

Facility: Prairie Island Nuclear Generating Station Date of Exam: August 8 – 19, 2022																	
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	3	3	6
	2	1	1	1	N/A			2	2	N/A			1	8	2	2	4
	Tier Totals	4	4	4	N/A			5	5	N/A			4	26	5	5	10
2. Plant Systems	1	2	3	2	2	3	2	2	3	3	3	3	28	2	3	5	
	2	2	0	1	2	0	1	1	0	1	1	0	9	2	1	3	
	Tier Totals	4	3	3	4	3	3	3	3	4	4	3	37	4	4	8	
3. Generic Knowledge and Abilities Categories	CO		EC			RC		EM					CO	EC	RC	EM	
	2		2			1		1					2	2	1	2	7
4. Theory	Reactor Theory				Thermodynamics												
	3				3												

Notes: CO = Conduct of Operations; EC = Equipment Control; RC = Radiation Control; EM = Emergency Procedures/Plan

* These systems/evolutions may be eliminated from the sample when Revision 2 of the K/A catalog is used to develop the sample plan

** These systems/evolutions are only included as part of the sample (as applicable to the facility) when Revision 2 of the K/A catalog is used to develop the sample plan

Form 4.1-PWR		PWR Examination Outline Emergency and Abnormal Plant Evolutions—Tier 1/Group 1 (RO/SRO)							ES 4.1	
E/APE # / Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#	
000007 (EPE 7; BW-E02&E10; CE-E02) Reactor Trip, Stabilization, Recovery P8180L-007 229				X			(000007EA1.08) Ability to operate and/or monitor the following as they apply to (EPE 7) REACTOR TRIP, STABILIZATION, RECOVERY (CFR: 41.7): AFW system	3.8	24	
000008 (APE 8) Pressurizer Vapor Space Accident P8140L-224 014				X			(000008AA1.06) Ability to operate and/or monitor the following as they apply to (APE 8) PRESSURIZER VAPOR SPACE ACCIDENT (CFR: 41.7): PZR LCS	3.5	74	
000009 (EPE 9) Small-Break LOCA P8197L-011 256			X				(000009EK3.28) Knowledge of the reasons for the following responses and/or actions as they apply to (EPE 9) SMALL-BREAK LOCA (CFR: 41.5 / 41.10): Manual ESFAS initiation requirements	4.0	35	
000011 (EPE 11) Large-Break LOCA P8197L-012 268						X	(000011EA2.15) Ability to determine and/or interpret the following as they apply to (EPE 11) LARGE-BREAK LOCA (CFR: 41.10 / 43.5): Sump level	4.0	90	
000015 (APE 15) Reactor Coolant Pump Malfunctions P8170L-002 151				X			(000015AA1.22) Ability to operate and/or monitor the following as they apply to (APE 15) REACTOR COOLANT PUMP MALFUNCTIONS (CFR: 41.7): RCP seal failure	4.0	59	
000022 (APE 22) Loss of Reactor Coolant Makeup P8172L-001A 166	X						(000022AK1.05) Knowledge of the operational implications and/or cause and effect relationships of the following as they apply to (APE 22) LOSS OF REACTOR COOLANT MAKEUP (CFR: 41.8 / 41.10): How long a PZR level can be maintained within limits.	3.3	32	
000022 (APE 22) Loss of Reactor Coolant Makeup P8140L-225 019						X	(000022 (APE 22) Loss of Reactor Coolant Makeup G2.1.1) CONDUCT OF OPERATIONS: Knowledge of conduct of operations requirements (CFR: 41.10 / 43.1)	4.2	93	
000025 (APE 25) Loss of Residual Heat Removal System P8197L-012 144						X	(000025 (APE 25) Loss of Residual Heat Removal System G2.4.20) EMERGENCY PROCEDURES/PLAN: Knowledge of the operational implications of emergency and abnormal operating procedures warnings, cautions, and notes (CFR: 41.10 / 43.5)	4.3	96	
000026 (APE 26) Loss of Component Cooling Water P8172L-002 110						X	(000026 (APE 26) Loss of Component Cooling Water G2.4.47) EMERGENCY PROCEDURES/PLAN: Ability to diagnose and recognize trends in an accurate and timely manner using the appropriate control room reference material (reference potential) (CFR: 41.10 / 43.5)	4.2	14	
000027 (APE 27) Pressurizer Pressure Control System Malfunction P8170L-005 086		X					(000027AK2.14) Knowledge of the relationship between (APE 27) PRESSURIZER PRESSURE CONTROL SYSTEM MALFUNCTION and the following systems or components (CFR: 41.7): RCP	3.4	70	
000029 (EPE 29) Anticipated Transient Without Scram P8197L-014 221						X	(000029 (EPE 29) Anticipated Transient Without Scram G2.1.20) CONDUCT OF OPERATIONS: Ability to interpret and execute procedure steps (CFR: 41.10 / 43.5)	4.6	28	
000038 (EPE 38) Steam Generator Tube Rupture P8197L-013 125						X	(000038 (EPE 38) Steam Generator Tube Rupture G2.4.23) EMERGENCY PROCEDURES: Knowledge of the bases for prioritizing emergency operating procedures implementation. (CFR: 43.5)	4.7	87	
000040 (APE 40; BW-E05; CE-E05; W-E12) Steam Line Rupture—Excessive Heat Transfer P8197L-012 269			X				(000040AK3.01) Knowledge of the reasons for the following responses and/or actions as they apply to (APE 40) STEAM LINE RUPTURE (CFR: 41.5 / 41.10): Operation of steam line isolation valves	4.1	48	

