

Facility:		Date of Exam:																
Tier	Group	RO K/A Category Points											SRO-Only Points					
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2	G*	Total		
1. Emergency and Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A			3	18				
	2	1	2	2	N/A			2	1	N/A			1	9				
	Tier Totals	4	5	5	N/A			5	4	N/A			4	27				
2. Plant Systems	1	3	2	3	3	1	1	3	3	3	3	3	28					
	2	1	1	1	1	1	1	1	1	1	1	0	10					
	Tier Totals	4	3	4	4	2	2	4	4	4	4	3	38					
3. Generic Knowledge and Abilities Categories					1		2		3		4		10		1	2	3	4
					2		3		2		3							

- Note:
1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outline sections (i.e., except for one category in Tier 3 of the SRO-only section, the "Tier Totals" in each K/A category shall not be less than two). (One Tier 3 radiation control K/A is allowed if it is replaced by a K/A from another Tier 3 category.)
  2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points, and the SRO-only exam must total 25 points.
  3. Systems/evolutions within each group are identified on the 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.
  4. Select topics from as many systems and evolutions as possible. Sample every system or evolution in the group before selecting a second topic for any system or evolution.
  5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
  6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
  7. The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
  8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' 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.
  9. For Tier 3, select topics from Section 2 of the K/A catalog and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

G\* Generic K/As

- \* These systems/evolutions must be included as part of the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan. They are not required to be included when using earlier revisions of the K/A catalog.
- \*\* These systems/evolutions may be eliminated from the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan.

ES-401		PWR Examination Outline						Form ES-401-2	
Emergency and Abnormal Plant Evolutions—Tier 1/Group 1 (RO)									
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#
000007 (EPE 7; BW E02&E10; CE E02) Reactor Trip, Stabilization, Recovery / 1					X		EA2.01 Ability to determine or interpret the following as they apply to a reactor trip: Decreasing power level, from available indications.  (CFR 41.7 / 45.5 / 45.6)	4.1	1
000008 (APE 8) Pressurizer Vapor Space Accident / 3						X	2.1.28 Knowledge of the purpose and function of major system components and controls.  (CFR 41.7)	4.1	2
000009 (EPE 9) Small Break LOCA / 3	X						EK 1.02 Knowledge of the operational implications of the following concepts as they apply to the small break LOCA: Use of steam tables (CFR 41.8 / 41.10 / 45.3)	3.5	3
000011 (EPE 11) Large Break LOCA / 3			X				EK3.10 Knowledge of the reasons for the following responses as they apply to the Large Break LOCA: PTS limits on RCS pressure and temperature. (CFR 41.5 / 41.10 / 45.6 / 45.13)	3.7	4
000015 (APE 15) Reactor Coolant Pump Malfunctions / 4			X				AK3.03 Sequence of events for manually tripping reactor and RCP as a result of an RCP malfunction. (CFR 41.5, 41.10 / 45.6 / 45.13)	3.7	5
000022 (APE 22) Loss of Reactor Coolant Makeup / 2 SRO				X			AA1.08 Ability to operate and / or monitor the following as they apply to the Loss of Reactor Coolant Makeup: VCT level. (CFR 41.7 / 45.5 / 45.6)	3.4	6
000025 (APE 25) Loss of Residual Heat Removal System / 4					X		AA2.07 Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: Pump cavitation. (CFR 43.5 / 45.13)	3.4	7
000026 (APE 26) Loss of Component Cooling Water / 8						X	2.1.19 Ability to use plant computers to evaluate system or component status  (CFR 41.10 / 45.12)	3.9	8
000027 (APE 27) Pressurizer Pressure Control System Malfunction / 3	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to Pressurizer Pressure Control Malfunctions: Expansion of liquids as temperature increases. (CFR 41.8 / 41.10 / 45.3)	2.8	9
000029 (EPE 29) Anticipated Transient Without Scram / 1 SRO									
000038 (EPE 38) Steam Generator Tube Rupture / 3 SRO									
000040 (APE 40; BW E05; CE E05; W E12) Steam Line Rupture—Excessive Heat Transfer / 4 SRO									
000054 (APE 54; CE E06) Loss of Main Feedwater / 4 SRO									

ES-401		PWR Examination Outline						Form ES-401-2	
Emergency and Abnormal Plant Evolutions—Tier 1/Group 1 (RO)									
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#
000055 (EPE 55) Station Blackout / 6	X						EK1.02 Knowledge of the operational implications of the following concepts as they apply to the Station Blackout: Natural circulation cooling. (CFR 41.8 / 41.10 / 45.3)	4.1	10
000056 (APE 56) Loss of Offsite Power / 6			X				AK3.01 Knowledge of the reasons for the following responses as they apply to the Loss of Offsite Power: Order and time to initiation of power for the load sequencer. (CFR 41.5, 41.10 / 45.6 / 45.13)	3.5	11
000057 (APE 57) Loss of Vital AC Instrument Bus / 6				X			AA1.06 Ability to operate and / or monitor the following as they apply to the Loss of Vital AC Instrument Bus: Manual control of components for which automatic control is lost. (CFR 41.7 / 45.5, 45.6)	3.5	12
000058 (APE 58) Loss of DC Power / 6					X		AA2.01 Ability to determine and interpret the following as they apply to the Loss of DC Power: That a loss of dc power has occurred; verification that substitute power sources have come online. (CFR 43.5 / 45.13)	3.7	13
000062 (APE 62) Loss of Nuclear Service Water / 4						X	2.2.42 Ability to recognize system parameters that are entry-level conditions for Technical Specifications. (CFR 41.7 / 41.10 / 43.2 / 43.3 / 45.3)	3.9	14
000065 (APE 65) Loss of Instrument Air / 8				X			AA1.03 Ability to operate and / or monitor the following as they apply to the Loss of Instrument Air: Restoration of systems served by instrument air when pressure is regained. (CFR 41.7 / 45.5 / 45.6)	2.9	15
000077 (APE 77) Generator Voltage and Electric Grid Disturbances / 6		X					AK2.04 Knowledge of the interrelations between Generator Voltage and Electric Grid Disturbances and the following: Controllers, positioners. (CFR 41.4, 41.5, 41.7, 41.10 / 45.8)	3.0	16
(W E04) LOCA Outside Containment / 3		X					EK2.2 Knowledge of the interrelations between the (LOCA Outside Containment) and the following: 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. (CFR 41.7 / 45.7)	3.8	17
(W E11) Loss of Emergency Coolant Recirculation / 4		X					EK2.1 Knowledge of the interrelations between the (Loss of Emergency Coolant Recirculation) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features. (CFR 41.7 / 45.7)	3.6	18
(BW E04; W E05) Inadequate Heat Transfer—Loss of Secondary Heat Sink / 4 SRO									
K/A Category Totals:	3	3	3	3	3	3	Group Point Total:		18

ES-401		PWR Examination Outline						Form ES-401-2		
Emergency and Abnormal Plant Evolutions—Tier 1/Group 2 (RO)										
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#	
000001 (APE 1) Continuous Rod Withdrawal / 1										
000003 (APE 3) Dropped Control Rod / 1										
000005 (APE 5) Inoperable/Stuck Control Rod / 1										
000024 (APE 24) Emergency Boration / 1										
000028 (APE 28) Pressurizer (PZR) Level Control Malfunction / 2		X					AK2.02 Knowledge of the interrelations between the Pressurizer Level Control Malfunctions and the following: Sensors and detectors. (CFR 41.7 / 45.7)	2.6	19	
000032 (APE 32) Loss of Source Range Nuclear Instrumentation / 7 SRO										
000033 (APE 33) Loss of Intermediate Range Nuclear Instrumentation / 7										
000036 (APE 36; BW/A08) Fuel-Handling Incidents / 8										
000037 (APE 37) Steam Generator Tube Leak / 3										
000051 (APE 51) Loss of Condenser Vacuum / 4			X				AK 3.01 Knowledge of the reasons for the following responses as they apply to the Loss of Condenser Vacuum: Loss of steam dump capability upon loss of condenser vacuum. (CFR 41.5, 41.10 / 45.6 / 45.13)	2.8	20	
000059 (APE 59) Accidental Liquid Radwaste Release / 9										
000060 (APE 60) Accidental Gaseous Radwaste Release / 9										
000061 (APE 61) Area Radiation Monitoring System Alarms / 7				X			AA1.01 Ability to operate and / or monitor the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: Automatic actuation. (CFR 41.7 / 45.5. / 45.6)	3.6	21	
000067 (APE 67) Plant Fire On Site / 8					X		AA2.03 Ability to determine and interpret the following as they apply to the Plant Fire on Site: Fire alarm (CFR 43.5 / 45.13)	3.3	22	
000068 (APE 68; BW A06) Control Room Evacuation / 8						X	2.4.1 Knowledge of EOP entry conditions and immediate actions steps. (CFR 41.10 / 43.5 / 45.13)	4.6	23	
000069 (APE 69; W E14) Loss of Containment Integrity / 5	X						AK1.01 Knowledge of the operational implications of the following concepts as they apply to Loss of Containment Integrity: Effect of pressure on leak rate. (CFR 41.8 / 41.10 / 45.3)	2.6	24	
000074 (EPE 74; W E06 & E07) Inadequate Core Cooling / 4		X					EK2.04 Knowledge of the interrelations between the and the following Inadequate Core Cooling: HPI pumps. (CFR 41.7 / 45.7)	3.9	25	
000076 (APE 76) High Reactor Coolant Activity / 9 SRO										
000078 (APE 78*) RCS Leak / 3							N/A			

ES-401		PWR Examination Outline						Form ES-401-2	
Emergency and Abnormal Plant Evolutions—Tier 1/Group 2 (RO)									
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#
(W E01 & E02) Rediagnosis & SI Termination / 3			X				EK3.3 Knowledge of the reasons for the following responses as they apply to the (SI Termination); Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations. (CFR 41.5 / 41.10, 45.6, 45.13)	3.9	26
(W E13) Steam Generator Overpressure / 4									
(W E15) Containment Flooding / 5				X			EA1.3 Ability to operate and / or monitor the following as they apply to the (Containment Flooding): Desired operating results during abnormal and emergency situations.	2.8	27
(W E16) High Containment Radiation / 9 SRO									
(BW A01) Plant Runback / 1							N/A		
(BW A02 & A03) Loss of NNI-X/Y/7							N/A		
(BW A04) Turbine Trip / 4							N/A		
(BW A05) Emergency Diesel Actuation / 6							N/A		
(BW A07) Flooding / 8							N/A		
(BW E03) Inadequate Subcooling Margin / 4							N/A		
(BW E08; W E03) LOCA Cooldown—Depressurization / 4									
(BW E09; CE A13**; W E09 & E10) Natural Circulation/4 SRO									
(BW E13 & E14) EOP Rules and Enclosures							N/A		
(CE A11**, W E08) RCS Overcooling—Pressurized Thermal Shock / 4									
(CE A16) Excess RCS Leakage / 2							N/A		
(CE E09) Functional Recovery							N/A		
(CE E13*) Loss of Forced Circulation/LOOP/Blackout / 4							N/A		
K/A Category Point Totals:	1	2	2	2	1	1	Group Point Total:		9

