Form 4.1-PWR Pressurized-Water Reactor Examination Outline

Facility: D.C. Cook **K/A Catalog Rev. 3** **Rev.** 06/28/2022 **Date of Exam:** 07/27/2022

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	2	4				3	3			3	18	4	2	6
	2	1	2	0				2	2			1	8	2	2	4
	Tier Totals	4	4	4				5	5			4	26	6	4	10
2. Plant Systems	1	2	2	2	3	3	3	3	2	3	3	2	28	2	3	5
	2	1	1	1	1	0	0	1	1	2	1	0	9	0 / 2	1	3
	Tier Totals	3	3	3	4	3	3	4	3	5	4	2	37	4	4	8

3. Generic Knowledge and Abilities Categories	CO	EC	RC	EM		CO	EC	RC	EM	
	2	2	1	1	6	2	2	1	2	7

4. Theory	Reactor Theory	Thermodynamics	
	3	3	6

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.

ES-4.1-PWR	D.C. Cook Emergency and Abnormal Plant Evolutions—Tier 1/Group 1 (RO/**SRO**)									
Item #	E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	Q#
1	(000007) (EPE 7; BW E02 & E10; CE E02) Reactor Trip, Stabilization, Recovery			X				(000007EK3.07) Knowledge of the reasons for the following responses and/or actions as they apply to (EPE 7) REACTOR TRIP, STABILIZATION, RECOVERY (CFR: 41.5 / 41.10 / 45.6 / 45.13): ECCS flow reduction	3.3	1
2	**(000008) (APE 8) Pressurizer Vapor Space Accident**					**X**		**(000008AA2.23) Ability to determine and/or interpret the following as they apply to (APE 8) PRESSURIZER VAPOR SPACE ACCIDENT (CFR: 43.5 / 45.13): Controlling CVCS for maintaining RCS inventory**	**3.8**	**76**
3	(000009) (EPE 9) Small Break LOCA					X		(000009EA2.05) Ability to determine and/or interpret the following as they apply to (EPE 9) SMALL-BREAK LOCA (CFR: 43.5 / 45.13): The time available for action before PZR is empty, given the rate of decrease of PZR level	2.8	2
4	(000011) (EPE 11) Large Break LOCA					X		(000011EA2.15) Ability to determine and/or interpret the following as they apply to (EPE 11) LARGE-BREAK LOCA (CFR: 43.5 / 45.13): Sump level	4.1	3
5	(000015) (APE 15) Reactor Coolant Pump Malfunctions			X				(000015AK3.07) Knowledge of the reasons for the following responses and/or actions as they apply to (APE 15) REACTOR COOLANT PUMP MALFUNCTIONS (CFR: 41.5 / 41.10 / 45.6 / 45.13): Ensuring that S/G levels are controlled properly for natural circulation enhancement	3.7	4
6	(000022) (APE 22) Loss of Reactor Coolant Makeup			X				(000022AK3.01) Knowledge of the reasons for the following responses and/or actions as they apply to (APE 22) LOSS OF REACTOR COOLANT MAKEUP (CFR: 41.5 / 41.10 / 45.6 / 45.13): Adjustment of RCP seal backpressure regulator valve to obtain normal flow	3.4	5
7	**(000025) (APE 25) Loss of Residual Heat Removal System**					**X**		**(000025AA2.07) Ability to determine and/or interpret the following as they apply to (APE 25) LOSS OF RESIDUAL HEAT REMOVAL SYSTEM (CFR: 43.5 / 45.13): Pump cavitation**	**4**	**77**
8	(000026) (APE 26) Loss of Component Cooling Water				X			(000026AA1.05) Ability to operate and/or monitor the following as they apply to (APE 26) LOSS OF COMPONENT COOLING WATER (CFR: 41.5 / 41.7 / 45.5 to 45.8): The CCWS surge tank, including level control, level alarms, and a radiation alarm	3.5	6
9	(000027) (APE 27) Pressurizer Pressure Control System Malfunction				X			(000027AA1.01) Ability to operate and/or monitor the following as they apply to (APE 27) PRESSURIZER PRESSURE CONTROL SYSTEM MALFUNCTION (CFR: 41.7 / 45.5 / 45.6): PZR heaters, sprays, and PORVs	3.8	7
10	(000029) (EPE 29) Anticipated Transient Without Scram					X		(000029EA2.01) Ability to determine and/or interpret the following as they apply to (EPE 29) ANTICIPATED TRANSIENT WITHOUT SCRAM (ATWS) (CFR: 43.5 / 45.13): Reactor power	4.4	8
11	(000038) (EPE 38) Steam Generator Tube Rupture		X					(000038EK2.10) Knowledge of the relationship between (EPE 38) STEAM GENERATOR TUBE RUPTURE and the following systems or components (CFR: 41.7 / 41.8 / 45.4 / 45.7 / 45.8): ECCS	4.1	9
12	**(000040) (APE 40; BW E05; CE E05; W E12) Steam Line Rupture – Excessive Heat Transfer**						**X**	**(000040) (APE 40; ~~BW E05; CE E05; W E12~~) STEAM LINE RUPTURE – EXCESSIVE HEAT TRANSFER (G2.4.18) EMERGENCY PROCEDURES/PLAN: Knowledge of the specific bases for emergency and abnormal operating procedures (CFR: 41.10 / 43.1 / 45.13)**	**4.0**	**78**
13	**(000054) (APE 54; CE E06) Loss of Main Feedwater**					**X**		**(000054AA2.08) Ability to determine and/or interpret the following as they apply to (APE 54) LOSS OF Main Feedwater (CFR: 43.5 / 45.13): Steam flow and/or MFW flow**	**3.4**	**79**
14	(000055) (EPE 55) Station Blackout			X				(000055EK3.01) Knowledge of the reasons for the following responses and/or actions as they apply to (EPE 55) STATION BLACKOUT (CFR: 41.5 / 41.10 / 45.6 / 45.13): Length of time for which battery capacity is designed	4.1	10
15	(000056) (APE 56) Loss of Offsite Power				X			(000056AA1.28) Ability to operate and/or monitor the following as they apply to (APE 56) LOSS OF OFFSITE POWER (CFR: 41.7 / 45.5 / 45.6): SWS flow control valve for the CCW cooler to control CCW outlet temperature	3.1	11
16	(000057) (APE 57) Loss of Vital AC Instrument Bus		X					(000057AK2.06) Knowledge of the relationship between (APE 57) LOSS OF VITAL AC ELECTRICAL INSTRUMENT BUS and the following systems or components (CFR: 41.7 / 45.7): RCS instrumentation	4	12