Form 4.1-PWR		PWR Examination Outline Emergency and Abnormal Plant Evolutions—Tier 1/Group 1 (RO/SRO)							ES 4.1	
E/APE # / Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#	
000054 (APE 54; CE E06) Loss of Main Feedwater P8180L-007 133						X	(000054 (APE 54) Loss of Main Feedwater G2.2.2) EQUIPMENT CONTROL: Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity. (CFR: 41.6 /41.7/45.2)	4.5	13	
000055 (EPE 55) Station Blackout P8186L-005 039					X		(000055EA2.05) Ability to determine and/or interpret the following as they apply to (EPE 55) STATION BLACKOUT (CFR: 41.10 / 43.5): When battery is approaching a fully discharged state	4.1	30	
000056 (APE 56) Loss of Offsite Power P8186L-008 091			X				(000056AK3.02) Knowledge of the reasons for the following responses and/or actions as they apply to (APE 56) LOSS OF OFFSITE POWER (CFR: 41.5 / 41.10): Actions contained in AOPs	4.1	67	
000057 (APE 57) Loss of Vital AC Instrument Bus P8186L-015 084					X		(000057AA2.08) Ability to determine and/or interpret the following as they apply to (APE 57) LOSS OF VITAL AC ELECTRICAL INSTRUMENT BUS (CFR: 43.5 / 45.13): Reactor Power	3.9	84	
000058 (APE 58) Loss of DC Power P8186L-005 045					X		(000058AA2.02) Ability to determine and/or interpret the following as they apply to (APE 58) LOSS OF DC POWER (CFR: 41.10 / 43.5: 125-V DC bus voltage	3.6	47	
000062 (APE 62) Loss of Service Water P8176L-003 094	X						(000062AK1.01) Knowledge of the operational implications and/or cause and effect relationships of the following as they apply to (APE 62) LOSS OF SERVICE WATER (CFR: 41.8 / 41.10): Effect on loads cooled by service water	3.8	5	
000065 (APE 65) Loss of Instrument Air P8178L-005 017		X					(000065AK2.10) Knowledge of the relationship between (APE 65) LOSS OF INSTRUMENT AIR and the following systems or components (CFR: 41.7): PZR PCS	3.6	34	
000077 (APE 77) Generator Voltage and Electric Grid Disturbances P8140L-246 003		X					(000077AK2.10) Knowledge of the relationship between (APE 77) GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES and the following systems or components (CFR: 41.4 / 41.5 / 41.7 / 41.10): EDGs	4.0	58	
(W E04) LOCA Outside Containment P8197L-012 270	X						(WE04EK1.05) Knowledge of the operational implications and/or cause and effect relationships of the following as they apply to (W E04) LOCA OUTSIDE CONTAINMENT / 3 (CFR: 41.5 / 41.7): Leakage accumulation in RHR pump area	3.6	63	
(W E11) Loss of Emergency Coolant Recirculation P8197L-012 272					X		(WE11EA2.10) Ability to determine and/or interpret the following as they apply to (W E11) LOSS OF EMERGENCY COOLANT RECIRCULATION (CFR: 41.10 / 43.5 / 45.13): S/G level, pressure, and/or feedwater flow	3.3	76	
(BW E04; W E05) Inadequate Heat Transfer—Loss of Secondary Heat Sink P8197L-014 232					X		(WE05EA2.12) Ability to determine and/or interpret the following as they apply to (W E05) LOSS OF SECONDARY HEAT SINK (CFR: 41.10 / 43.5): Charging flow	2.7	16	
K/A Category Totals:	3	3	3	3	3/3	3/3	Group Point Total:	18/6		

