

Facility: <b>Sequoyah</b>		Date of Exam: <b>March, 2016</b>																
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	2	1	2	N/A			1	1	N/A			2	9	2	2	4	
	Tier Totals	5	4	5	N/A			4	4	N/A			5	27	5	5	10	
2. Plant Systems	1	2	3	3	3	3	3	2	2	3	2	2	28	2	3	5		
	2	1	1	1	1	1	1	1	1	0	1	1	10	1	-	2	3	
	Tier Totals	3	4	4	4	4	4	3	3	3	3	3	38	3	5	8		
3. Generic Knowledge and Abilities Categories				1		2		3		4		10		1	2	3	4	7
				2		2		3		3				1	2	2	2	

- Note:
- Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two). [\(One Tier 3 Radiation Control K/A is allowed if the K/A is replaced by a K/A from another Tier 3 Category\).](#)
  - 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 with justification; 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 a category 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.
- G\* Generic K/As

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)						Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A2	G*	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1		X					007EK2.03; Knowledge of the interrelations between a reactor trip and the following: Reactor trip status panel.  007EG2.4.6; Knowledge of EOP mitigation strategies.	3.5  4.7	
000008 Pressurizer Vapor Space Accident / 3						X	008AG2.4.14; Knowledge of general guidelines for EOP usage.	4.5	
000009 Small Break LOCA / 3		X					009EK2.03; Knowledge of the interrelations between the small break LOCA and the following: S/Gs.	3.0	
000011 Large Break LOCA / 3					X		011EA2.06; Ability to determine or interpret the following as they apply to a Large Break LOCA: That fan is in slow speed and dampers are in accident mode during LOCA.	4.0	
000015/17 RCP Malfunctions / 4			X				015AK3.03; Knowledge of the reasons for the following responses as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Sequence of events for manually tripping reactor and RCP as a result of an RCP malfunction.	3.7	
000022 Loss of Rx Coolant Makeup / 2						X	022AG2.2.4; (multi-unit license) Ability to explain the variations in control board/control room layouts, systems, instrumentation, and procedural actions between units at a facility.	3.6	
000025 Loss of RHR System / 4	X						025AK1.01; Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System: Loss of RHRS during all modes of operation.	3.9	
000026 Loss of Component Cooling Water / 8					X		026AA2.01; Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: Location of a leak in the CCWS.	2.9	
000027 Pressurizer Pressure Control System Malfunction / 3						X	027AG2.1.7; Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	
000029 ATWS / 1		X					029EK2.06; Knowledge of the interrelations between the following and an ATWS: Breakers, relays, and disconnects.	2.9	
000038 Steam Gen. Tube Rupture / 3						X	038EG2.1.23; Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.4	
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4					X		040AA2.04; Ability to determine and interpret the following as they apply to the Steam Line Rupture: Conditions requiring ESFAS initiation.	4.7	
000054 (CE/E06) Loss of Main Feedwater / 4				X			054AA1.04; Ability to operate and / or monitor the following as they apply to the Loss of Main Feedwater (MFW): HPI, under total feedwater loss conditions.	4.4	
000055 Station Blackout / 6				X			055EA1.07; Ability to operate and monitor the following as they apply to a Station Blackout: Restoration of power from offsite.	4.3	
000056 Loss of Off-site Power / 6					X		056AA2.56; Ability to determine and interpret the following as they apply to the Loss of Offsite Power: RCS T-ave.	3.7	
000057 Loss of Vital AC Inst. Bus / 6					X		057AA2.08; Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: Reactor power digital display and remote flux meter.	3.4	

