Facility: Diablo Canyon Date of Exam: July, 2014

Tier	Group	RO K/A Category Points											SRO-Only Points		
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total
1. Emergency & Abnormal Plant Evolutions	1	2	3	3	N/A			4	3	N/A		3	18			6
	2	2	1	1				1	2			2	9			4
	Tier Totals	4	4	4				5	5			5	27			10
2. Plant Systems	1	3	2	3	2	2	2	2	3	3	3	3	28			5
	2	1	1	1	1	0	1	2	1	1	1	0	10			3
	Tier Totals	4	3	4	3	2	3	4	4	4	4	3	38			8
3. Generic Knowledge and Abilities Categories		1			2			3			4		10	1	2	3	4	7
		4			2			2			2							

Note:

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

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)						Form ES-401-2		
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1									
000008 Pressurizer Vapor Space Accident / 3						X	G2.1.7	4.4	
000009 Small Break LOCA / 3		X					EK2.03	3.0	
000011 Large Break LOCA / 3	X						EK1.01	4.1	
000015/17 RCP Malfunctions / 4				X			AA1.06	3.1	
000022 Loss of Rx Coolant Makeup / 2						X	G2.1.23	4.3	
000025 Loss of RHR System / 4	X						AK1.01	3.9	
000026 Loss of Component Cooling Water / 8									
000027 Pressurizer Pressure Control System Malfunction / 3									
000029 ATWS / 1		X					EK2.06	2.9	
000038 Steam Gen. Tube Rupture / 3					X		EA2.01	4.1	
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4			X				AK3.04	4.5	
000054 (CE/E06) Loss of Main Feedwater / 4					X		AA2.05	3.5	
000055 Station Blackout / 6						X	G2.2.22	4.0	
000056 Loss of Off-site Power / 6					X		AA2.04	3.5	
000057 Loss of Vital AC Inst. Bus / 6				X			AA1.06	3.5	
000058 Loss of DC Power / 6				X			AA1.01	3.4	
000062 Loss of Nuclear Svc Water / 4									
000065 Loss of Instrument Air / 8				X			AA1.04	3.5	
W/E04 LOCA Outside Containment / 3			X				EK3.3	3.8	
W/E11 Loss of Emergency Coolant Recirc. / 4		X					EK2.1	3.6	
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4			X				EK3.2	3.7	
000077 Generator Voltage and Electric Grid Disturbances / 6									
K/A Category Totals:	2	3	3	4	3	3	Group Point Total:		18

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)							Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1									
000003 Dropped Control Rod / 1									
000005 Inoperable/Stuck Control Rod / 1									
000024 Emergency Boration / 1					X		AA2.05	3.3	
000028 Pressurizer Level Malfunction / 2					X		AA2.11	3.2	
000032 Loss of Source Range NI / 7									
000033 Loss of Intermediate Range NI / 7	X						AK1.01	2.7	
000036 (BW/A08) Fuel Handling Accident / 8									
000037 Steam Generator Tube Leak / 3									
000051 Loss of Condenser Vacuum / 4									
000059 Accidental Liquid RadWaste Rel. / 9									
000060 Accidental Gaseous Radwaste Rel. / 9									
000061 ARM System Alarms / 7									
000067 Plant Fire On-site / 8	X						AK1.02	3.1	
000068 (BW/A06) Control Room Evac. / 8									
000069 (W/E14) Loss of CTMT Integrity / 5						X	G2.4.20	3.8	
000074 (W/E06&E07) Inad. Core Cooling / 4		X							
000076 High Reactor Coolant Activity / 9									
W/EO1 & E02 Rediagnosis & SI Termination / 3						X	G2.2.44	4.2	
W/E13 Steam Generator Over-pressure / 4				X			EA1.1	3.1	
W/E15 Containment Flooding / 5									
W/E16 High Containment Radiation / 9			X				EK3.3	3.0	
BW/A01 Plant Runback / 1									
BW/A02&A03 Loss of NNI-X/Y / 7									
BW/A04 Turbine Trip / 4									
BW/A05 Emergency Diesel Actuation / 6									
BW/A07 Flooding / 8									
BW/E03 Inadequate Subcooling Margin / 4									
BW/E08; W/E03 LOCA Cooldown - Depress. / 4									
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4									
BW/E13&E14 EOP Rules and Enclosures									
CE/A11; W/E08 RCS Overcooling - PTS / 4									
CE/A16 Excess RCS Leakage / 2									
CE/E09 Functional Recovery									
K/A Category Point Totals:	2	1	1	1	2	2			9

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)												Form ES-401-2	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump							X					A1.07	3.4	
004 Chemical and Volume Control										X		A4.01	3.8	
005 Residual Heat Removal		X										K2.01	3.0	
006 Emergency Core Cooling											X	G2.1.20	4.3	
007 Pressurizer Relief/Quench Tank	X											K1.03	3.0	
008 Component Cooling Water	X											K1.05	3.0	
010 Pressurizer Pressure Control					X							K5.01	3.5	
012 Reactor Protection		X		X								K4.01 K2.01	3.7 3.3	
013 Engineered Safety Features Actuation			X			X						K3.03 K6.01	4.3 2.7	
022 Containment Cooling							X				X	A1.02 G2.4.46	3.6 3.5	
025 Ice Condenser														
026 Containment Spray								X				A2.02	4.2	
039 Main and Reheat Steam								X				A2.04	3.4	
059 Main Feedwater											X	G2.1.31	4.2	
061 Auxiliary/Emergency Feedwater					X				X			K5.02 A3.04	3.2 4.1	
062 AC Electrical Distribution										X		A4.07	3.1	
063 DC Electrical Distribution	X									X		K1.03 A4.03	2.9 3.0	
064 Emergency Diesel Generator				X		X						K4.10 K6.08	3.5 3.2	
073 Process Radiation Monitoring			X									K3.01	3.6	
076 Service Water			X						X			K3.01 A3.02	3.4 3.7	
078 Instrument Air									X			A3.01	3.1	
103 Containment								X				A2.05	2.9	