Form 4.1-PWR		PWR Examination Outline Emergency and Abnormal Plant Evolutions—Tier 1/Group 2 (RO/SRO)							ES 4.1	
E/APE # / Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#	
000001 (APE 1) Continuous Rod Withdrawal										
000003 (APE 3) Dropped Control Rod P8184L-005 158			X				(000003AK3.05) Knowledge of the reasons for the following responses and/or actions as they apply to (APE 3) DROPPED CONTROL ROD (CFR: 41.5 / 41.10): Limits for reduction of load	3.5	69	
000005 (APE 5) Inoperable/Stuck Control Rod P8184L-005 157						X	(000005 (APE 5) Inoperable/Stuck Control Rod G2.4.31) EMERGENCY PROCEDURES/PLAN: Knowledge of annunciator alarms, indications, or response procedures. (CFR: 41.10)	4.2	20	
000024 (APE 24) Emergency Boration										
000028 (APE 28) Pressurizer Level Control Malfunction										
000032 (APE 32) Loss of Source Range Nuclear Instrumentation										
000033 (APE 33) Loss of Intermediate Range Nuclear Instrumentation P8184L-002 008	X						(000033AK1.02) Knowledge of the operational implications and/or cause and effect relationships of the following concepts as they apply to (APE 33) LOSS OF INTERMEDIATE RANGE NUCLEAR INSTRUMENTATION (CFR: 41.8 / 41.10): Equivalency and/or overlap among source range, intermediate range, and power range channel readings	3.5	23	
000036 (APE 36; BW/A08) Fuel Handling Incidents P8182L-003 107						X	(000036AA2.06) Ability to determine and/or interpret the following as they apply to (APE 36) FUEL HANDLING INCIDENTS (CFR: 41.10 / 43.5): Refueling water level	3.4	19	
000037 (APE 37) Steam Generator Tube Leak P8197L-013 147						X	(000037AA2.20) Ability to determine and/or interpret the following as they apply to (APE 37) STEAM GENERATOR TUBE LEAK (CFR: 41.10 / 43.5): T-cold and/or RCS cooldown rate	4.0	71	
000051 (APE 51) Loss of Condenser Vacuum P8174L-005 052				X			(000051AA1.05) Ability to operate and/or monitor the following as they apply to (APE 51) LOSS OF CONDENSER VACUUM (CFR: 41.7): Turbine load	3.5	61	
000059 (APE 59) Accidental Liquid Radwaste Release										
000060 (APE 60) Accidental Gaseous Radwaste Release										
000061 (APE 61) Area Radiation Monitoring System Alarms										
000067 (APE 67) Plant Fire On Site										
000068 (APE 68; BW A06) Control Room Evacuation										
000069 (APE 69; W E14) Loss of Containment Integrity										
000074 (EPE 74; W E06 & E07) Inadequate Core Cooling P8186L-009 011		X					(074WE06EK2.17) Knowledge of the relationship between (W E06) DEGRADED CORE COOLING and the following systems or components (CFR: 41.7 / 41.8): AC electrical distribution system	3.3	42	
000076 (APE 76) High Reactor Coolant Activity										
000078 (APE 78*) RCS Leak										
(W E01 & E02) Rediagnosis & SI Termination										

Form 4.1-PWR		PWR Examination Outline Emergency and Abnormal Plant Evolutions—Tier 1/Group 2 (RO/SRO)							ES 4.1	
E/APE # / Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#	
(W E13) Steam Generator Overpressure P8197L-014 228						X	((W E13) Steam Generator Overpressure / 4) (G2.2.38) EQUIPMENT CONTROL: Knowledge of conditions and limitations in the facility license (CFR: 41.7 / 41.10 / 43.1)	4.5	94	
(W E15) Containment Flooding P8197L-014 230						X	(WE15EA2.03) Ability to determine and/or interpret the following as they apply to (W E15) CONTAINMENT FLOODING (CFR: 41.10 / 43.5): Containment sump water level	3.7	100	
(W E16) High Containment Radiation P8197L-014 080						X	((W E16) High Containment Radiation /9) (G2.4.18) EMERGENCY PROCEDURES/PLAN: Knowledge of the specific bases for emergency and abnormal operating procedures (CFR: 41.10 / 43.1)	4.0	99	
(BW A01) Plant Runback										
(BW A02 & A03) Loss of NNI-X/Y										
(BW A04) Turbine Trip										
(BW A05) Emergency Diesel Actuation										
(BW A07) Flooding										
(BW E03) Inadequate Subcooling Margin										
(BW E08; W E03) LOCA Cooldown-Depressurization P8197L-012 271				X			(WE03EA1.10) Ability to operate and/or monitor the following as they apply to (W E03) LOCA COOLDOWN AND DEPRESSURIZATION (CFR: 41.5 to 41.8): Steam Dump System	3.2	9	
(BW E09; CE A13**; W E09 & E10) Natural Circulation										
(BW E13 & E14) EOP Rules and Enclosures										
(CE A14**; W E08) RCS Overcooling-Pressurized Thermal Shock P8197L-014 229						X	(WE08EA2.05) Ability to determine and/or interpret the following as they apply to (W E08) PRESSURIZED THERMAL SHOCK (CFR: 41.10 / 43.5): RCS pressure, temperature, and/or PRZR level.	3.9	78	
(CE A16) Excess RCS Leakage										
(CE E09) Functional Recovery										
(CE E13*) Loss of Forced Circulation/LOOP/Blackout										
K/A Category Point Totals:	1	1	1	2	2/2	1/2	Group Point Total:	8/4		