ES-4.1-PWR								D.C. Cook Emergency and Abnormal Plant Evolutions—Tier 1/Group 1 (RO/**SRO**)		
Item #	E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	Q#
17	**(000057) (APE 57) Loss of Vital AC Instrument Bus**					**X**		**(000057AA2.20) 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): The plant automatic actions that will occur on the loss of a vital AC electrical instrument bus**	**4**	**80**
18	(000058) (APE 58) Loss of DC Power	X						(000058AK1.03) Knowledge of the operational implications and/or cause and effect relationships of the following concepts as they apply to (APE 58) LOSS OF DC POWER (CFR: 41.8 / 41.10 / 45.3): Effect of battery discharge rate on capacity	3.7	13
19	**(000062) (APE 62) Loss of Nuclear Service Water**						**X**	**(000062) (APE 62) LOSS OF NUCLEAR SERVICE WATER (G2.4.6) EMERGENCY PROCEDURES/PLAN: Knowledge of emergency and abnormal operating procedures major action categories (CFR: 41.10 / 43.5 / 45.13)**	**4.7**	**81**
20	(000065) (APE 65) Loss of Instrument Air	X						(000065AK1.02) Knowledge of the operational implications and/or cause and effect relationships of the following concepts as they apply to (APE 65) LOSS OF INSTRUMENT AIR (CFR: 41.8 / 41.10 / 45.3): Effects of water and/or particulate matter in instrument air lines (operating experience)	3.1	14
21	(000077) (APE 77) Generator Voltage and Electric Grid Disturbances						X	(000077) (APE 77) GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES (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 / 45.12 / 45.13)	4.4	15
22	(W E04) LOCA Outside Containment						X	(W E04) LOCA OUTSIDE CONTAINMENT (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 / 45.12)	4.2	16
23	(W E11) Loss of Emergency Coolant Recirculation	X						(WE11EK1.05) Knowledge of the operational implications and/or cause and effect relationships of the following concepts as they apply to (W E11) LOSS OF EMERGENCY COOLANT RECIRCULATION (CFR: 41.5 / 41.7 / 45.7 / 45.8): Blocking low steamline pressure SI when PZR pressure lowers less than P-11 setpoint during cooldown	3.4	17
24	(BW E04; W E05) Inadequate Heat Transfer – Loss of Secondary Heat Sink						X	(~~BW E04;~~ W E05) INADEQUATE HEAT TRANSFER – LOSS OF SECONDARY HEAT SINK (G2.1.19) CONDUCT OF OPERATIONS: Ability to use available indications to evaluate system or component status (CFR: 41.10 / 45.12)	3.9	18
K/A Category Totals:		3	2	4	3	7	5	Group Point Total:		24