K/A Category Point Totals:	3	2	3	2	2	2	2	3	3	3	3	Group Point Total:		28

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO / SRO)												Form ES-401-2	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
001 Control Rod Drive														
002 Reactor Coolant														
011 Pressurizer Level Control			X									K3.01	3.2	
014 Rod Position Indication														
015 Nuclear Instrumentation	X											K1.02	3.4	
016 Non-nuclear Instrumentation								X				A2.03	3.0	
017 In-core Temperature Monitor						X						K6.01	2.7	
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control							X					A1.01	3.4	
029 Containment Purge				X								K4.03	3.2	
033 Spent Fuel Pool Cooling														
034 Fuel Handling Equipment														
035 Steam Generator														
041 Steam Dump/Turbine Bypass Control														
045 Main Turbine Generator														
055 Condenser Air Removal									X			A3.03	2.5	
056 Condensate														
068 Liquid Radwaste														
071 Waste Gas Disposal														
072 Area Radiation Monitoring							X					A1.01	3.4	
075 Circulating Water		X										K2.03	2.6	
079 Station Air														
086 Fire Protection										X		A4.06	3.2	
K/A Category Point Totals:	1	1	1	1	0	1	2	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.	2.1.1	3.8			
	2.1.	2.1.15	2.7			
	2.1.	2.1.19	3.9			
	2.1.	2.1.32	3.8			
	2.1.					
	2.1.					
2. Equipment Control	2.2.	2.2.2	4.6			
	2.2.	2.2.13	4.1			
	2.2.					
	2.2.					
	2.2.					
	2.2.					
3. Radiation Control	2.3.	2.3.4	3.2			
	2.3.	2.3.11	3.8			
	2.3.					
	2.3.					
	2.3.					
	2.3.					
4. Emergency Procedures / Plan	2.4.	2.4.6	3.7			
	2.4.	2.4.12	4.1			
	2.4.					
	2.4.					
	2.4.					
	2.4.					
	Subtotal					
Tier 3 Point Total				10		

Tier / Group	Randomly Selected K/A	Reason for Rejection

Facility: Diablo Canyon Date of Exam: July, 2014

Tier	Group	RO K/A Category Points											SRO-Only Points		
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total
1. Emergency & Abnormal Plant Evolutions	1				N/A					N/A			18	4	2	6
	2												9	2	2	4
	Tier Totals												27	6	4	10
2. Plant Systems	1												28	3	2	5
	2												10	2	1	3
	Tier Totals												38	5	3	8
3. Generic Knowledge and Abilities Categories		1			2			3			4		10	1	2	3	4	7
														2	2	2	1	

Note:

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

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)							Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1									
000008 Pressurizer Vapor Space Accident / 3									
000009 Small Break LOCA / 3									
000011 Large Break LOCA / 3									
000015/17 RCP Malfunctions / 4									
000022 Loss of Rx Coolant Makeup / 2					X		AA2.01	3.8	
000025 Loss of RHR System / 4									
000026 Loss of Component Cooling Water / 8									
000027 Pressurizer Pressure Control System Malfunction / 3					X		AA2.17	3.3	
000029 ATWS / 1									
000038 Steam Gen. Tube Rupture / 3									
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4									
000054 (CE/E06) Loss of Main Feedwater / 4						X	G2.1.28	3.3	
000055 Station Blackout / 6									
000056 Loss of Off-site Power / 6									
000057 Loss of Vital AC Inst. Bus / 6									
000058 Loss of DC Power / 6									
000062 Loss of Nuclear Svc Water / 4					X		AA2.04	2.9	
000065 Loss of Instrument Air / 8						X	G2.4.31	3.4	
W/E04 LOCA Outside Containment / 3					X		EA2.1	4.3	
W/E11 Loss of Emergency Coolant Recirc. / 4									
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4									
000077 Generator Voltage and Electric Grid Disturbances / 6									
K/A Category Totals:					4	2	Group Point Total:		6

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)							Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1									
000003 Dropped Control Rod / 1						X	G2.1.30	3.4	
000005 Inoperable/Stuck Control Rod / 1									
000024 Emergency Boration / 1									
000028 Pressurizer Level Malfunction / 2									
000032 Loss of Source Range NI / 7									
000033 Loss of Intermediate Range NI / 7									
000036 (BW/A08) Fuel Handling Accident / 8									
000037 Steam Generator Tube Leak / 3					X		AA2.09	3.4	
000051 Loss of Condenser Vacuum / 4									
000059 Accidental Liquid RadWaste Rel. / 9					X		AA2.05	3.9	
000060 Accidental Gaseous Radwaste Rel. / 9									
000061 ARM System Alarms / 7									
000067 Plant Fire On-site / 8									
000068 (BW/A06) Control Room Evac. / 8									
000069 (W/E14) Loss of CTMT Integrity / 5						X	G2.2.25	3.7	
000074 (W/E06&E07) Inad. Core Cooling / 4									
000076 High Reactor Coolant Activity / 9									
W/EO1 & E02 Rediagnosis & SI Termination / 3									
W/E13 Steam Generator Over-pressure / 4									
W/E15 Containment Flooding / 5									
W/E16 High Containment Radiation / 9									
BW/A01 Plant Runback / 1									
BW/A02&A03 Loss of NNI-X/Y / 7									
BW/A04 Turbine Trip / 4									
BW/A05 Emergency Diesel Actuation / 6									
BW/A07 Flooding / 8									
BW/E03 Inadequate Subcooling Margin / 4									
BW/E08; W/E03 LOCA Cooldown - Depress. / 4									
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4									
BW/E13&E14 EOP Rules and Enclosures									
CE/A11; W/E08 RCS Overcooling - PTS / 4									
CE/A16 Excess RCS Leakage / 2									
CE/E09 Functional Recovery									
K/A Category Point Totals:					2	2	Group Point Total:		4