Form 4.1-PWR		PWR Examination Outline Plant Systems—Tier 2/Group 1 (RO/SRO)											ES 4.1			
System # / Name		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)		IR	#
003 (SF4P RCP) Reactor Coolant Pump P8172L-002 111			X											(003K2.04) Knowledge of electrical power supplies to the following (CFR: 41.7): (SF4P RCP) REACTOR COOLANT PUMP SYSTEM Containment isolation valves for RCP cooling water	3.4	40
003 (SF4P RCP) Reactor Coolant Pump P8170L-002 003												X		(003 (SF4P RCP) REACTOR COOLANT PUMP SYSTEM G2.2.44) EQUIPMENT CONTROL: 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)	4.4	97
004 (SF1; SF2 CVCS) Chemical and Volume Control P8172L-001A 056										X				(004A3.09) Ability to monitor automatic features of the (SF1; SF2 CVCS) CHEMICAL AND VOLUME CONTROL SYSTEM, including (CFR: 41.7): VCT level	3.7	31
004 (SF1; SF2 CVCS) Chemical and Volume Control P8172L-001A 055									X					(004A2.05) Ability to (a) predict the impacts of the following on the (SF1; SF2 CVCS) CHEMICAL AND VOLUME CONTROL SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations (CFR: 41.5 / 43.5): RCP seal failures	4.1	98
005 (SF4P RHR) Residual Heat Removal P8180L-003 071				X										(005K3.05) Knowledge of the effect that a loss or malfunction of the (SF4P RHR) RESIDUAL HEAT REMOVAL SYSTEM will have on the following systems or system parameters (CFR: 41.7): ECCS	4.3	8
005 (SF4P RHR) Residual Heat Removal PI-OPS-GFE-193006L 001						X								(005K5.05) Knowledge of the operational implications or cause and effect relationships of the following concepts as they apply to the (SF4P RHR) RESIDUAL HEAT REMOVAL SYSTEM (CFR: 41.5): Plant response to RCS temperature changes during solid plant operations	3.7	73
006 (SF2; SF3 ECCS) Emergency Core Cooling System P8180L-006 096			X											(006K2.04) Knowledge of electrical power supplies to the following (CFR: 41.7): (SF2; SF3 ECCS) EMERGENCY CORE COOLING SYSTEM ESFAS-operated valves	3.7	36
006 (SF2; SF3 ECCS) Emergency Core Cooling P8180L-005 010												X		(006 (SF2; SF3 ECCS) EMERGENCY CORE COOLING SYSTEM G2.2.22) EQUIPMENT CONTROL: Knowledge of limiting conditions for operation and safety limits (CFR: 41.5 / 43.2)	4.7	95
007 (SF5 PRTS) Pressurizer Relief/Quench Tank P8170L-003 131												X		(007 (SF5 PRTS) PRESSURIZER RELIEF/QUENCH TANK SYSTEM G2.1.32) CONDUCT OF OPERATIONS: Ability to explain and apply system precautions, limitations, notes, or cautions (CFR: 41.10 / 43.2)	3.8	49
007 (SF5 PRTS) Pressurizer Relief/Quench Tank P8170L-003 222					X									(007K4.06) Knowledge of (SF5 PRTS) PRESSURIZER RELIEF/QUENCH TANK SYSTEM design features and/or interlocks that provide for the following (CFR: 41.7): Venting PRT/quench tank	2.6	25
008 (SF8 CCW) Component Cooling Water P8172L-002 030								X						(008A1.03) Ability to predict and/or monitor changes in parameters associated with operation of the (SF8 CCW) COMPONENT COOLING WATER SYSTEM, including (CFR: 41.7): CCW pressure	3.1	26
008 (SF8 CCW) Component Cooling Water P8172L-002 112			X											(008K2.01) Knowledge of electrical power supplies to the following (CFR: 41.7): (SF8 CCW) COMPONENT COOLING WATER SYSTEM CCW valves	3.0	11
010 (SF3 PZR PCS) Pressurizer Pressure Control P8170L-005 032												X		(010A4.05) Ability to manually operate and/or monitor the (SF3 PZR PCS) PRESSURIZER PRESSURE CONTROL SYSTEM in the control room (CFR: 41.7): PZR auxiliary spray valves	3.2	27