ES-4.1-PWR	D.C. Cook Emergency and Abnormal Plant Evolutions—Tier 1/Group 2 (RO/**SRO**)									
Item #	E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	Q#
	000001 (APE 1) Continuous Rod Withdrawal / 1									
	000003 (APE 3) Dropped Control Rod / 1									
25	**(000005) (APE 5) Inoperable/Stuck Control Rod**					**X**		**(000005AA2.07) Ability to determine and/or interpret the following as they apply to (APE 5) INOPERABLE/STUCK Control Rod (CFR: 43.5 / 45.13): RPI**	**3.7**	**82**
26	(000024) (APE 24) Emergency Boration					X		(000024AA2.10) Ability to determine and/or interpret the following as they apply to (APE 24) EMERGENCY BORATION (CFR: 43.5 / 45.13): Normal boron flow	2.8	19
27	**(000028) (APE 28) Pressurizer (PZR) Level Control Malfunction**						**X**	**(000028) (APE 28) PRESSURIZER (PZR) LEVEL CONTROL MALFUNCTION (G2.4.14) EMERGENCY PROCEDURES/PLAN: Knowledge of general guidelines for emergency and abnormal operating procedures usage (CFR: 41.10 / 43.1 / 45.13)**	**4.5**	**83**
	000032 (APE 32) Loss of Source Range Nuclear Instrumentation / 7									
	000033 (APE 33) Loss of Intermediate Range Nuclear Instrumentation / 7									
28	**(000036) (APE 36; BW/A08) Fuel-Handling Incidents**					**X**		**(000036AA2.04) Ability to determine and/or interpret the following as they apply to (APE 36) FUEL HANDLING INCIDENTS (CFR: 41.7 / 43.5 / 43.7 / 45.13): Containment ventilation isolation**	**3.7**	**84**
29	(000037) (APE 37) Steam Generator Tube Leak		X					(000037AK2.24) Knowledge of the relationship between (APE 37) STEAM GENERATOR TUBE LEAK and the following systems or components (CFR: 41.7 / 45.7): AFW system	3.7	20
30	(000051) (APE 51) Loss of Condenser Vacuum						X	(000051) (APE 51) LOSS OF CONDENSER VACUUM (G2.1.45) CONDUCT OF OPERATIONS: Ability to identify and interpret diverse indications to validate the response of another indication (CFR: 41.7 / 43.5 / 45.4)	4.3	21
	000059 (APE 59) Accidental Liquid Radwaste Release / 9									
	000060 (APE 60) Accidental Gaseous Radwaste Release / 9									
	000061 (APE 61) Area Radiation Monitoring System Alarms / 7									
31	(000067) (APE 67) Plant Fire On Site				X			(000067AA1.05) Ability to operate and/or monitor the following as they apply to (APE 67) PLANT FIRE ON SITE (CFR: 41.7 / 45.5 / 45.6): Plant and control room ventilation systems	3.5	22
32	(000068) (APE 68; BW A06) Control Room Evacuation									
	000069 (APE 69; W E14) Loss of Containment Integrity / 5									
32	**000074 (EPE 74; W E06 & E07) Inadequate Core Cooling / 4**						**X**	**(000074) (EPE 74; W E06 & E07) INADEQUATE CORE COOLING / 4 (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 / 45.13)**	**4.3**	**85**
33	(000076) (APE 76) High Reactor Coolant Activity				X			(000076AA1.13) Ability to operate and/or monitor the following as they apply to (APE 76) HIGH REACTOR COOLANT ACTIVITY (CFR: 41.7 / 45.5 / 45.6): LRS	3.2	23

ES-4.1-PWR								D.C. Cook		
								Emergency and Abnormal Plant Evolutions—Tier 1/Group 2 (RO/**SRO**)		
Item #	E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	Q#
34	(000078) (APE 78*) RCS Leak					X		(000078AA2.01) Ability to determine and/or interpret the following as they apply to (APE 78) REACTOR COOLANT SYSTEM LEAK (CFR: 43.5 / 45.13): Possible leak paths	4	24
	(W E01 & E02) Rediagnosis & SI Termination / 3									
35	(W E13) Steam Generator Overpressure	X						(WE13EK1.04) Knowledge of the operational implications and/or cause and effect relationships of the following concepts as they apply to (W E13) STEAM GENERATOR OVERPRESSURE (CFR: 41.5 / 41.7 / 45.7 / 45.8): Conditions required to cause overpressurization of an S/G	3.2	25
	(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 – Depressurization / 4									
	(BW E09; CE A13**; W E09 & E10) Natural Circulation/4									
	(BW E13 & E14) EOP Rules and Enclosures									
36	(CE A11**; W E08) RCS Overcooling – Pressurized Thermal Shock		X					(WE08EK2.05) Knowledge of the relationship between (W E08) PRESSURIZED THERMAL SHOCK and the following systems or components (CFR: 41.7 / 41.8 / 45.2 / 45.4): ITM	3.7	26
	(CE A16) Excess RCS Leakage / 2									
	(CE E09) Functional Recovery									
	(CE E13*) Loss of Forced Circulation / LOOP / Blackout / 4									
K/A Category Totals:		1	2	0	2	4	3	Group Point Total:		12