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)												Form ES-401-2	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump											X	G2.4.31	3.4	
004 Chemical and Volume Control								X				A2.15	3.7	
005 Residual Heat Removal														
006 Emergency Core Cooling														
007 Pressurizer Relief/Quench Tank														
008 Component Cooling Water														
010 Pressurizer Pressure Control											X	G2.4.47	3.7	
012 Reactor Protection														
013 Engineered Safety Features Actuation								X				A2.01	4.8	
022 Containment Cooling														
025 Ice Condenser														
026 Containment Spray														
039 Main and Reheat Steam														
059 Main Feedwater								X				A2.12	3.4	
061 Auxiliary/Emergency Feedwater														
062 AC Electrical Distribution														
063 DC Electrical Distribution														
064 Emergency Diesel Generator														
073 Process Radiation Monitoring														
076 Service Water														
078 Instrument Air														
103 Containment														
K/A Category Point Totals:								3			2	Group Point Total:		5

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO / SRO)												Form ES-401-2	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
001 Control Rod Drive														
002 Reactor Coolant														
011 Pressurizer Level Control														
014 Rod Position Indication														
015 Nuclear Instrumentation														
016 Non-nuclear Instrumentation														
017 In-core Temperature Monitor														
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control														
029 Containment Purge														
033 Spent Fuel Pool Cooling											X	G2.4.50	3.3	
034 Fuel Handling Equipment								X				A2.01	4.4	
035 Steam Generator														
041 Steam Dump/Turbine Bypass Control														
045 Main Turbine Generator														
055 Condenser Air Removal														
056 Condensate														
068 Liquid Radwaste								X				A2.04	3.3	
071 Waste Gas Disposal														
072 Area Radiation Monitoring														
075 Circulating Water														
079 Station Air														
086 Fire Protection														
K/A Category Point Totals:								2			1	Group Point Total:		3

Facility:		Date of Exam:				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.	2.1.2			4.4	
	2.1.	2.1.29			4.0	
	2.1.					
	2.1.					
	2.1.					
	2.1.					
					2	
2. Equipment Control	2.2.	2.2.6			3.6	
	2.2.	2.2.14			4.3	
	2.2.					
	2.2.					
	2.2.					
	2.2.					
					2	
3. Radiation Control	2.3.	2.3.4			3.7	
	2.3.	2.3.11			4.3	
	2.3.					
	2.3.					
	2.3.					
	2.3.					
					2	
4. Emergency Procedures / Plan	2.4.	2.4.12			4.3	
	2.4.					
	2.4.					
	2.4.					
	2.4.					
	2.4.					
	Subtotal				1	
Tier 3 Point Total					7	

Tier / Group	Randomly Selected K/A	Reason for Rejection

Facility: Diablo Canyon Date of Examination: 08/11/2014

Examination Level: RO ☒ SRO ☐ Operating Test Number: L121

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations (NRCL121-A1)	M, R	**Determine Ultimate Heat Sink Temperature** 2.1.23 Ability to perform specific system and integrated plant procedures during all modes of operation (4.3) (modified from bank LJACO-02R)
Conduct of Operations (NRCL121-A2)	M, R	**Determine Boration/Dilution Req for Power Rise** 2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. (3.9) (modified from L081 NRC ADMRO1)
Equipment Control (NRCL121-A3)	D, R	**Perform Outage Safety Checklist** 2.2.37 Ability to determine operability and/or availability of safety related equipment. (3.6) (bank: LJAEC-01R ; previously used in L061C NRC ADM02)
Radiation Control (NRCL121-A4)	M, R	**Review Liquid Radwaste Discharge Checklist** 2.3.11 Ability to control radiation releases. (3.8) (modified from L061C NRC ADM04)
Emergency Procedures/Plan		

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 5 are required.

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: Diablo Canyon Date of Examination: 08/11/2014

Examination Level: RO ☐ SRO ☒ Operating Test Number: L121

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations (NRCL121-A5)	M, R	**Verify Determination of Ultimate Heat Sink Temp** 2.1.23 Ability to perform specific system and integrated plant procedures during all modes of operation (4.4) (modified from LJACO-02S)
Conduct of Operations (NRCL121-A6)	M, R	**Determine Boration/Dilution Req for Power Rise** 2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. (4.2) (modified from L081 NRC ADMRO1)
Equipment Control (NRCL121-A7)	M, R	**Verify Outage Safety Checklist** 2.2.37 Ability to determine operability and/or availability of safety related equipment. (4.6) (modified from bank LJAEC-01R ; previously used in L061C NRC ADM02)
Radiation Control (NRCL121-A8)	M, R	**Review Liquid Radwaste Discharge Checklist** 2.3.11 Ability to control radiation releases. (4.3) (modified from L061C NRC ADM04)
Emergency Procedures/Plan (NRCL121-A9)	D, R	**Classification of a FH Accident in Containment** 2.4.41 Knowledge of the emergency action level thresholds and classifications. (4.6) (direct from bank - LJE-017)

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 5 are required.

