manually align Charging by opening Alternate Charging Isolation valve 62-85.

d. The examinee will assume the shift in MODE 3 and will be directed to respond to plant conditions. The #2 Reactor Coolant Pump (RCP) will develop a high temperature condition on the motor stator. The examinee will address the ARP and transition to AOP-R.04, Reactor Coolant Pump Malfunctions. Based on plant conditions with the plant in MODE 3, the examinee will use the alternate path to stop the #2 RCP and close the Loop 2 Pressurizer Spray valve.

e. The examinee will assume the shift in MODE 3 with a large leak in the Condensate Storage Tank and a Loss of Offsite Power. The examinee will align Essential Raw Cooling Water (Service Water) to the motor driven Auxiliary Feed Pumps (AFW) using EA-3-10 ESTABLISHING MOTOR DRIVEN AFW FLOW section 4.10 before the AFW pumps trip due to excessive cavitation.

f. The examinee will assume the shift following an accident. The examinee will determine the Containment Pressure correction factor and will place "A-A" Hydrogen Recombiner in service using EA-268-1, Placing Hydrogen Recombiner in Service.

g. The examinee will assume the shift in MODE 1 with 1A 6.9 Kv Shutdown Board to the aligned to the alternate power source. The examinee will be directed to transfer 1A-A 6.9kV Shutdown Board to Normal Feeder at 1-M-1 using 0-SO-202-4, 6900V Shutdown Boards, Section 8.1.5. The transfer to the normal power supply will fail, and the 1A Emergency Diesel Generator (EDG) will fail to auto start resulting in a loss of power to the 1A 6.9 Kv Shutdown Board. The examinee will use the alternate path to manually start the 1A EDG using 0-SO-202-4, 6900V Shutdown Boards.

h. The examinee will assume the shift in MODE 5 with Lower Containment Purge "A" Train in service. The examinee will remove Lower Containment Purge "A" Train from service using 0-SO-30-3 CONTAINMENT PURGE SYSTEM OPERATION.

i. The examinee will perform a normal, local start of the 1A Diesel Generator using 0-SO-82-1 Diesel Generator 1A-A section 8.2. While performing the start of the 1A Diesel Generator, the examinee will determine FCV-67-66 Emerg Dsl Htxs A1 & A2 Sup Vlv from Hdr A failed to automatically open. The examinee will use the alternate path and manually open 1-FCV-67-68D Emerg Dsl Htxs A1 & A2 Sup Vlv From Hdr B to establish cooling water flow to the 1A Diesel Generator.

j. The examinee will assume the shift in MODE 3 during a Loss of Essential Raw Cooling Water (ERCW) condition. The examinee will perform local actions to align the backup air supply isolation valves to the U-2 TDAFW Level Control Valves.

k. The examinee will assume the shift in MODE 3 during a Loss of Control and Service Air. The examinee will perform local actions to start and manually load the Station Air Compressors using EA-32-2, Establishing Control and Service Air.

Facility: Sequoyah Nuclear Station 1 & 2	Date of Examination: 05/13/2013
Exam Level: RO ☐ SRO-I √ SRO-U ☐	Operating Test No: 2013-301

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. Perform a 0-SI-OPS-085-011.0 Reactivity Control Systems Moveable Control Assemblies Test. K/A 001.A2.11 (4.4/4.7)	M, A, S	1
b. Align ECCS & CS Pumps to the Containment Sump K/A 006 A4.07 (4.4/4.4)	M, A, EN, L, S	2
c. Terminate SI and establish Normal Charging. K/A EPE E02 EA1.1 (4.0/3.9)	D, A, EN, S	3
d. Respond to a High RCP Stator Temperature Alarm. K/A APE 015/017 AA1.03 (3.7/3.8)	M, A, L, S	4P
e. Align ERCW to the AFW Pumps. K/A EPE E05 EA 1.1 (4.1/4.0)	N, L, S	4S
f. Not examined.		
g. Transfer 1A-A 6.9 KV SD Board from Alternate to Normal Supply. 064 A4.01 (4.0/4.3)	D, A, S	6
h. Shutdown Containment Purge. 029 A1.03 (3.0 / 3.3)	N, L, S	8
In-Plant Systems (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Perform a Local EDG Start with a Failure of ERCW Valve to Auto Open. K/A 064 A4.01 (4.0/4.3)	D, A, E	6
j. Perform a Local Alignment of U-2 TDAFW Level Control Valves. K/A 061A2.07 (3.4/3.5)	M, R, E,L	4S
k. Respond to Loss of Control Air System. K/A APE 065 AA1.04 (3.5/3.4)	D, E, L	8