Form 4.1-PWR		PWR Examination Outline Plant Systems—Tier 2/Group 1 (RO/SRO)											ES 4.1	
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
012 (SF7 RPS) Reactor Protection P8184L-004 120												X (012 (SF7 RPS) REACTOR PROTECTION SYSTEM G2.1.25) CONDUCT OF OPERATIONS: Ability to interpret reference materials, such as graphs, curves, and tables (reference potential) (CFR: 41.10 / 43.5)	3.9	52
012 (SF7 RPS) Reactor Protection P8180L-006 089						X						(012K6.02) Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the (SF7 RPS) REACTOR PROTECTION SYSTEM (CFR: 41.7): Redundant channels	3.9	72
013 (SF2 ESFAS) Engineered Safety Features Actuation P8180L-006 095							X					(013A1.13) Ability to predict and/or monitor changes in parameters associated with operation of the (SF2 ESFAS) ENGINEERED SAFETY FEATURES ACTUATION SYSTEM, including (CFR: 41.3 to 41.7): ECCS flow	4.1	44
022 (SF5 CCS) Containment Cooling P8180L-009H 056	X											(022K1.05) Knowledge of the physical connections and/or cause and effect relationships between the (SF5 CCS) CONTAINMENT COOLING SYSTEM and the following systems (CFR: 41.9): ESFAS	4.1	15
022 (SF5 CCS) Containment Cooling P8180L-002 003									X			(022A2.07) Ability to (a) predict the impacts of the following on the (SF5 CCS) CONTAINMENT COOLING SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations (CFR: 41.5 / 43.5): ESFAS actuation	4.0	82
025 (SF5 ICE) Ice Condenser														
026 (SF5 CSS) Containment Spray P8180L-002 077			X									(026K3.01) Knowledge of the effect that a loss or malfunction of the (SF5 CSS) CONTAINMENT SPRAY SYSTEM will have on the following systems or system parameters (CFR: 41.7): CCS	3.8	6
039 (SF4S MSS) Main and Reheat Steam P8174L-001 003						X						(039K6.11) Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the (SF4S MSS) MAIN AND REHEAT STEAM SYSTEM (CFR: 41.7): Steam Dump System	3.4	33
059 (SF4S MFW) Main Feedwater P8174L-003 124					X							(059K5.18) Knowledge of the operational implications or cause and effect relationships of the following concepts as they apply to the (SF4S MFW) MAIN FEEDWATER SYSTEM (CFR: 41.5): Power level restrictions for operation of MFW pumps and valves	3.5	37
061 (SF4S AFW) Auxiliary/Emergency Feedwater P8180L-007 231								X				(061A2.07) Ability to (a) predict the impacts of the following on the (SF4S AFW) AUXILIARY/EMERGENCY FEEDWATER SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations (CFR: 41.5): Air-operated valve, solenoid-operated valve, or motor-operated valve failure	4.0	50
061 (SF4S AFW) Auxiliary/Emergency Feedwater P8180L-007 132					X							(061K5.05) Knowledge of the operational implications or cause and effect relationships of the following concepts as they apply to the (SF4S AFW) AUXILIARY/EMERGENCY FEEDWATER SYSTEM (CFR: 41.5): Feedline voiding and water hammer	3.4	43
062 (SF6 ED AC) AC Electrical Distribution P8186L-008 069									X			(062A3.08) Ability to monitor automatic features of the (SF6 ED AC) AC ELECTRICAL DISTRIBUTION SYSTEM, including (CFR: 41.7): Load shedding	3.6	68