ES-401		PWR Examination Outline Plant Systems—Tier 2/Group 1 (RO)											Form ES-401-2	
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
003 (SF4P RCP) Reactor Coolant Pump								X				A2.01 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: Problems with RCP seals, especially rates of seal leak-off.  (CFR 41.5 / 43.5 / 45.3 / 45.13)	3.5	28
004 (SF1; SF2 CVCS) Chemical and Volume Control									X			A3.02 Ability to monitor automatic operation of the CVCS, including: Letdown isolation.  (CFR 41.7 / 45.5.)	3.6	29
005 (SF4P RHR) Residual Heat Removal										X		A4.01 Ability to manually operate and/or monitor in the control room: Controls and indication for RHR pumps. (CFR 41.7 / 45.5. to 45.8)	3.6	30
006 (SF2; SF3 ECCS) Emergency Core Cooling											X	2.1.19 Ability to use plant computers to evaluate system or component status.  (CFR 41.10 / 45.12)	3.9	31
007 (SF5 PRTS) Pressurizer Relief/Quench Tank	X											K1.03 Knowledge of the physical connections and/or cause-effect relationships between the PRTS and the following systems: RCS  (CFR 41.2 to 41.9 / 45.7 to 45.8)	3.0	32
008 (SF8 CCW) Component Cooling Water		X										K2.02 Knowledge of bus power supplies to the following: CCW pump, including emergency backup.  (CFR 41.2 to 41.9 / 45.7 to 45.9)	3.0	33
010 (SF3 PZR PCS) Pressurizer Pressure Control <b>SRO</b>			X									Knowledge of the effect that a loss or malfunction of the PZR PCS will have on the following: RPS.  (CFR 41.7 / 45.6)	4.0	34
012 (SF7 RPS) Reactor Protection				X								K4.06 Knowledge of RPS design feature(s) and/or interlock(s) which provide for the following: Automatic or manual enable/disable of RPS trips.  (CFR 41.7)	3.2	35
012 (SF7 RPS) Reactor Protection					X							K5.01 Knowledge of the operational implications of the following concepts as they apply to the RPS: DNB.  (CFR 41.5 / 45.7)	3.3	36
013 (SF2 ESFAS) Engineered Safety Features Actuation <b>SRO</b>						X						K6.01 Knowledge of the effect of a loss or malfunction on the following will have on the ESFAS: Sensors and detectors.  (CFR 41.7 / 45.5 to 45.8)	2.7	37

ES-401		PWR Examination Outline Plant Systems—Tier 2/Group 1 (RO)											Form ES-401-2	
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
022 (SF5 CCS) Containment Cooling							X					A1.02 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCS controls including: Containment pressure (CFR 41.5 / 45.5)	3.6	38
022 (SF5 CCS) Containment Cooling								X				A2.05 Ability to (a) predict the impacts of the following malfunctions or operations on the CCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Major leak in CCS (CFR 41.5 / 43.5 / 45.3 / 45.13)	3.1	39
025 (SF5 ICE) Ice Condenser												N/A		
026 (SF5 CSS) Containment Spray									X			A2.04 Ability to (a) predict the impacts of the following malfunctions or operations on the CSS; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations: Failure of spray pump. (CFR 41.5 / 43.5 / 45.3 / 45.13)	3.9	40
026 (SF5 CSS) Containment Spray										X		A3.01 Ability to monitor automatic operation of the CSS, including: Pump starts and correct MOV positioning (CFR 41.7 / 45.5)	4.3	41
039 (SF4S MSS) Main and Reheat Steam											X	2.1.20 Ability to interpret and execute procedure steps. (CFR 41.10 / 43.5 / 45.12)	4.6	42
059 (SF4S MFW) Main Feedwater	X											K1.04 Knowledge of the physical connections and/or cause-effect relationships between the MFW and the following systems: S/GS water level control system	3.4	43
059 (SF4S MFW) Main Feedwater			X									K3.02 Knowledge of the effect that a loss or malfunction of the MFW will have on the following: AFW system. (CFR 41.7 / 45.6)	3.6	44
061 (SF4S AFW) Auxiliary/Emergency Feedwater			X									K3.01 Knowledge of the effect that a loss or malfunction of the AFW will have on the following: RCS (CFR 41.7 / 45.6)	4.4	45
061 (SF4S AFW) Auxiliary/Emergency Feedwater				X								K4.04 Knowledge of AFW design feature(s) and/or interlocks(s) which provide for the following: Prevention of AFW runoff by limiting AFW flow. (CFR 41.7)	3.1	46

ES-401		PWR Examination Outline Plant Systems—Tier 2/Group 1 (RO)											Form ES-401-2	
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
062 (SF6 ED AC) AC Electrical Distribution			X									K4.10 Knowledge of ac distribution system design feature(s) and/or interlock(s) which provide for the following: Uninterruptable ac power sources.  (CFR 41.7)	3.1	47
063 (SF6 ED DC) DC Electrical Distribution		X										K2.01 Knowledge of bus power supplies to the following: Major DC loads  (CFR 41.7)	2.9	48
063 (SF6 ED DC) DC Electrical Distribution							X					A1.01 Ability to predict and/or monitor changes in parameters associated with operating the DC electrical system controls including: Battery capacity as it is affected by discharge rate.  (CFR 41.5 / 45.5)	2.5	49
064 (SF6 EDG) Emergency Diesel Generator								X				A2.09 Ability to (a) predict the impacts of the following malfunctions or operations on the ED/G system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Synchronization of the ED/G with other electric power supplies.  (CFR 41.5 / 43.5 / 45.3 / 45.13)	3.1	50
064 (SF6 EDG) Emergency Diesel Generator									X			A3.02 Ability to monitor automatic operation of the ED/G system, including minimum time for load pickup.  (CFR 41.7 / 45.5)	3.4	51
073 (SF7 PRM) Process Radiation Monitoring <b>SRO</b>										X		A4.02 Ability to manually operate and/or monitor in the control room: Radiation monitoring system control panel.  (CFR 41.7 / 45.5 to 45.8)	3.7	52
076 (SF4S SW) Service Water											X	2.4.45 Ability to prioritize and interpret the significance of each annunciator or alarm.  (CFR 41.10 / 43.5 / 45.3 / 45.12)	4.1	53
078 (SF8 IAS) Instrument Air <b>SRO</b>	X											K1.04 Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: Cooling water to compressor  (CFR 41.2 to 41.9 / 45.7 to 45.8)	2.6	54
103 (SF5 CNT) Containment <b>SRO</b>							X					A1.01 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the containment system controls including: Containment pressure, temperature, and humidity.  (CFR 41.5 / 45.5)	3.7	55
053 (SF1; SF4P ICS*) Integrated Control												N/A		
<b>K/A Category Point Totals:</b>	3	2	3	3	1	1	3	3	3	3	3	<b>Group Point Total:</b>		28



ES-401		PWR Examination Outline											Form ES-401-2	
Plant Systems—Tier 2/Group 2 (RO)														
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
001 (SF1 CRDS) Control Rod Drive										X		A4.03 Ability to manually operate and/or monitor in the control room: CRDS mode control. (CFR 41.7 / 45.5 to 45.8)	4.0	56
002 (SF2; SF4P RCS) Reactor Coolant														
011 (SF2 PZR LCS) Pressurizer Level Control														
014 (SF1 RPI) Rod Position Indication														
015 (SF7 NI) Nuclear Instrumentation						X						K6.04 Knowledge of the effect of a loss or malfunction on the following will have on the NIS: Bistables and logic circuits (CFR 41.7 / 45.7)	3.1	57
016 (SF7 NNI) Nonnuclear Instrumentation														
017 (SF7 ITM) In-Core Temperature Monitor	X											K1.02 Knowledge of the physical connections and/or cause-effect relationships between the ITM system and the following systems: RCS (CFR 41.2 to 41.9 / 45.7 to 45.8)	3.3	58
027 (SF5 CIRS) Containment Iodine Removal														
028 (SF5 HRPS) Hydrogen Recombiner and Purge Control		X										K2.01 Knowledge of bus power supplies to the following: Hydrogen recombiners (CFR 41.7)	2.5	59
029 (SF8 CPS) Containment Purge			X									K3.01 Knowledge of the effect that a loss of malfunction of the Containment Purge System will have on the following: Containment parameters. (CFR 41.7 / 45.6)	2.9	60
033 (SF8 SFPCS) Spent Fuel Pool Cooling SRO														
034 (SF8 FHS) Fuel-Handling Equipment				X								K4.03 Knowledge of design feature(s) and/or interlock(s) which provide for the following: Overload protection. (CFR 41.7)	2.6	61
035 (SF 4P SG) Steam Generator							X					A1.01 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the S/GS controls including: S/G wide and narrow range level during startup, shutdown, and normal operations (CFR 41.5 / 45.5)	3.6	62
041 (SF4S SDS) Steam Dump/Turbine Bypass Control									X			A3.02 Ability to monitor automatic operation of the SDS, including RCS pressure, RCS temperature, and reactor power (CFR 41.7 / 45.5)	3.3	63

ES-401	PWR Examination Outline Plant Systems—Tier 2/Group 2 (RO)											Form ES-401-2		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
045 (SF 4S MTG) Main Turbine Generator					X							K5.17 Knowledge of the operational implications of the following concepts as they apply to the MT/B System: Relationship between moderator temperature coefficient and boron concentration in RCS as T/G load increases (CFR 41.5 / 45.7)	2.5	64
055 (SF4S CARS) Condenser Air Removal SRO														
056 (SF4S CDS) Condensate														
068 (SF9 LRS) Liquid Radwaste														
071 (SF9 WGS) Waste Gas Disposal SRO														
072 (SF7 ARM) Area Radiation Monitoring														
075 (SF8 CW) Circulating Water														
079 (SF8 SAS**) Station Air								X				A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the SAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Cross-connection with IAS. (CFR 41.5 / 43.5 / 45.3 / 45.13)	2.8	65
086 Fire Protection														
050 (SF 9 CRV*) Control Room Ventilation												N/A		
K/A Category Point Totals:	1	1	1	1	1	1	1	1	1	1	0	Group Point Total:		10

Facility:		Date of Exam:				
Category	K/A #	Topic	RO		SRO-only	
			IR	#	IR	#
1. Conduct of Operations	2.1.21	Ability to verify the controlled procedure copy. (CFR 41.10 / 45.10 / 45.13)	3.5	66		
	2.1.31	Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup (CFR: 41.10 / 45.12)	3.8	67		
	Subtotal			2		
2. Equipment Control	2.2.3	Knowledge of the design, procedural, and operational differences between units. (CFR 41.10 / 43.5 / 45.13)	3.8	68		
	2.2.13	Knowledge of tagging and clearance procedures	4.1	69		
	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels. (CFR 41.6 / 41.7 / 45.2)	4.6	70		
	Subtotal			3		
3. Radiation Control	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions. (CFR 41.12 / 43.4 / 45.10)	3.2	71		
	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. (CFR 41.12 / 43.4 / 45.9 / 45.10)	3.4	72		
	Subtotal			2		
4. Emergency Procedures/Plan	2.4.20	Knowledge of the operational implications of EOP warnings, cautions, and notes. (CFR 41.10 / 43.5 / 45.13)	3.8	73		
	2.4.25	Knowledge of fire protection procedures. (CFR 41.10 / 43.5 / 45.13)	3.3	74		
	2.4.32	Knowledge of operator response to loss of all annunciators. (CFR 41.10 / 43.5 / 45.13)	3.6	75		
	Subtotal			3		
Tier 3 Point Total				10		

Facility:		Date of Exam:																		
Tier	Group	RO K/A Category Points											SRO-Only Points							
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2	G*	Total				
1. Emergency and Abnormal Plant Evolutions	1															3	3	6		
	2				N/A					N/A						2	2	4		
	Tier Totals															5	5	10		
2. Plant Systems	1															2	3	5		
	2															2	1	3		
	Tier Totals															4	4	8		
3. Generic Knowledge and Abilities Categories																				
					1		2		3		4					1	2	3	4	7
																2	2	1	2	

- Note:
1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outline sections (i.e., except for one category in Tier 3 of the SRO-only section, the "Tier Totals" in each K/A category shall not be less than two). (One Tier 3 radiation control K/A is allowed if it is replaced by a K/A from another Tier 3 category.)
  2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points, and the SRO-only exam must total 25 points.
  3. Systems/evolutions within each group are identified on the 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.
  4. Select topics from as many systems and evolutions as possible. Sample every system or evolution in the group before selecting a second topic for any system or evolution.
  5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
  6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
  7. The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
  8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' 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.
  9. For Tier 3, select topics from Section 2 of the K/A catalog and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

G\* Generic K/As

- \* These systems/evolutions must be included as part of the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan. They are not required to be included when using earlier revisions of the K/A catalog.
- \*\* These systems/evolutions may be eliminated from the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan.

