DRAFT Operating Test Outlines are in the DRAFT Operating Test Document.

ES-401 **PWR Examination Outline** **Form ES-401-2**

Facility: Diablo Canyon Reactor Operator Date of Exam: December 2009

Tier	Group	RO K/A Category Points												SRO-Only Points				
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2		G*		Total
1. Emergency & Abnormal Plant Evolutions	1	3	2	3	N/A			4	4	N/A		2	18					6
	2	1	2	2				1	1			2	9					4
	Tier Totals	4	4	5				5	5			4	27					10
2. Plant Systems	1	3	3	3	3	3	3	2	2	2	2	2	28					5
	2	1	1	0	1	1	1	1	1	1	1	1	10					3
	Tier Totals	4	4	3	4	4	4	3	3	3	3	3	38					8
3. Generic Knowledge and Abilities Categories		1			2			3			4		10	1	2	3	4	7
		2			3			3			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						AK 1.02 Knowledge of the operational implications of the following concepts as they apply to a Pressurizer Vapor Space Accident: Change in leak rate with change in pressure	3.1	39
000009 Small Break LOCA / 3		x					EK 2.03 Knowledge of the interrelations between the small break LOCA and the following: S/Gs	3.0	40
000011 Large Break LOCA / 3			x				EK 3.14 Knowledge of the reasons for the following responses as they apply to the Large Break LOCA: RCP tripping requirement	4.1	41
000015/17 RCP Malfunctions / 4				x			AA1.23 Ability to operate and/or monitor the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): RCP vibrations	3.1	42
000022 Loss of Rx Coolant Makeup / 2					x		AA2.01 Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Makeup: Whether charging line leak exists	3.2	43
000025 Loss of RHR System / 4						x	2.4.8 Emergency Procedures/Plan: Knowledge of how abnormal operating procedures are used in conjunction with EOPs. **(this appears to be SRO knowledge)**	3.8	44
000026 Loss of Component Cooling Water / 8					x		AA2..02 Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: The cause of possible CCW loss	2.9	45
~~000027 Pressurizer Pressure Control System Malfunction / 3~~									
000029 ATWS / 1				x			EA1.08 Ability to operate and monitor the following as they apply to a ATWS: Reactor trip switch pushbutton	4.5	46
000038 Steam Gen. Tube Rupture / 3			x				EK3.01 Knowledge of the reasons for the following responses as they apply to the SGTR: Equalizing pressure on primary and secondary sides of ruptured S/G	4.1	47
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4		x					AK2.02 Knowledge of the interrelations between the Steam Line Rupture and the following: Sensors and detectors	2.6	48
~~000054 (CE/E06) Loss of Main Feedwater / 4~~									
000055 Station Blackout / 6	x						EK1.01 Knowledge of the operational implications of the following concepts as they apply to the Station Blackout: Effect of battery discharge rates on capacity	3.3	49
000056 Loss of Off-site Power / 6	x						AK1.04 Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: Definition of saturation conditions, implication for the systems This may be a stretch	3.1	50

000057 Loss of Vital AC Inst. Bus / 6			x				AK3.01 Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: Actions contained in EOP for loss of vital ac electrical instrument bus	4.1	51
~~000058 Loss of DC Power / 6~~									
000062 Loss of Nuclear Svc Water / 4				x			AA1.02 Ability to operate and/or monitor the following as they apply to the Loss of Nuclear Service Water (SWS): Loads on the SWS in the control room **(note this is ASW at DCPP)**	3.2	52
000065 Loss of Instrument Air / 8					x		AA2.06 Ability to determine and interpret the following as they apply to the Loss of Instrument Air: When to trip reactor if instrument air pressure is decreasing	3.6	53
~~W/E04 LOCA Outside Containment / 3~~									
W/E11 Loss of Emergency Coolant Recirc. / 4						x	2.1.30 Conduct of Operations: Ability to locate and operate components, including local controls	4.4	54
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.	3.4	55
000077 Generator Voltage and Electric Grid Disturbances / 6				x			AA1.02 Ability to operate and/or monitor the following as they apply to Generator Voltage and Electric Grid Disturbances: Turbine/generator controls	3.8	56
K/A Category Totals:	3	2	3	4	4	2	Group Point Total:		18/6