ES-4.1-PWR	D.C. Cook Emergency and Abnormal Plant Evolutions—Tier 2/Group 1 (RO/**SRO**)													
Item #	System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	Q#
37	(003) (SF4P RCP) REACTOR COOLANT PUMP SYSTEM						X						(003K6.07) Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the (SF4P RCP) REACTOR COOLANT PUMP SYSTEM (CFR: 41.7 / 45.5): Thrust and radial bearing	3	27
38	(004) (SF1; SF2 CVCS) CHEMICAL AND VOLUME CONTROL SYSTEM							X					(004A1.04) Ability to predict and/or monitor changes in parameters associated with operation of the (SF1; SF2 CVCS) CHEMICAL AND VOLUME CONTROL SYSTEM, including (CFR: 41.5 to 41.7 / 45.5): PZR pressure and level	4.2	28
39	(004) (SF1; SF2 CVCS) CHEMICAL AND VOLUME CONTROL SYSTEM		X										(004K2.06) Knowledge of electrical power supplies to the following (CFR: 41.6 / 41.7): (SF1; SF2 CVCS) CHEMICAL AND VOLUME CONTROL SYSTEM Control instrumentation	3.3	29
40	(005) (SF4P RHR) RESIDUAL HEAT REMOVAL SYSTEM				X								(005K4.08) Knowledge of (SF4P RHR) RESIDUAL HEAT REMOVAL SYSTEM design features and/or interlocks that provide for the following (CFR: 41.7): Lineup for piggyback mode with HPI	4.0	30
41	**(005) (SF4P RHR) RESIDUAL HEAT REMOVAL SYSTEM**											**X**	**(005) (SF4P RHR) RESIDUAL HEAT REMOVAL SYSTEM (G2.4.41) EMERGENCY PROCEDURES/PLAN: Knowledge of the emergency action level thresholds and classifications (SRO Only) (CFR: 43.5 / 45.11)**	**4.6**	**86**
42	(006) (SF2; SF3 ECCS) EMERGENCY CORE COOLING SYSTEM					X							(006K5.06) Knowledge of the operational implications or cause and effect relationships of the following concepts as they apply to the (SF2; SF3 ECCS) EMERGENCY CORE COOLING SYSTEM (CFR: 41.5 / 45.7): Relationship between ECCS flow and RCS pressure	3.9	31
43	(007) (SF5 PRTS) PRESSURIZER RELIEF/QUENCH TANK SYSTEM							X					(007A1.04) Ability to predict and/or monitor changes in parameters associated with operation of the (SF5 PRTS) PRESSURIZER RELIEF/QUENCH TANK SYSTEM, including (CFR: 41.5 / 45.5): PZR tail pipe temperatures	3.9	32
44	(007) (SF5 PRTS) PRESSURIZER RELIEF/QUENCH TANK SYSTEM			X									(007K3.01) Knowledge of the effect that a loss or malfunction of the (SF5 PRTS) PRESSURIZER RELIEF/QUENCH TANK SYSTEM will have on the following systems or system parameters (CFR: 41.7 / 41.9): Containment	3.4	33
45	(008) (SF8 CCW) COMPONENT COOLING WATER SYSTEM		X										(008K2.01) Knowledge of electrical power supplies to the following (CFR: 41.7): (SF8 CCW) COMPONENT COOLING WATER SYSTEM CCW valves	3	34
46	(010) (SF3 PZR PCS) PRESSURIZER PRESSURE CONTROL SYSTEM											X	(010) (SF3 PZR PCS) PRESSURIZER PRESSURE CONTROL SYSTEM (191002K1.12) SENSORS AND DETECTORS (CFR: 41.7): (PRESSURE) Modes of failure	3.0	35