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: Diablo Canyon Date of Examination: 08/11/2014

Exam Level: RO ☒ SRO-I ☐ SRO-U ☐ Operating Test Number: L121

Control Room Systems[@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. (S1) (001.A2.03) Verify Misaligned Is Not Stuck (LJC-066)	D,S	1
b. (S2) (013.A4.01) Manually Isolate Phase A Components (LJC-026)	A,D,EN,L,S	2
c. (S3) (055.EA1.07) Energize Vital Busses From 230 KV System	A,L,N,S	6
d. (S4) (022.A4.01) Respond to High CFCU Vibration	A,N,S	5
e. (S5) (073.A4.01) Respond to High Radiation on RE-17A/B	N,S	7
f. (S6) (002.A4.02) Initiate a Nat Cir Cooldown (LJC-046)	D,L,S	4P
g. (S7) (059.A2.07) Perform Immediate Actions for MFW Pump Trip	A,M,S	4S
h. (S8) (006.A4.05) Align RHR for Hot Leg Recirc (LJC-028M)	A,L,D,S	3
In-Plant Systems[@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. (P1) (067.AA1.08) Manually Operate the Cardox System (LJP-138A)	A,D,E	8
j. (P2) (068.AA1.21) Align 480V Bus G for Control from HSDP (LJP-007)	D,E,L	6
k. (P3) (061.A2.04) Align Alternate AFW from the FWST (LJP-104A)	D,E,L,R	4S

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

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

Facility: Diablo Canyon Date of Examination: 08/11/2014

Exam Level: RO ☐ SRO-I ☒ SRO-U ☐ Operating Test Number: L121

Control Room Systems[@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. (S1) (001.A2.03) Verify Misaligned Is Not Stuck (LJC-006)	D,S	1
b. (S2) (013.A4.01) Manually Isolate Phase A Components (LJC-026)	A,D,EN,L,S	2
c. (S3) (055.EA1.07) Energize Vital Busses From 230 KV System	A,L,N,S	6
d. (S4) (022.A4.01) Respond to High CFCU Vibration	A,N,S	5
e. (S5) (073.A4.01) Respond to High Radiation on RE-17A/B	N,S	7
f.		
g. (S7) (059.A2.07) Perform Immediate Actions for MFW Pump Trip	A,M,S	4S
h. (S8) (006.A4.05) Align RHR for Hot Leg Recirc (LJC-028M)	A,L,D,S	3

In-Plant Systems[@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

i. (P1) (067.AA1.08) Manually Operate the Cardox System (LJP-138A)	A,D,E	8
j. (P2) (068.AA1.21) Align 480V Bus G for Control from HSDP (LJP-007)	D,E,L	6
k. (P3) (061.A2.04) Align Alternate AFW from the FWST (LJP-104A)	D,E,L,R	4S

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

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

Rev 0: Initial Submittal

Facility: Diablo Canyon Date of Examination: 08/11/2014

Exam Level: RO ☐ SRO-I ☐ SRO-U ☒ Operating Test Number: L121

Control Room Systems[@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a.		
b. (S2) (013.A4.01) Manually Isolate Phase A Components	A,D,EN,L,S	2
c. (S3) (055.EA1.07) Energize Vital Busses From 230 KV System	A,E,L,N,S	6
d.		
e. (S5) (073.A4.01) Respond to High Radiation on RE-17A/B	A,N,S	7
f.		
g.		
h.		

In-Plant Systems[@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

i. (P1) (067.AA1.08) Manually Operate the Cardox System (LJP-138A)	A,D,E	8
j.		
k. (P3) (061.A2.04) Align Alternate AFW from the FWST	D,E,L,R	4S

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

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

Rev 0: Initial Submittal

Group 1 (U2, I2, R3, Sur)

Facility: **Diablo Canyon** Date of Exam: **August 2014** Operating Test Number: **L121**

APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)		
		1(I2,R3,Sur)			2(U2,I2,R3)			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
RO ☐ SRO-I ☐ SRO-U ☒	RX													0	1	1	0
	NOR				1*									1	1	1	1
	I/C				*,2,3,4,5									4	4	4	2
	MAJ				7									1	2	2	1
	TS				1,2,4									3	0	2	2
RO ☐ SRO-I ☒ SRO-U ☐	RX					5								1	1	1	0
	NOR	3*												1	1	1	1
	I/C	*,4,5,6				2,3								5	4	4	2
	MAJ	7,8				7								2	2	2	1
	TS	2,3												2	0	2	2
RO ☒ SRO-I ☐ SRO-U ☐	RX		1											1	1	1	0
	NOR						1*							1	1	1	1
	I/C		5,6				*,2,4,5,6							6	4	4	2
	MAJ		7,8				7							3	2	2	1
	TS													0	0	2	2
RO ☐ SRO-I ☐ SRO-U ☐	RX														1	1	0
	NOR														1	1	1
	I/C														4	4	2
	MAJ														2	2	1
	TS														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 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 Instant SRO *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 1-for-1 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.

Group 2 (U1, I1, R1, R2)

Facility: **Diablo Canyon** Date of Exam: **August 2014** Operating Test Number: **L121**

APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)		
		1(I1,R1,R2)			2(I1,R2,R1)			3(U1,I1,R2)			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
RO ☐ SRO-I ☒ SRO-U ☐	RX								3					1	1	1	0
	NOR	3*												1	1	1	1
	I/C	*,4,5,6			1,2,3,4,5				1,3					10	4	4	2
	MAJ	7,8			7				5,7					5	2	2	1
	TS	2,3			1,2,4									5	0	2	2
RO ☒ SRO-I ☐ SRO-U ☐	RX		1											1	1	1	0
	NOR						1*							1	1	1	1
	I/C		5,6				*,2,4,5,6							6	4	4	2
	MAJ		7,8				7							3	2	2	1
	TS													0	0	2	2
RO ☒ SRO-I ☐ SRO-U ☐	RX					5								1	1	1	0
	NOR			3*										1	1	1	1
	I/C			*,4,9		2,3				1,2,3,4,6,8				10	4	4	2
	MAJ			7,8		7				5,7				5	2	2	1
	TS													0	0	2	2
RO ☐ SRO-I ☐ SRO-U ☒	RX													0	1	1	0
	NOR							1*						1	1	1	1
	I/C							*,2,3,4						3	4	4	2
	MAJ							5,7						2	2	2	1
	TS							1,3						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 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 Instant SRO *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 1-for-1 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.