ES-401		PWR Examination Outline						Form ES-401-2	
Emergency and Abnormal Plant Evolutions—Tier 1/Group 1 (SRO)									
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#
000007 (EPE 7; BW E02&E10; CE E02) Reactor Trip, Stabilization, Recovery / 1									
000008 (APE 8) Pressurizer Vapor Space Accident / 3									
000009 (EPE 9) Small Break LOCA / 3									
000011 (EPE 11) Large Break LOCA / 3									
000015 (APE 15) Reactor Coolant Pump Malfunctions / 4									
000022 (APE 22) Loss of Reactor Coolant Makeup / 2					X		AA2.01 Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Makeup: Charging pump problems (CFR 43.5 / 45.13)	3.7	76
000025 (APE 25) Loss of Residual Heat Removal System / 4									
000026 (APE 26) Loss of Component Cooling Water / 8									
000027 (APE 27) Pressurizer Pressure Control System Malfunction / 3									
000029 (EPE 29) Anticipated Transient Without Scram / 1						X	2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation. (CFR: 41.10 / 43.5 / 45.2 / 45.6)	4.4	77
000038 (EPE 38) Steam Generator Tube Rupture / 3						X	2.2.38 Knowledge of conditions and limitations in the facility license. (CFR: 41.7, 10 / 43.1 / 45.13)	4.5	78
000040 (APE 40; BW E05; CE E05; W E12) Steam Line Rupture—Excessive Heat Transfer / 4						X	2.4.2 Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions (CFR 41.7 / 45.7 / 45.8)	4.6	79
000054 (APE 54; CE E06) Loss of Main Feedwater / 4					X		AA2.06 Ability to determine and interpret the following as they apply to the Loss of Main Feedwater (MFW): AFW adjustments needed to maintain proper T-ave, and S/G level. (CFR 43.5 / 45.13)	4.3	80
000055 (EPE 55) Station Blackout / 6									
000056 (APE 56) Loss of Offsite Power / 6									
000057 (APE 57) Loss of Vital AC Instrument Bus / 6									
000058 (APE 58) Loss of DC Power / 6									
000062 (APE 62) Loss of Nuclear Service Water / 4									
000065 (APE 65) Loss of Instrument Air / 8									
000077 (APE 77) Generator Voltage and Electric Grid Disturbances / 6									

ES-401		PWR Examination Outline						Form ES-401-2	
Emergency and Abnormal Plant Evolutions—Tier 1/Group 1 (SRO)									
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#
(W E04) LOCA Outside Containment / 3									
(W E11) Loss of Emergency Coolant Recirculation / 4									
(BW E04; W E05) Inadequate Heat Transfer—Loss of Secondary Heat Sink / 4					X		EA2.1 Ability to determine and interpret the following as they apply to the (Loss of Secondary Heat Sink): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.  (CFR 43.5 / 45.13)	4.4	81
K/A Category Totals:					3	3	Group Point Total:		6

ES-401		PWR Examination Outline						Form ES-401-2		
Emergency and Abnormal Plant Evolutions—Tier 1/Group 2 (SRO)										
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#	
000001 (APE 1) Continuous Rod Withdrawal / 1										
000003 (APE 3) Dropped Control Rod / 1										
000005 (APE 5) Inoperable/Stuck Control Rod / 1										
000024 (APE 24) Emergency Boration / 1										
000028 (APE 28) Pressurizer (PZR) Level Control Malfunction / 2										
000032 (APE 32) Loss of Source Range Nuclear Instrumentation / 7						X	2.2.25 Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits (CFR 41.5 / 41.7 / 43.2)	4.2	82	
000033 (APE 33) Loss of Intermediate Range Nuclear Instrumentation / 7										
000036 (APE 36; BW/A08) Fuel-Handling Incidents / 8										
000037 (APE 37) Steam Generator Tube Leak / 3										
000051 (APE 51) Loss of Condenser Vacuum / 4										
000059 (APE 59) Accidental Liquid Radwaste Release / 9										
000060 (APE 60) Accidental Gaseous Radwaste Release / 9										
000061 (APE 61) Area Radiation Monitoring System Alarms / 7										
000067 (APE 67) Plant Fire On Site / 8										
000068 (APE 68; BW A06) Control Room Evacuation / 8										
000069 (APE 69; W E14) Loss of Containment Integrity / 5										
000074 (EPE 74; W E06 & E07) Inadequate Core Cooling / 4										
000076 (APE 76) High Reactor Coolant Activity / 9						X	AA2.03 Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: RCS radioactivity level meter. (CFR 43.5 / 45.13)	3.0	83	
000078 (APE 78*) RCS Leak / 3							N/A			
(W E01 & E02) Rediagnosis & SI Termination / 3										
(W E13) Steam Generator Overpressure / 4										
(W E15) Containment Flooding / 5										
(W E16) High Containment Radiation / 9						X	2.4.18 Knowledge of the specific bases for EOPs (CFR 41.10 / 43.1 / 45.13)	4.0	84	
(BW A01) Plant Runback / 1							N/A			
(BW A02 & A03) Loss of NNI-X/Y/7							N/A			
(BW A04) Turbine Trip / 4							N/A			
(BW A05) Emergency Diesel Actuation / 6							N/A			
(BW A07) Flooding / 8							N/A			
(BW E03) Inadequate Subcooling Margin / 4							N/A			
(BW E08; W E03) LOCA Cooldown—Depressurization / 4										

ES-401		PWR Examination Outline						Form ES-401-2	
Emergency and Abnormal Plant Evolutions—Tier 1/Group 2 (SRO)									
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#
(BW E09; CE A13**; W E09 & E10) Natural Circulation/4					X		EA2.1 Ability to determine and interpret the following as they apply to the (Natural Circulation Operations): Facility conditions and selection of appropriate procedures during abnormal and emergency operations. (CFR 43.5 / 45.13)	3.8	85
(BW E13 & E14) EOP Rules and Enclosures							N/A		
(CE A11**; W E08) RCS Overcooling—Pressurized Thermal Shock / 4									
(CE A16) Excess RCS Leakage / 2							N/A		
(CE E09) Functional Recovery							N/A		
(CE E13*) Loss of Forced Circulation/LOOP/Blackout / 4							N/A		
K/A Category Point Totals:					2	2	Group Point Total:		4



ES-401		PWR Examination Outline Plant Systems—Tier 2/Group 1 (SRO)											Form ES-401-2	
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
003 (SF4P RCP) Reactor Coolant Pump														
004 (SF1; SF2 CVCS) Chemical and Volume Control														
005 (SF4P RHR) Residual Heat Removal														
006 (SF2; SF3 ECCS) Emergency Core Cooling														
007 (SF5 PRTS) Pressurizer Relief/Quench Tank														
008 (SF8 CCW) Component Cooling Water														
010 (SF3 PZR PCS) Pressurizer Pressure Control											X	2.2.12 Knowledge of surveillance procedures (CFR 41.10 / 45.13)	4.1	86
012 (SF7 RPS) Reactor Protection														
013 (SF2 ESFAS) Engineered Safety Features Actuation								X				A2.04 Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and (b) based Ability on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations; Loss of instrument bus (CFR 41.5 / 43.5 / 45.3 / 45.13)	4.2	87
022 (SF5 CCS) Containment Cooling														
025 (SF5 ICE) Ice Condenser												NA		
026 (SF5 CSS) Containment Spray														
039 (SF4S MSS) Main and Reheat Steam														
059 (SF4S MFW) Main Feedwater														
061 (SF4S AFW) Auxiliary/Emergency Feedwater														
062 (SF6 ED AC) AC Electrical Distribution														
063 (SF6 ED DC) DC Electrical Distribution														
064 (SF6 EDG) Emergency Diesel Generator														
073 (SF7 PRM) Process Radiation Monitoring								X				A2.02 Ability to (a) predict the impacts of the following malfunctions or operations on the PRM system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Detector failure (CFR 41.5 / 43.5 / 45.3 / 45.13)	3.2	88

ES-401	PWR Examination Outline Plant Systems—Tier 2/Group 1 (SRO)												Form ES-401-2	
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
076 (SF4S SW) Service Water														
078 (SF8 IAS) Instrument Air											X	2.4.2 Knowledge of system set points, interlocks and automatic actions associated with EOP entries.  (CFR 41.7 / 45.7 / 45.8)	4.6	89
103 (SF5 CNT) Containment											X	2.2.42 Ability to recognize system parameters that are entry-level conditions for Technical Specifications  (CFR 41.7 / 41.10 / 43.2 / 43.3 / 45.3)	4.6	90
053 (SF1; SF4P ICS*) Integrated Control												N/A		
K/A Category Point Totals:								2			3	Group Point Total:		5

ES-401		PWR Examination Outline											Form ES-401-2	
Plant Systems—Tier 2/Group 2 (SRO)														
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
001 (SF1 CRDS) Control Rod Drive														
002 (SF2; SF4P RCS) Reactor Coolant														
011 (SF2 PZR LCS) Pressurizer Level Control														
014 (SF1 RPI) Rod Position Indication														
015 (SF7 NI) Nuclear Instrumentation														
016 (SF7 NNI) Nonnuclear Instrumentation														
017 (SF7 ITM) In-Core Temperature Monitor														
027 (SF5 CIRS) Containment Iodine Removal														
028 (SF5 HRPS) Hydrogen Recombiner and Purge Control														
029 (SF8 CPS) Containment Purge														
033 (SF8 SFPCS) Spent Fuel Pool Cooling								x				A2.03 Ability to (a) predict the impacts of the following malfunctions or operations on the Spent Fuel Pool Cooling System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Abnormal spent fuel pool water level or loss of water level.	3.5	91
034 (SF8 FHS) Fuel-Handling Equipment														
035 (SF 4P SG) Steam Generator														
041 (SF4S SDS) Steam Dump/Turbine Bypass Control														
045 (SF 4S MTG) Main Turbine Generator														
055 (SF4S CARS) Condenser Air Removal											X	2.2.44 Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions. (CFR 41.5 / 43.5 / 45.12)	4.4	92
056 (SF4S CDS) Condensate														
068 (SF9 LRS) Liquid Radwaste														
071 (SF9 WGS) Waste Gas Disposal								X				A2.02 Ability to (a) predict the impacts of the following malfunctions or operations on the Waste Gas Disposal System ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: A2.02 Use of waste gas release monitors, radiation, gas flow rate, and totalizer. (CFR: 41.5 / 43.5 / 45.3 / 45.13	3.6	93
072 (SF7 ARM) Area Radiation Monitoring														
075 (SF8 CW) Circulating Water														

