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SALEM INITIAL LICENSE EXAMINATION OUTLINE

Enclosed in the three-ring binder is our proposed outline for the initial license examination to be conducted for Salem candidates during a two week period beginning on January 10, 2000. Included are:

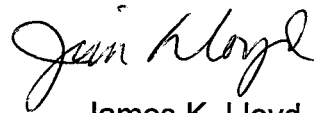
- Form ES-201-2, Examination Outline Quality Checklist
- Proposed Schedule: Currently there are 18 candidates: 12 SRO (two upgrades), 6 RO. The proposed schedule requires two full weeks to complete the operational examination. The written examination will therefore be scheduled for either January 7 or 24. If the number of candidates is reduced then time within the two-week examination schedule may become available for conducting the written examination.
- RO and SRO Written Examination Outlines: Please note that the column designated in ES-401-3&4 for "points" has been modified to cross reference to the question number. Internally, we find this to be a better way to utilize the column. All questions are one point each.
- RO, SRO(I), SRO(U) Administrative Topics Outlines
- Control Room Systems and Facility Walk-Through Test Outlines: There are outlines for two days worth of examinations. However, those two days of examinations will be further broken down and conducted in accordance with the proposed schedule. Basically, the proposed schedule is for the RO's, SRO(U)'s, and one SRO(I) (a formerly licensed RO at Salem) to do Operating Test #1 on the first Friday. The remaining SRO(I)'s will then do Operating Test #2 on the following Monday. For the remainder of the week, one-half of the candidates will do approximately one-half of their Simulator JPM's each day. Using proctors and scheduling controls, all candidates can be examined using the proposed Administrative Topics and JPM's.

Please note that Task 2 on each operating test is similar. However, on each of the tasks there is a different electrical bus out-of-service. Therefore, on each task the candidate must choose and execute a different path through the procedure. You and I discussed (by telecon) the issue of whether (or not) this could be counted as two different JPM's and then Steve Dennis called me to discuss it further. We concluded that this is acceptable.

- Scenario Outlines: There are five scenarios, each outlined on Form ES-D-1. Also included is a scenario summary on the page behind each Form ES-D-1. Behind those are the Forms ES-301-5&6 for each crew. The simulator scenarios have been benchmarked against Form 301-4 but that form cannot be completed until the scenarios are validated. Currently there are six crews, each consisting of two SRO's and one RO. Using proctors and scheduling controls, all candidates can be examined using four scenarios. At this time we intend to use Scenario 5 as the spare.

The examination team is currently reviewing the second draft of the written examination. Next week (completion of our Unit 1 Outage) we will begin detail work on the simulator materials in parallel with validation of the I/P JPM's and administrative topics materials. The operational examination parts are currently in different states of readiness, depending on their source. After comments from the second draft review of the written examination are incorporated, those examinations will be peer validated. Rather than wait until the entire examination is developed and validated, our intention is to send you major pieces of the examination as soon as their respective validation is complete. As of the writing of this letter, we do not have a firm schedule for that because the RO and SRO Reviewers have been assigned to Unit 1 Outage work. I will call you when that schedule is better defined.

If you have any questions or comments, please call me at 856-339-3839. Mike Gwartz, Salem Licensed Operator Training Supervisor, is also on the Examination Security Agreement and can be reached at 856-339-3863. At this time he is not up-to-date on examination specifics because of assignment as a Unit 1 Shift Outage Manager. For major issues, the Operations Training Manager, Don Jackson, can be reached at 856-339-3746. However, he is NOT on the Examination Security Agreement. You should not discuss specific examination issues with him.



James K. Lloyd
Sr. Instructor/Exam Co-ordinator

Class Code: _____ Instructor: J. Lloyd/J. Konovalchick
 Class Name: ECHO GROUP NRC EXAM
 Class Start Date: _____ End Date: _____

Schedule for Week Beginning: 1/10/00 Actual ☐ Proposed ☒

		MONDAY (1/10)	TUESDAY (1/11)	WEDNESDAY (1/12)	THURSDAY (1/13)	FRIDAY (1/14)	
0700	15	0715-Crew A-report to Room 81. Scenario at approx. 0730	0715-Crew E-report to Room 81. Scenario at approx. 0730	0715-Crew C-report to Room 81. Scenario at approx. 0730	0715-Crew A-report to Room 81. Scenario at approx. 0730	RO(6), SROI(1) and SROU(2) Admin. and I/P JPM's	
	30						
	45						
0800	15	0900-Crew B-report to ILT Clsrm. Scenario at approx. 0930	0900-Crew F-report to ILT Clsrm. Scenario at approx. 0930	0900-Crew D-report to ILT Clsrm. Scenario at approx. 0930	0900-Crew B-report to ILT Clsrm. Scenario at approx. 0930	0700-0930-3 candidates 0945-1215-3 candidates 1300-1530-3 candidates	
	30						
	45						
0900	15	0900-Crew B-report to ILT Clsrm. Scenario at approx. 0930	0900-Crew F-report to ILT Clsrm. Scenario at approx. 0930	0900-Crew D-report to ILT Clsrm. Scenario at approx. 0930	0900-Crew B-report to ILT Clsrm. Scenario at approx. 0930	<u>SEE NOTE BELOW</u>	
	30						
	45						
1000	15	Following their respective scenarios, proctor Crew A&B in the LOR Classroom. Release when Crew C&D candidates are controlled in ILT Clsrm.	Following their respective scenarios, proctor Crew E&F in the LOR Classroom. Release when Crew A&B candidates are controlled in ILT Clsrm.	Following their respective scenarios, proctor Crew C&D in the LOR Classroom. Release when Crew E&F candidates are controlled in ILT Clsrm.	Following their respective scenarios, proctor Crew A&B in the LOR Classroom. Release when Crew C&D candidates are controlled in ILT Clsrm.		
	30						
	45						
1100	15	1115-Crew C&D report to ILT Clsrm.	1115-Crew A&B report to ILT Clsrm.	1115-Crew E&F report to ILT Clsrm.	1115-Crew C&D report to ILT Clsrm.		
	30						
	45						
1130 - 1200		LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	
	15	1200-Crew C scenario	1200-Crew A scenario	1200-Crew E scenario	1200-Crew D scenario	<u>NOTE:</u> <ul style="list-style-type: none">Group 1 reports to Ops. Conf. Rm. by 0700.Group 2 reports <u>DIRECTLY</u> to Ops. Conf. Rm. by 0900.Group 3 reports <u>DIRECTLY</u> to Ops. Conf. Rm. by 1200.Proctor all completed candidates (at a location TBD) until Group 3 is controlled in the Ops. Conf. Rm.	
	30						
	45						
1300	15	Following the scenario, release Crew C when Crew D is in Rm. 81	Following the scenario, release Crew A when Crew B is in Rm. 81	Following the scenario, release Crew E when Crew F is in Rm. 81	Following the scenario, release Crew D when Crew C is in Rm. 81		
	30						
	45						
1400	15	1400-Crew D scenario	1400-Crew B scenario	1400-Crew F scenario	1400-Crew C scenario		
	30						
	45						
1500	15						
	30						
	45						
1600							

Operations Mgmt. Rep. _____
 Training Supvr. _____

Class Code:

Class Name:

ECHO GROUP NRC EXAM

Class Start Date:

Instructor:

J. Lloyd/J. Konovalchick

End Date:

Schedule for Week Beginning: 1/17/00

Actual

Proposed

X

	MONDAY (1/17)	TUESDAY (1/18)	WEDNESDAY (1/19)	THURSDAY (1/20)	FRIDAY (1/21)
0700	15 SROI Admin. and I/P JPM's	4 Simulator JPM's (Crews A, B, and C)	4 Simulator JPM's (Crews D, E, and F))	3 Simulator JPM's (Crews A, B, and C)	3 Simulator JPM's (Crews D, E, and F))
	30				
	45 0700-0930-3 candidates				
0800	0945-1215-3 candidates	0700-0745-Silk	0700-0745-Dennis	0700-0745-Fish	0700-0745-Silk
	15 1300-1500-3 candidates	0750-0835-Dennis	0750-0835-Fish	0750-0835-Silk	0750-0835-Dennis
	30	0840-0925-Fish	0840-0925-Silk	0840-0925-Dennis	0840-0925-Fish
	45 <u>SEE NOTE BELOW</u>	0930-1015-Silk	0930-1015-Dennis	0930-1015-Fish	0930-1015-Silk
0900		1020-1105-Dennis	1020-1105-Fish	1020-1105-Silk	1020-1105-Dennis
	15	1110-1155-Fish	1110-1155-Silk	1110-1155-Dennis	1110-1155-Fish
	30	1300-1345-Silk	1300-1345-Dennis	1300-1345-Fish	1300-1345-Silk
	45	1350-1435-Dennis	1350-1435-Fish	1350-1435-Silk	1350-1435-Dennis
1000		1440-1525-Fish	1440-1525-Silk	1440-1525-Dennis	1440-1525-Fish
	15				
	30	<u>SEE NOTE BELOW</u>	<u>SEE NOTE BELOW</u>	<u>SEE NOTE BELOW</u>	<u>SEE NOTE BELOW</u>
	45				
1100	15				
	30				
	45				
1130 - 1200	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
	15				
	30 <u>NOTE:</u>	<u>NOTE:</u>	<u>NOTE:</u>	<u>NOTE:</u>	<u>NOTE:</u>
	45 • Group 1 reports to Ops. Conf. Rm. by 0700.	• First candidate: Report to Rm. 81 by 0700.	• First candidate: Report to Rm. 81 by 0700.	• First candidate: Report to Rm. 81 by 0700.	• First candidate: Report to Rm. 81 by 0700.
1300	15 • Group 2 reports <u>DIRECTLY</u> to Ops. Conf. Rm. by 0900.	• All others: Report to Rm. 81 approx. 30 mins. prior to your scheduled exam time.	• All others: Report to Rm. 81 approx. 30 mins. prior to your scheduled exam time.	• All others: Report to Rm. 81 approx. 30 mins. prior to your scheduled exam time.	• All others: Report to Rm. 81 approx. 30 mins. prior to your scheduled exam time.
	30				
	45 • Group 3 reports <u>DIRECTLY</u> to Ops. Conf. Rm. by 1200.	• Proctor all completed candidates in the ILT Clsrm. Release when the last candidate is controlled in Rm 81.	• Proctor all completed candidates in the ILT Clsrm. Release when the last candidate is controlled in Rm 81.	• Proctor all completed candidates in the ILT Clsrm. Release when the last candidate is controlled in Rm 81.	• Proctor all completed candidates in the ILT Clsrm. Release when the last candidate is controlled in Rm 81.
1400	15				
	30				
	45 • Proctor all completed candidates (at a location TBD) until Group 3 is controlled in the Ops. Conf. Rm.				
1500	15				
	30				
	45				
1600	15				
	30				
	45				

Operations Mgmt. Rep.