Group 3 (I3, R4, R5, Sur)

Facility: **Diablo Canyon** Date of Exam: **August 2014** Operating Test Number: **L121**

APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)		
		1(I3,R4,R5)			2(I3,R5,R4)			3(Sur,I3,R5)			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
RO ☐ SRO-I ☒ SRO-U ☐	RX								3					1	1	1	0
	NOR	3*												1	1	1	1
	I/C	*,4,5,6			1,2,3,4,5				1,3					10	4	4	2
	MAJ	7,8			7				5,7					5	2	2	1
	TS	2,3			1,2,4									5	0	2	2
RO ☒ SRO-I ☐ SRO-U ☐	RX		1											1	1	1	0
	NOR						1*							1	1	1	1
	I/C		5,6				*,2,4,5,6							6	4	4	2
	MAJ		7,8				7							5	2	2	1
	TS													0	0	2	2
RO ☒ SRO-I ☐ SRO-U ☐	RX					5								1	1	1	0
	NOR			3*										1	1	1	1
	I/C			*,4,9		2,3				1,2,3,4,6,8				10	4	4	2
	MAJ			7,8		7				5,7				5	2	2	1
	TS													0	0	2	2
RO ☐ SRO-I ☐ SRO-U ☐	RX														1	1	0
	NOR														1	1	1
	I/C														4	4	2
	MAJ														2	2	1
	TS														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 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 Instant SRO *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 1-for-1 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.

Group 4 (I4, R6, R7, Sur)

Facility: **Diablo Canyon** Date of Exam: **August 2014** Operating Test Number: **L121**

APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)		
		1(I4,R6,R7)			2(I4,R6,R7)			3(Sur,I4,R7)			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
RO ☐ SRO-I ☒ SRO-U ☐	RX								3					1	1	1	0
	NOR	3*												1	1	1	1
	I/C	*,4,5,6			1,2,3,4,5				1,3					10	4	4	2
	MAJ	7,8			7				5,7					5	2	2	1
	TS	2,3			1,2,4									5	0	2	2
RO ☒ SRO-I ☐ SRO-U ☐	RX		1											1	1	1	0
	NOR						1*							1	1	1	1
	I/C		5,6				*,2,4,5,6							6	4	4	2
	MAJ		7,8				7							5	2	2	1
	TS													0	0	2	2
RO ☒ SRO-I ☐ SRO-U ☐	RX					5								1	1	1	0
	NOR			3*										1	1	1	1
	I/C			*,4,9		2,3				1,2,3,4,6,8				10	4	4	2
	MAJ			7,8		7				5,7				5	2	2	1
	TS													0	0	2	2
RO ☐ SRO-I ☐ SRO-U ☐	RX														1	1	0
	NOR														1	1	1
	I/C														4	4	2
	MAJ														2	2	1
	TS														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 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 Instant SRO *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 1-for-1 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.

Facility: Diablo Canyon (PWR) **Scenario No:** 1 **Op-Test No:** L121 NRC

Examiners: _____ **Operators:** _____

_____ _____

_____ _____

Initial Conditions: **10E-8 with AFW in service, MOL, 1667 ppm boron**

Turnover: **At OP L-2, step 6.1.25, ready to raise power to 2%. Continue to raise power, and stabilize at 2%.**

Event No	Malf No.	Event Type*	Event Description
1	N/A	R(ATC)	Raise reactor power from 10E-8 to ≈ 2% per **OP L-2, sec 6.1**
2	XMT_RCS6_3	(I) SRO	PT-403 fails low (**TS, ECG**) (Used for SRO TS/ECG Only)
3	PMP_CCW2_MTRF	C (BOP, SRO)	CCW Pp 1-2 overcurrent trip. (**AP-11; TS**)
4	PMP_TUR2 OVERLOAD_DEV_FAIL	C (BOP, SRO)	Thermal overload of AC Bearing Oil Pump (**AP-29**).
5	XMT_MSS1_3	I (SRO, ATC)	PT-507 slow failure low causing Group I dumps to close. (**AP-5**)
6	MAL_RCS2A 0.5	C (SRO, ATC)	RCP 1-1 No. 2 seal failure **(AP-28, Section C)**.
7	MAL_RCS3A 0.75	M (ALL)	SBLOCA (¾" seal injection line breaks at flange) requiring Safety Injection (SI) – (Auto SI failed; manual SI is required **CT**).
8	MAL_PPL5A/B	M (ALL)	ATWS, Both manual trip and 13D/E fail.
9	PMP_CVC1 PMP_CVC2	C (BOP)	Both CCPs Fail to auto start on SI (Requires manual start – **CT**)

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d) (from form ES301-4)	Actual Attributes
1. Total malfunctions (5–8) (Events 3,4,5,6,7,8,9)	7
2. Malfunctions after EOP entry (1–2) (Events 8&9)	2
3. Abnormal events (2–4) (AP-11,29,5,28)	4
4. Major transients (1–2) (Events 7&8)	2
5. EOPs entered/requiring substantive actions (1–2) (E-1)	1
6. EOP contingencies requiring substantive actions (0–2) (FR-S.1)	1
7. Critical tasks (2–3)(See Scenario Summary)	2

SCENARIO SUMMARY – NRC #1

1. Control rods are used to raise power from 10E-8 Amps (IR) to 2% per **OP L-2, Hot Standby to Startup Mode**, step 6.1.25.