000058 Loss of DC Power / 6				X			058AA1.02; Ability to operate and / or monitor the following as they apply to the Loss of DC Power: Static inverter dc input breaker, frequency meter, ac output breaker, and ground fault detector.	3.1	
000062 Loss of Nuclear Svc Water / 4						X	062AG2.4.47; Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	4.2	
000065 Loss of Instrument Air / 8					X		065AA2.07; Ability to determine and interpret the following as they apply to the Loss of Instrument Air: Whether backup nitrogen supply is controlling valve position.	2.8	
W/E04 LOCA Outside Containment / 3	X						WE04EK1.2; Knowledge of the operational implications of the following concepts as they apply to the (LOCA Outside Containment): Normal, abnormal and emergency operating procedures associated with (LOCA Outside Containment).	3.5	
W/E11 Loss of Emergency Coolant Recirc. / 4			X				WE11EK3.2; Knowledge of the reasons for the following responses as they apply to the (Loss of Emergency Coolant Recirculation): Normal, abnormal and emergency operating procedures associated with (Loss of Emergency Coolant Recirculation).	3.5	
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	X						WE05EK1.1; Knowledge of the operational implications of the following concepts as they apply to the (Loss of Secondary Heat Sink): Components, capacity, and function of emergency systems.	3.8	
000077 Generator Voltage and Electric Grid Disturbances / 6			X				077AK3.01; Knowledge of the reasons for the following responses as they apply to Generator Voltage and Electric Grid Disturbances: Reactor and turbine trip criteria.	3.9	
K/A Category Totals:	3	3	3	3	3/3	3/3	Group Point Total:		18/6



W/E16 High Containment Radiation / 9					X		WE16EA2.1; Ability to determine and interpret the following as they apply to the (High Containment Radiation): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.3	
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						X	WE10EG2.4.20; Knowledge of the operational implications of EOP warnings, cautions, and notes.	3.8	
BW/E13&E14 EOP Rules and Enclosures									
CE/A11; W/E08 RCS Overcooling - PTS / 4			X				WE08EK3.4; Knowledge of the reasons for the following responses as they apply to the (Pressurized Thermal Shock): 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 facility's license and amendments are not violated.	3.4	
CE/A16 Excess RCS Leakage / 2									
CE/E09 Functional Recovery									
K/A Category Point Totals:	2	1	2	1	1/2	2/2	Group Point Total:		9/4

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)											Form ES-401-2		
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G*	K/A Topic(s)	IR	#
003 Reactor Coolant Pump								X			X	003G2.2.36; Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.  003A2.04; Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effects of fluctuation of VCT pressure on RCP seal injection flow.	3.1  2.8	
004 Chemical and Volume Control						X						004K6.27; Knowledge of the effect of a loss or malfunction on the following CVCS components: Purpose of RHR relief and isolation valves.  004K5.09; Knowledge of the operational implications of the following concepts as they apply to the CVCS: Thermal shock: high component stress due to rapid temperature change.	3.4  3.7	
005 Residual Heat Removal					X							005K5.05; Knowledge of the operational implications of the following concepts as they apply the RHRs: Plant response during "solid plant": pressure change due to the relative incompressibility of water.	2.7	
006 Emergency Core Cooling								X				006A2.05; Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Improper amperage to the pump motor.  006K6.18; Knowledge of the effect of a loss or malfunction on the following will have on the ECCS: Subcooling margin indicators.	3.4  3.6	
007 Pressurizer Relief/Quench Tank					X							007K5.02; Knowledge of the operational implications of the following concepts as they apply to PRTS: Method of forming a steam bubble in the PZR.	3.1	
008 Component Cooling Water									X			008A3.08; Ability to monitor automatic operation of the CCWS, Including: Automatic actions associated with the CCWS that occur as a result of a safety injection signal.	3.6	
010 Pressurizer Pressure Control		X										010K2.01; Knowledge of bus power supplies to the following: PZR heaters.  010G2.1.32; Ability to explain and apply system limits and precautions.	3.0  4.0	