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~~									
~~000005 Inoperable/Stuck Control Rod / 1~~									
~~000024 Emergency Boration / 1~~									
000028 Pressurizer Level Malfunction / 2						x	2.1.20 Conduct of Operations: Ability to interpret and execute procedure steps.	4.6	57
~~000032 Loss of Source Range NI / 7~~									
~~000033 Loss of Intermediate Range NI / 7~~									
000036 (BW/A08) Fuel Handling Accident / 8					x		AA2.01 Ability to determine and interpret the following as they apply to the Fuel Handling Incidents: ARM system indications **(note for RO's this is in the spent fuel building, not Containment)**	3.2	58
~~000037 Steam Generator Tube Leak / 3~~									
000051 Loss of Condenser Vacuum / 4				x			AA1.04 Ability to operate and/or monitor the following as they apply to the Loss of Condenser Vacuum: Rod position **(resample? I don't see a tie here)**	2.5	59
~~000059 Accidental Liquid RadWaste Rel. / 9~~									
~~000060 Accidental Gaseous Radwaste Rel. / 9~~									
000061 ARM System Alarms / 7			x				AK3.02 Knowledge of the reasons for the following responses as they apply to the Area Radiation Monitoring (ARM) System Alarms: Guidance contained in alarm response for ARM system	3.4	60
~~000067 Plant Fire On-site / 8~~									
000068 (BW/A06) Control Room Evac. / 8		x					AK2.02 Knowledge of the interrelations between the Control Room Evacuation and the following: Reactor trip system	3.7	61
~~000069 (W/E14) Loss of CTMT Integrity / 5~~									
~~000074 (W/E06&E07) Inad. Core Cooling / 4~~									
~~000076 High Reactor Coolant Activity / 9~~									
W/EO1 & E02 Rediagnosis & SI Termination / 3	x						EK1.1 Knowledge of the operational implications of the following concepts as they apply to the (Reactor Trip or Safety Injection/Rediagnosis): components, capacity, and function of emergency systems.	3.1	62
W/E13 Steam Generator Over-pressure / 4		x					EK2.1 Knowledge of the interrelations between the (Steam Generator Overpressure) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.0	63

W/E15 Containment Flooding / 5			x				EK3.4 Knowledge of the reasons for the following responses as they apply to the (Containment Flooding): RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.	2.9	64
W/E16 High Containment Radiation / 9						x	2.4.50 Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	4.2	65
~~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:	1	2	2	1	1	2	Group Point Total:		9/4

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)											Form ES-401-2		
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump	x											K1.04 Knowledge of the physical connections and/or cause-effect relationships between the RCPS (Reactor Coolant Pump System) and the following systems: CVCS	2.6	1
004 Chemical and Volume Control		x										K2.03 Knowledge of bus power supplies to the following: Charging pumps	3.3	2
005 Residual Heat Removal			x									K3.01 Knowledge of the effect that a loss or malfunction of the RHRS will have on the following: RCS	3.9	3
006 Emergency Core Cooling				x								K4.13 Knowledge of ECCS design feature(s) and/or interlock(s) which provide for the following: Reset of containment isolation **(there isn't an eccs interlock per se, to reset containment isolation, its ESFAS or SI, which is covered w/103 Containment ka – resample)**	3.8	4
007 Pressurizer Relief/Quench Tank					x							K5.02 Knowledge of the operational implications of the following concepts as they apply to PRTS: Method of forming a steam bubble in the PZR **(consider resample, DCPP has not drawn a bubble this way for some time now. We use vacuum refill)**	3.1	5
008 Component Cooling Water							x					A1.01 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCWS controls including: CCW flow rate	2.8	6
010 Pressurizer Pressure Control					x	x						K6.03 Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS: PZR sprays and heaters K5.01 Knowledge of the operational implications of the following concepts as they apply to the PZR PCS: Determination of condition of fluid in PZR, using steam tables	3.2 3.5	7 8
012 Reactor Protection								x				A2.06 Ability to (a) predict the impacts of the following malfunctions or operations on the RPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of RPS signal to trip the reactor	4.4	9
013 Engineered Safety Features Actuation			x						x			K3.01 Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: Fuel A3.01 Ability to monitor automatic operation of the ESFAS including: Input channels and logic	4.4 3.7	10 11