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

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(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	

a. The examinee will perform a control rod testing in MODE 1 using 0-SI-OPS-085-011.0 Reactivity Control Systems Moveable Control Assemblies starting with Control Bank C. During the test an uncontrolled rod movement occurs, the examinee will use the alternate path and transition to AOP-C.01, Rod Control System Malfunctions to initiate a manual Reactor trip.

b. The examinee will assume the shift with a LOCA is in progress and ECCS pumps are running with the suction path aligned from the RWST. After assuming the shift, an RWST Low Level condition occurs and the examinee will transition to ES-1.3, Transfer to Cold Leg Recirculation to align Cold Leg Recirculation. While performing ES-1.3, RHR suction valve 74-21 fails to auto close, the examinee will use the alternate path and manually close RHR suction valve 74-21. The examinee will subsequently complete the alignment of Cold Leg Recirculation with the ECCS pumps suction path aligned to the containment sump.

c. The examinee will assume the shift in MODE 3 following a spurious Safety Injection. The examinee will terminate safety injection by stopping one charging pump, isolating the CCPIT and will attempt to establish charging flow using E-0, REACTOR TRIP OR SAFETY INJECTION. While aligning Charging flow, Normal Charging Isolation valve 62-85 will not operate, the examinee will use the alternate path and manually align Charging by opening Alternate Charging Isolation valve 62-85.

d. The examinee will assume the shift in MODE 3 and will be directed to respond to plant conditions. The #2 Reactor Coolant Pump (RCP) will develop a high temperature condition on the motor stator. The examinee will address the ARP and transition to AOP-R.04, Reactor Coolant Pump Malfunctions. Based on plant conditions with the plant in MODE 3, the examinee will use the alternate path to stop the #2 RCP and close the Loop 2 Pressurizer Spray valve.

e. The examinee will assume the shift in MODE 3 with a large leak in the Condensate Storage Tank and a Loss of Offsite Power. The examinee will align Essential Raw Cooling Water (Service Water) to the motor driven Auxiliary Feed Pumps (AFW) using EA-3-10 ESTABLISHING MOTOR DRIVEN AFW FLOW section 4.10 before the AFW pumps trip due to excessive cavitation.

f. Not examined.

g. The examinee will assume the shift in MODE 1 with 1A 6.9 Kv Shutdown Board to the aligned to the alternate power source. The examinee will be directed to transfer 1A-A 6.9kV Shutdown Board to Normal Feeder at 1-M-1 using 0-SO-202-4, 6900V Shutdown Boards, Section 8.1.5. The transfer to the normal power supply will fail, and the 1A Emergency Diesel Generator (EDG) will fail to auto start resulting in a loss of power to the 1A 6.9 Kv Shutdown Board. The examinee will use the alternate path to manually start the 1A EDG using 0-SO-202-4, 6900V Shutdown Boards.

h. The examinee will assume the shift in MODE 5 with Lower Containment Purge "A" Train in service. The examinee will remove Lower Containment Purge "A" Train from service using 0-SO-30-3 CONTAINMENT PURGE SYSTEM OPERATION.