Training Supvr.

Facility		Salem		Date of Exam: 01/10/00		Exam Level: SRO							
Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	
1. Emergency & Abnormal Plant Evolutions	1	3	2	4				5	7			3	24
	2	1	2	4				1	5			3	16
	3							1	2				3
	Tier Totals	4	4	8				7	14			6	43
2. Plant Systems	1	3	1	1		1		2	6	2	2	1	19
	2	2		1	5		1	1	5	1	1		17
	3	1		1				1				1	4
	Tier Totals	6	1	3	5	1	1	4	11	3	3	2	40
3. Generic Knowledge and Abilities					Cat 1		Cat 2		Cat 3		Cat 4		
					5		4		3		5		17
<p>Note:</p> <ul style="list-style-type: none"> • Attempt to distribute topics among all K/A Categories: select at least one topic from every K/A category within each tier. • Actual point totals must match those specified in the table. • Select topics from many systems: avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities. • Systems/evolutions within each group are identified on the associated outline. • The shaded areas are not applicable to the category/tier. 													

ES-401		PWR SRO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1							ES-401-3	
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp	Q#
001	Continuous Rod Withdrawal					X		AA2.05 Uncontrolled rod withdrawal, from available indications	4.6	58
003	Dropped Control Rod		X					AK2.05 Control rod drive power supplies and logic circuits	2.8	59
005	Inoperable/Stuck Control Rod					X		AA2.01 Stuck or inoperable rod from in-core and ex-core NIS, in-core or loop temperature measurements	4.1	60
011	Large Break LOCA				X			EA1.11 Long-term cooling of core	4.2	64
011	Large Break LOCA						X	2.4.49 Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	65
015	Reactor Coolant Pump (RCP) Malfunctions		X					AK2.10 RCP indicators and controls	2.8	66
017	Reactor Coolant Pump (RCP) Malfunctions (Loss of RC Flow)									
024	Emergency Boration				X			AA1.20 Manual boration valve and indicators	3.3	68
026	Loss of Component Cooling Water (CCW)					X		AA2.02 The cause of possible CCW loss	3.6	70
029	Anticipated Transient Without Scram (ATWS)					X		EA2.04 CVCS Centrifugal Charging Pump operating indication	3.3*	73
029	Anticipated Transient Without Scram (ATWS)	X						EK1.05 Definition of negative temperature coefficient as applied to large PWR coolant systems	3.2	74
040	Steam Line Rupture									
051	Loss of Condenser Vacuum						X	2.1.32 Ability to explain and apply all system limits and precautions.	3.8	80
055	Loss of Offsite and Onsite Power (Station Blackout)						X	2.4.4 Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	82
057	Loss of Vital AC Electrical Instrument Bus				X			AA1.06 Manual control of components for which automatic control is lost	3.5	84
059	Accidental Liquid Radwaste Release					X		AA2.02 The permit for liquid radioactive-waste release	3.9	86
062	Loss of Nuclear Service Water					X		AA2.01 Location of a leak in the SWS	3.5	87
067	Plant Fire on Site				X			AA1.06 Fire alarm	3.7	89
068	Control Room Evacuation				X			AA1.21 Transfer of controls from control room to shutdown panel or local control	4.1	90
069	Loss of Containment Integrity									
074	Inadequate Core Cooling			X				EK3.07 Starting up emergency feedwater and RCPs	4.4	91
076	High Reactor Coolant Activity			X				AK3.06 Actions contained in EOP for high reactor coolant activity	3.8	92

ES-401		PWR SRO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1							ES-401-3	
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
E02	SI Termination			X				EK3.3 Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.	3.9	93
E04	LOCA Outside Containment	X						EK1.3 Annunciators and conditions indicating signals, and remedial actions associated with the LOCA Outside Containment.	3.9	95
E06	Degraded Core Cooling									
E07	Saturated Core Cooling									
E08	Pressurized Thermal Shock					X		EA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	4.2	97
E09	Natural Circulation Operations									
E10	Natural Circulation with Steam Void in Vessel with/without RVLIS	X						EK1.2 Normal, abnormal and emergency operating procedures associated with Natural Circulation with Steam Void in Vessel with/without RVLIS.	3.6	98
E12	Uncontrolled Depressurization of all Steam Generators			X				EK3.3 Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.	3.7	100
E14	High Containment Pressure									
K/A Category Point Totals:		3	2	4	5	7	3	Group Point Total:	24	

ES-401		PWR SRO Examination Outline							ES-401-3		
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2											
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp	Q#	
007	Reactor Trip					X		EA2.03 Reactor trip breaker position	4.4	61	
008	Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)			X				AK3.02 Why PORV or code safety exit temperature is below RCS or PZR temperature	4.1	62	
009	Small Break LOCA					X		EA2.01 Actions to be taken, based on RCS temperature and pressure, saturated and superheated	4.8	63	
022	Loss of Reactor Coolant Makeup				X			AA1.08 VCT level	3.3	67	
025	Loss of Residual Heat Removal System (RHRS)			X				AK3.01 Shift to alternate flowpath	3.4	69	
027	Pressurizer Pressure Control (PZR PCS) Malfunction		X					AK2.03 Controllers and positioners	2.8	71	
032	Loss of Source Range Nuclear Instrumentation					X		AA2.05 Nature of abnormality, from rapid survey of control room data	3.2*	75	
033	Loss of Intermediate Range Nuclear Instrumentation					X		AA2.02 Indications of unreliable intermediate-range channel operation	3.6	76	
037	Steam Generator (S/G) Tube Leak						X	2.4.4 Ability to recognize abnormal indications - - - which are entry level conditions for emergency and abnormal procedures	4.3	78	
038	Steam Generator Tube Rupture (SGTR)			X				EK3.06 Actions contained in EOP for RCS water inventory balance, S/G tube rupture, and plant shutdown procedures	4.5	79	
054	Loss of Main Feedwater (MFW)	X						AK1.01 MFW line break depressurizes the S/G (similar to a steam line break)	4.3	81	
058	Loss of DC Power					X		AA2.03 DC loads lost; impact on ability to operate and monitor plant systems	3.9	85	
060	Accidental Gaseous Radwaste Release										
061	Area Radiation Monitoring (ARM) System Alarms										
065	Loss of Instrument Air			X				AK3.08 Actions contained in EOP for loss of instrument air	3.9	88	
E03	LOCA Cooldown and Depressurization						X	2.4.14 Knowledge of general guidelines for EOP flowchart use.	3.9	94	
E05	Loss of Secondary Heat Sink		X					EK2.2 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.	4.2	96	
E11	Loss of Emergency Coolant Recirculation						X	2.4.8 Knowledge of how the event-based emergency/abnormal operating procedures are used in conjunction with the symptom-based EOPs.	3.7	99	
E16	High Containment Radiation										
K/A Category Point Totals:		1	2	4	1	5	3	Group Point Total:	16		

ES-401		PWR SRO Examination Outline							ES-401-3	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 3										
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
028	Pressurizer (PZR) Level Control Malfunction					X		AA2.01 PZR level indicators and alarms	3.6	72
036	Fuel Handling Incidents					X		AA2.03 Magnitude of potential radioactive release	4.2*	77
056	Loss of Offsite Power				X			AA1.21 Reset of the ESF load sequencers	3.3*	83
E13	Steam Generator Overpressure									
E15	Containment Flooding									
	K/A Category Point Totals:	0	0	0	1	2	0	Group Point Total:		3

ES-401		PWR SRO Examination Outline Plant Systems - Tier 2/Group 1												ES-401-3	
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp	Q#
001	Control Rod Drive System								X				A2.06 Effects of transient xenon on reactivity	3.7	18
001	Control Rod Drive System					X							K5.05 Interpretation of rod worth curves, including proper curve to use: all rods in (ARI), all rods out (ARO), hot zero power (HZP), hot full power (HFP)	3.9	19
003	Reactor Coolant Pump System (RCPS)										X		A4.01 Seal injection	3.2	22
003	Reactor Coolant Pump System (RCPS)			X									K3.04 RPS	4.2	23
004	Chemical and Volume Control System (CVCS)									X			A3.10 PZR level and pressure	3.9	24
004	Chemical and Volume Control System (CVCS)	X											K1.18 CCWS	3.2	25
013	Engineered Safety Features Actuation System (ESFAS)								X				A2.04 Loss of instrument bus	4.2	34
014	Rod Position Indication System (RPIS)							X					A1.02 Control rod position indication on control room panels	3.6	35
015	Nuclear Instrumentation System														
017	In-Core Temperature Monitor (ITM) System							X					A1.01 Core exit temperature	3.9	37
022	Containment Cooling System (CCS)	X											K1.01 SWS/cooling system	3.7	38
022	Containment Cooling System (CCS)		X										K2.01 Containment cooling fans	3.1	39
025	Ice Condenser System														
026	Containment Spray System (CSS)								X				A2.03 Failure of ESF	4.4	40
056	Condensate System	X											K1.03 MFW	2.6	46
059	Main Feedwater (MFW) System								X				A2.03 Overfeeding event	3.1*	47
061	Auxiliary / Emergency Feedwater (AFW) System								X				A2.04 pump failure or improper operation	3.8	48
063	D.C. Electrical Distribution System														
068	Liquid Radwaste System (LRS)										X		A4.04 Automatic isolation	3.7	51
071	Waste Gas Disposal System (WGDS)									X			A3.02 Pressure-regulating system for waste gas vent header	2.8	52
072	Area Radiation Monitoring (ARM) System											X	2.1.32 Ability to explain and apply all system limits and precautions.	3.8	54
072	Area Radiation Monitoring (ARM) System								X				A2.02 Detector failure	2.9	53
	K/A Category Point Totals:	3	1	1	0	1	0	2	6	2	2	1	Group Point Total:		19