ES-4.1-PWR	D.C. Cook													
Emergency and Abnormal Plant Evolutions—Tier 2/Group 1 (RO/**SRO**)														
Item #	System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	Q#
47	**(010) (SF3 PZR PCS) PRESSURIZER PRESSURE CONTROL SYSTEM**								**X**				**(010A2.06) Ability to (a) predict the impacts of the following on the (SF3 PZR PCS) PRESSURIZER PRESSURE 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 / 45.3 / 45.13): Failure of PZR LCS**	**3.6**	**87**
48	(012) (SF7 RPS) REACTOR PROTECTION SYSTEM				X								(012K4.02) Knowledge of (SF7 RPS) REACTOR PROTECTION SYSTEM design features and/or interlocks that provide for the following (CFR: 41.7): Automatic reactor trip when RPS setpoints are exceeded for each RPS function; functional basis for each	4.5	36
49	(013) (SF2 ESFAS) ENGINEERED SAFETY FEATURES ACTUATION SYSTEM									X			(013A3.09) Ability to monitor automatic features of the (SF2 ESFAS) ENGINEERED SAFETY FEATURES ACTUATION SYSTEM, including (CFR: 41.6 / 41.7 / 41.8 / 45.5): Containment spray actuation/signal	4.1	37
50	(022) (SF5 CCS) CONTAINMENT COOLING SYSTEM								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 / 45.3 / 45.13): ESFAS actuation	4.0	38
51	(025) (SF5 ICE) ICE CONDENSER SYSTEM			X									(025K3.01) Knowledge of the effect that a loss or malfunction of the (SF5 ICE) ICE CONDENSER SYSTEM will have on the following systems or system parameters (CFR: 41.7 / 45.6): Containment	4.3	39
52	(026) (SF5 CSS) CONTAINMENT SPRAY SYSTEM								X				(026A2.04) Ability to (a) predict the impacts of the following on the (SF5 CSS) CONTAINMENT SPRAY 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 / 45.3 / 45.13): Failure of spray pump	3.9	40
53	**(026) (SF5 CSS) CONTAINMENT SPRAY SYSTEM**											**X**	**(026) (SF5 CSS) CONTAINMENT SPRAY SYSTEM (G2.2.25) EQUIPMENT CONTROL: Knowledge of the bases in TS for limiting conditions for operation and safety limits (SRO Only) (CFR: 43.2)**	**4.2**	**88**
54	(039) (SF4S MSS) MAIN AND REHEAT STEAM SYSTEM										X		(039A4.01) Ability to manually operate and/or monitor the (SF4S MSS) MAIN AND REHEAT STEAM SYSTEM in the control room (CFR: 41.7 / 45.5 to 45.8): MSIVs and bypass valves	3.9	41
55	(039) (SF4S MSS) MAIN AND REHEAT STEAM SYSTEM										X		(039A4.03) Ability to manually operate and/or monitor the (SF4S MSS) MAIN AND REHEAT STEAM SYSTEM in the control room (CFR: 41.7 / 45.5 to 45.8): MFW pump turbines	3.4	42

ES-4.1-PWR	D.C. Cook Emergency and Abnormal Plant Evolutions—Tier 2/Group 1 (RO/**SRO**)														
Item #	System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	Q#
	053 (SF1; SF4P ICS*) INTEGRATED CONTROL SYSTEM														
56	(059) (SF4S MFW) MAIN FEEDWATER SYSTEM						X						(059K6.18) Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the (SF4S MFW) MAIN FEEDWATER SYSTEM (CFR: 41.5 / 45.7): MFW pump malfunctions	3.7	43
57	(059) (SF4S MFW) MAIN FEEDWATER SYSTEM					X							(059K5.07) 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 / 45.3): Relationship between MFW pump speed and feedwater regulating valve position	3.4	44
58	(061) (SF4S AFW) AUXILIARY / EMERGENCY FEEDWATER SYSTEM											X	(061) (SF4S AFW) AUXILIARY / EMERGENCY FEEDWATER SYSTEM (G2.1.28) CONDUCT OF OPERATIONS: Knowledge of the purpose and function of major system components and controls (CFR: 41.7)	4.1	45
59	**(061) (SF4S AFW) AUXILIARY / EMERGENCY FEEDWATER SYSTEM**								**X**				**(061A2.03) 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 / 45.6): Loss of DC power**	**3.8**	**89**
60	(062) (SF6 ED AC) AC ELECTRICAL DISTRIBUTION SYSTEM										X		(062A4.07) Ability to manually operate and/or monitor the (SF6 ED AC) AC ELECTRICAL DISTRIBUTION SYSTEM in the control room (CFR: 41.7 / 45.5 to 45.8): Synchronizing and paralleling of different AC supplies	3.7	46
61	(063) (SF6 ED DC) DC ELECTRICAL DISTRIBUTION SYSTEM	X											(063K1.01) Knowledge of the physical connections and/or cause and effect relationships between the (SF6 ED DC) DC ELECTRICAL DISTRIBUTION SYSTEM and the following systems (CFR: 41.3 to 41.8 / 45.7 / 45.8): Ground detection system	2.6	47
62	(063) (SF6 ED DC) DC ELECTRICAL DISTRIBUTION SYSTEM					X							(063K5.02) Knowledge of the operational implications or cause and effect relationships of the following concepts as they apply to the (SF6 ED DC) DC ELECTRICAL DISTRIBUTION SYSTEM (CFR: 41.5 / 45.7): Hydrogen generation during battery charging	2.8	48
63	(064) (SF6 EDG) EMERGENCY DIESEL GENERATOR SYSTEM									X			(064A3.06) Ability to monitor automatic features of the (SF6 EDG) EMERGENCY DIESEL GENERATOR SYSTEM, including (CFR: 41.7 / 45.5): Stop	3.6	49