2. PT-403 fails low. Crew responds to **PK05-07, Subcooling Margin Lo/Lo-Lo** and **PK05-09, RVLIS Lo Lvl RVLIS/SCMM Trouble** and identifies affected instrumentation. Shift Foreman addresses **TS 3.3.3, Post Accident Monitoring Instrumentation** and **ECG 7.8, Accident Monitoring Instrumentation.**

3. CCW 1-2 trips on overcurrent and CCW 1-3 must be started manually (auto-start blocked) per direction in PK01-09 or as directed by **OP AP-11**, **Malfunction of Component Cooling Water System, Section A**. **T.S. 3.7.7, Vital Component Cooling Water (CCW) System**, is entered for one loop of CCW inoperable.

4. AC Lube Oil Pump trips on thermal overload. Crew responds to **PK12-16,Turbine Lube Oil System** and is directed to OP **AP-29, Main Turbine Malfunction** to start the DC Backup Pump (autostart failed).

5. PT-507 slowly fails low causing Group I dumps to close. Crew diagnoses the failure and takes manual control of HC-507. **OP AP-5, Malfunction of Eagle 21 Protection or Control Channel** is used to address the failure and return primary and secondary to normal bands.

6. RCP 1-1 No.2 seal fails. Crew responds to **PK05-01, RCP NO. 11** and is directed to **OP AP-28, Reactor Coolant Pump Malfunction, Section C**, which establishes continuous action to monitor for Reactor Trip criteria.

7. Seal injection line ruptures resulting in a SBLOCA. Auto Safety Injection (SI) fails to actuate, requiring manual SI (**WOG CT:E-0--D to manually initiate Safety Injection**).

8. Crew's attempt to trip reactor from the control room is unsuccessful. Shift Foreman enters **EOP E-0 (Reactor Trip or Safety Injection)** and transitions to **EOP FR-S.1, Response to Nuclear Power Generation / ATWS.**

9. Both CCPs fail to autostart on SI, but can be started manually. (**WOG CT: E-0--I to manually start CCPs**)

10. After addressing ATWS condition, crew transitions through **E-0 (Reactor Trip or Safety Injection)** and **E-1 (Loss of Reactor or Secondary Coolant)** to **E-1.2 (Post LOCA Cooldown and Depressurization)** .

The scenario is terminated at entry into E-1.2, Post LOCA Cooldown and Depressurization.

Facility: Diablo Canyon (PWR) **Scenario No.:** 2 **Op-Test No.:** L121-NRC

Examiners: _____ **Operators:** _____

_____ _____

_____ _____

Initial Conditions: **100%, MOL, 774 ppm boron**

Turnover: **Bus H Work Week: AFW 1-2 OOS, D/G 1-1 OOS**
Maintenance in progress on PCV-20.
CCP 1-1 In Service.

Event No	Malf No.	Event Type*	Event Description
1	XMT_RMS11_3	I (SRO, BOP)	RM-12 (containment gaseous radiation monitor) fails high requiring crew to place leak detection system in service (**TS**)
2	PMP_CVC1_MTRF	C (ALL)	CCP 1-1 OC Trip requiring restoration of letdown (**TS**) (**AP-17**)
3	MAL_CVC8A 100.0 ramp=30	C (SRO, ATC)	Seal Injection Filter 1-1 plugs causing reduction in charging flow to RCP seals.
4	MAL_EPS4E DIFF	C (SRO, BOP)	Loss of 4KV Vital Bus H (diff trip); alternate equipment is placed in service, and Tech Specs are implemented (**AP-27**) (**TS**)**.**
5	LOA_CND1 5E-5 LOA_CND1 1 LT 1010	C (SRO, BOP) R (ATC)	Slow vacuum leak develops requiring ramp. At 95% reactor power, vacuum leak rises substantially, requiring turbine/Rx trip (**AP-7 and AP-25**).
6	MAL_AFW1 1 cd='fnispr_1 lt 5 PMP_AFW2	C (BOP)	Immediately following the Rx Trip, TDAFW trips on overspeed and MDAFW 1-3 fails to autostart, requiring manual start of motor driven pump **(CT)**.
7	PMP_AFW2_MTRF	M (ALL)	Crew transitions to E-0.1. MDAFW 1-3 trips on overcurrent leading to Loss Of Heat Sink condition. Secondary heat sink is restored using condensate **(CT).**

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d) (from form ES301-4)	Actual Attributes
1. Total malfunctions (5–8) (Events 1,2,3,4,5,6,7)	7
2. Malfunctions after EOP entry (1–2) (Event 7)	1
3. Abnormal events (2-4) (AP-17, AP-27, AP-7, AP-25)	4
4. Major transients (1–2) (Event 7)	1
5. EOPs entered/requiring substantive actions (1–2) (E-0.1)	1
6. EOP contingencies requiring substantive actions (0–2) (FR-H.1)	1
7. Critical tasks (2–3) (See Scenario Summary)	2

.

SCENARIO SUMMARY – NRC #2

1. RM-12 fails high and crew responds using guidance of **AR PK11-21, High Radiation** which calls for CFCU Drain Collection System to be placed in service. Shift Foreman evaluates **TS 3.4.15**, **RCS Leakage Detection Instrumentation** for applicability**.**

2. CCP 1-1 trips on overcurrent causing letdown to isolate. Crew restores charging and letdown using **OP AP-17, Loss of Charging** and addresses **TS 3.5.2, ECCS – Operating**.

3. In-service Seal Injection Filter 1-1 plugs, reducing flow to RCP seals and bringing in **AR PK04-22, RCP Seal Inj Fltr Delta-P Hi**. Crew throttles RCP seal injection hand control valve, HCV-142, as needed to maintain pressurizer level and directs field operator to swap seal injection filters.