ES-401		PWR SRO Examination Outline Plant Systems - Tier 2/Group 2											ES-401-3		
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp	Q#
002	Reactor Coolant System (RCS)	X											K1.07 Reactor vessel level indication system	3.7*	21
002	Reactor Coolant System (RCS)								X				A2.01 Loss of coolant inventory	4.4	20
006	Emergency Core Cooling System (ECCS)	X											K1.08 CVCS	3.9	27
006	Emergency Core Cooling System (ECCS)				X								K4.05 Autostart of HPI/LPI/SIP.	4.4	28
010	Pressurizer Pressure Control System (PZR PCS)									X			A3.02 PZR pressure	3.5	30
011	Pressurizer Level Control System (PZR LCS)							X					A1.02 Charging and letdown flows	3.5	31
011	Pressurizer Level Control System (PZR LCS)						X						K6.03 Relationship between PZR level and PZR heater control circuit	3.3	32
012	Reactor Protection System								X				A2.04 Erratic power supply operation	3.2	33
016	Non-Nuclear Instrumentation System (NNIS)								X				A2.01 Detector failure	3.1*	36
027	Containment Iodine Removal System (CIRS)										X		A4.01 CIRS controls	3.3*	41
028	Hydrogen Recombiner and Purge Control System (HRPS)								X				A2.01 Hydrogen recombinder power setting, determined by using plant data book	3.6*	42
029	Containment Purge System (CPS)														
033	Spent Fuel Pool Cooling System (SFPCS)														
034	Fuel Handling Equipment System (FHES)				X								K4.02 Fuel movement	3.3	43
035	Steam Generator System (S/GS)														
039	Main and Reheat Steam System (MRSS)														
055	Condenser Air Removal System (CARS)			X									K3.01 Main Condenser	2.7	45
062	A.C. Electrical Distribution System								X				A2.01 Types of loads that, if de-energized, would degrade or hinder plant operation	3.9	49
062	A.C. Electrical Distribution System				X								K4.10 Uninterruptable ac power sources	3.5	50
064	Emergency Diesel Generator (ED/G) System														
073	Process Radiation Monitoring (PRM) System														
075	Circulating Water System														

ES-401		PWR SRO Examination Outline Plant Systems - Tier 2/Group 2												ES-401-3	
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
079	Station Air System (SAS)				X								K4.01 Cross-connect with IAS	3.2	56
086	Fire Protection System (FPS)				X								K4.06 CO2	3.3	57
103	Containment System														
	K/A Category Point Totals:	2	0	1	5	0	1	1	5	1	1	0	Group Point Total:		17

ES-401		PWR SRO Examination Outline Plant Systems - Tier 2/Group 3											ES-401-3		
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
005	Residual Heat Removal System (RHRS)							X					A1.01 Heatup/cooldown rates	3.6	26
007	Pressurizer Relief Tank/Quench Tank System (PRTS)	X											K1.03 RCS	3.2	29
008	Component Cooling Water System (CCWS)														
041	Steam Dump System (SDS) and Turbine Bypass Control			X									K3.02 RCS	3.9	44
045	Main Turbine Generator (MT/G) System														
076	Service Water System (SWS)											X	2.1.28 Knowledge of the purpose and function of major system components and controls	3.3	55
078	Instrument Air System (IAS)														
K/A Category Point Totals:		1	0	1	0	0	0	1	0	0	0	1	Group Point Total:		4
Plant-Specific Priorities															
System / Topic		Recommended Replacement for ...					Reason					Pts			
Plant Specific Priority Total: (limit 10)															

Facility	Salem	Date:	January 10, 2000	Exam Level:	SRO
Category	KA #	KA Topic	Imp.	Q#	
Conduct of Operations	2.1.1	Knowledge of conduct of operations requirements.	3.8	1	
	2.1.10	Knowledge of conditions and limitations in the facility license.	3.9	2	
	2.1.12	Ability to apply technical specifications for a system.	4.0	3	
	2.1.29	Knowledge of how to conduct and verify valve lineups.	3.3	4	
	2.1.33	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	4.0	5	
			Total	5	
Equipment Control	2.2.20	Knowledge of the process for managing troubleshooting activities.	3.3	6	
	2.2.23	Ability to track limiting conditions for operations.	3.8	7	
	2.2.24	Ability to analyze the affect of maintenance activities on LCO status.	3.8	8	
	2.2.28	Knowledge of new and spent fuel movement procedures.	3.5	9	
			Total	4	
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	3.0	10	
	2.3.2	Knowledge of facility ALARA program.	2.9	11	
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	12	
			Total	3	
Emergency Procedures and Plan	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures.	4.0	13	
	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions including: 1. Reactivity control; 2. Core cooling and heat removal; 3. Reactor coolant system integrity; 4. Containment conditions; 5. Radioactivity release control.	4.3	14	
	2.4.30	Knowledge of which events related to system operations/status should be reported to outside agencies.	3.6	15	
	2.4.32	Knowledge of operator response to loss of all annunciators.	3.5	16	
	2.4.38	Ability to take actions called for in the facility emergency plan, including (if required) supporting or acting as emergency coordinator.	4.0	17	
			Total	5	
			Tier 3 Target Point Total (SRO)		17

Facility		Salem		Date of Exam: 01/10/00				Exam Level: RO					
Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	
1. Emergency & Abnormal Plant Evolutions	1	2	2	3				4	3			2	16
	2	4	2	4				2	3			2	17
	3			1				1	1				3
	Tier Totals	6	4	8				7	7			4	36
2. Plant Systems	1	4	1	2	3	2		2		5	3	1	23
	2	4		1	4		1	4	3	2	1		20
	3	1		1	1			1	1	1	1	1	8
	Tier Totals	9	1	4	8	2	1	7	4	8	5	2	51
3. Generic Knowledge and Abilities					Cat 1		Cat 2		Cat 3		Cat 4		13
					3		4		3		3		
<p>Note:</p> <ul style="list-style-type: none"> • Attempt to distribute topics among all K/A Categories: select at least one topic from every K/A category within each tier. • Actual point totals must match those specified in the table. • Select topics from many systems: avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities. • Systems/evolutions within each group are identified on the associated outline. • The shaded areas are not applicable to the category/tier. 													

ES-401		PWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1							ES-401-4	
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp	Q#
005	Inoperable/Stuck Control Rod					X		AA2.01 Stuck or inoperable rod from in-core and ex-core NIS, in-core or loop temperature measurements	3.3	66
015	Reactor Coolant Pump (RCP) Malfunctions		X					AK2.10 RCP indicators and controls	2.8*	72
017	Reactor Coolant Pump (RCP) Malfunctions (Loss of RC Flow)									
024	Emergency Boration				X			AA1.20 Manual boration valve and indicators	3.2*	74
026	Loss of Component Cooling Water (CCW)					X		AA2.02 The cause of possible CCW loss	2.9	76
027	Pressurizer Pressure Control (PZR PCS) Malfunction		X					AK2.03 Controllers and positioners	2.6	77
040	Steam Line Rupture	X						AK1.06 High-energy steam line break considerations	3.7	82
051	Loss of Condenser Vacuum						X	2.1.32 Ability to explain and apply all system limits and precautions.	3.4	83
055	Loss of Offsite and Onsite Power (Station Blackout)						X	2.4.7 Knowledge of event based EOP mitigation strategies.	3.1	85
057	Loss of Vital AC Electrical Instrument Bus				X			AA1.06 Manual control of components for which automatic control is lost	3.5	87
062	Loss of Nuclear Service Water					X		AA2.01 Location of a leak in the SWS	2.9	89
067	Plant Fire on Site				X			AA1.06 Fire alarm	3.5	91
068	Control Room Evacuation				X			AA1.21 Transfer of controls from control room to shutdown panel or local control	3.9	92
069	Loss of Containment Integrity									
074	Inadequate Core Cooling			X				EK3.07 Starting up emergency feedwater and RCPs	4.0	93
076	High Reactor Coolant Activity			X				AK3.06 Actions contained in EOP for high reactor coolant activity	3.2	94
E06	Degraded Core Cooling									
E07	Saturated Core Cooling									
E08	Pressurized Thermal Shock									
E09	Natural Circulation Operations									
E10	Natural Circulation with Steam Void in Vessel with/without RVLIS	X						EK1.2 Normal, abnormal and emergency operating procedures associated with Natural Circulation with Steam Void in Vessel with/without RVLIS.	3.4	99
E12	Uncontrolled Depressurization of all Steam Generators			X				EK3.3 Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.	3.5	100
E14	High Containment Pressure									
K/A Category Point Totals:		2	2	3	4	3	2	Group Point Total:		16

ES-401		PWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2							ES-401-4	
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp	Q#
001	Continuous Rod Withdrawal									
003	Dropped Control Rod		X					AK2.05 Control rod drive power supplies and logic circuits	2.5	65
007	Reactor Trip	X						EK1.05 Decay power as a function of time	3.3	67
008	Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)			X				AK3.02 Why PORV or code safety exit temperature is below RCS or PZR temperature	3.6	68
009	Small Break LOCA					X		EA2.01 Actions to be taken, based on RCS temperature and pressure, saturated and superheated	4.2	69
011	Large Break LOCA						X	2.1.31 Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.	4.2	71
011	Large Break LOCA				X			EA1.11 Long-term cooling of core	4.2	70
022	Loss of Reactor Coolant Makeup				X			AA1.08 VCT level	3.4	73
025	Loss of Residual Heat Removal System (RHRS)			X				AK3.01 Shift to alternate flowpath	3.1	75
029	Anticipated Transient Without Scram (ATWS)	X						EK1.05 Definition of negative temperature coefficient as applied to large PWR coolant systems	2.8	79
032	Loss of Source Range Nuclear Instrumentation									
033	Loss of Intermediate Range Nuclear Instrumentation					X		AA2.02 Indications of unreliable intermediate-range channel operation	3.3	80
037	Steam Generator (S/G) Tube Leak									
038	Steam Generator Tube Rupture (SGTR)			X				EK3.06 Actions contained in EOP for RCS water inventory balance, S/G tube rupture, and plant shutdown procedures	4.2	81
054	Loss of Main Feedwater (MFW)	X						AK1.01 MFW line break depressurizes the S/G (similar to a steam line break)	4.1	84
058	Loss of DC Power					X		AA2.03 DC loads lost; impact on ability to operate and monitor plant systems	3.5	88
059	Accidental Liquid Radwaste Release									
060	Accidental Gaseous Radwaste Release									
061	Area Radiation Monitoring (ARM) System Alarms									
E02	SI Termination			X				EK3.3 Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.	3.9	95
E03	LOCA Cooldown and Depressurization						X	2.4.14 Knowledge of general guidelines for EOP flowchart use.	3.0	96

ES-401		PWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2							ES-401-4	
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
E04	LOCA Outside Containment	X						EK1.3 Annunciators and conditions indicating signals, and remedial actions associated with the LOCA Outside Containment.	3.5	97
E05	Loss of Secondary Heat Sink		X					EK2.2 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.	3.9	98
E11	Loss of Emergency Coolant Recirculation									
E16	High Containment Radiation									
K/A Category Point Totals:		4	2	4	2	3	2	Group Point Total:		17

ES-401		PWR RO Examination Outline								ES-401-4	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 3											
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#	
028	Pressurizer (PZR) Level Control Malfunction					X		AA2.01 PZR level indicators and alarms	3.4	78	
036	Fuel Handling Incidents										
056	Loss of Offsite Power				X			AA1.21 Reset of the ESF load sequencers	3.3*	86	
065	Loss of Instrument Air			X				AK3.08 Actions contained in EOP for loss of instrument air	3.7	90	
E13	Steam Generator Overpressure										
E15	Containment Flooding										
K/A Category Point Totals:		0	0	1	1	1	0	Group Point Total:	3		