Form 4.1-PWR		PWR Examination Outline Plant Systems—Tier 2/Group 1 (RO/SRO)											ES 4.1	
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
063 (SF6 ED DC) DC Electrical Distribution P8186L-005 081								X				(063A2.04) Ability to (a) predict the impacts of the following on the (SF6 ED DC) DC ELECTRICAL DISTRIBUTION SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations (CFR: 41.5 / 43.5): Battery malfunctions	3.9	57
064 (SF6 EDG) Emergency Diesel Generator P8186L-004 167											X	(064 (SF6 EDG) EMERGENCY DIESEL GENERATOR SYSTEM G2.1.23) CONDUCT OF OPERATIONS: Ability to perform general and/or normal operating procedures during any plant condition (CFR: 41.10 / 43.5)	4.3	51
073 (SF7 PRM) Process Radiation Monitoring P8182L-002 058				X								(073K4.01) Knowledge of (SF7 PRM) PROCESS RADIATION MONITORING SYSTEM design features and/or interlocks that provide for the following (CFR 41.7): Release termination	3.9	54
073 (SF7 PRM) Process Radiation Monitoring P8182L-002 097										X		(073A4.04) Ability to manually operate and/or monitor the (SF7 PRM) PROCESS RADIATION MONITORING SYSTEM in the control room (CFR: 41.7): Alarm and/or interlock setpoint checks and adjustments	3.2	46
076 (SF4S SW) Service Water P8176L-003 095											X	(076A3.06) Ability to monitor automatic features of the (SF4S SW) SERVICE WATER SYSTEM, including (CFR: 41.7): ESFAS	3.9	41
076 (SF4S SW) Service Water P8176L-003 075											X	(076A4.02) Ability to manually operate and/or monitor the (SF4S SW) SERVICE WATER SYSTEM in the control room (CFR: 41.7): SWS valves	3.7	64
078 (SF8 IAS) Instrument Air P8178L-005 025								X				(078A2.01) Ability to (a) predict the impacts of the following on the (SF8 IAS) INSTRUMENT AIR SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations (CFR: 41.5 / 43.5): Air dryer and filter malfunctions	3.3	45
103 (SF5 CNT) Containment P8180L-008 059	X											(103K1.16) Knowledge of the physical connections and/or cause and effect relationships between the (SF5 CNT) CONTAINMENT SYSTEM and the following systems (CFR: 41.9): HRPS	3.0	65
103 (SF5 CNT) Containment P8180L-001 036											X	(103 (SF5) CONTAINMENT SYSTEM G2.4.21) EMERGENCY PROCEDURES/PLAN: Knowledge of the parameters and logic used to assess the status of emergency operating procedures critical safety functions or shutdown critical safety functions (CFR: 41.7 / 43.5)	4.6	88
053 (SF1; SF4P ICS*) Integrated Control														
K/A Category Point Totals:	2	3	2	2	3	2	2	3/2	3	3	3/3	Group Point Total:	28/5	

Form 4.1-PWR		PWR Examination Outline Plant Systems—Tier 2/Group 2 (RO/SRO)											ES 4.1	
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 P8197L-014 106								X				(002A2.04) Ability to (a) predict the impacts of the following on the (SF2; SF4P RCS) REACTOR COOLANT SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations (CFR: 41.5 / 43.5): Loss of heat sinks	4.5	80
011 (SF2 PZR LCS) Pressurizer Level Control														
014 (SF1 RPI) Rod Position Indication														
015 (SF7 NI) Nuclear Instrumentation														
016 (SF7 NNI) Nonnuclear Instrumentation P8140L-234 002											X	(016 (SF7 NNI) NONNUCLEAR INSTRUMENTATION SYSTEM G2.4.45) Ability to prioritize and interpret the significance of each annunciator or alarm. (CFR 41.10 / 43.5)]	4.3	92
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 P8180L-009E 023				X								(029K4.03) Knowledge of (SF8 CPS) CONTAINMENT PURGE SYSTEM design features and/or interlocks that provide for the following (CFR: 41.7): Automatic purge isolation	3.6	66
033 (SF8 SFPCS) Spent Fuel Pool Cooling P8182L-004 030								X				(033A2.02) Ability to (a) predict the impacts of the following on the (SF8 SFPCS) SPENT FUEL POOL COOLING SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations (CFR: 41.5 / 43.5): SFPCS malfunction	3.2	81
034 (SF8 FHS) Fuel Handling Equipment														
035 (SF 4P SG) Steam Generator P8140L-204 013										X		(035A4.12) Ability to manually operate and/or monitor the (SF4P SG) STEAM GENERATOR SYSTEM in the control room (CFR: 41.7): Steam flow	3.4	10
041 (SF4S SDS) Steam Dump/Turbine Bypass Control P8174L-002 093				X								(041K4.14) Knowledge of (SF4S SDS) STEAM DUMP/TURBINE BYPASS CONTROL SYSTEM design features and/or interlocks that provide for the following (CFR: 41.7): Operation of loss-of-load bistable upon turbine load loss	3.4	38
045 (SF 4S MT/G) Main Turbine Generator														
055 (SF4S CARS) Condenser Air Removal P8174L-001 040									X			(055A3.01) Ability to monitor automatic features of the (SF4S CARS) CONDENSER AIR REMOVAL SYSTEM, including (CFR: 41.7): Air removal pump	3.0	55