ES-401	PWR Examination Outline											Form ES-401-2		
Plant Systems—Tier 2/Group 2 (SRO)														
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
079 (SF8 SAS**) Station Air														
086 Fire Protection														
050 (SF 9 CRV*) Control Room Ventilation												N/A		
K/A Category Point Totals:								2				1	Group Point Total:	3

Facility: Callaway Plant		Date of Exam: August 31, 2020				
Category	K/A #	Topic	RO		SRO-only	
			IR	#	IR	#
1. Conduct of Operations	2.1.34	Knowledge of primary and secondary plant chemistry limits. (CFR: 41.10 / 43.5 / 45.12)			3.5	94
	2.1.39	Knowledge of conservative decision-making practices. (CFR: 41.10 / 43.5 / 45.12)			4.3	95
	Subtotal					2
2. Equipment Control	2.2.18	Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc. (CFR 41.10 / 43.5 / 45.13)			3.9	96
	2.2.37	Ability to determine operability and/or availability of safety related equipment. (CFR 41.7 / 43.5 / 45.12)			4.6	97
	Subtotal					2
3. Radiation Control	2.3.6	Ability to approve release permits (CFR: 41.13 / 43.4 / 45.10)			3.6	98
	Subtotal					1
4. Emergency Procedures/Plan	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.			4.6	99
	2.4.40	Knowledge of SRO responsibilities in emergency plan implementation. (CFR 41.10 / 43.5 / 45.11)			4.5	100
	Subtotal					2
Tier 3 Point Total						7

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/1 (RO)	APE 26: G2.2.22 (Q#8)	It would've been difficult to construct an RO question based on safety limits and LCO. Question was replaced with a K/A that would be more in-line with RO required level of knowledge.
1/1 (RO)	EPE 09: EK1.01 (Q#3)	The natural circulation was a repeat of another K/A. Changed to EK1.02
2/2 (RO)	015 (SF7NI) 2.2.36 (Q#57)	This K/A was replaced with one from K6 since Note 1 requirement was not met. Additionally, this would have been difficult to construct an RO level question.
3/G (RO)	2.2.25 (Q#68)	2.2.25 needed to be replaced since it is fundamentally an SRO function.
3/G (RO)	2.2.37 (Q#69)	2.2.37 needed to be replaced since it is fundamentally an SRO function.
3/G (RO)	2.2.40 (Q#70)	2.2.40 decided to replace the question with a non-T.S. related K/A.
1/2 (SRO)	000078 (APE 78*) 2.4.18	This system should have been excluded since it is not in Rev 2, Supp 1.
3/G (SRO)	2.2.20 (Q#97)	K/A was better suited for one of the RO generic equipment control questions. It was replaced with 2.2.37.
3/G (SRO)	2.4.39 (Q#100)	By definition not an SRO-only question. Replaced with 2.4.40.
1/2 (SRO)	000032 (APE 32) Loss of Source Range Nuclear Instrument 2.2.4	There are probably no differences between the STP units regarding this system. It was replaced with 2.2.25.
2/2 (RO)	045 (SF 4S MTG) Main Turbine Generator K.5.18 (Q#64)	Any reactor trip will trip the turbine. Not much of a distinction below and above 25% power. This K/A has been replaced with K.5.23
2/1 (SRO)	071 Waste Gas Disposal A2.04 (Q#93)	The A2.04 you have shown does not match the A2.04 in NUREG 1122. The question was replaced with A2.02.
1/1 (SRO)	000029 (EPE 29) Anticipated Transient Without Scram 2.2.37 (Q#77)	Original K/A not a good fit for topic of ATWS. Replaced with 2.1.23
2/2 (RO)	045 (SF 4S MTG) Main Turbine Generator k5.25 (Q64)	Replaced with K5.17 Knowledge of the operational implications of the following concepts as they apply to the MT/B System: Relationship between moderator temperature coefficient and boron concentration in RCS as T/G load increases

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/1 (SRO)	000038 (EPE 38) Steam Generator Tube Rupture  2.2.46 (Q78)	Could not develop an SRO-only question with the K/A. Replaced with G2.2.38. Knowledge of conditions and limitations in the facility license. (CFR 41.7,10 / 43.1 / 45.13)
3 (RO)	G2.2.20	The RO does not participate in the Operations Troubleshooting Process. Replaced with G2.2.3.
1/2 (RO)	APE067 AA2.15	The RO is not involved with the fire watch process. Replaced with APE067 AA2.03.

ES-301

## Administrative Topics Outline

Form ES-301-1

Facility: <u>South Texas Project</u>		Date of Examination: <u>7-12-2021</u>
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: <u>LOT 25 NRC Exam</u>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations A1 KA Importance: 4.4	M,R	Determine if natural circulation cooling exists following Station Blackout  G2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.
Conduct of Operations A2 KA Importance: 4.6	D,R	Performs the Independent Verification of the QPTR calculation.  G2.1.20 Ability to interpret and execute procedural steps.
Equipment Control A3 KA Importance: 4.1	M,R	Prepare ECO for AFW.  G2.2.13 Knowledge of tagging and clearance procedures.
Radiation Control A4 KA Importance: 3.2	D,P,R	Calculate Maximum Stay Time (Room M108C)  G2.3.4 Knowledge of radiation exposure limits under normal and emergency conditions.
NOTE: RO applicants require only 4 items unless they are retaking only the administrative topics (which would require all five items, Emergency Procedures/Plan).		
*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)		



ES-301

Administrative Topics Outline

Form ES-301-1

Facility: <u>South Texas Project</u>		Date of Examination: <u>7-12-2021</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: <u>LOT 25 NRC Exam</u>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations A5 KA Importance: 4.6	D,R	Calculate SDM with a Misaligned Control Rod and Determine Applicable Technical Specifications.  G2.1.37 Knowledge of procedures, guidelines or limitations associated with Reactivity Management.
Conduct of Operations A6 KA Importance: 4.4	D,P,R	Review a Power Range NI Channel Calibration to evaluate Technical Specifications  G2.1.23 Ability to perform specific system and integrated plant procedures during all modes of operation.
Equipment Control A7 KA Importance: 4.7	N,R	Review an AFW Surveillance and Determine Operability  G2.2.40 Ability to apply Technical Specifications for a system
Radiation Control A8 KA Importance: 3.7	N,R	Select individual to exceed dose limit for accident mitigation.  G2.3.4 Knowledge of radiation exposure limits under normal or emergency conditions.
Emergency Procedures/Plan A9 KA Importance: 4.6	M,R	Determine EAL  G2.4.41 Knowledge of the emergency action level thresholds and classifications.
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 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)		

STP LOT-25  
NRC Admin JPM Description

**RO**

- (A1) Determine if Natural Circulation Cooling Exists  
Demonstrate the ability to determine if natural circulation exists using 0POP05-EO-EC01, Loss of All AC Power Recovery Without SI Required. [LOT 13 Audit A2, Originally Static Simulator JPM] [NOTE: Bank JPM is documented to be performed in a static simulator, in order to verify plant parameters for natural circulation. This should be modifiable for a classroom setting, by providing pictures of the various parameter trends: SG pressures, Hot Leg Temps, CETs, cold leg temps.]
- (A2) Verify an Excore QPTR Calculation  
Demonstrate the ability to perform and/or verify a QPTR. 0PSP10-NI-0002, Excore QPTR Determination. [LOT 22 NRC 2018 JPM A1]
- (A3) Prepare ECO for the AFW  
Demonstrate knowledge of tagging and clearance procedure for the AFW system. [New JPM]
- (A4) Calculate Maximum Stay Time (Room 108C)  
Demonstrate knowledge of radiation exposure limits under normal and emergency conditions. [LOT 23 2019 NRC JPM A4]

**SRO**

- (A5) Calculate SDM with a Misaligned Control Rod and Determine Applicable Technical Specifications  
Demonstrate the ability perform a SDM and apply appropriate TSs if required. 0PSP10-ZG-0005, Shutdown Margin Verification – Modes 1 and 2. [LOT 22 NRC 2018 JPM A5]
- (A6) Review a Power Range NI Channel Calibration to evaluate Technical Specifications  
NOTE: Name changed from ‘Review Calorimetric Heat Balance to Evaluate Acceptance Criteria’  
Demonstrate the ability to perform a Calorimetric Verification and evaluate TSs. 0PEP02-CU-0001, Calorimetric Verification, and 0PSP03-NI-0001, Power Range NI Channel Calibration. [LOT 23 2019 NRC JPM A6]
- (A7) Review an AFW Surveillance and Determine Operability  
Demonstrate the ability to apply Technical Specifications for a system. Use technical specifications to determine operability for the applicable train based on reviewing a surveillance. [NEW JPM]
- (A8) Select Individual to Exceed Exposure Limits for Accident Mitigation in an Emergency  
During a declared ALERT, choose from 2 volunteers the one individual to exceed occupational dose limits, IAW site specific procedures. [NEW JPM. See Callaway 2020 JPM A8 for reference]
- (A9) Determine Emergency Action Level  
Demonstrate the ability to correctly determine an Emergency Action Level for a given condition requiring entry into the STPNOC Emergency Action Plan.

Facility: <u>South Texas Project</u>		Date of Examination: <u>7-12-21</u>
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: <u>LOT 25 NRC</u>
Control Room Systems: * 8 for RO, 7 for SRO-I, and 2 or 3 for SRO-U		
System / JPM Title	Type Code*	Safety Function
a. (S1) Perform Emergency Boration of RCS KA: 004 A4.07 (3.9/3.7)	A,D,S	1
b. (S2) Raise SI Accumulator Level KA: 006 4.07 (4.4/4.4)	D,EN,L,S	2
c. (S3) Respond to CCW Leak after Swapping CCW Pumps KA: 008 A4.01 (3.3/3.1)	A,EN,M,S	8
d. (S4) MSIV Operability Test KA: 039 K4.01 (2.9/2.8)	D,S	4S
e. (S5) Place H2 Monitoring in Service KA: 028 A4.03 (3.1/3.3)	D,S	5
f. (S6) Respond to Failed SR NI KA: 015 A4.03 (3.8/3.9)	D,L,S	7
g. (S7) Respond to Stuck Open PZR Spray Valve KA: 010 A4.01 (3.7/3.5)	A,N,S	3
h. (S8) Perform Immediate Actions for a RX Trip with LOOP KA: 064 A4.06 (3.9/3.9)	A,N,S	6
In-Plant Systems: * 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U		
i. (P1) Locally Trip the Reactor KA: 001 A4.06 (2.9/3.2)	D,E	1
j. (P2) Perform EDG Post Run Checklist with Overspeed Butterfly Valve NOT Fully Latched KA: 064 A4.06 (3.9/3.9)	A,E,N	6
k. (P3) Place a Second Spent Fuel Pool Cooling Train (B) in Service KA: 033 A4.02 (2.4/2.8)	N,R	4P
* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions, all 5 SRO-U systems must serve different safety functions, and 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 Features	≥ 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		