ES-4.1-PWR	D.C. Cook													
Emergency and Abnormal Plant Evolutions—Tier 2/Group 1 (RO/**SRO**)														
Item #	System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	Q#
64	(073) (SF7 PRM) PROCESS RADIATION MONITORING SYSTEM							X					(073A1.02) Ability to predict and/or monitor changes in parameters associated with operation of the (SF7 PRM) PROCESS RADIATION MONITORING SYSTEM, including (CFR: 41.5 / 45.8 / 45.9): Lights and alarms	3.2	50
65	(076) (SF4S SW) SERVICE WATER SYSTEM						X						(076K6.14) Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the (SF4S SW) SERVICE WATER SYSTEM (CFR: 41.7 / 45.7): System leakage	2.9	51
66	(078) (SF8 IAS) INSTRUMENT AIR SYSTEM	X											(078K1.18) Knowledge of the physical connections and/or cause and effect relationships between the (SF8 IAS) INSTRUMENT AIR SYSTEM and the following systems (CFR: 41.3 to 41.8 / 45.7 / 45.8): Heater drain system	2.5	52
67	**(078) (SF8 IAS) INSTRUMENT AIR SYSTEM**											**X**	**(078) (SF8 IAS) INSTRUMENT AIR SYSTEM (G2.1.32) CONDUCT OF OPERATIONS: Ability to explain and apply system precautions, limitations, notes, or cautions (CFR: 41.10 / 43.2 / 45.12)**	**4.0**	**90**
68	(103) (SF5 CNT) CONTAINMENT SYSTEM									X			(103A3.01) Ability to monitor automatic features of the (SF5 CNT) CONTAINMENT SYSTEM, including (CFR: 41.7 / 45.7): Containment isolation	4.2	53
69	(103) (SF5 CNT) CONTAINMENT SYSTEM				X								(103K4.05) Knowledge of (SF5 CNT) CONTAINMENT SYSTEM design features and/or interlocks that provide for the following (CFR: 41.7): Containment construction	2.8	54
K/A Category Totals:		2	2	2	3	3	3	3	4	3	3	5	Group Point Total:		33

ES-4.1-PWR	D.C. Cook													
	Emergency and Abnormal Plant Evolutions—Tier 2/Group 2 (RO/**SRO**)													
Item #	System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	Q#
70	(001) (SF1 CRDS) CONTROL ROD DRIVE SYSTEM		X										(001K2.03) Knowledge of electrical power supplies to the following (CFR: 41.6): (SF1 CRDS) CONTROL ROD DRIVE SYSTEM Logic circuits	3.5	55
	002 (SF2; SF4P RCS) REACTOR COOLANT SYSTEM														
	011 (SF2 PZR LCS) PRESSURIZER LEVEL CONTROL SYSTEM														
	014 (SF1 RPI) ROD POSITION INDICATION SYSTEM														
	015 (SF7 NI) NUCLEAR INSTRUMENTATION SYSTEM														
	016 (SF7 NNI) NONNUCLEAR INSTRUMENTATION SYSTEM														
	017 (SF7 ITM) IN CORE TEMPERATURE MONITOR SYSTEM														
	027 (SF5 CIRS) CONTAINMENT IODINE REMOVAL SYSTEM														
	028 (SF5 HRPS) HYDROGEN RECOMBINER AND PURGE CONTROL SYSTEM														
71	(029) (SF8 CPS) CONTAINMENT PURGE SYSTEM							X					(029A1.02) Ability to predict and/or monitor changes in parameters associated with operation of the (SF8 CPS) CONTAINMENT PURGE SYSTEM, including (CFR: 41.5 / 45.5 / 45.8): Radiation levels	3.2	56
	033 (SF8 SFPCS) SPENT FUEL POOL COOLING SYSTEM														
72	(034) (SF8 FHS) FUEL HANDLING EQUIPMENT SYSTEM				X								(034K4.02) Knowledge of (SF8 FHS) FUEL HANDLING EQUIPMENT SYSTEM design features and/or interlocks that provide for the following (CFR: 41.6 / 41.7 / 43.7 / 45.8): Fuel movement	3.0	57
73	(035) (SF4P SG) STEAM GENERATOR SYSTEM									X			(035A3.05) Ability to monitor automatic features of the (SF4P SG) STEAM GENERATOR SYSTEM, including (CFR: 41.7 / 41.7 / 45.5): Automatic S/GB system and sample line isolation	3.1	58
	041 (SF4S SDS) STEAM DUMP / TURBINE BYPASS CONTROL SYSTEM														
	045 (SF4S MTG) MAIN TURBINE GENERATOR SYSTEM														