ES-401		PWR RO Examination Outline Plant Systems - Tier 2/Group 1											ES-401-4		
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp	Q#
001	Control Rod Drive System					X							K5.05 Interpretation of rod worth curves, including proper curve to use: all rods in (ARI), all rods out (ARO), hot zero power (HZP), hot full power (HFP)	3.5	15
001	Control Rod Drive System				X								K4.02 Control rod mode select control (movement control)	3.8	14
003	Reactor Coolant Pump System (RCPS)										X		A4.01 Seal injection	3.3	18
003	Reactor Coolant Pump System (RCPS)			X									K3.04 RPS	3.9	19
004	Chemical and Volume Control System (CVCS)									X			A3.10 PZR level and pressure	3.9	20
004	Chemical and Volume Control System (CVCS)	X											K1.18 CCWS	2.9	21
013	Engineered Safety Features Actuation System (ESFAS)									X			A3.02 Operation of actuated equipment	4.1	32
013	Engineered Safety Features Actuation System (ESFAS)										X		A4.03 ESFAS initiation	4.5	33
013	Engineered Safety Features Actuation System (ESFAS)				X								K4.03 Main Steam Isolation System	3.9	34
015	Nuclear Instrumentation System					X							K5.04 Factors affecting accuracy and reliability of calorimetric calibrations	2.6	37
015	Nuclear Instrumentation System			X									K3.01 RPS	3.9	36
017	In-Core Temperature Monitor (ITM) System							X					A1.01 Core exit temperature	3.7	39
022	Containment Cooling System (CCS)		X										K2.01 Containment cooling fans	3.0*	41
022	Containment Cooling System (CCS)	X											K1.01 SWS/cooling system	3.5	40
025	Ice Condenser System														
056	Condensate System	X											K1.03 MFW	2.6*	51
059	Main Feedwater (MFW) System									X			A3.07 ICS	3.4*	52
059	Main Feedwater (MFW) System				X								K4.19 Automatic feedwater isolation of MFW	3.2	53
061	Auxiliary / Emergency Feedwater (AFW) System							X					A1.01 S/G level	3.9	54
061	Auxiliary / Emergency Feedwater (AFW) System									X			A3.01 AFW startup and flows	4.2	55
068	Liquid Radwaste System (LRS)										X		A4.04 Automatic isolation	3.8	58
068	Liquid Radwaste System (LRS)	X											K1.07 Sources of liquid wastes for LRS	2.7	59

ES-401		PWR RO Examination Outline Plant Systems - Tier 2/Group 1												ES-401-4	
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
071	Waste Gas Disposal System (WGDS)									X			A3.02 Pressure-regulating system for waste gas vent header	2.8	60
072	Area Radiation Monitoring (ARM) System											X	2.1.32 Ability to explain and apply all system limits and precautions.	3.4	61
K/A Category Point Totals:		4	1	2	3	2	0	2	0	5	3	1	Group Point Total:		23

ES-401		PWR RO Examination Outline Plant Systems - Tier 2/Group 2											ES-401-4		
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
002	Reactor Coolant System (RCS)	X											K1.07 Reactor vessel level indication system	3.5*	17
002	Reactor Coolant System (RCS)							X					A1.08 RCS average temperature	3.7	16
006	Emergency Core Cooling System (ECCS)	X											K1.08 CVCS	3.6	23
006	Emergency Core Cooling System (ECCS)				X								K4.05 Autostart of HPI/LPI/SIP.	4.3	24
010	Pressurizer Pressure Control System (PZR PCS)									X			A3.02 PZR pressure	3.6	28
010	Pressurizer Pressure Control System (PZR PCS)							X					A1.07 RCS pressure	3.7	27
011	Pressurizer Level Control System (PZR LCS)							X					A1.02 Charging and letdown flows	3.3	29
011	Pressurizer Level Control System (PZR LCS)						X						K6.04 Operation of PZR level controllers	3.1	30
012	Reactor Protection System								X				A2.04 Erratic power supply operation	3.1	31
014	Rod Position Indication System (RPIS)							X					A1.02 Control rod position indication on control room panels	3.2	35
016	Non-Nuclear Instrumentation System (NNIS)	X											K1.01 RCS	3.4*	38
026	Containment Spray System (CSS)	X											K1.01 ECCS	4.2	43
026	Containment Spray System (CSS)								X				A2.03 Failure of ESF	4.1	42
029	Containment Purge System (CPS)									X			A3.01 CPS isolation	3.8	46
033	Spent Fuel Pool Cooling System (SFPCS)														
035	Steam Generator System (S/GS)														
039	Main and Reheat Steam System (MRSS)								X				A2.04 Malfunctioning steam dump	3.4	48
055	Condenser Air Removal System (CARS)			X									K3.01 Main Condenser	2.5	50
062	A.C. Electrical Distribution System				X								K4.10 Uninterruptable ac power sources	3.1	56
063	D.C. Electrical Distribution System														
064	Emergency Diesel Generator (ED/G) System										X		A4.02 Adjustment of exciter voltage (using voltage control switch)	3.3	57
073	Process Radiation Monitoring (PRM) System														
075	Circulating Water System														

ES-401		PWR RO Examination Outline Plant Systems - Tier 2/Group 2												ES-401-4	
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
079	Station Air System (SAS)				X								K4.01 Cross-connect with IAS	2.9	63
086	Fire Protection System (FPS)				X								K4.06 CO2	3.0	64
K/A Category Point Totals:		4	0	1	4	0	1	4	3	2	1	0	Group Point Total:		20

ES-401		PWR RO Examination Outline Plant Systems - Tier 2/Group 3												ES-401-4	
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
005	Residual Heat Removal System (RHRS)							X					A1.01 Heatup/cooldown rates	3.5	22
007	Pressurizer Relief Tank/Quench Tank System (PRTS)	X											K1.03 RCS	3.0	25
008	Component Cooling Water System (CCWS)									X			A3.08 Automatic actions associated with the CCWS that occur as a result of a safety injection signal	3.6*	26
027	Containment Iodine Removal System (CIRS)										X		A4.01 CIRS controls	3.3*	44
028	Hydrogen Recombiner and Purge Control System (HRPS)								X				A2.01 Hydrogen recombinder power setting, determined by using plant data book	3.4*	45
034	Fuel Handling Equipment System (FHES)				X								K4.02 Fuel movement	2.5	47
041	Steam Dump System (SDS) and Turbine Bypass Control			X									K3.02 RCS	3.8	49
045	Main Turbine Generator (MT/G) System														
076	Service Water System (SWS)											X	2.1.28 Knowledge of the purpose and function of major system components and controls	3.2	62
078	Instrument Air System (IAS)														
103	Containment System														
K/A Category Point Totals:		1	0	1	1	0	0	1	1	1	1	1	Group Point Total:	8	
Plant-Specific Priorities															
System / Topic		Recommended Replacement for ...				Reason				Pts					
Plant Specific Priority Total: (limit 10)															

Facility	Salem	Date: January 10, 2000	Exam Level:	RO
Category	KA #	KA Topic	Imp.	Q#
Conduct of Operations	2.1.29	Knowledge of how to conduct and verify valve lineups.	3.4	1
	2.1.3	Knowledge of shift turnover practices.	3.0	2
	2.1.33	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	3.4	3
			Total	3
Equipment Control	2.2.23	Ability to track limiting conditions for operations.	2.6	4
	2.2.24	Ability to analyze the affect of maintenance activities on LCO status.	2.6	5
	2.2.28	Knowledge of new and spent fuel movement procedures.	2.6	6
	2.2.34	Knowledge of the process for determining the internal and external effects on core reactivity.	2.8	7
			Total	4
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	2.6	8
	2.3.2	Knowledge of facility ALARA program.	2.5	9
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9	10
			Total	3
Emergency Procedures and Plan	2.4.13	Knowledge of crew roles and responsibilities during EOP flowchart use.	3.3	11
	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures.	3.0	12
	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions including: 1. Reactivity control; 2. Core cooling and heat removal; 3. Reactor coolant system integrity; 4. Containment conditions; 5. Radioactivity release control.	3.7	13
			Total	3
Tier 3 Target Point Total (RO)				13

Facility: Salem Units 1 & 2**Date of Examination:** 1/10/00**Examination Level (circle one):** SRO(U)/SRO(I)**Operating Test Number:** 1

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions	
A.1	Reactor Startup	2.1.25	3.1 - Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data. JPM: Evaluate criticality data by comparing a 1/M Plot to the ECP
	Shift Turnover	2.1.3	3.4 - Knowledge of shift turnover practices JPM: As oncoming Control Room Supervisor, complete a shift turnover attachment
A.2	Temporary Modifications	2.2.11	3.4 - Knowledge of the process for controlling temporary changes QUESTION: Evaluate evolutions and identify a temporary modification
	Post-maintenance Retest	2.2.21	3.5 - Knowledge of pre- and post-maintenance operability requirements QUESTION: Specify post-maintenance retest requirements
A.3	Actions for High Dose Rates	2.3.1	3.0 - Knowledge of 10CFR20 and related facility radiation control requirements. QUESTION: Given a set of conditions, specify actions to be taken when a high dose rate is encountered
	Very High Radiation Area Entry	2.3.1	3.0 - Knowledge of 10CFR20 and related facility radiation control requirements. QUESTION: Determine the authorization/notification requirements for entry into a Very High Radiation Area entry.
A.4	Release Rate Calc/Classification	2.4.41	4.1 - Knowledge of the Emergency Action Level Thresholds and Classifications. JPM: Provided with a set of conditions, perform a total gaseous release rate calculation and classify the event

Facility: Salem Units 1 & 2**Date of Examination:** 1/10/00**Examination Level (circle one):** RO**Operating Test Number:** 1

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions	
A.1	ECP Calculation	2.1.25	3.1 - Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data JPM: Provided with ECP data, determine the required RCS boron concentration
	Shift Turnover	2.1.3	3.0 - Knowledge of shift turnover practices. JPM: As oncoming RO, complete a shift turnover attachment
A.2	Tagging	2.2.13	3.6 - Knowledge of tagging and clearance procedures JPM: Evaluate a tagging request and determine the order of operations
A.3	Release Rate Calculation	2.3.10	2.9 - Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure JPM: Provided with a set of conditions, perform a total gaseous release rate calculation
A.4	Reporting Time Limit	2.4.39	3.3 - Knowledge of RO's responsibilities in emergency plan implementation QUESTION: Given a set of conditions, determine if reporting time requirements have been met
	NRC Communications	2.4.39	3.3 - Knowledge of RO's responsibilities in Emergency Plan implementation QUESTION: Specify the internal requirements for maintaining an open telephone line with NRC