Facility: <u>South Texas Project</u>		Date of Examination: <u>7-12-21</u>
Exam Level: RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: <u>LOT 25 NRC</u>
Control Room Systems: * 8 for RO, 7 for SRO-I, and 2 or 3 for SRO-U		
System / JPM Title	Type Code*	Safety Function
a.		
b. (S2) Raise SI Accumulator Level KA: 006 4.07 (4.4/4.4)	D,EN,L,S	2
c. (S3) Respond to CCW Leak after Swapping CCW Pumps KA: 008 A4.01 (3.3/3.1)	A,EN,M,S	8
d. (S4) MSIV Operability Test KA: 039 K4.01 (2.9/2.8)	D,S	4S
e. (S5) Place H2 Monitoring in Service KA: 028 A4.03 (3.1/3.3)	D,S	5
f. (S6) Respond to Failed SR NI KA: 015 A4.03 (3.8/3.9)	D,L,S	7
g. (S7) Respond to Stuck Open PZR Spray Valve KA: 010 A4.01 (3.7/3.5)	A,N,S	3
h. (S8) Perform Immediate Actions for a RX Trip with LOOP KA: 064 A4.06 (3.9/3.9)	A,N,S	6
In-Plant Systems: * 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U		
i. (P1) Locally Trip the Reactor KA: 001 A4.06 (2.9/3.2)	D,E	1
j. (P2) Perform EDG Post Run Checklist with Overspeed Butterfly Valve NOT Fully Latched KA: 064 A4.06 (3.9/3.9)	A,E,N	6
k. (P3) Place a Second Spent Fuel Pool Cooling Train (B) in Service KA: 033 A4.02 (2.4/2.8)	N,R	4P
* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions, all 5 SRO-U systems must serve different safety functions, and 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 Features	≥ 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		

Facility: <u>South Texas Project</u>		Date of Examination: <u>7-12-21</u>
Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>		Operating Test No.: <u>LOT 25 NRC</u>
Control Room Systems: * 8 for RO, 7 for SRO-I, and 2 or 3 for SRO-U		
System / JPM Title	Type Code*	Safety Function
a. (S1) Perform Emergency Boration of RCS KA: 004 A4.07 (3.9/3.7)	A,D,S	1
b.		
c. (S3) Respond to CCW Leak after Swapping CCW Pumps KA: 008 A4.01 (3.3/3.1)	A,EN,M,S	8
d.		
e.		
f. (S6) Respond to Failed SR NI KA: 015 A4.03 (3.8/3.9)	D,L,S	7
g.		
h.		
In-Plant Systems: * 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U		
i.		
j. (P2) Perform EDG Post Run Checklist with Overspeed Butterfly Valve NOT Fully Latched KA: 064 A4.06 (3.9/3.9)	A,E,N	6
k. (P3) Place a Second Spent Fuel Pool Cooling Train (B) in Service KA: 033 A4.02 (2.4/2.8)	N,R	4P
* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions, all 5 SRO-U systems must serve different safety functions, and 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 Features	≥ 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		

**STP LOT-25  
NRC Systems JPM Description**

**Control Room Systems JPMs**

- (S1) **Perform Emergency Boration of RCS**  
Unit 1 failed to automatically trip when two channels of pressurizer pressure low bistables were tripped. The crew is performing actions of 0POP05-EO-FRS1, Response To Nuclear Power Generation – ATWS. The Unit Supervisor directs to initiate emergency boration of the RCS in accordance with the procedure. However, during the performance of the JPM, the only running charging pump will trip prior to the operator reaching Step 4b of the procedure. The applicant must correctly establish emergency boration flowpath and flowrates in accordance with procedure 0POP05-EO-FRS1, “Response To Nuclear Power Generation – ATWS” in which there are no running charging pumps. [NRC LOT-17]
- (S2) **Raise SI Accumulator Level**  
Unit 2 is in Mode 3. A low-level alarm for the 2A Accumulator has been received. The applicant is directed to restore level. The applicant must successfully use the HHSI Pump 2A and fill the SI accumulator to clear the alarm. Additionally, the applicant must secure filling before reaching a high level. This will be done in accordance with 0POP02-SI-0001, “Safety Injection Accumulators.” This is from the licensee’s bank labeled JPM Number: [NRC LOT-22 S2].
- (S3) **Respond to CCW Leak after Swapping CCW Pumps**  
Unit 1 is in Mode 5. RHR Pumps 1B and 1C are in service. The applicant is tasked by the Unit Supervisor to start CCW Pump 1A in preps to start RHR Pump 1A. A leak will develop when CCW Pump 1A starts. The applicant must correctly address the leak and secure CCW Pump 1A in accordance with 0POP04-CC-0001, “Component Cooling Water System Leak.” This is modified from the licensee’s bank labeled JPM Number: NRC S1. [NRC LOT-16]
- (S4) **MSIV Operability Test**  
Unit 1 is in Mode 5. The off-going shift has completed preparations for performing operability testing “A” MSIV FSV-7414 and MSIB FV-7412. The applicant must correctly perform timed strokes of “A” MSIV FSV-7414 and MSIB FV-7412 and determine if they are within the acceptance criteria per 0PSP03-MS-0002, “Main Steam System Cold Shutdown Valve Operability Test.” This is from the licensee’s bank labeled JPM NO: NRC-007. [NRC LOT-10]
- (S5) **Place H2 Monitoring in Service**  
Unit 1 has experienced a Large Break LOCA. The control room has completed standard post trip actions. The Unit Supervisor has directed to check containment H2 concentration per procedure. The applicant must correctly place the H2 monitors in service in accordance with 0POP05-EO-EO10, “Loss of Reactor or Secondary Coolant.” This is from the licensee’s bank labeled JPM Number: LOT 22 Audit S1. [NRC LOT-21]
- (S6) **Respond to Failed SR NI**  
Unit 1 is in Mode 3 preparing for reactor startup. Source Range Nuclear Instrument Channel NI 31 has failed low. The Unit Supervisor has directed the applicant to respond to the failure. The applicant must correctly place the Source Range Channel Level Trip to BYPASS, the High Flux Shutdown switch to BLOCK and set NI-32 for Audible Count Rate in accordance with 0POP04-NI-0001, “Nuclear Instrument Malfunction.” This is from the licensee’s bank labeled JPM Number: S8. [NRC LOT-22]

**Control Room Systems JPMs (continued)****(S7) Respond to Stuck Open PZR Spray Valve**

Unit 1 is at 100% and the PRZR PRESS DEV LO B/U HTRS ON alarm actuates. The Unit Supervisor has directed the applicant to respond to the alarm. Procedures 0POP09-AN-04M8, "Annunciator Lampbox 04M8 Response Instructions" and 0POP04-RP-0001, "Loss of Automatic Pressurizer Pressure Control" will be used to determine the cause of the alarm. The applicant must identify that a normal pressurizer spray valve is open and stuck open. Actions to mitigate the pressure drop will fail resulting in manually tripping the reactor and securing RCPs 1A and 1D. [NEW]

**(S8) Perform Immediate Actions for a RX Trip with LOOP**

Unit 1 has just experienced a reactor trip with a LOOP. The Main Steam to Deaerator Valves are open and Emergency Diesel Generator for Train B did not start. The applicant is directed to perform immediate actions in 0POP05-EO-EO00, Reactor Trip or Safety Injection. The applicant must successfully close the Main Steam to Deaerator Valves and restore power to Train B ESF 4.16 KV Bus by emergency starting ESF/DG #12 and closing the DG output breaker. [NEW]

**In Plant Systems JPMs****(P1) Locally Trip the Reactor**

Unit 1 is at 100% and experiences a loss of all feedwater. Reactor did not automatically trip when S/G LO-LO level setpoint was reached. Manual actions to trip the reactor in the control room are not successful. The Unit Supervisor has directed the applicant to manually trip the reactor. The applicant must correctly perform actions to manually trip the reactor in accordance with 0POP05-EO-EO00, "Reactor Trip or Safety Injection." This JPM will begin outside the control room. The applicant must ultimately operate the reactor trip breakers in the Rod Control Equipment Room. This is from the licensee's bank labeled JPM NO: P1 [NRC LOT-18].

**(P2) Perform EDG Post Run Checklist with Overspeed Butterfly Valve NOT Fully Latched**

Unit 1 EDG 11(21) has been locally stopped. Unit Supervisor has directed to complete the DG Post Run Checklist 2. Applicant will find that the Diesel Air Intake Butterfly Valve has not fully latched. Applicant must successfully reset the valve locally at the turbocharger or by depressing the engine overspeed shutdown air reset valve at the overspeed trip governor. [NEW]

**(P3) Place a Second Spent Fuel Pool Cooling Train (B) in Service**

Unit 1 is a full power. Unit Supervisor has directed that both trains of spent fuel pool cooling be placed in service. Initial condition will have the "A" train running. Applicant must correctly step thru station procedure 0POP02-FC-0001, "Spent Fuel Pool Cooling and Cleanup System" Section 6.1 to start Train B of spent fuel pool cooling. Step 6.1.1 has already been completed. [NEW]

NOTE:

KA 033 A4.02 is being used for this task. The rating is 2.4 for RO and 2.8 for SRO. Given the industry emphasis on SFP Cooling after the Fukushima accident the regulator agrees that SFP Cooling is of sufficient importance to be evaluated on an NRC Initial Exam.



**Scheduling**

NOTE: All Control Room JPMs will be performed dynamically in the Simulator. JPMs will be performed as follows:

- S1 has its own IC – RO and SROU ONLY
- S2 and S6 together – RO and SROI ONLY S2. All Students S6. Perform S6 first.
- S3 and S4 together – All Students S3 RO and SROI ONLY S4. Perform S3 first.
- S5 has its own IC – RO and SROI ONLY.
- S7 has its own IC – RO and SROI ONLY. DO NOT perform with S8.
- S8 has its own IC – RO and SROI ONLY. DO NOT perform with S7.
- P1 – RO and SROI ONLY.
- P2 – All Students
- P3 – All Students. RCA

## Appendix D

## Scenario Outline

Form ES-D-1

<b>Facility: South Texas Project</b>		<b>Scenario No.: 1</b>		<b>Op-Test No.: LOT 25 NRC</b>	
<b>Examiners:</b> _____			<b>Operators:</b> _____		
_____			_____		
_____			_____		
<u>Initial Conditions:</u> <ul style="list-style-type: none"> <li>Reactor is at 100%. BOL. IC #196</li> </ul> <u>Turnover:</u> <ul style="list-style-type: none"> <li>Orders have been given to lower reactor power to 98%.</li> </ul>			<u>Critical Tasks:</u> <ul style="list-style-type: none"> <li>CT-3: Manually initiate CS</li> <li>CT-11: Close Phase A CIV.</li> <li>CT-32: Isolate the LOCA outside containment</li> </ul>		
Event No.	Malf. No.	Event Type*	Event Description		
1 (0 min)	N/A	R (All)	Lower Reactor power to 98%		
2 (10 min)	02-25-01 & 01A 1.0	I (RO, SRO) TS (SRO)	Loop A 410A T-hot instrument fails HI		
3 (30 min)	Multiple	C (BOP, SRO) TS (SRO)	EAB Battery Rm Exh Fan 11A shaft shears. Battery Room Exh Fan 11B fan trips when attempted to start.		
4 (40 min)	11-04-02 0.8	C (ALL)	Instrument Air Leak. In TGB – Reactor Trip.		
5 (46 min)	02-01-04 0.7	M(ALL)	LBLOCA.		
6 (N/A)	04-16-04, 05, 06 True	C (BOP, SRO)	Containment Spray Pumps fail to start. <b>(CT-3)</b>		
7 (N/A)	Multiple	C (BOP, SRO)	Phase A containment isolation valves for CVCS Letdown (OCIV MOV-0024, ICIV MOV-0023 and FV-0011) fail to close. <b>(CT-11)</b>		
8 (N/A)	Multiple	C (RO, SRO)	HHSI B pump seal failure following swap over to Containment Emergency Sump. LOCA Outside Containment <b>(CT-32)</b>		
Lot* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specification					
Target Quantitative Attributes (Per Scenario; See Section D.5.d)				Actual Attributes	
1. Malfunctions after EOP entry (1–2)				3	
2. Abnormal events (2–4)				3	
3. Major transients (1–2)				1	
4. EOPs entered/requiring substantive actions (1–2)				2	
5. Entry into a contingency EOP with substantive actions ( $\geq 1$ per scenario set)				0	
6. Preidentified critical tasks ( $\geq 2$ )				3	

STP LOT-25  
NRC Scenario #1 Description

**Initial Conditions:** Mode 1 with Reactor Power at 100%. The Crew will reduce power to 98%. 0POP03-ZG-0008, Power Operations, Section 6.0.