i. The examinee will perform a normal, local start of the 1A Diesel Generator using 0-SO-82-1 Diesel Generator 1A-A section 8.2. While performing the start of the 1A Diesel Generator, the examinee will determine FCV-67-66 Emerg Dsl Htxs A1 & A2 Sup Vlv from Hdr A failed to automatically open. The examinee will use the alternate path and manually open 1-FCV-67-68D Emerg Dsl Htxs A1 & A2 Sup Vlv From Hdr B to establish cooling water flow to the 1A Diesel Generator.

j. The examinee will assume the shift in MODE 3 during a Loss of Essential Raw Cooling Water (ERCW) condition. The examinee will perform local actions to align the backup air supply isolation valves to the U-2 TDAFW Level Control Valves.

k. The examinee will assume the shift in MODE 3 during a Loss of Control and Service Air. The examinee will perform local actions to start and manually load the Station Air Compressors using EA-32-2, Establishing Control and Service Air.

Facility: Sequoyah Nuclear Station 1 & 2	Date of Examination: 05/13/2013
Exam Level: RO ☐ SRO-I ☐ SRO-U √	Operating Test No: 2013-301

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. Perform a 0-SI-OPS-085-011.0 Reactivity Control Systems Moveable Control Assemblies Test. K/A 001.A2.11 (4.4/4.7)	M, A, S	1
b. Align ECCS & CS Pumps to the Containment Sump K/A 006 A4.07 (4.4/4.4)	M, A, EN, L, S	2
c. Terminate SI and establish Normal Charging. K/A EPE E02 EA1.1 (4.0/3.9)	D, A, EN, S	3
d. Not Examined		
e. Not Examined		
f. Not Examined		
g. Not Examined		
h. Not Examined		
In-Plant Systems (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Not Examined		
j. Perform a Local Alignment of U-2 TDAFW Level Control Valves. K/A 061A2.07 (3.4/3.5)	M, R, E,L	4S
k. Respond to Loss of Control Air System. K/A APE 065 AA1.04 (3.5/3.4)	D, E, L	8

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

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(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	

a. The examinee will perform a control rod testing in MODE 1 using 0-SI-OPS-085-011.0 Reactivity Control Systems Moveable Control Assemblies starting with Control Bank C. During the test an uncontrolled rod movement occurs, the examinee will use the alternate path and transition to AOP-C.01, Rod Control System Malfunctions to initiate a manual Reactor trip.

b. The examinee will assume the shift with a LOCA is in progress and ECCS pumps are running with the suction path aligned from the RWST. After assuming the shift, an RWST Low Level condition occurs and the examinee will transition to ES-1.3, Transfer to Cold Leg Recirculation to align Cold Leg Recirculation. While performing ES-1.3, RHR suction valve 74-21 fails to auto close, the examinee will use the alternate path and manually close RHR suction valve 74-21. The examinee will subsequently complete the alignment of Cold Leg Recirculation with the ECCS pumps suction path aligned to the containment sump.

c. The examinee will assume the shift in MODE 3 following a spurious Safety Injection. The examinee will terminate safety injection by stopping one charging pump, isolating the CCPIT and will attempt to establish charging flow using E-0, REACTOR TRIP OR SAFETY INJECTION. While aligning Charging flow, Normal Charging Isolation valve 62-85 will not operate, the examinee will use the alternate path and manually align Charging by opening Alternate Charging Isolation valve 62-85.

d. Not Examined.

e. Not Examined.

f. Not Examined.

g. Not Examined.

h. Not Examined.

i. Not Examined.

j. The examinee will assume the shift in MODE 3 during a Loss of Essential Raw Cooling Water (ERCW) condition. The examinee will perform local actions to align the backup air supply isolation valves to the U-2 TDAFW Level Control Valves.

k. The examinee will assume the shift in MODE 3 during a Loss of Control and Service Air. The examinee will perform local actions to start and manually load the Station Air Compressors using EA-32-2, Establishing Control and Service Air.