4. 4 kV bus H trips on differential. **OP AP-27, Loss of Vital 4kV and/or 480V Bus** is used to stabilize and respond to the loss of the bus, and restoration of equipment. **TS 3.4.11-Pressurizer Power Operated Relief Valves; 3.8.1-AC Sources, Operating; 3.8.4-DC Sources.**

5. Slow vacuum leak develops requiring crew to reduce load. At 95% reactor power, vacuum leak rises quickly, reaching the automatic turbine trip set point. (**OP AP-7, Degraded Condenser and OP AP-25, Rapid Load Reduction or Shutdown**). At this power, the turbine trip results in a Rx trip and the crew enters **E-0, Reactor Trip or Safety Injection.**

6. Turbine driven AFW pump trips on overspeed and cannot be restarted. The remaining motor driven AFW pump (MDAFW 1-3) fails to auto start and must be started manually (**WOG CT FR-H.1—E**).

7. Crew transitions from **E-0, Reactor Trip or Safety Injection** to **E-0.1, Reactor Trip Response** to stabilize the plant. MDAFW 1-3 trips on overcurrent leading to Loss Of Heat Sink condition. **EOP FR-H.1, Response to Loss of Secondary Heat Sink** is used to establish secondary feedwater from the condensate system. (**WOG CT FR-H.1—A**).

The scenario is terminated in FR-H.1, once condensate flow to the steam generators has been established.

Facility: Diablo Canyon (PWR) **Scenario No.:** 3 **Op-Test No.:** L121-NRC

Examiners: _____ **Operators:** _____

_____ _____

_____ _____

Initial Conditions: **75%, MOL, 774 ppm boron**

Turnover: **Bus H Work Week: AFW 1-2 OOS, D/G 1-1 OOS**
Maintenance in progress on PCV-20.
CCP 1-1 In Service.

Event No	Malf No.	Event Type*	Event Description
1	MAL_NIS6D 200 (ramp in slowly)	I (ALL)	NI-44 slowly fails high causing unwarranted rod motion (**TS, ECGs**) (**AP-5**)
2	PMP_CND2 BLOCK_AUTO_STRT PMP_CND3_MTRF	C (SRO, BOP)	Condensate Booster Pump 1-3 Trips on overcurrent. Standby fails to autostart (**AP-15**).
3	MAL_RCS4F 35	C (ALL) R (ATC)	35 gpm tube leak on S/G 1-2, requiring power reduction. (**TS**) (**AP-3, AP-5**)
4	MAL_CWS2C 1.3	C (SRO, BOP)	Condenser in-leakage in SW quadrant requiring 25 MW/min ramp (**AP-20**)
5	MAL_RCS4B 400	M (ALL)	S/G 1-2 ruptures (400 gpm) requiring manual Safety Injection.
6	VLV_SIS3_1 1 VLV_SIS4_1 1	C (BOP)	8801A/B fail to open on SI, requiring manual opening to establish high head ECCS injection (**CT**)
7	MAL_MSS1B 3500000	M (ALL)	MSLB on S/G 1-2 inside containment downstream of flow restrictor on Rx Trip resulting in faulted/ruptured S/G.
8	insert VLV_MSS7_2 insert VLV_MSS8_2	C (SRO, BOP)	MSIVs on leads 1 & 2 fail to close in auto, but can be closed manually (**CT**).

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d) (from form ES301-4)	Actual Attributes
1. Total malfunctions (5–8) (Events 1,2,3,4,5,6,7,8)	8
2. Malfunctions after EOP entry (1–2) (Events 6,8)	2
3. Abnormal events (2–4) (AP-5, AP-15, AP-3, AP-20)	4
4. Major transients (1–2) (Event 5,7)	2
5. EOPs entered/requiring substantive actions (1–2) (E-2, E-3)	2
6. EOP contingencies requiring substantive actions (0–2) (terminate @ ECA-3.1 entry)	0
7. Critical tasks (2–3) (See Scenario Summary)	2

SCENARIO SUMMARY – NRC #3

1. NI-44 slowly fails high causing inward rod motion. Crew diagnoses failure, and once motion is deemed unwarranted, takes rods to manual. Failure is addressed per **OP AP-5, Malfunction of Eagle 21 Protection or Control Channel**, which removes the failed channel from service and directs the Shift Foreman to address **Tech Specs 3.3.1, ECG 37.2 Axial Flux Difference (AFD) monitoring, and ECG 3.73 (Quadrant Power Tilt Ratio Alarms)**.

2. Condensate Booster Pump 1-3 trips and standby pump fails to autostart. Crew responds by manually starting standby pump and following guidance of **OP AP-15, Loss of Feedwater Flow**.

3. S/G 1-2 develops a 35 gpm tube leak over a two minute period. Crew determines leak rate and enters **OP AP-3, Steam Generator Tube Failure**. Leak is also evaluated per **OP O-4, Primary to Secondary Steam Generator Tube Leak Detection**, which directs crew to reduce power by 50% in the next hour and be in Mode 3 within two hours. Shift Foreman determines **TS 3.4.13, RCS Operations Leakage** applies.

4. A saltwater leak develops in the SW quadrant of the condenser, requiring the crew to raise the ramp rate to 25 MW/min per **OP AP-20, Condenser Tube Leak.**

5. S/G 1-2 ruptures during ramp, requiring crew to initiate a Safety Injection and enter **EOP E-0, Reactor Trip or Safety Injection**.

6. On the SI, two of the charging injection isolation valves fail to open, but are opened manually in order to supply high-head ECCS injection. **(CT – WOG CT E-0-D)**.

7. On the Reactor Trip, a Main Steam Line Break occurs on S/G 1-2 inside containment, downstream of the flow restrictor, resulting in a faulted/ruptured condition.