**Event 1:** The crew will lower power to 98% using 0POP03-ZG-0008, Power Operations. This will have the BOP lower turbine load coordinating with the RO to perform a boration in accordance with 0POP02-CV-0001, "Makeup to the Reactor Coolant System," Section 10.0.

**Event 2:** Loop A T-hot instrument fails HI. Operators will respond in accordance with 0POP04-RP-0004, Failure Of RCS Loop RTD Protection Channel. This will prompt multiple alarms (5M02, A-8, A-5, A-6, C-6, D-6, E-6, F-6, A-4). This will require entry into Technical Specification 3.3.1 Function 8 & 9, Action 6 AND TS 3.3.2 Function 5.f, Action 20.

**Event 3:** Respond to EAB Battery Room Fan alarm in accordance with 0POP09-AN-22M3, Annunciator Lampbox 22M03 Response Instructions, Section BATT ROOM EXH FAN TRBL. SRO should be looking at TS 3.3.3.5 and at TS Bases Table B 3.3.5-1, function 5e.

**Event 4:** Respond to a leak in the instrument air system per 0POP04-IA-0001, Loss of Instrument Air. Leak will be small enough to allow operators to step thru the procedure. Leak is in the TGB so the crew will have to trip the RX.

**Event 5:** Respond to a large break LOCA (Pressurizer Low Pressure Reactor Trip) in accordance with 0POP05-EO-EO00, Reactor Trip or Safety Injection. Step 15 of this procedure will lead the operators to 0POP05-EO-EO10.

**Event 6:** Containment Spray pumps will fail to automatically start. Operators will manually initiate containment spray per 0POP05-EO-EO00, Step 6. **(Critical Task CT-3)**

**Event 7:** 0POP05-EO-EO00 Step 5 will have operators verify actions per Addendum 5. Addendum 5, Step 6b has operators check Phase A valves. **(Critical Task CT-11)**

**Event 8:** While in 0POP05-EO-EO10, the B HHSI pump will have a seal failure when suction is swapped over the Containment Sump. This causes FHB radiation levels to rise greater than normal levels. The crew will isolate Train B ECCS in 0POP05-EO-ES13, Transfer to Cold Leg Recirculation. **(Critical Task CT-32)**

STP LOT-25  
NRC Scenario #1 Description

**Termination:** Completion of 0POP05-EO-ES13, TRANSFER TO COLD LEG RECIRCULATION, Step 9, when B Train ECCS is secured.

**Critical Tasks:**

- CT-3: Manually initiate at least one train of containment spray
- CT-11: Close containment isolation valves such that at least one valve is closed on each Phase-A penetration.
- CT-32: Isolate the LOCA outside containment.

**Source:** New

NOTE: Detailed description of Critical Tasks will be included in From ES-D-2, Required Operator Actions.

## Appendix D

## Scenario Outline

Form ES-D-1

<b>Facility:</b> South Texas Project	<b>Scenario No.:</b> 3	<b>Op-Test No.:</b> LOT 25 NRC
<b>Examiners:</b> _____	<b>Operators:</b> _____	
_____	_____	
_____	_____	

**Initial Conditions:**

- Reactor is at 98% Power. BOL. IC #198
- Both FW LEFM are OOS.

**Turnover:**

- Orders have been given to raise reactor power to 99.6% per Step 7.68 of OPOP03-ZG-0005, Plant Startup to 100%.

**Critical Tasks:**

- CT-13: Manually trip the Main Turbine
- CT-52: Insert negative reactivity via emergency boration.

Event No.	Malf. No.	Event Type*	Event Description
1 (0 min)	N/A	R (ALL)	Raise reactor power to 99.6%
2 (5 min)	08-15-01 True	I (BOP, SRO),	SG 1A controlling feedwater flow channel, FT-0510, fails low
3 (23 min)	03-11-01 0.02	C (RO, SRO) TS (SRO)	30 GPM RCS leak (isolable) on the letdown line in containment.
4 (35 min)	50-R3-05 True	I (RO, SRO), TS (SRO)	Power Range Nuclear Instrument Channel 41 fails HIGH
5 (55 min)	50-R3-02 True	M (ALL)	A second PR NI channel fails but RX does NOT trip – ATWS – local action to open RTBs required.
6 (N/A)	Multiple	C (BOP, SRO)	Main Turbine fails to trip. <b>(CT-13)</b>
7 (N/A)	Multiple	C (BOP, SRO)	Main Generator output breaker fails to open.
8 (N/A)	51-LI-91 & 96	C (RO, SRO)	2 Control Rods stuck partially withdrawn > 18 steps following reactor trip and cannot be inserted. (F14 & H14) <b>(CT-52)</b>
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specification			

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Malfunctions after EOP entry (1–2)	2
2. Abnormal events (2–4)	3
3. Major transients (1–2)	1
4. EOPs entered/requiring substantive actions (1–2)	1
5. Entry into a contingency EOP with substantive actions ( $\geq 1$ per scenario set)	1
6. Preidentified critical tasks ( $\geq 2$ )	2

STP LOT-25  
NRC Scenario #3 Description

**Initial Conditions:** Reactor power is at 98%. The Crew will raise power to 99.6% per Step 7.68 of 0POP03-ZG-0005, Plant Startup to 100%.

**Event 1:** Operators will raise power to 99.6% in accordance with 0POP03-ZG-0008, Power Operations. This will have the BOP raise turbine load coordinating with the RO to perform a dilution in accordance with 0POP02-CV-0001, Makeup to the Reactor Coolant System, Section 10.0.

**Event 2:** Operators respond to the controlling feedwater flow channel, FT-0510, failure (LOW) for S/G 1A per 0POP04-FW-0001, Loss of Steam Generator Water Level Control.

**Event 3:** Operators will respond to RCS excessive leakage per 0POP04-RC-0003, Excessive RCS Leakage. The crew will place excess letdown in service since Normal Letdown and Charging will be isolated in Addendum 3, step 4.0. The SRO will need to evaluate RCS leakage per Technical Specification 3.4.6.2, Action b. The leakage should be within limits once normal letdown is isolated per procedure.

**Event 4:** Operators respond to power range nuclear instrument channel 41 (fail HIGH) per 0POP04-NI-0001, Nuclear Instrument Malfunction. There should also be an assessment for entry into Technical Specification 3.3.1 (Table 3.3-1 Function 2 and 3)

**Event 5:** A second Power Range NI channel will fail causing a RX Trip signal, but the Reactor fails to trip. Operators should enter 0POP05-EO-EO00 for manually tripping the reactor. Manual trip of the reactor from the control room will be unsuccessful. 480V LC 1K1 feeder breaker fails to open. Step 1 in the RNO requires entry into 0POP05-EO-FRS1, Response to Nuclear Power Generation – ATWS. Control room should direct plant operator to locally open the trip and bypass breakers.

**Event 6:** Main Turbine fails to trip. Operators respond per the RNO column in procedure 0POP05-EO-EO00. **(Critical Task CT-13)**

**Event 7:** Main Generator output breaker will fail to open. Operators respond per the RNO column in procedure 0POP05-EO-EO00.

**Event 8:** When the plant operator locally trips the RTBs, 2 control rods will fail to fully insert, > 18 steps. This is expected to occur very shortly after being directed in FRS1, before the crew has commenced emergency boration. The crew will use the CIP page to transition back to EO00 before they get to FRS1 step 4, which directs emergency boration. In this case, they will proceed thru EO00 until step 4, RNO, at which point they'll transition to ES01. ES01 Step 4 will direct emergency borating a specific volume for each rod that is not inserted. If there is a delay in opening RTBs in FRS1, the crew will emergency borate in that procedure, which is also satisfactory. **(Critical Task CT-52)**

STP LOT-25  
NRC Scenario #3 Description

**Termination:** Completion of 0POP05-EO-ES01, Reactor Trip Response, Step 4.

**Critical Tasks:**

- CT-13: Manually trip the Main Turbine.
- CT-52: Insert negative reactivity via emergency boration.

**Source:** New

NOTE: Detailed description of Critical Tasks will be included in From ES-D-2, Required Operator Actions.

## Appendix D

## Scenario Outline

Form ES-D-1

<b>Facility:</b> South Texas Project	<b>Scenario No.:</b> 4	<b>Op-Test No.:</b> LOT 25 NRC	
<b>Examiners:</b> _____		<b>Operators:</b> _____	
_____		_____	
_____		_____	
<b>Initial Conditions:</b> <ul style="list-style-type: none"> <li>• Mode 2 at 10E-8 AMPS Power. MOL</li> </ul> <b>Turnover:</b> <ul style="list-style-type: none"> <li>• Raise power to 1-3% (NIs)</li> </ul>		<b>Critical Tasks:</b> <ul style="list-style-type: none"> <li>• CT-11: E7: Close Phase A CIV</li> <li>• CT-6: E8: Start at least 1 HHSI pump</li> <li>• CT-EO10-D-STP: E6: Depressurize SGs to 1000 psig.</li> </ul>	
Event No.	Malf. No.	Event Type*	Event Description
1 (0 min)	N/A	R (RO, SRO)	Withdraw control rods to raise power to 1-3%
2 (15 min)	52-LI-73 88	I (BOP, SRO) TS (SRO)	Once power is at 2%, Control Rod M4 in control bank D will drop >12 steps in.
3 (32 min)	03-05-01 1	I (RO, SRO)	VCT Level transmitter LT-0112 fails high.
4 (41 min)	Multiple	C (BOP, SRO) TS (SRO)	Inadvertent start of AFW Pump #13
5 (49 min)	03-09-02 1	C (RO, SRO) TS (SRO)	CCP 1B Trip on overcurrent.
6 (60 min)	02-12-01 0.05- 0.02	M (ALL)	PZR Vapor Space SBLOCA. (CT-EO10-D-STP)
7 (N/A)	Multiple	C (BOP, SRO)	Seal Return Isolation valves, MOV-0077 and MOV-0079 fail to automatically close. (CT-11)
8 (N/A)	50-BF- 07, 08, 09	C (BOP, SRO)	ALL HHSI pumps fails to start on SI signal. (CT-6)
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specification			

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Malfunctions after EOP entry (1-2)	2
2. Abnormal events (2-4)	4
3. Major transients (1-2)	1
4. EOPs entered/requiring substantive actions (1-2)	1
5. Entry into a contingency EOP with substantive actions ( $\geq 1$ per scenario set)	0
6. Preidentified critical tasks ( $\geq 2$ )	3



STP LOT-25  
NRC Scenario #4 Description

**Initial Conditions:** Unit 1 is in Mode 2 at  $1 \times 10^{-8}$  Amps. The Crew will raise power to 1-3% Power by Nis.

**Event 1:** Perform power ascension per 0POP03-ZG-0004, Reactor Startup.

**Event 2:** Operators will respond per 0POP09-AN-05M3, Annunciator Lampbox 5M03 (Window D-5) Response Instructions, for ROD SUPV MNTR ROD POSITION TRBL. Operators will check that one of the rods dropped >12 steps inward. The annunciator response procedure will direct operators to enter 0POP04-RS-0001, Control Rod Malfunction. SRO will address compliance with Technical Specifications.