Facility: Salem Units 1 & 2**Date of Examination:** 1/10/00**Examination Level (circle one):** SRO(I)**Operating Test Number:** 2

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions	
A.1	Night and Temporary Standing Orders	2.1.15	3.0 - Ability to manage short term information such as night and standing orders QUESTION: Determine time limits and shift turnover requirements for Night Orders and Temporary Standing Orders
	Key Control	2.1.1	3.8 - Knowledge of conduct of operations requirements QUESTION: Identify key control requirements and practices
	Shutdown Margin Calculation	2.1.25	3.1 - Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data JPM: Verify a shutdown margin calculation
A.2	Tech Spec Log	2.2.23	3.8 - Ability to track Limiting Conditions for Operations. JPM: Evaluate a situation and complete the TSAS log
A.3	Dose Limit Extensions	2.3.4	3.1 - Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized QUESTION: Determine authorization requirements for extending facility dose limit
	Mode 1 Containment Entry	2.3.4	3.1 - Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized QUESTION: Determine requirements for containment entry during power operation
A.4	Emergency Classification JPM	2.4.41	4.1 - Knowledge of the emergency action level thresholds and classifications JPM: Provided with a set of conditions, classify an event

Facility: Salem Units 1 & 2Date of Examination: 1/10/00Exam Level (circle one): RO/SRO(I)/SRO(U)Operating Test No.: 1**B.1: Control Room Systems**

	System	JPM Description	Type Code*	Safety Function
1	CVCS (004)	Perform a dilution of the RCS	M,S	1
2	ECCS (006)	Shift to Cold Leg Recirculation with 2A 4KV Vital Bus unavailable <u>SRO(U)</u>	A,E,N,S	2
3	PZR (010)	Reduce RCS pressure during a natural circulation cooldown <u>SRO(U)</u>	A,E,N,S	3
4	RHR (005)	Place RHR In Service with the RCS depressurized <u>SRO(U)</u>	L,D,S	4(Pri)
5	CNMT CLG (022)	Service Water leak in a Containment Fan Coil Unit during EOP implementation	A,E,N,S	5
6	AC ELEC (062)	2C 4KV Vital Bus transfer fails	A,E,N,S	6
7	CCW (008)	Shift operating Component Cooling Water Pumps	D,S	8

B.2: Facility Walk-Through

8	AFW (061)	Local control of a MDAFW Pump and the associated valves to feed SG's	E,D,R	4(Sec)
9	EDG (064)	Local start of an Emergency Diesel Generator during EOP implementation <u>SRO(U)</u>	D,R	6
10	DC ELEC/RCS (APE068)	Align the ASDS Inverter to DC and energize RCS loop 22 and 23 WR Th and Tc <u>SRO(U)</u>	E,N	8

* **Type Codes:** (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol Room, (S)imulator, (L)ow-Power, (R)CA, (E)OP/AB

Facility: Salem Units 1 & 2Date of Examination: 1/10/00Exam Level (circle one): RO/SRO(I)/SRO(U)Operating Test No.: 2**B.1: Control Room Systems**

	System	JPM Description	Type Code*	Safety Function
1	CVCS (004)	Perform calculations and setup the VCT makeup controller for AUTO	M,S	1
2	ECCS (006)	Shift ECCS to Cold Leg Recirculation with 2B 4KV Vital Bus unavailable	A,E,N,S	2
3	PZR (010)	Control RCS pressure following a reactor trip	A,E,D,S	3
4	AFW (061)	Establish minimum required AFW flow following a reactor trip	A,D,E,S	4(Sec)
5	CNMT CLG (022)	Containment Fan Coil Unit Surveillance Test	N,S	5
6	AC ELEC (062)	Synchronize the Main Generator to the grid	A,L,M,S	6
7	CCW (008)	Split the CCW system headers	E,M,S	8

B.2 Facility Walk-Through

8	ESFAS (013)	Defeat AUTO SI following Control Rm Evacuation	D,E	2
9	AFW (061)	Defeat the AFW Pump low suction pressure trip	E,N,R	4(Sec)
10	AC ELEC (062)	Transfer PZR B/U Heaters to 2A Vital Bus	D	6

* **Type Codes:** (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol Room, (S)imulator, (L)ow-Power, (R)CA, (E)OP/AB

Facility: Salem Units 1 & 2

Scenario No.: 1

Op Test No.:

Examiners: _____

Candidates: _____ CRS

RO

PO

Objectives: In accordance with plant procedures: (a) begin a normal power reduction to 75% power; (b) respond to a signal output failure on PT-505, Turbine First Stage Pressure transmitter; (c) respond to a main steam isolation valve drifting closed; (d) respond to a pressurizer pressure channel failure; (e) recognize and respond to a letdown heat exchanger tube leak; (f) respond to a tube leak progressing to a tube rupture in 23 SG; (g) enter and properly execute the EOP network; (h) respond to the trip of 21 AFW Pump; (i) respond to a loss of steam dump capability

Initial Conditions: IC-82 at 100% power with 22 AFW Pump OOS for bearing replacement and 21 CFCU OOS for coil leak repairs.

Turnover: The plant is in Mode 1 with power at 100%. 22 AFW Pump is OOS for bearing replacement and 21 CFCU is OOS for coil leak repairs. All other equipment is operating normally and major control systems are in AUTO. Orders for the shift are to reduce power to 75% to remove 22 Condensate Pump from service for seal replacement.

Event No.	Malf. No.	Event Type*	Event Description
1		N CRS N PO R RO	Perform a normal power reduction
2	RD0045	I CRS RO	PT-505, Turbine First Stage Pressure Transmitter, output failure
3	VL0422	C CRS PO	Main Steam Isolation Valve, 23MS167 drifts closed
4	PR0016A	I CRS RO	Pressurizer Pressure Channel I fails high
5	CV0030	C CRS RO	Letdown HX Tube leak
6	SG0078C	M ALL	23 SG Tube Leak/Rupture
7	AF0181B	C CRS PO	21 Aux Feedwater Pump trip
8	MS0093	I CRS PO	Loss of Steam Dump Vacuum permissive

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO SUMMARY (ECHO-ESG1)

The scenario begins with a normal reduction to 75% power in order to remove 22 Condensate Pump from service. On cue from the Lead Evaluator, the output signal on PT-505, Turbine First Stage Pressure transmitter, fails low. The crew should respond in accordance with (IAW) S2.OP-AB.ROD-0003, Continuous Rod Motion.

After the plant is stable and the investigation into the unwarranted rod motion has been initiated, 23MS167, 23 SG Main Steam Isolation Valve, will drift off the open seat. The crew should respond IAW the Alarm Response Procedures (ARP's).

When 23MS167 has been re-opened, the controlling pressurizer pressure channel fails high causing actual pressure to lower. The crew should respond IAW S2.OP-AB.PZR-0001, Pressurizer Pressure Malfunction.

When the crew has stabilized the plant following the pressure malfunction, a tube leak will occur in the letdown heat exchanger. The crew should recognize rising level in the CCW Surge Tank and respond IAW S2.OP-AB.CC-0001, Component Cooling Abnormality.

After the major actions associated with the letdown heat exchanger tube leak have been completed, a SG Tube Leak is initiated and ramps to a tube rupture. The crew should respond IAW S2.OP-AB.SG-0001, Steam Generator Tube Leak.

As the size of the leak progresses, the crew should initiate a manual reactor trip and safety injection and enter EOP-TRIP-0001, Reactor Trip or Safety Injection. A short time after the reactor trip, 21 Auxiliary Feedwater Pump will trip requiring SG's to be fed using 23 AFW Pump. They should transition to EOP-SGTR-0001, Steam Generator Tube Rupture, at the appropriate diagnostic step.

The Steam Dump Vacuum Permissive will be lost after the RCS cooldown is commenced, requiring the remainder to be performed using the unaffected SG MS10's, SG Atmospheric Relief Valves. The scenario can be terminated when RCS temperature reaches the target value or at the discretion of the Lead Evaluator.

Facility: Salem Units 1 & 2	Scenario No.: 2	Op Test No.:
Examiners: _____	Candidates: _____	CRS
_____	_____	RO
_____	_____	PO

Objectives: In accordance with plant procedures: (a) begin a normal power reduction to 75%; (b) respond to the failure of a VCT Level transmitter; (c) respond to the failure of a FHB area radiation monitor; (d) respond to a Service Water leak requiring isolation of one bay; (e) respond to a seal failure on 22 RCP; (f) initiate a manual reactor trip and stop 22 RCP; (g) enter and properly execute the EOP network; (h) recognize a Main Steam Line Break and initiate a manual safety injection; (i) respond to failure of Containment Spray to actuate; (j) take compensatory action for failure of the MSIVs to close

Initial Conditions: IC-84 at 90% power with 22 AFW Pump OOS for bearing replacement and 21 CFCU is OOS for coil leak repairs.

Turnover: The plant is in Mode 1 with power at 90%. 22 AFW Pump is OOS for bearing replacement and 21 CFCU is OOS for coil leak repairs. All other equipment is operating normally and major controls are in AUTO. Orders for the shift are to perform a normal reduction to 75% power in order to remove 22 Condensate Pump from service for seal replacement.

Event No.	Malf. No.	Event Type*	Event Description
1		N CRS N PO R RO	Perform a normal reduction to 75% power
2	CV0037	I CRS RO	LT-112, VCT Level transmitter, fails high
3	OVDI	I CRS RO	2R5, FHB Area Radiation Monitor, fails high
4	SW0216A	C CRS RO	Leak in #2 Service Water Bay
5	RC0007B	C CRS RO	22 RCP Seal Failure
6	MS0090C	M ALL	Main Steam Line Leak/Break in Containment on 22 S/G
7	MS0092B,C	C ALL	MSIVs 22 & 23 MS167 fail open
8	RP0277A,B	C CRS RO	Auto Containment Spray fails to actuate

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO SUMMARY (ECHO-ESG2)

The crew commences a normal power reduction to 75%. On cue from the Lead Evaluator, VCT level transmitter LT-112 fails high, causing actual VCT level to lower. The crew should respond in accordance with (IAW) Alarm Response Procedures (ARP's) and place the makeup controller in MANUAL.

After the crew has completed the actions for the VCT level problem, 2R5, Fuel Handling Building (FHB) Area Radiation Monitor, will fail high. The crew should respond IAW S2.OP-AB.RAD-0001, Abnormal Radiation, and re-align FHB Ventilation.

After the crew has re-aligned FHB Ventilation, a leak will occur in a Service Water (SW) Bay. The crew should respond IAW S2.OP-AB.SW-0001, Loss of Service Water Header Pressure, isolating the bay.