012 Reactor Protection	X																			012K1.05; Knowledge of the physical connections and/or cause effect relationships between the RPS and the following systems: ESFAS.	3.8	
																				012A2.04; Ability to (a) predict the impacts of the following malfunctions or operations on the RPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Erratic power supply operation.	3.1	
013 Engineered Safety Features Actuation																				013A4.01; Ability to manually operate and/or monitor in the control room: ESFAS-initiated equipment which fails to actuate.	4.5	
																				013K3.03; Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: Fuel.	4.4	
022 Containment Cooling																				022K4.05; Knowledge of CCS design feature(s) and/or interlock(s) which provide for the following: Containment cooling after LOCA destroys ventilation ducts.	2.6	
																				022K3.02; Knowledge of the effect that a loss or malfunction of the CCS will have on the following: Containment instrumentation readings.	2.9	
025 Ice Condenser																						
026 Containment Spray																				026A1.04; Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: Containment humidity.	3.1	
039 Main and Reheat Steam	X																			039K1.05; Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems: T/G.	2.5	
																				039K4.02; Knowledge of MRSS design feature(s) and/or interlock(s) which provide for the following: Utilization of T-ave. program control when steam dumping through atmospheric relief/dump valves, including T-ave. limits.	3.1	
059 Main Feedwater																				059G2.1.32; Ability to explain and apply system limits and precautions.	3.8	
																				059G2.1.43; Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc.	4.3	
061 Auxiliary/Emergency Feedwater																				061K3.01; Knowledge of the effect that a loss or malfunction of the AFW will have on the following: RCS.	4.4	
																				061K6.01; Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Controllers and positioners.	2.5	

062 AC Electrical Distribution											X			062A3.04; Ability to monitor automatic operation of the ac distribution system, including: Operation of inverter (e.g., precharging synchronizing light, static transfer).	2.7	
												X		062G2.2.38; Knowledge of conditions and limitations in the facility license.	4.5	
063 DC Electrical Distribution												X		063A4.01; Ability to manually operate and/or monitor in the control room: Major breakers and control power fuses.	2.8	
064 Emergency Diesel Generator		X												064K2.02; Knowledge of bus power supplies to the following: Fuel oil pumps.	2.8	
073 Process Radiation Monitoring								X						073A1.01; Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRM system controls including: Radiation levels.	3.2	
076 Service Water								X						076A2.01; Ability to (a) predict the impacts of the following malfunctions or operations on the SWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of SWS.	3.5	
078 Instrument Air		X												078K2.02; Knowledge of bus power supplies to the following: Emergency air compressor.	3.3	
				X										078K4.01; Knowledge of IAS design feature(s) and/or interlock(s) which provide for the following: Manual/automatic transfers of control.	2.7	
103 Containment												X		103A3.01; Ability to monitor automatic operation of the containment system, including: Containment isolation.	3.9	
K/A Category Point Totals:	2	3	3	3	3	3	3	2	2/2	3	2	2/3	Group Point Total:		28/5	



056 Condensate									X					056A2.04; Ability to (a) predict the impacts of the following malfunctions or operations on the Condensate System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of condensate pumps.	2.6	
068 Liquid Radwaste																
071 Waste Gas Disposal																
072 Area Radiation Monitoring												X		072A3.01; Ability to monitor automatic operation of the ARM system, including: Changes in ventilation alignment.	2.9	
075 Circulating Water																
079 Station Air					X									079K4.01; Knowledge of SAS design feature(s) and/or interlock(s) which provide for the following: Cross-connect with IAS.	2.9	
086 Fire Protection																
K/A Category Point Totals:	1	1	1	1	1	1	1	1	1/1	0	1	1/2		Group Point Total:		10/3