ES-4.1-PWR	D.C. Cook													
Emergency and Abnormal Plant Evolutions—Tier 2/Group 2 (RO/**SRO**)														
Item #	System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	Q#
74	(050) (SF9 CRV*) CONTROL ROOM VENTILATION										X		(050A4.01) Ability to manually operate and/or monitor the (SF9 CRV) CONTROL ROOM VENTILATION in the control room (CFR: 41.7 / 45.5 to 45.8): Initiate/reset system	3.8	59
75	(055) (SF4S CARS) CONDENSER AIR REMOVAL SYSTEM								X				(055A2.03) Ability to (a) predict the impacts of the following on the (SF4S CARS) CONDENSER AIR REMOVAL 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 / 45.3 / 45.13): Loss of air ejector cooling water	3.2	60
76	**(056) (SF4S CDS) CONDENSATE SYSTEM**								**X**				**(056A2.04) Ability to (a) predict the impacts of the following on the (SF4S CDS) CONDENSATE 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 / 45.3 / 45.13): Loss of condensate pumps**	**3.7**	**91**
77	**(068) (SF9 LRS) LIQUID RADWASTE SYSTEM**								**X**				**(068A2.05) Ability to (a) predict the impacts of the following on the (SF9 LRS) LIQUID RADWASTE 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 / 45.3 / 45.8 / 45.9 / 45.13): CWS malfunction**	**2.8**	**92**
78	(071) (SF9 WGS) WASTE GAS DISPOSAL SYSTEM			X									(071K3.02) Knowledge of the effect that a loss or malfunction of the (SF9 WGS) WASTE GAS DISPOSAL SYSTEM will have on the following systems or system parameters (CFR: 41.7 / 45.8 / 45.9): CVCS	3.1	61
79	(072) (SF7 ARM) AREA RADIATION MONITORING SYSTEM									X			(072A3.01) Ability to monitor automatic features of the (SF7 ARM) AREA RADIATION MONITORING SYSTEM, including (CFR: 41.7 / 45.8 / 45.9): Changes in system alignment	3.3	62
80	(075) (SF8 CW) CIRCULATING WATER SYSTEM	X											(075K1.09) Knowledge of the physical connections and/or cause and effect relationships between the (SF8 CW) CIRCULATING WATER SYSTEM and the following systems (CFR: 41.4 / 41.5 / 45.7 / 45.8): Vacuum priming	2.5	63
	079 (SF8 SAS**) STATION AIR SYSTEM														
81	**(086) (SF8 FPS) FIRE PROTECTION SYSTEM**											**X**	**(086) (SF8 FPS) FIRE PROTECTION SYSTEM (G2.2.38) EQUIPMENT CONTROL: (G2.2.38) EQUIPMENT CONTROL: Knowledge of conditions and limitations in the facility license (CFR: 41.7 / 41.10 / 43.1 / 45.13)**	**4.5**	**93**
K/A Category Totals:		1	1	1	1	0	0	1	3	2	1	1	Group Point Total:		12