Form 4.1-PWR		PWR Examination Outline Plant Systems—Tier 2/Group 2 (RO/SRO)											ES 4.1	
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
056 (SF4S CDS) Condensate P8174L-003 086						X						(056K6.14) Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the (SF4S CDS) CONDENSATE SYSTEM (CFR: 41.7): Steam dumps	3.2	22
068 (SF9 LRS) Liquid Radwaste P8182L-001A 009			X									(068K3.03) Knowledge of the effect that a loss or malfunction of the (SF9 LRS) LIQUID RADWASTE SYSTEM will have on the following systems or system parameters (CFR: 41.7): Sources of LRS	2.7	53
071 (SF9 WGS) Waste Gas Disposal														
072 (SF7 ARM) Area Radiation Monitoring P8182L-002 059							X					(072A1.01) Ability to predict and/or monitor changes in parameters associated with operation of the (SF7 ARM) AREA RADIATION MONITORING SYSTEM, including (CFR: 41.5): Radiation levels	3.4	17
075 (SF8 CW) Circulating Water														
079 (SF8 SAS**) Station Air														
086 (SF8 FP) Fire Protection														
050 (SF 9 CRV*) Control Room Ventilation P8180L-009I 020	X											(050K1.06) Knowledge of the physical connections and/or cause and effect relationships between the (SF9 CRV) CONTROL ROOM VENTILATION and the following systems (CFR: 41.2 to 41.9): Plant pneumatic system	2.6	75
Component: 191006 Heat Exchangers and Condensers PI-OPS-GFE-191006L 001	X											(191006K1.14) Reasons for non-condensable gas removal	2.6	29
K/A Category Point Totals:	2	0	1	2	0	1	1	0/2	1	1	0/1	Group Point Total:	9/3	

Facility: Prairie Island Nuclear Generating Station		Date of Exam: August 8 – 19, 2022				
Generic Knowledge and Abilities—Tier 3 (RO/SRO)						
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.7	(G2.1.7) CONDUCT OF OPERATIONS: Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation (CFR: 41.5 / 43.5) P8176L-003 093	4.4	2		
	2.1.36	(G2.1.36) CONDUCT OF OPERATIONS: Knowledge of procedures and limitations involved in core alterations (CFR: 41.10 / 43.6) P8182L-003 102			4.1	91
	2.1.39	(G2.1.39) CONDUCT OF OPERATIONS: Knowledge of conservative decision-making practices (CFR: 41.10 / 43.5) P9150L-031 074			4.3	85
	2.1.44	(G2.1.44) CONDUCT OF OPERATIONS: Knowledge of RO duties in the control room during fuel handling, such as responding to alarms from the fuel handling area, communicating with fuel-handling personnel, operating systems from the control room to support fuel operations, or supporting instrumentation (CFR 41.10 / 43.7) P8182L-003 108	3.9	18		
	Subtotal			2		2
2. Equipment Control	2.2.7	(G2.2.7) EQUIPMENT CONTROL: Knowledge of the process for conducting infrequently performed tests or evolutions (CFR: 41.10 / 43.3) P9150L-003 020	2.9	1		
	2.2.12	(G2.2.12) EQUIPMENT CONTROL: Knowledge of surveillance procedures (CFR: 41.10 / 43.2) P8171L-007 075			4.1	79
	2.2.14	(G2.2.14) Knowledge of the process for controlling equipment configuration or status (CFR 41.10 / 43.3) P8140L-201 009			4.3	86
	2.2.20	(G2.2.20) EQUIPMENT CONTROL: Knowledge of the process for managing troubleshooting activities (CFR: 41.10 / 43.5) P9150L-005 021	2.6	12		
	Subtotal			2		2
3. Radiation Control	2.3.6	(G2.3.6) RADIATION CONTROL: Ability to approve liquid or gaseous release permits (CFR: 41.13 / 43.4) P8182L-001C 139			3.8	77
	2.3.11	(G2.3.11) RADIATION CONTROL: Ability to control radiation releases (CFR: 41.11 / 43.4) P8182L-002 061	3.8	4		
	Subtotal			1		1
4. Emergency Procedures/Plan	2.4.14	(G2.4.14) EMERGENCY PROCEDURES/PLAN: Knowledge of general guidelines for emergency and abnormal operating procedures usage (CFR: 41.10 / 43.1) P8197L-014 234			4.5	83
	2.4.17	(G2.4.17) EMERGENCY PROCEDURES/PLAN: Knowledge of emergency and abnormal operating procedures terms and definitions (CFR: 41.10) P8197L-010 059	3.9	39		
	2.4.51	(G2.4.51) EMERGENCY PROCEDURES/PLAN: Knowledge of emergency operating procedure exit conditions (e.g., emergency condition no longer exists or severe accident guideline entry is required) (CFR: 41.10 / 43.5) P8197L-014 235			4.0	89
	Subtotal			1		2
Tier 3 Point Total				6		7