Facility: <b>Sequoyah</b>		Date of Exam: <b>March, 2016</b>				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.28	Knowledge of the purpose and function of major system components and controls.	4.1			
	2.1.42	Knowledge of new and spent fuel movement procedures.	2.5			
	2.1.30	Ability to locate and operate components, including local controls.			4.0	
	Subtotal			2		1
2. Equipment Control	2.2.39	Knowledge of ≤ to one hour Technical Specification action statements for systems.	3.9			
	2.2.43	Knowledge of the process used to track inoperable alarms.	3.0			
	2.2.5	Knowledge of the process for making design or operating changes to the facility.			3.2	
	2.2.14	Knowledge of the process for controlling equipment configuration or status.			4.3	
	Subtotal			2		2
3. Radiation Control	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	3.2			
	2.3.11	Ability to control radiation releases.	3.8			
	2.3.12	Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.2			
	2.3.6	Ability to approve release permits.			3.8	
	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.			3.8	
	Subtotal			3		2
4. Emergency Procedures / Plan	2.4.26	Knowledge of facility protection requirements, including fire brigade and portable fire-fighting equipment usage.	3.1			
	2.4.29	Knowledge of the emergency plan.	3.1			
	2.4.46	Ability to verify that the alarms are consistent with the plant conditions.	4.2			
	2.4.14	Knowledge of general guidelines for EOP usage.			4.5	
	2.4.19	Knowledge of EOP layout, symbols, and icons.			4.1	
	Subtotal			3		2
Tier 3 Point Total				10		7

Initial rejection list following review with licensee

ES-401

Record of Rejected K/As

Form ES-401-4

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/1	022G2.4.14	Overselected. Replaced by 08AG2.4.14.
1/1	WE12EK2.2	Overselected. Replaced by 029EK2.06.
1/2	005AK1.06	Overselected. Replaced by 028AK1.01.
1/2	051AA2.02	Overselected. Replaced by 037AA2.12.
1/2	061AA2.02	Overselected. Replaced by WE16EA2.1.
2/1	003K6.01	Overselected. Replaced by 061K6.01.
2/1	005K5.09	Overselected. Replaced by 004K5.09.
2/1	062K3.01	Overselected. Replaced by 022K3.02.
2/1	078G2.1.27	Unable to write to SRO level. Replaced by 059G2.1.43.
2/2	015G2.4.1	Unable to write to SRO level. Replaced by 014G2.1.45.
2/2	068A3.01	Equipment not used. Replaced with 072A3.01.
1/2	024AG2.1.3	Unable to write an operationally valid question. Replaced with 024AG2.1.31.
1/2	051AG2.4.9	Unable to write an operationally valid question. Replaced with 051AG2.1.34.

Facility: <u>Sequoyah Nuclear Station 1 &amp; 2</u>		Date of Examination: <u>3/7/2016</u>
Exam Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test No: <u>2016-301</u>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R, N	Determine compliance with fatigue management and work hour limits. G 2.1.2 (3.0/4.0)
Conduct of Operations	R, N	Calculate required amount and time for emergency boration in preparation for cool down. G 2.1 .25 (2.8)
Equipment Control	R, N	Evaluate valve stroke testing results. G 2.2.12 (3.0)
Radiation Control	N/A	Not examined
Emergency Procedures/Plan	R, N	Complete a state notification form and complete an initial state notification. G 2.4.25
NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).		
* Type Codes & Criteria: (C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank ( $\leq 3$ for ROs; $\leq 4$ for SROs & RO retakes) (N)ew or (M)odified from bank ( $\geq 1$ ) (P)revious 2 exams ( $\leq 1$ ; randomly selected)		

**A.1.a**

The examinee is given the case where two operators are required to be called out for work. The examinee evaluate the work history between five different operators and will determine operator 3 may assume the shift in Unit 1 which is the operating unit and Operator 2 may assume the shift in Unit 2 which is the outage unit. This JPM is a common JPM with the SRO examinees.

**A.1.b**

The examinee is given the case where Unit 1 is making preparations for an Emergency Boration while in MODE 3 and an RCS cool down to 350 degrees. The examinee will determine by looking up from a chart that 6280 gallons from the Boric Acid Tank and calculate a minimum boration time of 125.6 minutes is required for emergency boration prior to initiating the cool down to 350 degrees.

**A.2**

The examinee will complete and review data from a Section XI Valve Surveillance and determine the following:

- three valves are within the acceptable range.
- two valves are in the alert range.
- one valve is in the required action range.

The examinee will determine the valves not in the acceptable range require subsequent valve strokes. The examinee will determine the valve in the required action range is INOPERABLE.