Form 4.1-COMMON Common Examination Outline

ES-4.1-COMMON	COMMON Examination Outline (D.C. Cook)						
Facility: D.C. Cook					Date of Exam: 07/27/2022		
Generic Knowledge and Abilities Outline (Tier 3) (RO/SRO)							
				RO		SRO-Only	
Category	K/A #	Topic	Item #	IR	Q#	IR	Q#
1. Conduct of Operations	**G2.1.5**	**(G2.1.5) CONDUCT OF OPERATIONS: Ability to use procedures related to shift staffing, such as minimum crew complement or overtime limitations (reference potential) (CFR: 41.10 / 43.5 / 45.12)**	**82**			**3.9**	**94**
	G2.1.14	**(G2.1.14) CONDUCT OF OPERATIONS: Knowledge of criteria or conditions that require plantwide announcements, such as pump starts, reactor trips, and mode changes (CFR: 41.10 / 43.5 / 45.12)**	**83**			**3.1**	**95**
	G2.1.15	(G2.1.15) CONDUCT OF OPERATIONS: Knowledge of administrative requirements for temporary management direction, such as standing orders, night orders, or operations memoranda (CFR: 41.10 / 45.12)	84	2.7	64		
	G2.1.38	(G2.1.38) CONDUCT OF OPERATIONS: Knowledge of the station's requirements for verbal communications when implementing procedures (CFR: 41.10 / 45.13)	85	3.7	65		
	Subtotal			N/A	2	N/A	**2**
2. Equipment Control	G2.2.3	(G2.2.3) EQUIPMENT CONTROL: (Multi-unit license) Knowledge of the design, procedural, and/or operational differences between units (CFR: 41.5 / 41.6 / 41.7 / 41.10 / 45.12)	86	3.8	66		
	G2.2.12	(G2.2.12) EQUIPMENT CONTROL: Knowledge of surveillance procedures (CFR: 41.10 / 43.2 / 45.13)	87	3.7	67		
	G2.2.13	**(G2.2.13) EQUIPMENT CONTROL: Knowledge of tagging and clearance procedures (CFR: 41.10 / 43.1 / 45.13)**	**88**			**4.3**	**96**
	G2.2.20	**(G2.2.20) EQUIPMENT CONTROL: Knowledge of the process for managing troubleshooting activities (CFR: 41.10 / 43.5 / 45.13)**	**89**			**3.8**	**97**
	Subtotal			N/A	2	N/A	**2**
3. Radiation Control	G2.3.5	(G2.3.5) RADIATION CONTROL: Ability to use RMSs, such as fixed radiation monitors and alarms or personnel monitoring equipment (CFR: 41.11 / 41.12 / 43.4 / 45.9)	90	2.9	68		
	G2.3.12	**(G2.3.12) RADIATION CONTROL: Knowledge of radiological safety principles and procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, or alignment of filters (CFR: 41.12 / 43.4 / 45.9 / 45.10)**	**91**			**3.7**	**98**
	Subtotal			N/A	1	N/A	**1**
4. Emergency Procedures / Plan	**G2.4.16**	**(G2.4.16) EMERGENCY PROCEDURES/PLAN: Knowledge of emergency and abnormal operating procedures implementation hierarchy and coordination with other support procedures or guidelines, such as operating procedures, abnormal operating procedures, or severe accident management guidelines (CFR: 41.10 / 43.5 / 45.13)**	**92**			**4.4**	**99**
	G2.4.31	(G2.4.31) EMERGENCY PROCEDURES/PLAN: Knowledge of annunciator alarms, indications, or response procedures (CFR: 41.10 / 45.3)	93	4.2	69		
	G2.4.45	**(G2.4.45) EMERGENCY PROCEDURES/PLAN: Ability to prioritize and interpret the significance of each annunciator or alarm (CFR: 41.10 / 43.5 / 45.3 / 45.12)**	**94**			**4.3**	**100**
	Subtotal			N/A	1	N/A	**2**
Tier 3 Point Total				N/A	**6**	N/A	**7**

Form 4.1-COMMON Common Examination Outline

ES-4.1-COMMON		COMMON Examination Outline (D.C. Cook)			
Facility: D.C. Cook				Date of Exam: 07/27/2022	
Theory (Tier 4) (RO)					
				RO	
Category	K/A #	Topic	Item #	IR	Q#
Reactor Theory	192006	(192006K1.14) FISSION PRODUCT POISONS (CFR: 41.1): Explain the methods and reasons for the reactor operator to compensate for the time-dependent behavior of xenon-135 concentration in the reactor	95	3.3	70
	192007	(192007K1.01) FUEL DEPLETION AND BURNABLE POISONS (CFR: 41.1): Define burnable poison and state its use in the reactor	96	2.5	71
	192008	(192008K1.16) REACTOR OPERATIONAL PHYSICS (CFR: 41.1): (POWER OPERATION) Describe the monitoring and control of reactor power and primary temperature between 0 percent to 15 percent power	97	3.3	72
	Subtotal			N/A	3
Thermodynamics	193003	(193003K1.08) STEAM (CFR: 41.14): Define the following term: -- saturated liquid	98	2.8	73
	193004	(193004K1.11) THERMODYNAMIC PROCESS (CFR: 41.14): (CONDENSERS) Describe the process of condensate depression (subcooling) and its effect on plant operation	99	2.5	74
	193009	(193009K1.08) CORE THERMAL LIMITS (CFR: 41.14): Describe axial flux imbalance, including long-range effects	100	3.3	75
	Subtotal			N/A	3
Tier 4 Point Total				N/A	**6**