022 Containment Cooling										x		A4.05 Ability to manually operate and/or monitor in the control room: Containment readings of temperature, pressure, and humidity system	3.8	12
~~025 Ice Condenser~~														
026 Containment Spray				x							x	K4.06 Knowledge of CSS design features and/or interlock(s) which provide for the following: Iodine scavenging via the CSS 2.2.37 Ability to determine operability and/or availability of safety related equipment	2.8 3.6	13 14
039 Main and Reheat Steam	x										x	2.1.28 Knowledge of the purpose and function of major system components and controls. K1.01 Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems: S/G	4.1 3.1	15 16
059 Main Feedwater										x		A4.11 ability to manually operate and monitor in the control room: Recovery from automatic feedwater isolation	3.1	17
061 Auxiliary/Emergency Feedwater						x			x			K6.02 Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Pumps A3.04 Ability to monitor automatic operation of the AFW, including: Automatic AFW isolation	2.6 4.1	18 19
062 AC Electrical Distribution								x				A2.09 Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Consequences of exceeding current limitations	2.7	20
063 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. **(same KA as EPE055 (page 2) resample**	2.5	21
064 Emergency Diesel Generator						x						K6.07 Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system: Air receivers	2.7	22
073 Process Radiation Monitoring					x							K5.01 Knowledge of the operational implications as they apply to concepts as they apply to the PRM system: Radiation theory, including sources, types, units, and effects	2.5	23

076 Service Water		x		x								K4.06 Knowledge of SWS design feature(s) and/or interlock(s) which provide for the following: Service water train separation K2.01 Knowledge of bus power supplies to the following: Service water Assuming this is "nuclear" service water or ASW	2.8 2.7	24 25
078 Instrument Air		x	x									K2.02 Knowledge of bus power supplies to the following: Emergency air compressor **(DCPP does not "emergency air compressors)** K3.01 Knowledge of the effect that a loss or malfunction of the IAS will have on the following: Containment air system	3.3 3.1	26 27
103 Containment	x											K1.08 Knowledge of the physical connections and/or cause-effect relationships between the containment system and the following systems: SIS, including action of safety injection reset	3.6	28
K/A Category Point Totals:	3	3	3	3	3	3	2	2	2	2	2	Group Point Total:		28/5

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		x										K2.02 Knowledge of bus power supplies to the following: One-line diagram of power supply to trip breakers	3.6	29
002 Reactor Coolant											x	2.4.31 Knowledge of annunciator alarms, indications, or response procedures	4.2	30
~~011 Pressurizer Level Control~~														
~~014 Rod Position Indication~~														
015 Nuclear Instrumentation										x		A4.02 Ability to manually operate and/or monitor in the control room: NIS indicators	3.9	31
016 Non-nuclear Instrumentation									x			A3.01 Ability to monitor automatic operation of the NNIS, including: Automatic selection of NNIS inputs to control systems	2.9	32
017 In-core Temperature Monitor								x				A2.02 Ability to (a) predict the impacts of the following malfunctions or operations on the ITM system; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations: Core damage	3.6	33
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control							x					A1.01 Ability to predict and/or monitor changes in parameter (to prevent exceeding design limits) associated with operating the HRPS controls including: Hydrogen concentration The most visible tie is the venting of containment which would be a better JPM, consider resample (This comment was for previous selected K/A A1.02)	3.4	34
~~29 Containment Purge~~														
~~033 Spent Fuel Pool Cooling~~														
~~034 Fuel Handling Equipment~~														
~~035 Steam Generator~~														
041 Steam Dump/Turbine Bypass Control						x						K6.03 Knowledge of the effect of a loss or malfunction on the following will have on the SDS: Controller and positioners, including ICS, S/G, CRDS	2.7	35
045 Main Turbine Generator					x							K5.18 Knowledge of the operational implications of the following concepts as they apply to the MT/B System: Purpose of low-power reactor trips (limited to 25% power)	2.7	36
~~055 Condenser Air Removal~~														
~~056 Condensate~~														
~~068 Liquid Radwaste~~														
~~071 Waste Gas Disposal~~														