**A.3**

Not examined.

**A.4**

While acting as the Site Communicator and given data for a plant emergency, the examinee will interpret the data and complete the EPIP-3 ALERT Appendix A ALERT INITIAL NOTIFICATION FORM within 15 minutes and perform a State of Tennessee Notification within the following 15 minutes.

Facility: <u>Sequoyah Nuclear Station 1 &amp; 2</u>		Date of Examination: <u>3/7/2016</u>
Exam Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test No: <u>2016-301</u>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R, N	Determine compliance with fatigue management and work hour limits. G 2.1.2 (3.0/4.0)
Conduct of Operations	R, N	Evaluate and approve a disabled alarm checklist. G 2.1.1 (3.8)
Equipment Control	R, N	Evaluate a proposed clearance for the 1B Condensate Demineralizer Booster Pump. G 2.2.13 (3.8)
Radiation Control	R, M	Perform required administrative actions after a Radiation Monitor is removed from service. G 2.3.11 (3.2)
Emergency Procedures/Plan	R, M	Classify the Event using the EPIP-1 and complete a TVA INITIAL NOTIFICATION. 2.4.41 (4.6)
NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).		
* Type Codes & Criteria: <ul style="list-style-type: none"> <li>(C)ontrol room, (S)imulator, or Class(R)oom</li> <li>(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs &amp; RO retakes)</li> <li>(N)ew or (M)odified from bank (≥ 1)</li> <li>(P)revious 2 exams (≤ 1; randomly selected)</li> </ul>		

### **A.1.a**

The examinee is given the case where two operators are required to be called out for work. The examinee evaluate the work history between five different operators and will determine operator 3 may assume the shift in Unit 1 which is the operating unit and Operator 2 may assume the shift in Unit 2 which is the outage unit. This JPM is a common JPM with the RO examinees.

### **A.1.b**

The examinee will evaluate a completed OPDP-4-1 - Disabled Alarm Checklist, will identify three embedded errors and determine the correct entries for the embedded errors. The examinee will determine the following correct solutions for the embedded errors:

- the source for the annunciator panel XA-55-1A window C-1 is a multi point input and needs to have leads removed to maintain monitoring availability of the other inputs to the SER.
- determines a 50.59 review must be performed prior to disabling alarm.
- determines a technical evaluation must be performed.

### **A.2**

The examinee evaluates the proposed clearance for the 1B Condensate Demineralizer Booster Pump and discovers the following four embedded errors:

- No vent or drain path is provided to establish conditions for work.
- The pump hand switch is tagged instead of the pump motor breaker.
- The discharge valve for the 1B Condensate Booster Pump is tagged instead of the 1B Condensate Demineralizer Booster Pump.
- The suction valve for the 1B Condensate Demineralizer Booster Pump is tagged locally at the MOV instead of the breaker for the MOV.

### **A.3**

The examinee evaluates a work package and determines LCO 3.3.7 condition a must be entered and RM-90-125 is required to be blocked prior to removing RM-90-125 from service. The examinee subsequently determines the isolation relay for 0-RE-90-125 must be removed prior to unblocking 0-RE-90-125.

### **A.4**

During a dual unit event, the examinee will evaluate plant conditions and classifies the event as a SITE AREA EMERGENCY based on EAL 3.1 within 15 minutes and the examinee completes a TVA Initial Notification for Site Area Emergency form with no errors on items noted with an \* within the subsequent 15 minutes.