**Event 3:** Operators will respond per 0POP09-AN-04M8, Annunciator Lampbox 04M8 Response Instructions, for Window E-2, VCT LEVEL HI/LO.

**Event 4:** Operators respond to stabilize the plant as allowed per Conduct of Operations Manual, Chapter 2 and manually secure the running AFW pump. SRO will address compliance with Technical Specifications.

**Event 5:** Operators respond per procedure 0POP09-AN-04M8, Window F-3, CHG FLOW HI/LO, due to an overcurrent trip of CCP 1B. This will direct operators to start CCP 1A to restore charging flow. SRO will address compliance with Technical Requirements.

**Event 6:** Operators respond per 0POP05-EO-EO10, Loss of Reactor or Secondary Coolant. **(Critical Task CT- EO10-D-STP)**

**Event 7:** While performing 0POP05-EO-EO00, Reactor Trip or Safety Injection, Addendum 5, SI Equipment Verification. CIS Phase A will be checked per Addendum 1 and operators will note that all the valves did not automatically shut. This will require the operators to manually shut them. **(Critical Task CT-11)**

**Event 8:** Operators should verify per 0POP05-EO-EO00, Reactor Trip or Safety Injection, Addendum 5 that none of the HHSI pumps are running and should be manually started. **(Critical Task CT-6)**

STP LOT-25  
NRC Scenario #4 Description

**Termination:** Completion of OPOP05-EO-EO10, "Loss of Reactor or Secondary Coolant," Step 8.

**Critical tasks:**

- CT-11: Close containment isolation valves such that at least one valve is closed on each Phase-A penetration.
- CT-6: Start at least 1 HPSI pump
- CT-EO10-D-STP: Depressurize SGs to 1000 psig

**Source:** New

NOTE: Detailed description of Critical Tasks will be included in form ES-D-2, Required Operator Actions.

## Appendix D

## Scenario Outline

Form ES-D-1

<b>Facility: South Texas Project</b>		<b>Scenario No.: 5</b>		<b>Op-Test No.: LOT 25 NRC</b>	
<b>Examiners:</b> _____		<b>Operators:</b> _____		_____	
_____		_____		_____	
_____		_____		_____	
<b>Initial Conditions:</b> <ul style="list-style-type: none"> <li>• Mode 1 is at 85% Power. BOL. IC 195</li> </ul> <b>Turnover:</b> <ul style="list-style-type: none"> <li>• Raise power to 90%</li> </ul>			<b>Critical Tasks:</b> <ul style="list-style-type: none"> <li>• CT – 17: Isolate a Faulted Steam Generator</li> <li>• CT – 12: Adequate response to failure of MSIV 1B to close.</li> </ul>		
Event No.	Malf. No.	Event Type*	Event Description		
1 (0 min)	N/A	R(ALL)	Raise power to 90%		
2 (20 min)	02-20-01 1.0	C (RO, SRO) TS (SRO)	PZR level channel LT-0465 fails high		
3 (35 min)	04-09-03 True	C (BOP, SRO) TS (SRO)	ECW Pump #1C trips		
4 (50 min)	02-25-02 0.0	I(RO, SRO) TS (SRO)	Loop A Cold Leg RTD TI-0410B Fails Low		
5 (65 min)	05-11-01 1.0	I (BOP, SRO)	SG 1A controlling steam flow channel FT-0512 fails high		
6 (80 min)	05-02-02 0.3	M (ALL)	Main Steam Line Break SG 1B Inside Containment (CT-17)		
7 (N/A)	05-07-02 True	C (BOP, SRO)	1B MSIV fails to close (CT-12)		
8 (N/A)	Multiple	C (BOP, SRO)	Train B EAB HVAC fails to actuate		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specification					

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Malfunctions after EOP entry (1–2)	2
2. Abnormal events (2–4)	4
3. Major transients (1–2)	1
4. EOPs entered/requiring substantive actions (1–2)	1
5. Entry into a contingency EOP with substantive actions ( $\geq 1$ per scenario set)	0
6. Preidentified critical tasks ( $\geq 2$ )	2

STP LOT-25  
NRC Scenario #5 Description

**Initial Conditions:** Current reactor power level is at 85%. Following a Unit trip the Crew will raise power to 90%. A line of thunderstorms is tracking from the south toward the site and have affected loads on the grid.

**Event 1:** The crew is re-commencing raising power per step 7.58 of 0POP03-ZG-0005, Plant Startup to 100%. Diluting 75 gallons every 5 minutes at .25%/minute

**Event 2:** The crew acknowledges and announces annunciators:

- 0POP09-AN-04M8/A6, PRZR LEVEL HI RX TRIP ALERT
- 0POP09-AN-04M8/C6, PRZR LEVEL DEV HI B/U HTRS ON

The crew will enter 0POP04-RP-0002, Loss of Automatic Pressurizer Level Control and the SRO will address Tech Spec implications.

**Event 3:** The crew will get annunciator 02M4 C-7, ECW Pump 1C Trip 0POP09-AN-02M4. This will be based on the trip of ECW Pump #13. This will require a Technical specification call for one loop Essential Cooling water loop being OOS. TS 3.7.4.

**Event 4:** Loop A Cold Leg RTD T-0410B Fails Low. The crew will respond based upon annunciators using 0POP09-AN-05M2, A-6, C-6, and D-6. SRO will direct actions consistent on 0POP04-RP-0004, Failure of RCS Loop RTD Protection Channel. The SRO will address Tech Spec implications.

**Event 5:** SG 1A controlling steam flow channel FT-0512 fails low. This will cause SG1A STM/FW Flow Mismatch based upon 0POP09-AN-06M3, Window E-3. The crew will respond using 0POP04-FW-0001, Loss of Steam Generator Level Control.

**Event 6:** Main Steam Line Break on S/G 1B In Containment. Crew will enter 0POP05-EO-E000 and proceed to step 13. RNO expected since break occurred, thus crew will go to 0POP05-EO-EO20, Faulted Steam Generator Isolation, Step 1 while completing 0POP-5-EO-E000 , Addendum 5.

**Event 7:** 1B MSIV fails to close. Crew performing actions of 0POP05-EO-E000, Addendum 5 and will get to step 2b and RNO will direct to close MSIV manually using 0POP05-EO-E000, Addendum 6. This will take the operator to Addendum 6, Failing Air to MSIVs and MSIBs.

**Event 8:** Train B EAB HVAC fails to actuate. While performing actions in 0POP05-EO-E000, Addendum 5, operator will get to step 14 to verify ventilation actuation. RNO for step 14b will direct crew to Manually place EAB HVAC in Emergency Recirc mode.

STP LOT-25  
NRC Scenario #5 Description

**Termination:** The scenario will terminate after the crew transitions out of 0POP05-EO-EO20, Faulted Steam Generator Isolation, and either goes to 0POP05-EO-EO10, Loss of Reactor or Secondary Coolant, or 0POP05-EO-ES11, SI Termination.

**Critical tasks:**

- CT – 17; Isolate faulted SG1B.
- CT – 12; Adequate response to failure of MSIV 1B to close from 0POP05-EO-EO00, Addendum 5.

**Source:** New

NOTE: Detailed description of Critical Tasks will be included in From ES-D-2, Required Operator Actions.

Facility: South Texas Project			Date of Exam: 7-12-21			Operating Test No.: LOT 25											
A P P L I C A N T	E V E N T  T Y P E	Scenarios											T O T A L	M I N I M U M(*)			
		1			4			5						R	I	U	
		C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C					B O P
Crew A	RX	1				1			1					3	1	1	0
	NOR													0	1	1	1
	I/C	2,3, 4,6, 7,8				3,5			2,3, 4,5, 7,8					14	4	4	2
	MAJ	5				6			6					3	2	2	1
	TS	2,3							2,3, 4					5	0	2	2
RO <input type="checkbox"/> SRO-I4 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>	RX			1	1				1					3	1	1	0
	NOR													0	1	1	1
	I/C			3,4, 6,7	2,3,4 ,5,7, 8				2,4					12	4	4	2
	MAJ			5	6				6					3	2	2	1
	TS				2,4, 5									3	0	2	2
RO-4 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX		1								1			2	1	1	0
	NOR													0	1	1	1
	I/C		2,4, 8				2,4, 7,8			3,5, 7,8				11	4	4	2
	MAJ		5				6			6				3	2	2	1
	TS													0	0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls" (ATC) and "balance-of-plant" (BOP) positions. Instant SROs (SRO-I) must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an SRO-I *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (\*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a one-for-one basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.
4. For licensees that use the ATC operator primarily for monitoring plant parameters, the chief examiner may place SRO-I applicants in either the ATC or BOP position to best evaluate the SRO-I in manipulating plant controls.

Facility: South Texas Project				Date of Exam: 7-12-21				Operating Test No.: LOT 25									
A P P L I C A N T	E V E N T  T Y P E	Scenarios												T O T A L	M I N I M U M (*)		
		1			3			4							R	I	U
		C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P				
Crew B	RX		1		1			1					3	1	1	0	
	NOR												0	1	1	1	
	I/C		2,4,8		2,3,4,6,7,8			2,3,4,5,7,8					15	4	4	2	
	MAJ		5		5			6					3	2	2	1	
	TS				3,4			2,4,5					5	0	2	2	
RO <input type="checkbox"/> SRO-I8 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>	RX	1				1							2	1	1	0	
	NOR												0	1	1	1	
	I/C	2,3,4,6,7,8				3,4,8					2,4,7,8		13	4	4	2	
	MAJ	5				5					6		3	2	2	1	
	TS	2,3											2	0	2	2	
RO-3 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX			1			1		1				3	1	1	0	
	NOR												0	1	1	1	
	I/C			3,4,6,7			2,6,7		3,5				9	4	4	2	
	MAJ			5			5		6				3	2	2	1	
	TS												0	0	2	2	

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls" (ATC) and "balance-of-plant" (BOP) positions. Instant SROs (SRO-I) must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an SRO-I *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (\*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a one-for-one basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.
4. For licensees that use the ATC operator primarily for monitoring plant parameters, the chief examiner may place SRO-I applicants in either the ATC or BOP position to best evaluate the SRO-I in manipulating plant controls.

Facility: South Texas Project		Date of Exam: 7-12-21		Operating Test No.: LOT 25													
A P P L I C A N T	E V E N T  T Y P E	Scenarios												T O T A L	M I N I M U M(*)		
		3			5										R	I	U
		C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P				
Crew C	RX			1		1								2	1	1	0
	NOR													0	1	1	1
	SRO-I <input type="checkbox"/>	I/C		2,6, 7		2,4								5	4	4	2
	SRO-U <input type="checkbox"/>	MAJ		5		6								2	2	2	1
		TS												0	0	2	2
RO-2 <input checked="" type="checkbox"/>	RX		1			1								2	1	1	0
	NOR													0	1	1	1
	SRO-I <input type="checkbox"/>	I/C		3,4, 8		3,5, 7,8								7	4	4	2
	SRO-U <input type="checkbox"/>	MAJ		5		6								2	2	2	1
		TS												0	0	2	2
RO <input type="checkbox"/>	RX	1			1									2	1	1	0
	NOR													0	1	1	1
	SRO-I <input type="checkbox"/>	I/C	2,3, 4,6, 7,8		2,3, 4,5, 7,8									12	4	4	2
	SRO-U1 <input checked="" type="checkbox"/>	MAJ	5		6									2	2	2	1
		TS	3,4		2,3, 4									5	0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls" (ATC) and "balance-of-plant" (BOP) positions. Instant SROs (SRO-I) must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an SRO-I *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (\*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a one-for-one basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.
4. For licensees that use the ATC operator primarily for monitoring plant parameters, the chief examiner may place SRO-I applicants in either the ATC or BOP position to best evaluate the SRO-I in manipulating plant controls.