072 Area Radiation Monitoring				x								K4.02 Knowledge of ARM system design feature(s) and/or interlock(s) which provide for the following: Fuel Building isolation	3.2	37
075 Circulating Water			x									K1.08 Knowledge of the physical connections and/or cause-effect relationships between the circulating water system and the following systems: Emergency/essential SWS	3.2	38
~~079 Station Air~~														
~~086 Fire Protection~~														
K/A Category Point Totals:	0	1	1	1	1	1	1	1	1	1	1	Group Point Total:		10/3

Facility:		Date of Exam:				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.	2.1.31 Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup.	4.6			66
	2.1.	2.1.1 Knowledge of conduct of operations requirements.	3.8			67
	2.1.					
	2.1.					
	2.1.					
	2.1.					
	Subtotal					
2. Equipment Control	2.2.	2.2.6 Knowledge of the process for making changes to procedures.	3.0			68
	2.2.	2.2.13 Knowledge of tagging and clearance procedures.	4.1			69
	2.2.	2.2.20 Knowledge of the process for managing troubleshooting activities.	2.6			70
	2.2.					
	2.2.					
	2.2.					
	Subtotal					
3. Radiation Control	2.3.	2.3.4 Knowledge of radiation exposure limits under normal or emergency conditions.	3.2			71
	2.3.	2.3.11 Ability to control radiation releases.	3.8			72
	2.3.	2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions.	3.5			73
	2.3.					
	2.3.					
	2.3.					
	Subtotal					
4. Emergency Procedures / Plan	2.4.	2.4.3 Ability to identify post accident instrumentation.	3.7			74
	2.4.	2.4.19 Knowledge of EOP layout, symbols, and icons.	3.4			75
	2.4.					
	2.4.					
	2.4.					
	2.4.					
	Subtotal					
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
Tier 1/Group 2	2.1.39	Suppressed per Diablo Canyon as not applicable
T2/G2	028 A1.02	Not a good tie in for Diablo Canyon. Would make better JPM. Randomly selected A1.01 as a replacement.
T2/G2	072 K4.03	Similar question already sampled on this exam. Replaced with K4.02
T2/G2	075 K3.07	No connection at DC between ESFAS and Circulation Water System. Replaced with K1.08

Facility: Diablo Canyon Senior Reactor Operator Date of Exam: December 2009

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	3	3	6
	2												9	2	2	4
	Tier Totals												27	5	5	10
2. Plant Systems	1												28	2	3	5
	2												10	2	1	3
	Tier Totals												38	4	4	8
3. Generic Knowledge and Abilities Categories		1			2			3			4		10	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 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).
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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.

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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						x	2.1.20 Ability to Interpret and execute procedure steps.	4.6	76
000011 Large Break LOCA / 3									
000015/17 RCP Malfunctions / 4									
000022 Loss of Rx Coolant Makeup / 2									
000025 Loss of RHR System / 4					x		AA2.02 Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: Leakage of reactor coolant from RHR into closed cooling water system or into reactor building atmosphere.	3.8	77
000026 Loss of Component Cooling Water / 8						x	2.1.28 Knowledge of the purpose and function of major system components and controls.	4.1	78
000027 Pressurizer Pressure Control System Malfunction / 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									
000055 Station Blackout / 6					x		EA2.03 Ability to determine or interpret the following as they apply to a Station Blackout: Actions necessary to restore power	4.7	79
000056 Loss of Off-site Power / 6						x	2.4.11 Knowledge of abnormal condition procedures.	4.2	80
000057 Loss of Vital AC Inst. Bus / 6					x		AA2.14 Ability to determine and interpret the following as they apply to the Loss of vital AC Instrument Bus: That substitute power sources have come on line on a loss of initial AC.	3.6	81
000058 Loss of DC Power / 6									
000062 Loss of Nuclear Svc Water / 4									
000065 Loss of Instrument Air / 8									

W/E04 LOCA Outside Containment / 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:					3	3	Group Point Total:		18/6