Theory—Tier 4 (RO)				
Category	K/A #	Topic	RO	
			IR	#
Reactor Theory	6K1.03 192004	(192004K1.03) REACTIVITY COEFFICIENTS; Describe the effect on the magnitude of the temperature coefficient of reactivity from changes in the following: core age PI-OPS-GFE-192004L 005	3.1	21
	6K1.08 192006	(192006K1.08) FISSION PRODUCT POISONS: Describe the effects of xenon concentration on flux shape and control rod patterns PI-OPS-GFE-192006L 002	3.4	3
	6K1.05 192008	(192008K1.05) REACTOR OPERATIONAL PHYSICS; Startup and approach to Criticality: Explain characteristics to be observed when the reactor is very close to criticality PI-OPS-GFE-192008L 006	3.9	60
	Subtotal		N/A	3
Thermodynamics	6K1.05 193008	(193008K1.05) THERMAL HYDRAULICS; Departure from Nucleate Boiling: List the parameters that affect departure from nucleate boiling and DNBR and describe their effect(s) PI-OPS-GFE-193008L 001	3.6	62
	6K1.05 193009	(193009K1.05) CORE THERMAL LIMITS: State why thermal limits are necessary PI-OPS-GFE-193009L 001	3.5	7
	6K1.07 193010	(193010K1.07) BRITTLE FRACTURE AND VESSEL THERMAL STRESS: State the operational concerns of uncontrolled cooldown PI-OPS-GFE-193010L 001	4.1	56
	Subtotal		N/A	3
Tier 4 Point Total			↓↑	6

Facility: **Prairie Island Nuclear Generating Station**Date of Exam: **August 8 – 19, 2022**

Refer to Examination Standard (ES)-4.2, "Developing Written Examinations," Section B.3, for deviations from the approved written examination outline.

Tier/Group	Randomly Selected K/A	Reason for Rejection
1 / 1 (R32)	022 APE 22 AK1.02	Relationship of charging flow to D/P between charging and RCS has low operational validity for our facility.
Replaced with	AK1.05	How long a PZR level can be maintained within limits.
1 / 1 (S87)	038 EPE 38 G2.2.45	Ability to determine TS during a SGTR is low operational validity. A tube leak, yes - AOPs, but a tube rupture, no - EOPs.
Replaced with	G2.4.23	Knowledge of the bases for prioritizing emergency operating procedures implementation.
1 / 1 (R13)	054 APE 54 G2.2.42	MFW is a secondary system, not a primary or safety related system, thus does not have TS conditions associated.
Replaced with	G2.2.3	(Multi-unit license) Knowledge of the design, procedural, and/or operational differences between units.
1 / 1 (R13)	054 APE 54 G2.2.3	PI does not have a significant design, procedural, and/or operational difference related to MFW between units.
Replaced with	G2.2.1	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.
1 / 2 (R20)	005 APE 5 G2.4.49	PI has no immediate actions for Inoperable or Stuck Rod.
Replaced with	G2.4.31	Knowledge of annunciator alarms, indications, or response procedures.
1 / 2 (S78)	W E08 EA 2.07	Low operational validity. RCP seal D/P not significant in this procedure.
Replaced with	EA2.05	RCS pressure, temperature, and/or PZR level.
2 / 2 (S92)	016 SF7 NNI	We are going to try this one. It is effectively RO knowledge (entry conditions for AOPs and EOPS), but we are going to give it a go, see if we can come up with something Tech Spec-y, or maybe you have some suggestions.
Replaced with	G2.4.45	(If the above does not work, perhaps try this one to include a procedure selection based upon the prioritization.) Ability to prioritize and interpret the significance of each annunciator or alarm.
4 (R21)	192004 K 1.02	We basically had this K/A last exam. Not this exact K/A, but close enough to be the same question. Overlap is not the concern. The question validated at 53% and performed at 0%. Again, we do not have to reject this one. We are just sharing so we can make an informed decision.
Replaced with	K1.03	Core age.

2 / 1 (R41)	076 A3.03	There are no auto closing CCW valves associated with Service Water (Cooling Water at PI), only auto open CC HX inlet valves.
Replaced with	076 A3.06	ESFAS.
2 / 1 (R31)	004 A3.04	PI does not have automatic VCT pressure control capability.
Replaced with	A3.09	VCT Level.
1 / 1 (S84)	057 APE AA2.11	Pi does not have an operationally valid interaction between AC VITAL Instrument power and a MFW pump running.
Replaced with	AA2.08	Reactor Power.
2 / 1 (R37)	059 K5.14	Unable to develop an operationally valid question on the operational implications of Quadrant Power Tilt as applied to the MFW system.
Replaced with	K5.18	Power level restrictions for operation of MFW pumps and valves.
2 / 2 (R55)	055 A3.03	PI does not have an auto CAR system exhaust realignment.
Replaced with	A3.01	Air removal pump.
		End