Facility: Sequoyah Nuclear Station 1 & 2

Date of Examination: 3/7/2016

Exam Level: RO  SRO-I  SRO-U

Operating Test No: 2016-301

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. Withdraw Shutdown Banks. 001 A2.11 (4.4/4.7)	L, M, S	1
b. Terminate Emergency Boration. 004 A2.14 (3.8/3.9)	N, L, S	2
c. Align ECCS & CS Pumps to the Containment Sump with a Failure of a Containment Sump Valve. EPE 011 EA1.11 (4.2/4.2)	A, EN, L, M, S	3
d. Establish Once Through Cooling by Initiating RCS Bleed and Feed with a Failure of a PORV and Blow Down Steam Generators. EPE E05 EA 2.2 (3.7/4.3)	A, L, M, S	4P
e. Secure a Main Feed Pump with a Failure of a Main Feed Regulating Valve. 059 A4.10 (3.9/3.8)	A, N, S	4S
f. Perform Post Trip Equipment Checks with a Failure of Slave Relays and EGTS Fans to Start. 103 A4.01 (4.5/4.8)	A, M, S	5
g. Perform D/G Load Test on 1A-A D/G with a Subsequent High Crankcase Pressure Alarm. 064 A4.01 (4.0/4.3)	A, D, S	6
h. Shift Thermal Barrier Booster Pumps with a Subsequent Leak in the Component Cooling Water System. APE 026 AA1.05 (3.1/3.1)	A, L, N, S	8

In-Plant Systems\* (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

i. Control SG Atmospheric Dump Valves from the Aux CR. APE.068 AA1.01 (4.3/4.5)	E, M	8
j. Restore a 125 V Vital Battery Charger I During a Station Blackout. EPE 055 EA1.06 (4.1/4.5)	E, N	6
k. Re-establish Nonessential AND Essential Control Air to Containment. 004 A2.11 (3.6/4.2)	D, E, R	2

\* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five 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 / ≥ 1 / ≥ 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. During a reactor startup, the examinee will select and withdraw Shutdown Bank A Control Rods to the fully withdrawn (225 to 231) steps position.
- b. While in MODE 3 and Emergency Boration in progress, the examinee will terminate Emergency Boration using EA EA-68-4, Emergency Boration.
- c. With a LOCA in progress, the examinee will stop Containment Spray pumps, and complete the alignment for Charging Pump and Safety Injection pump for sump recirculation using ES-1.3 TRANSFER TO RHR CONTAINMENT. While aligning the ECCS pumps, the Containment Sump Valve Isolation FCV-74-3 fails to close. The examinee will use the alternate path to manually close the RHR Pump Suction from RWST FCV-63-1, while maintaining RHR pump flow.
- d. With a Loss of Secondary Heat Sink, RCS Bleed and Feed required in progress, the examinee will start the A Safety Injection pump. The examinee will use the alternate path to open Reactor Vessel Head Vent valves to establish once through cooling. The examinee will subsequently open the A Train Essential Raw Cooling Water valves and depressurize at least one of the intact Steam Generators.
- e. With an AOP-C.03 RAPID SHUTDOWN OR LOAD REDUCTION in progress, the examinee will start to shutdown the B Main Feed Pump. When the shutdown the B Main Feed Pump commences a fault in the #2 SG Feed Regulating valve will occur. The examinee will use the alternate path and take manual control of the #2 SG Feed Regulating valve using the Immediate Operator Actions of AOP-S.01 MAIN FEEDWATER MALFUNCTIONS.
- f. Following a plant accident, the examinee will initiate performance of EA-0-1, EQUIPMENT CHECKS FOLLOWING ESF ACTUATION and manually start at least one Emergency Gas Treatment System fan. Subsequently the examinee will use the alternate path and transition to EA-65-1, EGTS OPERATION to re-align dampers which failed to re-position due to a slave relay failure.
- g. While performing a D/G Operability Test using 1-SI-OPS-082-007.A, the examinee will parallel the 1 A-A Diesel Generator to the 1A-A 6.9 kv Shutdown Board. Subsequently, a high crankcase temperature condition occurs. The examinee will transition to the alarm response and use the alternate path and emergency stop within 3 minutes of the receipt of the alarm.
- h. While shifting Thermal Barrier Booster pumps, a leak in the Component Cooling Water system occurs inside the containment. The examinee will transition to the alarm response and ultimately to AOP-M.03 Loss Of Component Cooling Water and use the alternate path to isolate the RCP oil coolers and trip the Reactor Coolant Pumps.
- i. While the main control room is abandoned using AOP-C.04, SHUTDOWN FROM AUXILIARY CONTROL ROOM, the examinee will initiate a cool down of all Steam Generators from the Auxiliary Control Room.
- j. While recovering from a Station Blackout the examinee will align 125 V Vital Battery Charger I from the normal power supply and place the charger in service.
- k. While recovering from a Containment Isolation, both trains of Essential Control Air isolation valves and the Non-essential Control Air isolation valves are opened supplying air to containment.