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)						Form ES-401-2		
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000001 Continuous Rod Withdrawal / 1									
000003 Dropped Control Rod / 1									
000005 Inoperable/Stuck Control Rod / 1									
000024 Emergency Boration / 1									
000028 Pressurizer Level Malfunction / 2					x		AA2.11 Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions: Leak in PZR	3.6	82
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									
000051 Loss of Condenser Vacuum / 4						x	2.1.27 Knowledge of system purpose and/or function **(don't see this as SRO level, recommend resample)**	4.0	83
000059 Accidental Liquid RadWaste Rel. / 9					x		AA2.01 Ability to determine and interpret the following as they apply to the Accidental Liquid Radwaste Release: The failure-indication light arrangement for a radioactive-liquid monitor Not sure this is an SRO level, also see SRO T2G2	3.5	84
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									
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						x	2.2.22 Knowledge of limiting conditions for operations and safety limits.	4.7	85
CE/A16 Excess RCS Leakage / 2									
CE/E09 Functional Recovery									
K/A Category Point Totals:					2	2	Group Point Total:		9/4

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)												Form ES-401-2	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump														
004 Chemical and Volume Control														
005 Residual Heat Removal														
006 Emergency Core Cooling														
007 Pressurizer Relief/Quench Tank											x	2.2.25 Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits. **(this is a tenuous one, its your call, but the PRT itself is not TS, the connections that discharge or leak to it, to it, such as PZR safeties/PORVs are, if that's an ok tie, then fine, otherwise, consider resample)**	4.2	86
008 Component Cooling Water														
010 Pressurizer Pressure Control														
012 Reactor Protection														
013 Engineered Safety Features Actuation														
022 Containment Cooling														
025 Ice Condenser														
026 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	4.2	87
039 Main and Reheat Steam														
059 Main Feedwater														
061 Auxiliary/Emergency Feedwater											x	2.4.50 Ability to verify system alarm setpoints and **operate controls** identified in the alarm response manual. RO vs. SRO?	4.0	88
062 AC Electrical Distribution														

063 DC Electrical Distribution							x				A2.02 Ability to (a) predict the impacts of the following malfunctions or operations on the DC electrical systems; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of ventilation during battery charging **(battery charging is not really something done by the sro, its done with operators in the field, not sure this is a good sro level ka)**	3.1	89
064 Emergency Diesel Generator													
073 Process Radiation Monitoring													
076 Service Water										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. **(note, I believe this is the 4th service water (ASW) ka selected.)**	4.4	90
078 Instrument Air													
103 Containment													
K/A Category Point Totals:							2			3	Group Point Total:		28/5

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								x				A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the NIS: and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Power supply loss or erratic operation	3.9	91
016 Non-nuclear Instrumentation														
017 In-core Temperature Monitor														
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control								x				A2.02 Malfunctions or operations on the HRPS; and 9 (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations.	3.9	92
029 Containment Purge														
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														
056 Condensate														
068 Liquid Radwaste											x	2.2.36 Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	4.2	93
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:		10/3

Facility:		Date of Exam:				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.	2.1.5 Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.			3.9	94
	2.1.	2.1.17 Ability to make accurate, clear, and concise **verbal reports.**			4.0	95
	2.1.					
	2.1.					
	2.1.					
	2.1.					
	Subtotal					
2. Equipment Control	2.2.	2.2.14 Knowledge of the process for controlling equipment configuration or status.			4.3	96
	2.2.	2.2.25 Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.			4.2	97
	2.2.					
	2.2.					
	2.2.					
	2.2.					
	Subtotal					
3. Radiation Control	2.3.	2.3.6 Ability to approve release permits.			3.8	98
	2.3.					
	2.3.					
	2.3.					
	2.3.					
	2.3.					
	Subtotal					
4. Emergency Procedures / Plan	2.4.	2.4.17 Knowledge of EOP terms and definitions.			4.3	99
	2.4.	2.4.22 Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.			4.4	100
	2.4.					
	2.4.					
	2.4.					
	2.4.					
	Subtotal					
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
TIG1	009 2.1.19	Not applicable to DCPP. Replaced with 2.1.20
TIG1	025 AA2.03	Replaced with AA2.02 due to increased significance of the K/A
TIGI	055 EA2.05	Already sampled. Replaced with EA2.03
T1G1	057 AA2.15	Similar question already sampled. Replaced with AA2.14
T2G2	028 2.1.30	Question Task oriented (Would make better JPM). Replaced with A2.02
T2G2	068 A2.04	Due to replacement of 028 2.1.30, a generic question was needed. Replacement with 2.2.36
T3G2	2.2.1	Question more RO oriented. Replaced with 2.2.14
T3G2	2.2.41	Question more RO oriented. Replaced with 2.2.25