After the SW Bay is isolated and the CRS has made the technical specification determination, 22 RCP #1 Seal will fail. The crew should enter S2.OP-AB.RCP-1, RCP Abnormality and initiate a MANUAL reactor trip IAW Attachment 1, due to high seal leakoff flow. 21 RCP should be stopped prior to entering EOP-TRIP-1, Reactor Trip or Safety Injection, and 21CV104 should be closed within a 3-5 minute window thereafter.

After the crew transitions to EOP-TRIP-0002, Reactor Trip Response, a Main Steam Line Break will occur. The crew should initiate a MANUAL safety injection and transition back to EOP-TRIP-0001. Containment Spray fails to actuate at the automatic setpoint and 22 and 23MS167 fail open. The crew should take compensatory action IAW EOP-FRCE-1, Response to Excessive Containment Pressure, and the EOP network.

The crew should transition to EOP-FRTS-0001, Response to Imminent Pressurized Thermal Shock Conditions. The scenario may be terminated when the RCS depressurization is initiated or at the discretion of the Lead Evaluator.

Facility: Salem Units 1 & 2

Scenario No.: 3

Op Test No.:

Examiners: _____

Candidates: _____ CRS

RO

PO

Objectives: In accordance with plant procedures: (a) begin a normal power ascension to 100%; (b) respond to the controlling pressurizer level channel failing low; (c) respond to a leaking Pressurizer PORV, PR1; (d) respond to failure of a PRNIS channel; (e) respond to the loss of 4kV CW Bus Section 23 and the trip of the 21B Circulating Water Pump, resulting in a lowering condenser vacuum; (f) manually trip the reactor due to the lowering vacuum; (g) respond to a failure of the reactor to trip; (h) enter and properly execute the EOP network; (i) take compensatory action for failure of a valve in the rapid boration flowpath; (j) respond to a subsequent loss of all AC power

Initial Conditions: IC-85 at 70% power with 22 AFW Pump OOS for bearing replacement and 21 CFCU OOS for coil leak repairs.

Turnover: The plant is in Mode 1 with power at 70%. 22 AFW Pump is OOS for bearing replacement and 21 CFCU is OOS for coil leak repairs. All other equipment is operating normally and major control systems are in AUTO. Orders for the shift are to raise power to 100% at 5% per hour.

Event No.	Mal. No.	Event Type*	Event Description
1		N CRS N PO R RO	Perform a normal ascension to 100% power
2	PR0017	I CRS RO	Controlling Pressurizer Level channel fails low
3	PR0018A	C CRS RO	2PR1, Pressurizer PORV, develops a leak
4	NI0193	I CRS RO	PRNIS Channel fails high
5	EL0053 CW0114F	C CRS PO	Loss of Circulating Water 4kV Bus Section 23 21B CW Pump trip due to screen differential level
6	RP0058 RP0059A	M ALL	Failure of the Reactor to Trip (Auto & Manual)
7	VL0095	C CRS RO	CV175, Rapid Borate Valve, fails closed
8	EL0134 EL0161 EL0146 EL0273B IO2BDD	M ALL	Loss of All AC Power 2A DG Trip 2C 4KV Bus Differential 2B DG Bkr fail to Auto Close 2B DG Bkr Trip upon Closure

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO SUMMARY (ECHO-ESG3)

The crew starts a normal power ascension to 100%. On cue from the Lead Evaluator, the controlling pressurizer level channel fails low causing actual level to rise. The crew should respond in accordance with (IAW) the Alarm Response Procedures (ARP's) and remove it from service IAW S2.OP-SO.RPS-0003, Placing a Pressurizer Channel in a Tripped Condition.

When pressurizer level control is in AUTO and the technical specification determination made, 2PR1, Pressurizer PORV, develops a leak. The crew should respond IAW S2.OP-AB.PZR-0001, Pressurizer Pressure Malfunction, closing PR6 to isolate the leak.

After PR-1 is isolated and technical specifications have been addressed, a PRNIS channel will fail high, causing rods to step ~~out~~. The crew should respond IAW S2.OP-AB.ROD-0003, Continuous Rod Motion. *in JUL 10/21/99*

After the PRNIS channel is tripped and rod control has been returned to AUTO, a loss of condenser vacuum will occur when 4kV Bus CW2 de-energizes and 21B Circulating Water Pump trips. The crew should respond IAW S2.OP-AB.COND-0001, Loss of Condenser Vacuum.

As vacuum continues to degrade, the crew should initiate a MANUAL reactor trip and enter EOP-TRIP-1, Reactor Trip or Safety Injection. When the reactor trip is not confirmed, the crew should transition to EOP-FRSM-1, Response to Nuclear Power Generation. During initiation of rapid boration, CV175 fails to open requiring boron injection from the RWST.

After the crew confirms a reactor trip and has returned to EOP-TRIP-1, a Loss of all AC power will occur. The crew should transition to EOP-LOPA-1, Loss of All AC Power. The crew should energize 2B 4KV Vital Bus by manually closing 2B EDG breaker. The scenario may be terminated when either 23 or 24 SW Pump is running or at the discretion of the Lead Examiner.

Facility: Salem Units 1 & 2	Scenario No.: 4	Op Test No.:
Examiners: _____	Candidates: _____	CRS
_____	_____	RO
_____	_____	PO

Objectives: In accordance with plant procedures: (a) begin a normal power ascension to 100 %; (b) respond to RCS loop 23 T_{cold} failing high; (c) respond to a SG Atmospheric Relief Valve failing open; (d) respond to a SGFP trip; (e) respond to a SGFP discharge pipe break; (f) enter and properly execute the EOP network; (g) respond to a trip of 23 AFW Pump and the subsequent loss of 21 AFW Pump when 2A 4KV Vital Bus de-energizes; (h) isolate the SGFP discharge pipe break and feed one or more SG's via a Condensate Pump; (i) energize the SRNIS detectors

Initial Conditions: IC-84 at 90% power with 22 AFW Pump OOS for bearing replacement and 21 CFCU OOS for coil leak repairs.

Turnover: The plant is in Mode 1 with power at 90%. 22 AFW Pump is OOS for bearing replacement and 21 CFCU is OOS for coil leak repairs. All other equipment is operating normally and major control systems are in AUTO. Orders for the shift are to perform a normal power ascension to 100%, at 5% per hour.

Event No.	Malf. No.	Event Type*	Event Description
1		N CRS N PO R RO	Perform a normal ascension to 100% power.
2	RC0015C	I CRS RO	23 Loop T _{cold} fails High
3	OVDI	C CRS PO	MS10 setpoint fails low
4	BF0105B	C ALL	22 SGFP trip
5	CN0117B BF0007	M All	22 Condensate Pump trip 21 SGFP Discharge Line break
6	AF0183	C CRS PO	23 Aux Feedwater Pump overspeed trip
7	EL0144	C All	Loss of 2A 4160V Vital Bus
8	NI0195D	I CRS RO	Under-compensated IRNIS Channel (N-36)

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO SUMMARY (ECHO-ESG4)

The crew begins a normal power ascension to 100%. On cue from the Lead Evaluator, RCS Loop 23 T_{cold} fails high causing continuous control rod insertion. The crew will respond in accordance with (IAW) S2.OP-AB.ROD-0003, Continuous Rod Motion.

When Loop 23 T_{ave} has been removed from service IAW S2.OP-SO.RPS-0002, Placing RCS Temperature Channel in Tripped Condition, 21MS10, 21 SG Atmospheric Relief Valve will fail open. The crew should respond IAW S2.OP-AB.STM-0001, Excessive Steam Flow, closing the affected MS10 in MANUAL.

After 21MS10 has been closed, 22 SGFP will trip. The crew should respond by entering and taking the actions of S2.OP-AB.CN-0001, Main Feedwater/Condensate System Abnormality.

After the plant has been stabilized, 22 Condensate Pump will trip coincident with the rupture of the 21 SGFP discharge line, upstream of the pump discharge valve. The PO should note the lowering SG levels, then trip the reactor and enter EOP-TRIP-1, Reactor Trip or Safety Injection.

Following the reactor trip, 23 Auxiliary Feedwater (AFW) Pump trips on overspeed, leaving only 21 AFW Pump available to feed the steam generators. While still in EOP-TRIP-1, a loss of the 2A 4KV Vital Bus will occur resulting in the loss of 21 AFW Pump. The crew should transition to EOP-FRHS-1, Response to Loss of Secondary Heat Sink. If necessary, the crew should initiate RCS Feed&Bleed and continue with the actions of FRHS-1. When the Feed System leak is identified as isolable and is isolated, the crew should establish feed via a condensate pump. During implementation of the EOP's, the RO should note that one IRNIS channel is undercompensated and then manually energize the SRNIS channels. When wide range SG level in the selected S/G is rising or at the discretion of the Lead Evaluator, the scenario may be terminated.

Facility: Salem Units 1 & 2

Scenario No.: 5

Op Test No.:

Examiners: _____

Candidates: _____ CRS

RO

PO

Objectives: In accordance with plant procedures: (a) begin a normal power ascension to 100%; (b) respond to a failure of the controlling pressurizer level channel; (c) respond to a failure of PT-505, Turbine First Stage Pressure transmitter; (d) respond to the trip of 21 Charging Pump; (e) respond to a RCS leak that progresses to a SBLOCA; (f) initiate a manual reactor trip and safety injection; (g) enter and properly execute the EOP network; (h) respond to a failure of 2C SEC

Initial Conditions: IC-85 at 70% power with 22 AFW Pump C/T for bearing replacement and 21 CFCU C/T for coil leak repairs.

Turnover: The plant is in Mode 1 with power at 70%. Power was reduced three days ago at the request of the ESO following an extended run at full power. 22 AFW Pump is OOS for bearing replacement and 21 CFCU is OOS for coil leak repairs. All other equipment is operating normally and major control systems are in AUTO. Orders for the shift are to begin a normal ascension to 100% power, at 5% per hour.

Event No.	Malf. No.	Event Type*	Event Description
1		N CRS N PO R RO	Perform a normal ascension to 100% power
2	PR017A	I CRS RO	LT-459, Pressurizer Level fails high
3	TU0055	I CRS PO RO	PT-505, Turbine First Stage Pressure transmitter fails high
4	CV0208B	C CRS RO	21 Charging Pump trip
5	RC0002	C CRS RO PO	RCS Leak inside Containment
6	RC0002	M ALL C ALL	Small Break LOCA – 500 gpm 2C Safeguards Equipment Control (SEC) fails to actuate

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO SUMMARY (ECHO-ESG5)

The scenario begins with a normal ascension to 100% power. On cue from the Lead Evaluator, the controlling pressurizer level channel, LT-459, will fail high causing charging flow and pressurizer level to lower. The crew should respond in accordance with (IAW) the Alarm Response Procedures (ARP's) and S2.OP-SO.RPS-0003, Placing Pressurizer Channel in Tripped Condition.