Facility: Sequoyah Nuclear Station 1 & 2	Date of Examination: <u>3/7/2016</u>
Exam Level: RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>	Operating Test No: <u>2016-301</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. Withdraw Shutdown Banks. 001 A2.11 (4.4/4.7)	L, M, S	1
b. Not Examined	N/A	N/A
c. Align ECCS & CS Pumps to the Containment Sump. EPE 011 EA1.11 (4.2/4.2)	A, EN, L, M, S	3
d. Establish Once Through Cooling by Initiating RCS Bleed and Feed. EPE E05 EA 2.2 (3.7/4.3)	A, L, M, S	4P
e. Secure a Main Feed Pump. 059 A4.10 (3.9/3.8)	A, N, S	4S
f. Perform Post Trip Equipment Checks. 103 A4.01 (4.5/4.8)	A, M, S	5
g. Perform D/G Load Test on 1A-A D/G. 064 A4.01 (4.0/4.3)	A, D,S	6
h. Respond to a Leak in the Component Cooling Water System. APE 026 AA1.05 (3.1/3.1)	A, L, N, S	8

**In-Plant Systems\* (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)**

i. Control SG Atmospheric Dump Valves from the Aux CR. APE.068 AA1.01 (4.3/4.5)	E, M	8
j. Restore 125 V Vital Battery Charger I During a Station Blackout. EPE 055 EA1.06 (4.1/4.5)	E, N	6
k. Re-establish Nonessential AND Essential Control Air to Containment. 004 A2.11 (3.6/4.2)	D, E, R	2

\* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five 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 / ≥ 1 / ≥ 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. During a reactor startup, the examinee will select and withdraw Shutdown Bank A Control Rods to the fully withdrawn (225 to 231) steps position.
- b. Not examined.
- c. With a LOCA in progress, the examinee will stop Containment Spray pumps, and complete the alignment for Charging Pump and Safety Injection pump for sump recirculation using ES-1.3 TRANSFER TO RHR CONTAINMENT. While aligning the ECCS pumps, the Containment Sump Valve Isolation FCV-74-3 fails to close. The examinee will use the alternate path to manually close the RHR Pump Suction from RWST FCV-63-1, while maintaining RHR pump flow.
- d. With a Loss of Secondary Heat Sink, RCS Bleed and Feed required in progress, the examinee will start the A Safety Injection pump. The examinee will use the alternate path to open Reactor Vessel Head Vent valves to establish once through cooling. The examinee will subsequently open the A Train Essential Raw Cooling Water valves and depressurize at least one of the intact Steam Generators.
- e. With an AOP-C.03 RAPID SHUTDOWN OR LOAD REDUCTION in progress, the examinee will start to shutdown the B Main Feed Pump. When the shutdown the B Main Feed Pump commences a fault in the #2 SG Feed Regulating valve will occur. The examinee will use the alternate path and take manual control of the #2 SG Feed Regulating valve using the Immediate Operator Actions of AOP-S.01 MAIN FEEDWATER MALFUNCTIONS.
- f. Following a plant accident, the examinee will initiate performance of EA-0-1, EQUIPMENT CHECKS FOLLOWING ESF ACTUATION and manually start at least one Emergency Gas Treatment System fan. Subsequently the examinee will use the alternate path and transition to EA-65-1, EGTS OPERATION to re-align dampers which failed to re-position due to a slave relay failure.
- g. While performing a D/G Operability Test using 1-SI-OPS-082-007.A, the examinee will parallel the 1 A-A Diesel Generator to the 1A-A 6.9 kv Shutdown Board. Subsequently, a high crankcase temperature condition occurs. The examinee will transition to the alarm response and use the alternate path and emergency stop within 3 minutes of the receipt of the alarm.
- h. While shifting Thermal Barrier Booster pumps, a leak in the Component Cooling Water system occurs inside the containment. The examinee will transition to the alarm response and ultimately to AOP-M.03 Loss Of Component Cooling Water and use the alternate path to isolate the RCP oil coolers and trip the Reactor Coolant Pumps.
- i. While the main control room is abandoned using AOP-C.04, SHUTDOWN FROM AUXILIARY CONTROL ROOM, the examinee will initiate a cool down of all Steam Generators from the Auxiliary Control Room.
- j. While recovering from a Station Blackout the examinee will align 125 V Vital Battery Charger I from the normal power supply and place the charger in service.
- k. While recovering from a Containment Isolation, both trains of Essential Control Air isolation valves and the Non-essential Control Air isolation valves are opened supplying air to containment.