Facility: South Texas Project			Date of Exam: 7-12-21			Operating Test No.: LOT 25											
A P P L I C A N T	E V E N T  T Y P E	Scenarios											T O T A L	M I N I M U M(*)			
		1			3			4						R	I	U	
		C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C					B O P
Crew D	RX	1					1		1					3	1	1	0
	NOR													0	1	1	1
	I/C	2,3, 4,6, 7,8					2,6, 7		3,5					11	4	4	2
	MAJ	5					5		6					3	2	2	1
	TS	2,3												2	0	2	2
RO <input type="checkbox"/> SRO-I3 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>	RX			1		1		1						3	1	1	0
	NOR													0	1	1	1
	I/C			3,4, 6,7		3,4, 8		2,3, 4,5, 7,8						13	4	4	2
	MAJ			5		5		6						3	2	2	1
	TS							2,4, 5						3	0	2	2
RO <input type="checkbox"/> SRO-I5 <input checked="" type="checkbox"/> SRO <input type="checkbox"/>	RX		1		1									2	1	1	0
	NOR													0	1	1	1
	I/C		2,4, 8		2,3, 4,6, 7,8				2,4, 7, 8					13	4	4	2
	MAJ		5		5				6					3	2	2	1
	TS				3,4									2	0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls" (ATC) and "balance-of-plant" (BOP) positions. Instant SROs (SRO-I) must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an SRO-I *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (\*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a one-for-one basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.
4. For licensees that use the ATC operator primarily for monitoring plant parameters, the chief examiner may place SRO-I applicants in either the ATC or BOP position to best evaluate the SRO-I in manipulating plant controls.

Facility: South Texas Project			Date of Exam: 7-12-21			Operating Test No.: LOT 25											
A P P L I C A N T	E V E N T  T Y P E	Scenarios											T O T A L	M I N I M U M(*)			
		1			3			4						R	I	U	
		C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C					B O P
Crew E	RX	1			1				1					3	1	1	0
	NOR													0	1	1	1
	I/C	2,3, 4,6, 7,8			2,3, 4,6, 7,8				3,5					14	4	4	2
	MAJ	5			5				6					3	2	2	1
	TS	2,3			3,4									4	0	2	2
RO <input type="checkbox"/> SRO-I6 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>	RX			1		1			1					3	1	1	0
	NOR													0	1	1	1
	I/C			3,4, 6,7		3,4, 8			2,3, 4,5, 7,8					13	4	4	2
	MAJ			5		5			6					3	2	2	1
	TS								2,4, 5					3	0	2	2
RO-5 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO <input type="checkbox"/>	RX		1											2	1	1	0
	NOR													0	1	1	1
	I/C		2,4, 8					2,6, 7				2,4, 7, 8		10	4	4	2
	MAJ		5				5					6		3	2	2	1
	TS													0	0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls" (ATC) and "balance-of-plant" (BOP) positions. Instant SROs (SRO-I) must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an SRO-I *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (\*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a one-for-one basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.
4. For licensees that use the ATC operator primarily for monitoring plant parameters, the chief examiner may place SRO-I applicants in either the ATC or BOP position to best evaluate the SRO-I in manipulating plant controls.

<b>Facility: South Texas Project      Date of Examination: 7-12-21      Operating Test No.: LOT 25</b>													
<b>Competencies</b>	<b>APPLICANTS – Crew A</b>												
	RO <input type="checkbox"/> SRO-I4 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>			RO <input type="checkbox"/> SRO-I9 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>			RO-4 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>						
	<b>SCENARIO</b>				<b>SCENARIO</b>				<b>SCENARIO</b>				
	<b>1u</b>	<b>4a</b>	<b>5u</b>		<b>1b</b>	<b>4u</b>	<b>5a</b>		<b>1a</b>	<b>4b</b>	<b>5b</b>		
<b>Interpret/Diagnose Events and Conditions</b>	2,3, 4,6, 7,8	1,3, 5	2,3, 4,5, 7,8		1,3	2,3, 4,5, 7,8	1,2, 4		1,2, 4	2,4	1,3, 5		
<b>Comply With and Use Procedures (1)</b>	All	1,3, 5	All		1,3, 4,6, 7	All	1,2, 4		1,2, 4	2,4, 7,8	1,3, 5,7, 8		
<b>Operate Control Boards (2)</b>	N/A	1,3, 5,6	N/A		1,3, 4,5, 6,7	N/A	1,2, 4,6		1,2, 4,5, 8	2,4, 6,7, 8	1,3, 5,6, 7,8		
<b>Communicate and Interact</b>	All	All	All		All	All	All		All	All	All		
<b>Demonstrate Supervisory Ability (3)</b>	All	N/A	All		N/A	All	N/A		N/A	N/A	N/A		
<b>Comply With and Use Tech. Specs. (3)</b>	2,3	N/A	2,3, 4		N/A	2,4, 5	N/A		N/A	N/A	N/A		
<b>Notes:</b> (1) Includes Technical Specification compliance for an RO. (2) Optional for an SRO-U. (3) Only applicable to SROs.													

**Instructions:**

**Check 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. (This includes all rating factors for each competency.) (Forms ES-303-1 and ES-303-3 describe the competency rating factors.)**

Facility: South Texas Project      Date of Examination: 7-12-21      Operating Test No.: LOT 25														
Competencies	APPLICANTS – Crew B													
	RO <input type="checkbox"/> SRO-I7 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>				RO <input type="checkbox"/> SRO-I8 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>				RO-3 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>					
	SCENARIO				SCENARIO				SCENARIO					
	1a	3u	4u		1u	3a	4b		1b	3b	4a			
Interpret/Diagnose Events and Conditions	1,2, 4	1,2, 3,4	2,3, 4,5, 7,8		2,3, 4,6, 7,8	1,3, 4	2,4		1,3	1,2	1,3, 5			
Comply With and Use Procedures (1)	1,2, 4	All	All		All	1,3, 4,8	2,4, 7,8		1,3, 4,6, 7	1,2, 6,7	1,3, 5			
Operate Control Boards (2)	1,2, 4,5, 8	N/A	N/A		N/A	1,3, 4,5, 8	2,4, 6,7, 8		1,3, 4,5, 6,7	1,2, 5,6, 7	1,3, 5,6			
Communicate and Interact	All	All	All		All	All	All		All	All	All			
Demonstrate Supervisory Ability (3)	N/A	All	All		All	N/A	N/A		N/A	N/A	N/A			
Comply With and Use Tech. Specs. (3)	N/A	3,4	2,4, 5		2,3	N/A	N/A		N/A	N/A	N/A			

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

**Instructions:**

**Check 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. (This includes all rating factors for each competency.) (Forms ES-303-1 and ES-303-3 describe the competency rating factors.)**

Facility: South Texas Project      Date of Examination: 7-12-21      Operating Test No.: LOT 25														
Competencies	APPLICANTS – Crew C													
	RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/> U1				RO-1 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>				RO-2 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>					
	SCENARIO				SCENARIO				SCENARIO					
	3u	5u			3b	5a			3a	5b				
Interpret/Diagnose Events and Conditions	1,2, 3,4	2,3, 4,5, 7,8			1,2	1,2, 4			1,3, 4	1,3, 5				
Comply With and Use Procedures (1)	All	All			1,2, 6,7	1,2, 4			1,3, 4,8	1,3, 5,7, 8				
Operate Control Boards (2)	N/A	N/A			1,2, 5,6, 7	1,2, 4,6			1,3, 4,5, 8	1,3, 5,6, 7,8				
Communicate and Interact	All	All			All	All			All	All				
Demonstrate Supervisory Ability (3)	All	All			N/A	N/A			N/A	N/A				
Comply With and Use Tech. Specs. (3)	3,4	2,3, 4			N/A	N/A			N/A	N/A				
<b>Notes:</b> (1) Includes Technical Specification compliance for an RO. (2) Optional for an SRO-U. (3) Only applicable to SROs.														

**Instructions:**

**Check 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. (This includes all rating factors for each competency.) (Forms ES-303-1 and ES-303-3 describe the competency rating factors.)**

Facility: South Texas Project      Date of Examination: 7-12-21      Operating Test No.: LOT 25														
Competencies	APPLICANTS – Crew D													
	RO <input type="checkbox"/> SRO-I1 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>			RO <input type="checkbox"/> SRO-I3 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>			RO <input type="checkbox"/> SRO-I5 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>							
	SCENARIO				SCENARIO				SCENARIO					
	1u	3b	4a		1b	3a	4u		1a	3u	4b			
Interpret/Diagnose Events and Conditions	2,3, 4,6, 7,8	1,2	1,3, 5		1,3	1,3, 4	2,3, 4,5, 7,8		1,2, 4	1,2, 3,4	2,4			
Comply With and Use Procedures (1)	All	1,2, 6,7	1,3, 5		1,3, 4,6, 7	1,3, 4,8	All		1,2, 4	All	2,4, 7,8			
Operate Control Boards (2)	N/A	1,2, 5,6, 7	1,3, 5,6		1,3, 4,5, 6,7	1,3, 4,5, 8	N/A		1,2, 4,5, 8	N/A	2,4, 6,7, 8			
Communicate and Interact	All	All	All		All	All	All		All	All	All			
Demonstrate Supervisory Ability (3)	All	N/A	N/A		N/A	N/A	All		N/A	All	N/A			
Comply With and Use Tech. Specs. (3)	2,3	N/A	N/A		N/A	N/A	2,4, 5		N/A	3,4	N/A			

**Notes:**

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

**Instructions:**

**Check 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. (This includes all rating factors for each competency.) (Forms ES-303-1 and ES-303-3 describe the competency rating factors.)**

Facility: South Texas Project      Date of Examination: 7-12-21      Operating Test No.: LOT 25														
Competencies	APPLICANTS – Crew E													
	RO <input type="checkbox"/> SRO-I2 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>			RO <input type="checkbox"/> SRO-I6 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>			RO-5 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>							
	SCENARIO				SCENARIO				SCENARIO					
	1u	3u	4a		1b	3a	4u		1a	3b	4b			
Interpret/Diagnose Events and Conditions	2,3, 4,6, 7,8	1,2, 3,4	1,3, 5		1,3	1,3, 4	2,3, 4,5, 7,8		1,2, 4	1,2	2,4			
Comply With and Use Procedures (1)	All	All	1,3, 5		1,3, 4,6, 7	1,3, 4,8	All		1,2, 4	1,2, 6,7	2,4, 7,8			
Operate Control Boards (2)	N/A	N/A	1,3, 5,6		1,3, 4,5, 6,7	1,3, 4,5, 8	N/A		1,2, 4,5, 8	1,2, 5,6, 7	2,4, 6,7, 8			
Communicate and Interact	All	All	All		All	All	All		All	All	All			
Demonstrate Supervisory Ability (3)	All	All	N/A		N/A	N/A	All		N/A	N/A	N/A			
Comply With and Use Tech. Specs. (3)	2,3	3,4	N/A		N/A	N/A	2,4, 5		N/A	N/A	N/A			

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

**Instructions:**

**Check 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. (This includes all rating factors for each competency.) (Forms ES-303-1 and ES-303-3 describe the competency rating factors.)**