When pressurizer level has been stabilized and controls are returned to AUTO, Turbine First Stage Pressure Transmitter, PT-505, will fail high causing continuous control rod withdrawal. The crew should respond by entering and taking the actions of S2.OP-AB.ROD-0003, Continuous Rod Motion. PT-505 should be placed in the tripped condition IAW S2.OP-SO.RPS-0006, Main Turbine Channel Trip/Restoration.

After the plant has been stabilized following the PT-505 failure, 21 Charging Pump will trip. The crew should respond in accordance with the ARP's and start 22 Charging Pump IAW S2.OP-SO.CV-0002, Charging Pump Operation. Letdown should be restored IAW S2.OP-SO.CVC-0001, Charging, Letdown and Seal Injection.

After letdown has been restored, a Reactor Coolant System leak will develop inside Containment. The crew should recognize changing Containment and Reactor Coolant System parameters and respond IAW S2.OP-AB.RC-0001, Reactor Coolant System Leak.

While the crew is executing S2.OP-AB.RC-0001, a small break LOCA will occur inside Containment. The crew should initiate a manual reactor trip and safety injection and enter EOP-TRIP-0001, Reactor Trip or Safety Injection. 2C Safeguards Equipment Control (SEC) fails to actuate when SI is initiated. The crew should perform 2C SEC actions, as directed by EOP-TRIP-0001.

The crew should transition to EOP-LOCA-1, Loss of Reactor Coolant, and then to EOP-LOCA-2, Post-LOCA Cooldown and Depressurization. The scenario may be terminated after the transition to EOP-LOCA-2 or at the discretion of the Lead Evaluator.

OPERATING TEST NO.: **CREW A (2 SRO-I, 1 RO)**

Applicant Type	Evolution Type	Minimum Number	Scenario Number			
			1	2	3	4
RO1 RO/PO	Reactivity	1	1/			
	Normal	1		/1		/1
	Instrument	2	2,4/			
	Component	2	5/	/7		/3,4,6,7
	Major	1	6/	/6		/5
SRO1/SRO2 As RO or PO SRO-I As SRO	Reactivity	1		1/		/1
	Normal	0	/1			
	Instrument	1		2,3/		/2,8
	Component	1	/3,7	4,5,7,8/		/4,7
	Major	1	/6	6/		/5
	Reactivity	0				
	Normal	1	1/	/1		1/
	Instrument	1	2,4,8/	/2,3		2,8/
	Component	1	3,5,7/	/4,5,7,8		3,4,6,7/
	Major	1	6/	/6		5/
SRO-U	Reactivity	0				
	Normal	1				
	Instrument	1				
	Component	1				
	Major	1				

- Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
 (2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author:



Chief Examiner:

CREW A Competencies	RO1 RO/SRO-I/SRO-U				SRO1 RO/SRO-I/SRO-U				SRO2 RO/SRO-I/SRO-U			
	SCENARIO				SCENARIO				SCENARIO			
	1 RO	2 PO	3	4 PO	1 SR	2 RO	3	4 SR	1 PO	2 SR	3	4 RO
Understand and Interpret Annunciators and Alarms	2,4,5,6	6,7		3,4,5,6,7	2,4,5,6,8	2,3,4,5,6,8		2,3,4,5,7,8	3,6,7,8	2,3,4,5,6,8		2,5,8
Diagnose Events and Conditions	2,4,5,6	6,7		3,4,5,6,7	2,4,5,6	2,3,4,5,6,8		2,3,4,5,7,8	2,3,6,7,8	2,3,4,5,6,7,8		2,5,8
Understand Plant and System Response	1,2,4,5,6	1,6,7		3,4,5,6,7	1,2,4,5,6,8	ALL		2,3,4,5,7,8	2,3,6,7,8	ALL		1,2,5,7,8
Comply With and Use Procedures (1)	1,2,4,5,6	1,4,6,7		1,3,4,5,7	ALL	ALL		ALL	2,6,7,8	ALL		1,2,4,5,7,8
Operate Control Boards (2)	1,2,4,5,6	1,4,6,7		1,3,5,6,7		1,2,3,4,5,6,8			1,2,3,6,7,8			1,2,4,5,8
Communicate and Interact With the Crew	ALL	ALL		ALL	ALL	ALL		ALL	ALL	ALL		ALL
Demonstrate Supervisory Ability (3)					1,2,3,4,5,6,8			1,2,3,5,7,8		1,2,3,4,5,6,8		
Comply With and Use Tech. Specs. (3)					2,4,6			2		3,4		

Notes:


- (1) Includes Technical Specification compliance for an RO.
 (2) Optional for an SRO-U.
 (3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author:

Chief Examiner:



OPERATING TEST NO.: **CREW B (2 SRO-I, 1 RO)**

Applicant Type	Evolution Type	Minimum Number	Scenario Number			
			1	2	3	4
RO2 RO/PO	Reactivity	1	1/			
	Normal	1		/1		/1
	Instrument	2	2,4/			
	Component	2	5/	/7		/3,4,6,7
	Major	1	6/	/6		/5
SRO3/SRO4 As RO or PO SRO-I As SRO	Reactivity	1		1/		/1
	Normal	0	/1			
	Instrument	1		2,3/		/2,8
	Component	1	/3,7	4,5,7,8/		/4,7
	Major	1	/6	6/		/5
	Reactivity	0				
	Normal	1	1/	/1		1/
	Instrument	1	2,4,8/	/2,3		2,8/
	Component	1	3,5,7/	/4,5,7,8		3,4,6,7/
	Major	1	6/	/6		5/
SRO-U	Reactivity	0				
	Normal	1				
	Instrument	1				
	Component	1				
	Major	1				

- Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
 (2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author:



Chief Examiner:

CREW B Competencies	RO2 RO/SRO-I/SRO-U				SRO3 RO/SRO-I/SRO-U				SRO4 RO/SRO-I/SRO-U			
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4
	RO	PO		PO	SR	RO		SR	PO	SR		RO
Understand and Interpret Annunciators and Alarms	2,4,5,6	6,7		3,4,5,6,7	2,4,5,6,8	2,3,4,5,6,8		2,3,4,5,7,8	3,6,7,8	2,3,4,5,6,8		2,5,8
Diagnose Events and Conditions	2,4,5,6	6,7		3,4,5,6,7	2,4,5,6	2,3,4,5,6,8		2,3,4,5,7,8	2,3,6,7,8	2,3,4,5,6,7,8		2,5,8
Understand Plant and System Response	1,2,4,5,6	1,6,7		3,4,5,6,7	1,2,4,5,6,8	ALL		2,3,4,5,7,8	2,3,6,7,8	ALL		1,2,5,7,8
Comply With and Use Procedures (1)	1,2,4,5,6	1,4,6,7		1,3,4,5,7	ALL	ALL		ALL	2,6,7,8	ALL		1,2,4,5,7,8
Operate Control Boards (2)	1,2,4,5,6	1,4,6,7		1,3,5,6,7		1,2,3,4,5,6,8			1,2,3,6,7,8			1,2,4,5,8
Communicate and Interact With the Crew	ALL	ALL		ALL	ALL	ALL		ALL	ALL	ALL		ALL
Demonstrate Supervisory Ability (3)					1,2,3,4,5,6,8			1,2,3,5,7,8		1,2,3,4,5,6,8		
Comply With and Use Tech. Specs. (3)					2,4,6			2		3,4		

Notes:

(1) Includes Technical Specification compliance for an RO.

(2) Optional for an SRO-U.

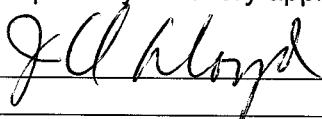
(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author:

Chief Examiner:



OPERATING TEST NO.: **CREW C (2 SRO-I, 1 RO)**

Applicant Type	Evolution Type	Minimum Number	Scenario Number			
			1	2	3	4
RO3 RO/PO	Reactivity	1	1/			
	Normal	1			/1	/1
	Instrument	2	2,4/			
	Component	2	5/		/5	/3,4,6,7
	Major	1	6/		/6,8	/5
SRO5/SRO6 As RO or PO SRO-I As SRO	Reactivity	1			1/	/1
	Normal	0	/1			
	Instrument	1			2,4/	/2,8
	Component	1	/3,7		3,7/	/4,7
	Major	1	/6		6,8/	/5
	Reactivity	0				
	Normal	1	1/		/1	1/
	Instrument	1	2,4,8/		/2,4	2,8/
	Component	1	3,5,7/		/3,5,7	3,4,6,7/
	Major	1	6/		/6,8	5/
SRO-U	Reactivity	0				
	Normal	1				
	Instrument	1				
	Component	1				
	Major	1				

- Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
 (2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author:

Chief Examiner:

CREW C Competencies	RO3 RO/SRO-I/SRO-U				SRO5 RO/SRO-I/SRO-U				SRO6 RO/SRO-I/SRO-U			
	SCENARIO				SCENARIO				SCENARIO			
	1 RO	2	3 PO	4 PO	1 SR	2	3 RO	4 SR	1 PO	2	3 SR	4 RO
Understand and Interpret Annunciators and Alarms	2,4,5 ,6		5,6,8	3,4,5 ,6,7	2,4,5 ,6,8		2,3,4 ,6,7, 8	2,3,4 ,5,7, 8	3,6,7 ,8		2,3,4 ,5,6, 8	2,5,8
Diagnose Events and Conditions	2,4,5 ,6		5,6,8	3,4,5 ,6,7	2,4,5 ,6		2,3,4 ,6,7, 8	2,3,4 ,5,7, 8	2,3,6 ,7,8		2,3,4 ,5,6, 8	2,5,8
Understand Plant and System Response	1,2,4 ,5,6		1,5,6 ,8	3,4,5 ,6,7	1,2,4 ,5,6, 8		ALL	2,3,4 ,5,7, 8	2,3,6 ,7,8		ALL	1,2,5 ,7,8
Comply With and Use Procedures (1)	1,2,4 ,5,6		1,4,5 ,6,8	1,3,4 ,5,7	ALL		ALL	ALL	2,6,7 ,8		ALL	1,2,4 ,5,7, 8
Operate Control Boards (2)	1,2,4 ,5,6		1,4,5 ,6,8	1,3,5 ,6,7			ALL		1,2,3 ,6,7, 8			1,2,4 ,5,8
Communicate and Interact With the Crew	ALL		ALL	ALL	ALL		ALL	ALL	ALL		ALL	ALL
Demonstrate Supervisory Ability (3)					1,2,3 ,4,5, 6,8			1,2,3 ,5,7, 8			ALL	
Comply With and Use Tech. Specs. (3)					2,4,6			2			2,3,4	

Notes:

(1) Includes Technical Specification compliance for an RO.

(2) Optional for an SRO-U.