Facility: Sequoyah Nuclear Station 1 & 2

Date of Examination: 3/7/2016

Exam Level: RO  SRO-I  SRO-U

Operating Test No: 2016-301

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. Not Examined	N/A	N/A
b. Not Examined	N/A	N/A
c. Align ECCS & CS Pumps to the Containment Sump. EPE 011 EA1.11 (4.2/4.2)	A,EN,L,M,S	3
d. Not Examined	N/A	N/A
e. Secure a Main Feed Pump. 059 A4.10 (3.9/3.8)	A,N,S	4S
f. Perform Post Trip Equipment Checks. 103 A4.01 (4.5/4.8)	A, M, S	5
g. Not Examined	N/A	N/A
h. Not Examined	N/A	N/A

In-Plant Systems\* (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

i. Control SG Atmospheric Dump Valves from the Aux CR. APE.068 AA1.01 (4.3/4.5)	E, M	8
j. Not Examined	N/A	N/A
k. Re-establish Nonessential AND Essential Control Air to Containment. 004 A2.11 (3.6/4.2)	D, E, R	2

\* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five 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 / ≥ 1 / ≥ 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. Not examined.
- b. Not examined.
- c. With a LOCA in progress, the examinee will stop Containment Spray pumps, and complete the alignment for Charging Pump and Safety Injection pump for sump recirculation using ES-1.3 TRANSFER TO RHR CONTAINMENT. While aligning the ECCS pumps, the Containment Sump Valve Isolation FCV-74-3 fails to close. The examinee will use the alternate path to manually close the RHR Pump Suction from RWST FCV-63-1, while maintaining RHR pump flow.
- d. Not examined.
- e. With an AOP-C.03 RAPID SHUTDOWN OR LOAD REDUCTION in progress, the examinee will start to shutdown the B Main Feed Pump. When the shutdown the B Main Feed Pump commences a fault in the #2 SG Feed Regulating valve will occur. The examinee will use the alternate path and take manual control of the #2 SG Feed Regulating valve using the Immediate Operator Actions of AOP-S.01 MAIN FEEDWATER MALFUNCTIONS.
- f. Following a plant accident, the examinee will initiate performance of EA-0-1, EQUIPMENT CHECKS FOLLOWING ESF ACTUATION and manually start at least one Emergency Gas Treatment System fan. Subsequently the examinee will use the alternate path and transition to EA-65-1, EGTS OPERATION to re-align dampers which failed to re-position due to a slave relay failure.
- g. Not examined.
- h. Not examined.
- i. While the main control room is abandoned using AOP-C.04, SHUTDOWN FROM AUXILIARY CONTROL ROOM, the examinee will initiate a cool down of all Steam Generators from the Auxiliary Control Room.
- j. Not examined.
- k. While recovering from a Containment Isolation, both trains of Essential Control Air isolation valves and the Non-essential Control Air isolation valves are opened supplying air to containment.