8. MSIVs on steam leads 1 and 2 fail to isolate and are closed manually by the crew. The S/G will be isolated per **EOP E-2, Faulted S/G Isolation (WOG CT E-2--A)**. The crew will continue to mitigate the casualty following the guidance of **EOP E-3, Steam Generator Tube Rupture**, and transition to **EOP ECA-3.1, SGTR with Loss of Reactor Coolant – Subcooled Recovery Desired**.

The scenario is terminated once crew transitions to ECA 3.1, SGTR with Loss of Reactor Coolant – Subcooled Recovery.

Facility: Diablo Canyon (PWR) **Scenario No.:** 4 **Op-Test No.:** L121-NRC

Examiners: _____ **Operators:** _____

_____ _____

_____ _____

Initial Conditions: **100%, MOL, 774 ppm boron**

Turnover: **Bus H Work Week: AFW 1-2 OOS, D/G 1-1 OOS**
Maintenance in progress on PCV-20.
CCP 1-1 In Service.

Event No	Malf No.	Event Type*	Event Description
1	XMT_CVC20_3	I (SRO, BOP)	VCT level LT-114 gradually fails high causing letdown flow to divert to the LHUTs. Automakeup commences when actual level falls to 14% (**AP-19**);
2	MAL_SEI1 .15 delay=0 ramp=5 VLV_PZR5_2 0.25 delay=0 ramp=5	C (SRO, BOP)	PCV-456 slowly drifts open following small seismic (**TS, CT**)
3		C (SRO,BOP) R(ATC)	Call from Energy Trading for Unit 1 backdown order to 850 MW within 10 minutes due to grid disturbance (**AP-25**)
4	MAL_ROD3A_ROD B10 MAL_ROD3A STATIONARY	C (SRO, ATC)	Dropped rod and urgent failure at 855 MW inhibits auto rod motion and requires rods to be taken to manual (**AP-12C)**(TS).
5	MAL_SEI1 .17 delay=0 ramp=6 MAL_SYD3 56.0 delay=3 ramp=30	C (ALL)	Second seismic results in full load rejection. Rods are still in manual and crew must trip the reactor based on first step of **AP-2.**
6	MAL_SEI1 .3 delay=0 ramp=6 MAL_SYD2 0	C(ALL)	Loss of Startup immediately following Rx Trip. D/G 1-3 fails to auto start but can be manually started. Both ASW Pumps fail to restart after power transfer (**CT**).
7	MAL_RCS1D 50%_dba MTRF 15 cd='jpplsia or jpplsib' PMP_SIS1_MTRF 15.0 cd='jpplsia or jpplsib'	M (ALL)	Strong aftershock results in LBLOCA. ECCS CCPs and SIP 1-1 trip on overcurrent reducing the amount of high head injection.
8	PMP_RHR1 BLOCK_AUTO_STRT PMP_CSS1 BLOCK_AUTO_STRT	C (BOP)	RHR 1-1 and CSP 1-1 fail to autostart, but may be manually started (**CTs**).

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d) (from form ES301-4)	**Actual Attributes**
1. Total malfunctions (5–8) (Events 1,2,4,5,6,7,8)	7
2. Malfunctions after EOP entry (1–2) (Events 6,7,8)	3
3. Abnormal events (2–4) (AP-19, AP-25, AP-12C, AP-2)	4
4. Major transients (1–2) (Events 5&6)	2
5. EOPs entered/requiring substantive actions (1–2) (E-0.1, E-1)	2
6. EOP contingencies requiring substantive actions (0–2)	0
7. Critical tasks (2–3)(See Scenario Summary)	4

SCENARIO SUMMARY – NRC #4

1. Volume Control Tank (VCT) level channel LT-114 fails high, causing letdown to divert to the LHUTs. Automatic reactor makeup will maintain VCT level above 14%. The crew diagnoses the level channel failure by comparing other VCT parameters, and addresses issue following **OP AP-19, Malfunction of the Reactor Makeup Control System** guidance. LCV-112A control is set to the VCT position.

2. Small seismic causes PCV-456 to slowly drift open and must be isolated using the associated 8000-C block valve. Shift Forman enters **TS 3.4.11 Pressurizer Power Operated Relief Valves (PORVs)**. **(CT: Failure to close PORV will result in automatic Safety Injection).**

3. Grid Control Center (GCC) calls with a backdown order for DCPP due to grid disturbance. Shift Manager directs Unit 1 to shed 350 MW in the next 10 minutes. Crew commences ramp using guidance of **OP AP-25, Rapid Load Reduction or Shutdown** to reduce load.

4. At 855 MW, a Rod Control Urgent Failure occurs and rod B10 is drops. Crew places rod control in manual and enters **OP AP-12C, Dropped Control Rod**.

5. A large seismic event occurs resulting in a full load rejection. Crew enters **OP AP-2, Full Load Rejection**, and trips the reactors based on unavailability of auto rod control.

6. Crew enters E-0, Reactor Trip or Safety Injection, and transitions into E-0.1, Reactor Trip Response to stabilize the plant. Start-up power is lost and D/G 1-3 fails to autostart due to a shutdown relay, reducing vital 4kV power to a single bus (D/G 1-1 out of service from initial conditions). Relay is reset from the control room and the diesel started in manual. Both ASW Pumps fail to autostart, but can be started manually **(WOG CT: E-0—L to manually start minimum number of ASW pumps).**

7. A large aftershock occurs resulting in a LBLOCA. ECCS CCPs (High Head Injection) and SIP 1-1 (Intermediate Head Injection) all trip on overcurrent.

8. RHRP 1-1 (Low Head Injection) and CSP 1-1 (Containment Spray) fail to autostart, but may be manually started (**WOG CT: E-0—H to manually start at least one low head ECCS pump and E-0—E to manually actuate required complement of containment cooling equipment).**

The scenario is terminated once crew has completed actions of EOP E-1 and is waiting to transition to Cold Leg Recirc.