(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author:

Chief Examiner:

J. C. Klop

CREW C Competencies	RO3 RO/SRO-I/SRO-U				SRO5 RO/SRO-I/SRO-U				SRO6 RO/SRO-I/SRO-U			
	SCENARIO				SCENARIO				SCENARIO			
	1 RO	2	3 PO	4 PO	1 SR	2	3 RO	4 SR	1 PO	2	3 SR	4 RO
Understand and Interpret Annunciators and Alarms	2,4,5 ,6		5,6,8	3,4,5 ,6,7	2,4,5 ,6,8		2,3,4 ,6,7, 8	2,3,4 ,5,7, 8	3,6,7 ,8		2,3,4 ,5,6, 8	2,5,8
Diagnose Events and Conditions	2,4,5 ,6		5,6,8	3,4,5 ,6,7	2,4,5 ,6		2,3,4 ,6,7, 8	2,3,4 ,5,7, 8	2,3,6 ,7,8		2,3,4 ,5,6, 8	2,5,8
Understand Plant and System Response	1,2,4 ,5,6		1,5,6 ,8	3,4,5 ,6,7	1,2,4 ,5,6, 8		ALL	2,3,4 ,5,7, 8	2,3,6 ,7,8		ALL	1,2,5 ,7,8
Comply With and Use Procedures (1)	1,2,4 ,5,6		1,4,5 ,6,8	1,3,4 ,5,7	ALL		ALL	ALL	2,6,7 ,8		ALL	1,2,4 ,5,7, 8
Operate Control Boards (2)	1,2,4 ,5,6		1,4,5 ,6,8	1,3,5 ,6,7			ALL		1,2,3 ,6,7, 8			1,2,4 ,5,8
Communicate and Interact With the Crew	ALL		ALL	ALL	ALL		ALL	ALL	ALL		ALL	ALL
Demonstrate Supervisory Ability (3)					1,2,3 ,4,5, 6,8			1,2,3 ,5,7, 8			ALL	
Comply With and Use Tech. Specs. (3)					2,4,6			2			2,3,4	

Notes:

(1) Includes Technical Specification compliance for an RO.

(2) Optional for an SRO-U.

(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author:

Chief Examiner:

J. L. Lloyd

OPERATING TEST NO.: **CREW D (2 SRO-I, 1 RO)**

Applicant Type	Evolution Type	Minimum Number	Scenario Number			
			1	2	3	4
RO4 RO/PO	Reactivity	1	1/			
	Normal	1			/1	/1
	Instrument	2	2,4/			
	Component	2	5/		/5	/3,4,6,7
	Major	1	6/		/6,8	/5
SRO7/SRO8 As RO or PO SRO-I As SRO	Reactivity	1			1/	/1
	Normal	0	/1			
	Instrument	1			2,4/	/2,8
	Component	1	/3,7		3,7/	/4,7
	Major	1	/6		6,8/	/5
	Reactivity	0				
	Normal	1	1/		/1	1/
	Instrument	1	2,4,8/		/2,4	2,8/
	Component	1	3,5,7/		/3,5,7	3,4,6,7/
	Major	1	6/		/6,8	5/
SRO-U	Reactivity	0				
	Normal	1				
	Instrument	1				
	Component	1				
	Major	1				

- Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
 (2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author:



Chief Examiner:

CREW D Competencies	RO4 RO/SRO-I/SRO-U				SRO7 RO/SRO-I/SRO-U				SRO8 RO/SRO-I/SRO-U			
	SCENARIO				SCENARIO				SCENARIO			
	1 RO	2	3 PO	4 PO	1 SR	2	3 RO	4 SR	1 PO	2	3 SR	4 RO
Understand and Interpret Annunciators and Alarms	2,4,5 ,6		5,6,8	3,4,5 ,6,7	2,4,5 ,6,8		2,3,4 ,6,7, 8	2,3,4 ,5,7, 8	3,6,7 ,8		2,3,4 ,5,6, 8	2,5,8
Diagnose Events and Conditions	2,4,5 ,6		5,6,8	3,4,5 ,6,7	2,4,5 ,6		2,3,4 ,6,7, 8	2,3,4 ,5,7, 8	2,3,6 ,7,8		2,3,4 ,5,6, 8	2,5,8
Understand Plant and System Response	1,2,4 ,5,6		1,5,6 ,8	3,4,5 ,6,7	1,2,4 ,5,6, 8		ALL	2,3,4 ,5,7, 8	2,3,6 ,7,8		ALL	1,2,5 ,7,8
Comply With and Use Procedures (1)	1,2,4 ,5,6		1,4,5 ,6,8	1,3,4 ,5,7	ALL		ALL	ALL	2,6,7 ,8		ALL	1,2,4 ,5,7, 8
Operate Control Boards (2)	1,2,4 ,5,6		1,4,5 ,6,8	1,3,5 ,6,7			ALL		1,2,3 ,6,7, 8			1,2,4 ,5,8
Communicate and Interact With the Crew	ALL		ALL	ALL	ALL		ALL	ALL	ALL		ALL	ALL
Demonstrate Supervisory Ability (3)					1,2,3 ,4,5, 6,8			1,2,3 ,5,7, 8			ALL	
Comply With and Use Tech. Specs. (3)					2,4,6			2			2,3,4	

Notes:

(1) Includes Technical Specification compliance for an RO.

(2) Optional for an SRO-U.

(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author: _____

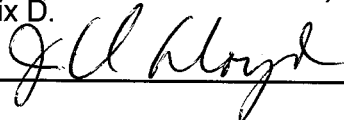
Chief Examiner: _____

OPERATING TEST NO.: **CREW E (1 SRO-I, 1 SRO-U, 1 RO)**

Applicant Type	Evolution Type	Minimum Number	Scenario Number			
			1	2	3	4
RO5 RO	Reactivity	1		1/		
	Normal	1			/1	
	Instrument	2		2,3/		
	Component	2		4,5,7,8/	/5	
	Major	1		6/	/6,8	
SRO9 As RO or PO SRO-I As SRO	Reactivity	1			1	
	Normal	0				
	Instrument	1			2,4	
	Component	1			3,7	
	Major	1			6,8	
	Reactivity	0				
	Normal	1		1		
	Instrument	1		2,3		
	Component	1		4,5,7,8		
	Major	1		6		
SRO10 SRO-U PO/SRO	Reactivity	0				
	Normal	1		1/	/1	
	Instrument	1			/2,4	
	Component	1		7/	/3,5,7	
	Major	1		6/	/6,8	

- Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
- (2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author:



Chief Examiner:

CREW E Competencies	RO5 RO/SRO-I/SRO-U				SRO9 RO/SRO-I/SRO-U				SRO10 RO/SRO-I/SRO-U			
	SCENARIO				SCENARIO				SCENARIO			
	1	2 RO	3 PO	4	1	2 SR	3 RO	4	1	2 PO	3 SR	4
		2,3,4 ,5,6, 8	5,6,8			2,3,4 ,5,6, 8	2,3,4 ,6,7, 8			6,7	2,3,4 ,5,6, 8	
Understand and Interpret Annunciators and Alarms		2,3,4 ,5,6, 8	5,6,8			2,3,4 ,5,6, 7,8	2,3,4 ,6,7, 8			6,7	2,3,4 ,5,6, 8	
Diagnose Events and Conditions		2,3,4 ,5,6, 8	5,6,8			2,3,4 ,5,6, 7,8	2,3,4 ,6,7, 8			6,7	2,3,4 ,5,6, 8	
Understand Plant and System Response		ALL	1,5,6 ,8			ALL	ALL			1,6,7	ALL	
Comply With and Use Procedures (1)		ALL	1,4,5 ,6,8			ALL	ALL			1,4,6 ,7	ALL	
Operate Control Boards (2)		1,2,3 ,4,5, 6,8	1,4,5 ,6,8				ALL			1,4,6 ,7		
Communicate and Interact With the Crew		ALL	ALL			ALL	ALL			ALL	ALL	
Demonstrate Supervisory Ability (3)						1,2,3 ,4,5, 6,8					ALL	
Comply With and Use Tech. Specs. (3)						3,4					2,3,4	

Notes:

(1) Includes Technical Specification compliance for an RO.

(2) Optional for an SRO-U.


(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author:

Chief Examiner:



OPERATING TEST NO.: **CREW F (1 SRO-I, 1 SRO-U, 1 RO)**

Applicant Type	Evolution Type	Minimum Number	Scenario Number			
			1	2	3	4
RO6 RO	Reactivity	1		1/		
	Normal	1			/1	
	Instrument	2		2,3/		
	Component	2		4,5,7,8/	/5	
	Major	1		6/	/6,8	
SRO11 As RO or PO SRO-I As SRO	Reactivity	1			1	
	Normal	0				
	Instrument	1			2,4	
	Component	1			3,7	
	Major	1			6,8	
	Reactivity	0				
	Normal	1		1		
	Instrument	1		2,3		
	Component	1		4,5,7,8		
	Major	1		6		
SRO12 SRO-U PO/SRO	Reactivity	0				
	Normal	1		1/	/1	
	Instrument	1			/2,4	
	Component	1		7/	/3,5,7	
	Major	1		6/	/6,8	

- Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
 (2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author:

Chief Examiner:



CREW F Competencies	RO6 RO/SRO-I/SRO-U				SRO11 RO/SRO-I/SRO-U				SRO12 RO/SRO-I/SRO-U			
	SCENARIO				SCENARIO				SCENARIO			
	1	2 RO	3 PO	4	1	2 SR	3 RO	4	1	2 PO	3 SR	4
Understand and Interpret Annunciators and Alarms		2,3,4 ,5,6, 8	5,6,8			2,3,4 ,5,6, 8	2,3,4 ,6,7, 8			6,7	2,3,4 ,5,6, 8	
Diagnose Events and Conditions		2,3,4 ,5,6, 8	5,6,8			2,3,4 ,5,6, 7,8	2,3,4 ,6,7, 8			6,7	2,3,4 ,5,6, 8	
Understand Plant and System Response		ALL	1,5,6 ,8			ALL	ALL			1,6,7	ALL	
Comply With and Use Procedures (1)		ALL	1,4,5 ,6,8			ALL	ALL			1,4,6 ,7	ALL	
Operate Control Boards (2)		1,2,3 ,4,5, 6,8	1,4,5 ,6,8				ALL			1,4,6 ,7		
Communicate and Interact With the Crew		ALL	ALL			ALL	ALL			ALL	ALL	
Demonstrate Supervisory Ability (3)						1,2,3 ,4,5, 6,8					ALL	
Comply With and Use Tech. Specs. (3)						3,4					2,3,4	

Notes:

(1) Includes Technical Specification compliance for an RO.

(2) Optional for an SRO-U.

(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author:

Chief Examiner:

