Form 4.1-PWR Pressurized-Water Reactor Examination Outline

Facility: Shearon Harris		**K/A Catalog Rev. 3**							**Rev.** dd/mm/yyyy				**Date of Exam:** 6/10/2024							
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				3	3			3	18							
	2	2	1	1				1	1			2	8							
	Tier Totals	5	4	4				4	4			5	26							
2. Plant Systems	1	2	3	2	3	2	2	2	3	3	3	3	28							
	2	1	0	1	1	1	2	1	1	0	0	1	9							
	Tier Totals	3	3	3	4	3	4	3	4	3	3	4	37							
3. Generic Knowledge and Abilities Categories	CO	EC			RC			EM					6	**CO**	**EC**	**RC**	**EM**			
	2	2			1			1												
4. Theory	Reactor Theory				Thermodynamics								6							
	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.

ES-4.1-PWR | Shearon Harris

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		(000007EA2.05) Ability to determine and/or interpret the following as they apply to (EPE 7) REACTOR TRIP, STABILIZATION, RECOVERY (CFR: 41.7 / 45.5 / 45.6): Lights and alarms	3.7	1
2	(000009) (EPE 9) SMALL BREAK LOCA				X			(000009EA1.01) Ability to operate and/or monitor the following as they apply to (EPE 9) SMALL-BREAK LOCA (CFR: 41.7 / 45.5 / 45.6): RCS pressure and temperature	4.0	2
3	(000011) (EPE 11) LARGE BREAK LOCA				X			(000011EA1.05) Ability to operate and/or monitor the following as they apply to (EPE 11) LARGE-BREAK LOCA (CFR: 41.7 / 45.5 / 45.6): CVCS	3.5	3
4	(000015) (APE 15) REACTOR COOLANT PUMP MALFUNCTIONS		X					(000015AK2.12) Knowledge of the relationship between (APE 15) REACTOR COOLANT PUMP MALFUNCTIONS and the following systems or components (CFR: 41.7 / 45.7): RCS pressure control valves	3.5	4
5	(000022) (APE 22) LOSS OF REACTOR COOLANT			X				(000022AK3.04) 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): Isolating letdown	3.7	5
6	(000025) (APE 25) LOSS OF RESIDUAL HEAT REMOVAL		X					(000025AK2.17) Knowledge of the relationship between (APE 25) LOSS OF RESIDUAL HEAT REMOVAL SYSTEM and the following systems or components (CFR: 41.7 / 45.7): SGS	3.2	6
7	(000026) (APE 26) LOSS OF COMPONENT COOLING WATER						X	(000026) (APE 26) LOSS OF COMPONENT COOLING WATER (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	7
8	(000027) (APE 27) PRESSURIZER PRESSURE CONTROL SYSTEM			X				(000027AK3.03) Knowledge of the reasons for the following responses and/or actions as they apply to (APE 27) PRESSURIZER PRESSURE CONTROL SYSTEM MALFUNCTION (CFR: 41.5 / 41.10 / 45.6 / 45.13): Actions contained in AOPs for a PZR PCS malfunction	3.9	8
9	(000029) (EPE 29) ANTICIPATED TRANSIENT WITHOUT SCRAM		X					(000029EK2.14) Knowledge of the relationship between (EPE 29) ANTICIPATED TRANSIENT WITHOUT SCRAM (ATWS) and the following systems or components (CFR: 41.7 / 45.7): AMSAC	4.2	9
10	(000040) (APE 40; BW E05; CE E05; W E12) STEAM LINE RUPTURE – EXCESSIVE HEAT TRANSFER	X						(WE12EK1.06) Knowledge of the operational implications and/or cause and effect relationships of the following concepts as they apply to (W E12) UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS (CFR: 41.5 / 41.7 / 45.7 / 45.8): Effect on automatic transfer of high-head SI pump suction to TWST after SI reset.	3.5	10
11	(000054) (APE 54; CE E06) LOSS OF MAIN FEEDWATER	X						(000054AK1.02) Knowledge of the operational implications and/or cause and effect relationships of the following concepts as they apply to (APE 54) LOSS OF MAIN FEEDWATER (CFR: 41.8 / 41.10 / 45.3): Effects of feedwater introduction on a dry S/G	4.0	11

12	(000056) (APE 56) LOSS OF OFFSITE POWER						X	(000056) (APE 56) LOSS OF OFFSITE POWER (G2.1.20) CONDUCT OF OPERATIONS: Ability to interpret and execute procedure steps (CFR: 41.10 / 43.5 / 45.12)	4.6	12
13	(000057) (APE 57) LOSS OF VITAL AC INSTRUMENT BUS			X				(000057AK3.01) Knowledge of the reasons for the following responses and/or actions as they apply to (APE 57) LOSS OF VITAL AC ELECTRICALINSTRUMENT BUS (CFR: 41.5 / 41.10 / 45.6 / 45.13): Actions contained in AOPs for the loss of a vital AC electrical instrument bus	4.1	13
14	(000058) (APE 58) LOSS OF DC POWER					X		(000058AA2.01) Ability to determine and/or interpret the following as they apply to (APE 58) LOSS OF DC POWER (CFR: 43.5 / 45.13): Verification that alternate power sources have come on line	3.4	14
15	(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	15
16	(000077) (APE 77) GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES				X			(000077AA1.02) Ability to operate and/or monitor the following as they apply to (APE 77) GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES (CFR: 41.5 / 41.10 / 45.5 / 45.7 / 45.8): Turbine/generator controls	3.6	16
17	(W E11) LOSS OF EMERGENCY COOLANT RECIRCULATION					X		(WE11EA2.03) 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): Indications of sump blockage	3.0	17
18	(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, 10 CFR Part 55 (CFR: 41.10 / 45.12)	3.9	18
K/A Category Totals:		3	3	3	3	6	6	Group Point Total:		18

ES-4.1-PWR	Shearon Harris 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#
19	(000001) (APE 1) CONTINUOUS ROD		X					(000001AK2.13) Knowledge of the relationship between (APE 1) CONTINUOUS ROD WITHDRAWAL and the following systems or components (CFR: 41.7 / 45.7): NIS	3.8	19
	(003) (APE 3) Dropped Control Rod / 1									
20	(000005) (APE 5) INOPERABLE/STUCK CONTROL ROD						X	(000005) (APE 5) INOPERABLE/STUCK CONTROL ROD (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)	3.8	20
21	(000024) (APE 24) EMERGENCY BORATION						X	(000024) (APE 24) EMERGENCY BORATION (G2.2.2) EQUIPMENT CONTROL: Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels (CFR: 41.6 / 41.7 / 45.2)	4.6	21
22	(000028) (APE 28) PRESSURIZER (PZR) LEVEL CONTROL MALFUNCTION	X						(000028AK1.02) Knowledge of the operational implications and/or cause and effect relationships of the following concepts as they apply to (APE 28) PRESSURIZER (PZR) LEVEL CONTROL MALFUNCTION (CFR: 41.7 / 41.8 / 41.10 / 45.3): Cause for PZR level deviation alarm: controller malfunction or other instrument	3.6	22
	(032) (APE 32) Loss of Source Range Nuclear Instrumentation / 7									
	(036) (APE 36; BW/A08) Fuel-Handling Incidents / 8									
	(037) (APE 37) Steam Generator Tube Leak / 3									
	(051) (APE 51) Loss of Condenser Vacuum / 4									
	(059) (APE 59) Accidental Liquid Radwaste Release / 9									
	(060) (APE 60) Accidental Gaseous Radwaste Release / 9									
	(061) (APE 61) Area Radiation Monitoring System Alarms / 7									
	(068) (APE 68; BW A06) Control Room Evacuation / 8									
23	(000069) (APE 69; W E14) LOSS OF CONTAINMENT INTEGRITY			X				(WE14EK3.06) Knowledge of the reasons for the following responses and/or actions as they apply to (W E14) HIGH CONTAINMENT PRESSURE (CFR: 41.5 / 41.10 / 45.6 / 45.13): Establishing containment spray	4.1	23
	(076) (APE 76) High Reactor Coolant Activity / 9									

24	(000078) (APE 78*) RCS LEAK					X		(000078AA2.04) Ability to determine and/or interpret the following as they apply to (APE 78) REACTOR COOLANT SYSTEM LEAK (CFR: 43.5 / 45.13): CCWS surge tank vent isolation valve indication	2.7	24
25	(W E01 & E02) REDIAGNOSIS & SI TERMINATION				X			(WE02EA1.11) Ability to operate and/or monitor the following as they apply to (W E02) SI TERMINATION (CFR: 41.5 to 4.18 / 45.5 to 45.8): SDS	2.9	25
	(W E13) Steam Generator Overpressure / 4									
	(W E15) Containment Flooding / 5									
26	(W E16) HIGH CONTAINMENT RADIATION	X						(WE16EK1.01) Knowledge of the operational implications and/or cause and effect relationships of the following concepts as they apply to (W E16) HIGH CONTAINMENT RADIATION (CFR: 41.5 / 41.7 / 45.7 / 45.8): Value(s) of high radiation and/or associated radiation monitors that require entry into the FRZ EOP for high radiation	3.4	26
	(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									
	(CE A16) Excess RCS Leakage / 2									
	(CE E09) Functional Recovery									
	(CE E13*) Loss of Forced Circulation / LOOP / Blackout / 4									
K/A Category Totals:		2	1	1	1	3	4	Group Point Total:		12

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Shearon Harris

Plant Systems—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#
27	(003) (SF4P RCP) REACTOR COOLANT PUMP SYSTEM											X	(003) (SF4P RCP) REACTOR COOLANT PUMP SYSTEM (191007K1.11) DEMINERALIZERS AND ION EXCHANGERS (CFR: 41.3): Plant evolutions that can cause crud bursts and the effect on demineralizers	2.8	27
28	(004) (SF1; SF2 CVCS) CHEMICAL AND VOLUME CONTROL SYSTEM					X							(004K5.26) Knowledge of the operational implications or cause and effect relationships of the following concepts as they apply to the (SF1; SF2 CVCS) CHEMICAL AND VOLUME CONTROL SYSTEM (CFR: 41.5 / 45.7): Relationship between VCT pressure and NPSH for charging pumps	3.5	28
29	(005) (SF4P RHR) RESIDUAL HEAT REMOVAL SYSTEM			X									(005K3.01) 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 / 45.6): RCS	4.5	29
30	(006) (SF2; SF3 ECCS) EMERGENCY CORE COOLING SYSTEM	X											(006K1.11) Knowledge of the physical connections and/or cause and effect relationships between the (SF2; SF3 ECCS) EMERGENCY CORE COOLING SYSTEM and the following systems (CFR: 41.2 to 41.8 / 45.3 / 45.7 / 45.8): CCWS	3.7	30

31	(007) (SF5 PRTS) PRESSURIZER RELIEF/QUENCH TANK SYSTEM										X		(007A4.01) Ability to manually operate and/or monitor the (SF5 PRTS) PRESSURIZER RELIEF/QUENCH TANK SYSTEM in the control room (CFR: 41.5 / 41.7 / 45.5 / 45.7 / 45.8): PRT/quench tank makeup valve	2.8	31
32	(007) (SF5 PRTS) PRESSURIZER RELIEF/QUENCH TANK SYSTEM				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	32
33	(008) (SF8 CCW) COMPONENT COOLING WATER SYSTEM											X	(008) (SF8 CCW) COMPONENT COOLING WATER SYSTEM (G2.4.31) Knowledge of annunciator alarms, indications or response procedures (CFR: 41.10 / 45.3)	4.2	33
34	(008) (SF8 CCW) COMPONENT COOLING WATER SYSTEM		X										(008K2.02) Knowledge of electrical power supplies to the following (CFR: 41.7): (SF8 CCW) COMPONENT COOLING WATER SYSTEM CCW pumps	3.9	34
35	(010) (SF3 PZR PCS) PRESSURIZER PRESSURE CONTROL SYSTEM							X					(010A1.07) Ability to predict and/or monitor changes in parameters associated with operation of the (SF3 PZR PCS) PRESSURIZER PRESSURE CONTROL SYSTEM, including (CFR: 41.5 / 45.5): RCS or PZR pressure	3.9	35
36	(012) (SF7 RPS) REACTOR PROTECTION SYSTEM								X				(012A2.02) Ability to (a) predict the impacts of the following on the (SF7 RPS) REACTOR PROTECTION 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 / 45.5): Loss of instrument power	3.9	36
37	(012) (SF7 RPS) REACTOR PROTECTION SYSTEM						X						(012K6.06) Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the (SF7 RPS) REACTOR PROTECTION SYSTEM (CFR: 41.7 / 45.7): Sensors and detectors	3.7	37
38	(013) (SF2 ESFAS) ENGINEERED SAFETY FEATURES ACTUATION SYSTEM		X										(013K2.01) Knowledge of electrical power supplies to the following (CFR: 41.7): (SF2 ESFAS) ENGINEERED SAFETY FEATURES ACTUATION SYSTEM ESFAS/safeguards train power supplies	4.0	38

39	(022) (SF5 CCS) CONTAINMENT COOLING SYSTEM				X								(022K4.02) Knowledge of (SF5 CCS) CONTAINMENT COOLING SYSTEM design features and/or interlocks that provide for the following (CFR: 41.7): Correlation of fan speed and flowpath changes with containment pressure	3.4	39
	(025) (SF5 ICE) ICE CONDENSER SYSTEM														
40	(026) (SF5 CSS) CONTAINMENT SPRAY SYSTEM									X			(026A3.01) Ability to monitor automatic features of the (SF5 CSS) CONTAINMENT SPRAY SYSTEM, including (CFR: 41.7 / 45.5): Pump starts and correct valve positioning	4.1	40
41	(026) (SF5 CSS) CONTAINMENT SPRAY SYSTEM		X										(026K2.02) Knowledge of electrical power supplies to the following (CFR: 41.7): (SF5 CSS) CONTAINMENT SPRAY SYSTEM Motor-operated valves	3.6	41
42	(039) (SF4S MSS) MAIN AND REHEAT STEAM SYSTEM									X			(039A3.02) Ability to monitor automatic features of the (SF4S MSS) MAIN AND REHEAT STEAM SYSTEM, including (CFR: 41.5 / 45.5): Isolation of the MRSS	3.3	42
	(053) (SF1; SF4P ICS*) INTEGRATED														
43	(059) (SF4S MFW) MAIN FEEDWATER SYSTEM			X									(059K3.03) Knowledge of the effect that a loss or malfunction of the (SF4S MFW) MAIN FEEDWATER SYSTEM will have on the following systems or system parameters (CFR: 41.7 / 45.6): S/Gs	3.8	43
44	(061) (SF4S AFW) AUXILIARY / EMERGENCY FEEDWATER SYSTEM							X					(061A1.01) Ability to predict and/or monitor changes in parameters associated with operation of the (SF4S AFW) AUXILIARY/EMERGENCY FEEDWATER SYSTEM, including (CFR: 41.5 / 45.5): S/G level	4.2	44
45	(061) (SF4S AFW) AUXILIARY / EMERGENCY FEEDWATER SYSTEM									X			(061A3.01) Ability to monitor automatic features of the (SF4S AFW) AUXILIARY/EMERGENCY FEEDWATER SYSTEM, including (CFR: 41.7 / 45.7): AFW system automatic start	4.2	45
46	(062) (SF6 ED AC) AC ELECTRICAL DISTRIBUTION SYSTEM	X											(062K1.10) Knowledge of the physical connections and/or cause and effect relationships between the (SF6 ED AC) AC ELECTRICAL DISTRIBU_TION SYSTEM and the following systems (CFR: 41.4 to 41.8): Non Class 1E AC distribution system	3.1	46

47	(063) (SF6 ED DC) DC ELECTRICAL DISTRIBUTION SYSTEM										X		(063A4.02) Ability to manually operate and/or monitor the (SF6 ED DC) DC ELECTRICAL DISTRIBUTION SYSTEM in the control room (CFR: 41.7 / 45.5 to 45.8): Load shedding	3.6	47
48	(064) (SF6 EDG) EMERGENCY DIESEL GENERATOR SYSTEM						X						(064K6.11) Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the (SF6 EDG) EMERGENCY DIESEL GENERATOR SYSTEM (CFR: 41.7 / 45.7): DC distribution system	3.9	48
49	(073) (SF7 PRM) PROCESS RADIATION MONITORING SYSTEM				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	49
50	(076) (SF4S SW) SERVICE WATER SYSTEM								X				(076A2.08) Ability to (a) predict the impacts of the following on the (SF4S SW) SERVICE WATER SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations (CFR: 41.1 / 41.5 / 43.5 / 45.3 / 45.6 / 45.13): Malfunction of breakers, relays, and disconnects	3.5	50
51	(078) (SF8 IAS) INSTRUMENT AIR SYSTEM										X		(078A4.03) Ability to manually operate and/or monitor the (SF8 IAS) INSTRUMENT AIR SYSTEM in the control room (CFR: 41.7 / 45.5 to 45.8): Isolation/restoration of instrument air to isolated components/systems	3.2	51
52	(078) (SF8 IAS) INSTRUMENT AIR SYSTEM											X	(078) (SF8 IAS) INSTRUMENT AIR SYSTEM (G2.2.2) Ability to manipulate thet console controls as required to operate the facility between shutdown and designated power levels (CFR: 41.6 / 41.7 / 45.2)	4.6	52
53	(103) (SF5 CNT) CONTAINMENT SYSTEM								X				(103A2.06) Ability to (a) predict the impacts of the following on the (SF5 CNT) CONTAINMENT 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): High containment pressure	4.5	53

54	(103) (SF5 CNT) CONTAINMENT SYSTEM					X							(103K5.01) Knowledge of the operational implications or cause and effect relationships of the following concepts as they apply to the (SF5 CNT) CONTAINMENT SYSTEM (CFR: 41.5 / 45.7): Containment isolation/containment integrity	4.1	54
K/A Category Totals:		2	3	2	3	2	2	2	5	3	3	6	Group Point Total:		33

ES-4.1-PWR	Shearon Harris Plant Systems—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#
55	(001) (SF1 CRDS) CONTROL ROD DRIVE SYSTEM						X						(001K6.06) Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the (SF1 CRDS) CONTROL ROD DRIVE SYSTEM (CFR: 41.1 / 41.2 / 41.5 / 41.6 / 45.7): Rod drive M/G set(s)	3.8	55
	(002) (SF2; SF4P RCS) REACTOR COOLANT														
56	(011) (SF2 PZR LCS) PRESSURIZER LEVEL CONTROL SYSTEM							X					(011A1.07) Ability to predict and/or monitor changes in parameters associated with operation of the (SF2 PZR LCS) PRESSURIZER LEVEL CONTROL SYSTEM, including (CFR: 41.5 / 45.5): RCS leak rate	3.9	56
57	(014) (SF1 RPI) ROD POSITION INDICATION SYSTEM					X							(014K5.04) Knowledge of the operational implications or cause and effect relationships of the following concepts as they apply to the (SF1 RPI) ROD POSITION INDICATION SYSTEM (CFR: 41.6 / 41.7 / 45.7): Concepts of magnetic flux and permeability of stainless steel housing	2.5	57
58	(015) (SF7 NI) NUCLEAR INSTRUMENTATIO N SYSTEM			X									(015K3.02) Knowledge of the effect that a loss or malfunction of the (SF7 NI) NUCLEAR INSTRUMENTATION SYSTEM will have on the following systems or system parameters (CFR: 41.7 / 45.6): CRDS	3.7	58
	(016) (SF7 NNI) NONNUCLEAR INSTRUMENTATIO N SYSTEM														
59	(017) (SF7 ITM) IN CORE TEMPERATURE MONITOR SYSTEM								X				(017A2.02) Ability to (a) predict the impacts of the following on the (SF7 ITM) IN CORE TEMPERATURE MONITOR 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 / 45.5): Elevated in-core temperatures that can cause or have caused core damage	4.1	59

60	(027) (SF5 CIRS) CONTAINMENT IODINE REMOVAL SYSTEM											X	(027) (SF5 CIRS) CONTAINMENT IODINE REMOVAL SYSTEM (191003K1.10) Controllers and Positioners (CFR: 41.7): Function and characteristics of air-operated valves, including failure modes	2.8	60
	(028) (SF5 HRPS) HYDROGEN RECOMBINER AND PURGE CONTROL														
	(029) (SF8 CPS) CONTAINMENT PURGE SYSTEM														
61	(033) (SF8 SFPCS) SPENT FUEL POOL COOLING SYSTEM				X								(033K4.06) Knowledge of (SF8 SFPCS) SPENT FUEL POOL COOLING SYSTEM design features and/or interlocks that provide for the following (CFR: 41.7): K-eff	3.3	61
62	(034) (SF8 FHS) FUEL HANDLING EQUIPMENT SYSTEM						X						(034K6.05) Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the (SF8 FHS) FUEL HANDLING EQUIPMENT SYSTEM (CFR: 41.6 / 41.7 / 43.5 / 45.7): SFPCS	3.3	62
	(041) (SF4S SDS) STEAM DUMP / TURBINE BYPASS CONTROL														
63	(050) (SF9 CRV*) CONTROL ROOM VENTILATION	X											(050K1.01) 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 / 45.7 / 45.8): RMS	3.5	63
	(055) (SF4S CARS) CONDENSER AIR REMOVAL														
	(056) (SF4S CDS) CONDENSATE SYSTEM														
	(068) (SF9 LRS) LIQUID RADWASTE														
	(071) (SF9 WGS) WASTE GAS DISPOSAL														
	(072) (SF7 ARM) AREA RADIATION MONITORING SYSTEM														
	(075) (SF8 CW) CIRCULATING WATER SYSTEM														
	(079) (SF8 SAS**) STATION AIR SYSTEM														
K/A Category Totals:		1	0	1	1	1	2	1	2	0	0	3	Group Point Total:		12

Form 4.1-COMMON Common Examination Outline

ES-4.1-COMMON	COMMON Examination Outline (Shearon Harris)					
Facility: Shearon Harris					Date of Exam: 6/10/2024	

Generic Knowledge and Abilities Outline (Tier 3) (RO/SRO)

Category	K/A #	Topic	Item #	RO IR	RO Q#	SRO-Only IR	SRO-Only Q#
1. Conduct of Operations							
	G2.1.3	(G2.1.3) CONDUCT OF OPERATIONS: Knowledge of shift or short-term relief turnover practices (CFR: 41.10 / 45.13)	64	3.7	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)	65	3.7	65		
	Subtotal			N/A	2	N/A	
2. Equipment Control	G2.2.2	(G2.2.2) EQUIPMENT CONTROL: Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels (CFR: 41.6 / 41.7 / 45.2)	66	4.6	66		
	G2.2.13	(G2.2.13) EQUIPMENT CONTROL: Knowledge of tagging and clearance procedures (CFR: 41.10 / 43.1 / 45.13)	67	4.1	67		
	Subtotal			N/A	2	N/A	
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)	68	2.9	68		
	Subtotal			N/A	1	N/A	
4. Emergency Procedures / Plan	G2.4.14	(G2.4.14) EMERGENCY PROCEDURES/PLAN: Knowledge of general guidelines for emergency and abnormal operating procedures usage (CFR: 41.10 / 43.1 / 45.13)	69	3.8	69		
	Subtotal			N/A	1	N/A	
Tier 3 Point Total				N/A	**6**	N/A	

Form 4.1-COMMON Common Examination Outline

ES-4.1-COMMON	COMMON Examination Outline (Shearon Harris)			
Facility: Shearon Harris			Date of Exam: 6/10/2024	

Theory (Tier 4) (RO)

Category	K/A #	Topic	Item #	RO IR	RO Q#
Reactor Theory	192006	(192006K1.01) FISSION PRODUCT POISONS (CFR: 41.1): Define fission product poison	70	2.6	70
	192007	(192007K1.04) FUEL DEPLETION AND BURNABLE POISONS (CFR: 41.1): Describe how and why boron concentration changes over core life	71	3.4	71
	192008	(192008K1.20) REACTOR OPERATIONAL PHYSICS (CFR: 41.1): (POWER OPERATION) Explain the effects of control rod motion or boration/dilution on reactor power	72	3.9	72
	Subtotal			N/A	3
Thermodynamics	193003	(193003K1.16) STEAM (CFR: 41.14): Define the following term: -- subcooled and compressed liquids	73	2.7	73
	193004	(193004K1.11) THERMODYNAMIC PROCESS (CFR: 41.14): (CONDENSERS) Describe the process of condensate depression (subcooling) and its effect on plant operation	74	2.5	74
	193009	(193009K1.10) CORE THERMAL LIMITS (CFR: 41.14): Define and calculate quadrant tilt (symmetric offset) ratio	75	3.3	75
	Subtotal			N/A	3
Tier 4 Point Total				N/A	**6**

1. 2024-2 NRC RO 001/BANK/C/A//AOP-001, OP-104/NONE/2013 NRC RO 19/007 EA2.05/

0Given the following plant conditions:

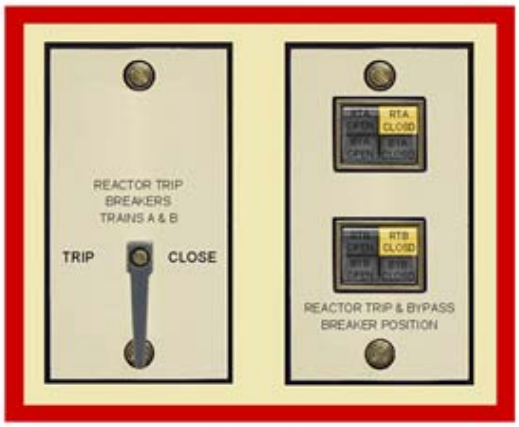
- The unit is at operating at 100%

Subsequently a manual Reactor trip is required:

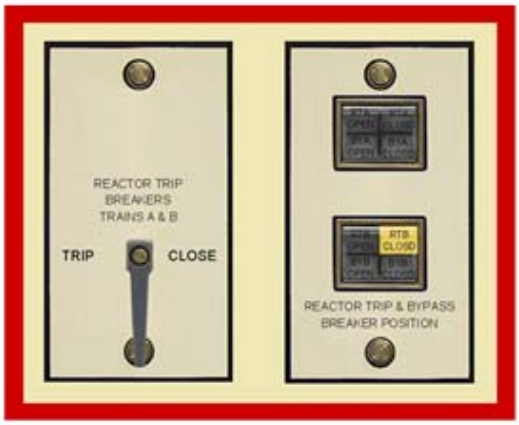
- The MCB Rx Trip Switch #1 is taken to Trip
- The Reactor Trip Breaker indications change as indicated in the pictures below

(NOTE: the light bulbs are not blown)

Before Rx Trip Switch # 1 taken to Trip



After Rx Trip Switch # 1 taken to Trip



Which ONE of the following completes the statement below?

The current status of the Reactor is ___(1)___ AND the indication of the Reactor Trip Breakers on the MCB indicates a failure of the ___(2)___ Trip coil.

A. (1) tripped

(2) UV

B. (1) tripped

(2) Shunt

C. (1) NOT tripped

(2) UV

D. (1) NOT tripped

(2) Shunt

Plausibility and Answer Analysis

Reason answer is correct: With reactor trip switch taken to the trip position both reactor trip breaker should indicate open. The absence of the green Rx Trip breaker open light indicates that both breakers have remained shut and the reactor is not tripped. The loss of indication on the Reactor Trip breakers identifies the potential failure of the shunt trip coil and because it is an energize to actuate breaker the reactor trip breaker may not be trippable from the shunt trip device.

A. Incorrect. The first part is plausible because only one Reactor Trip Breaker is required to open in order to remove power from the CRDM and allow the rods to insert into the Reactor, however this is not correct because the loss of indication on the MCB is not an indication of a change in the Rx Trip Breaker Status. The second part is plausible because the UV coil de-energizes to actuate a reactor trip and the majority of RPS bi-stable lights energize when power is loss and the loss of indication can be perceived as the UV trip coil has loss continuity.

B. Incorrect. The first part is plausible because only one Reactor Trip Breaker is required to open in order to remove power from the CRDM and allow the rods to insert into the Reactor, however this is not correct because the loss of indication on the MCB is not an indication of a change in the Rx Trip Breaker Status. The second part is correct.

C. Incorrect. The first part is correct. The second part is plausible because the UV coil de-energizes to actuate a reactor trip and the majority of RPS bi-stable lights energize when power is loss and the loss of indication can be perceived as the UV trip coil has loss continuity.

D. Correct.

007 Reactor Trip / EPE

007 EA2.05; Ability to determine and/or interpret the following as they apply to a Reactor Trip: Lights and alarms

(CFR: 41.7 / 45.5 / 45.6)

Importance Rating:	3.7
Cognitive Level:	High
Technical Reference:	EOP-E-0, Step 1, Pg 4, Rev. 15 OP-104, Sect. 4.0, P&L #17, Pg 7, Rev. 50
References to be provided:	None
Learning Objective:	EOP-LP-3.22, Obj. 3.a Given a set of plant conditions, Determine the expected plant response and explain the required operator actions, including the assumed operator knowledge from the HNP SDDs and WOG ERGs for the following: Verification of reactor/turbine trip
Question Origin:	Bank HNP 2013 NRC RO 19
Comments:	None
Tier/Group:	T1/G1

2. 2024-2 NRC RO 002/BANK/C/A//EOP-ES-1.2/NONE/2014 NRC RO 03/009 EA1.01/SAT

Given the following plant conditions:
- The unit was operating at 100% power

Subsequently the following occurs:
- Small Break LOCA
- Loss Of Offsite Power

Currently:
- The crew is implementing EOP-ES-1.2, Post LOCA Cooldown and Depressurization
- PRZ level is off scale low
- The OATC has been directed to depressurize the RCS to refill the PRZ

Which ONE of the following actions will be performed by the OATC to initiate the RCS depressurization?

A. OPEN one PRZ PORV

B. OPEN 1CS-487, PRZ Aux Spray valve

C. Place both PRZ Spray Valves to MANUAL and raise the demand signal to OPEN both valves

D. Place PK-444.1, Master Pressure Controller, to MANUAL and raise the demand signal to OPEN both PRZ Spray Valves

Plausibility and Answer Analysis

Reason answer is correct: *In accordance with EOP-ES-1.2 to depressurize the RCS to refill the PRZ (step 14) the operator would use normal PRZ spray but since there is also a loss of offsite power the RCP's would be off and normal spray would not be available. The RNO statement for depressurization requires the use of one PRZ PORV.*

A. Correct.

B. Incorrect. Plausible since this is valve (auxiliary spray) is used to depressurize the RCS when letdown is in service during natural circulation conditions, however with the pressurizer not on scale letdown is isolated therefore auxiliary spray is not available.

C. Incorrect. Plausible since with the RCPs in operation this action would be a method of depressurizing the RCS. But, a loss of offsite power causes all of the RCPs to stop operating. With the RCPs off opening the spray valves will not depressurize the RCS

D. Incorrect. Plausible since performing this action would cause a RCS pressure reduction but with the RCPs off opening the spray valves will not depressurize the RCS.

009 Small-Break LOCA / EPE

009 EA1.01; Ability to operate and/or monitor the following as they apply to a Small-Break LOCA: RCS pressure and temperature

(CFR: 41.7 / 45.5 / 45.6)

Importance Rating:	4.0
Cognitive Level:	High
Technical Reference:	EOP-ES-1.2, Step 14, Pg 16, Rev. 5
References to be provided:	None
Learning Objective:	EOP-3.05 Obj. 2 Decribe the major action catagories for ES-1.2 and arrange them in the proper sequence
Question Origin:	Bank HNP 2014 NRC RO 03
Comments:	None
Tier/Group:	T1/G1

3. 2024-2 NRC RO 003/BANK/FUNDAMENTAL//EOP-ES-1.3/NONE/2013 NRC RO 29/011 EA1.05/SAT

Given the following plant conditions:

- A Large Break LOCA has occurred
- RWST level indicates 22% and continues to lower
- 1RH-1, RCS Loop A to RHR Pump A-SA is SHUT

Based on the conditions above, in accordance with ES-1.3, Transfer to Cold Leg Recirculation, which ONE of the following actions completes the statement below to establish the 'A' CSIP alignment for long term operation?

The operator must FIRST ___(1)___ 1CS-746 AND then ___(2)___ must be OPENED.

Valve Noun Name:

1CS-746, CSIP A Alternate Miniflow
1RH-25 SA, Suction From RHR Heat Exchanger A-SA
1SI-340, Safety Injection A train to Cold Leg

A. (1) SHUT

(2) 1RH-25

B. (1) SHUT

(2) 1SI-340

C. (1) OPEN

(2) 1RH-25

D. (1) OPEN

(2) 1SI-340

Plausibility and Answer Analysis

Reason answer is correct: RHRS to CSIP Suction Isolation Valves 1RH-25, 1RH-63: The CSIP suction isolation valves are interlocked to allow their manual opening only when BOTH of the following conditions exist:

- At least one of the two RHRS inlet isolation valves on the same train associated with the CSIP suction isolation valve is closed. For instance, either 1RH-1 or 1RH-2, or both, must be closed in order to open 1RH-25.
- At least one of the two isolation valves for the same train in each CVCS alternate miniflow line is closed. For instance, either 1CS-745 or 1CS-746, or both, must be closed in order to open 1RH-25

This interlock with the RCS suction valves is based on preventing cross-connection of the RHR and CVCS suction piping during normal cooldown or heat-up and preventing over pressurization of the CSIP suction piping. The interlock with the miniflow valves is to ensure that post-accident recirculation water from the containment sumps does not enter the RWST (radiological release).

A. Correct.

B. Incorrect. The first part is correct. The second part is plausible because 1SI-340 or 1SI-341 are verified open during the performance of cold leg recirculation alignment as a discharge from the RHR pump and the one valve is shut to prevent runout of the remaining RHR pump if one pump were to trip .

C. Incorrect. Plausible because if 1RH-1 and 1CS-746 were closed this would be correct.

D. Incorrect. Plausible because if 1RH-1 and 1CS-746 were closed this would be correct. 1SI-340 is normally open and is downsteam of the cross tie header for the RHR discharge on the A train and if this valve where located on the upstream side of this cross-tie header it would be required to stay open to allow the RHR pump discharge to flow to the suction of the charging pump

011 Large-Break LOCA / EPE

011 EA1.05; Ability to operate and/or monitor the following as they apply to a Large-Break LOCA: CVCS

(CFR: 41.7 / 45.5 / 45.6)

Importance Rating:	3.5
Cognitive Level:	Low
Technical Reference:	EOP-ES-1.3, Step 2, Pg 6, Rev. 5
References to be provided:	None
Learning Objective:	EOP-LP-3.03, Obj. 3.f Given a set of plant conditions, determine the expected plant response and explain the required operator actions, including the assumed operator knowledge from the HNP SDDs and WOG ERGs for the following: Shutting Charging/Safety Injection Pump (CSIP) miniflow valves when aligning for recirculation from containment sumps
Question Origin:	Bank HNP 2013 NRC RO 29
Comments:	None
Tier/Group:	T1/G1

4. 2024-2 NRC RO 004/NEW/C/A//AOP-018/NONE//015 AK2.12/

Given the following plant conditions:

- A Reactor startup is in progress with the unit in Mode 2
- Annunciator ALB-008, Window 4-3, RCP-B Seal #1 Leakoff High Low Flow, has alarmed

Subsequently:

- The BOP reports that RCP 'B' #1 seal leakoff is approximately 8.5 gpm and rising

Based on the conditions above, in accordance with AOP-018, Reactor Coolant Pump Abnormal Conditions, which ONE of the following actions completes the statements below concerning the required actions the crew must perform?

Trip the Reactor ___(1)___ stopping the 'B' RCP.

1RC-103, PRZ Spray Loop B, valve ___(2)___ required to be shut after stopping the RCP.

A. (1) prior to

   (2) is NOT

B. ✔ (1) prior to

   (2) is

C. (1) after

   (2) is NOT

D. (1) after

   (2) is

Plausibility and Answer Analysis

Reason answer is correct: RCP 'B' seal has failed as evidenced by the magnitude of seal leakoff ($\geq$ 8 gpm) and continuing degrading conditions. The OATC will be required to trip the Reactor, GO TO EOP-E-0 (to perform the immediate actions) and then perform steps 3-9 of AOP-018 section 4.3 when time permits. AOP-018 Section 4.3 step 3 stops the affected RCP then shuts the affected PRZ Spray valve after securing the RCP.

A. Incorrect. The first part is correct. The second part is plausible since the 'C' RCP does not have spray capability and therefore the spray valves are not shut after stopping the 'C' RCP; however this is incorrect because the 'B' PRZ spray valve is shut after stopping the 'B' RCP. Additionally the driving flow for the PRZ Loop B has been significantly reduced as a result the candidate may have the misconception that the position of the PRZ Spray valve does not impact PRZ pressure and is therefore not required to be shut; however this is incorrect as well because the PRZ Spray valve on the stopped pump is shut to prevent the Master Pressure controller from attempting to control PRZ pressure with a spray valve that is not responsive.

B. Correct.

C. Incorrect. The first part is plausible since RCP trip criteria is met and if the candidate had a misconception that with the unit being in Mode 2 that the Reactor trip breakers do not have to be opened prior to securing the RCP. The second part is correct.

D. Incorrect. The first part is plausible since RCP trip criteria is met and if the candidate had a misconception that with the unit being in Mode 2 that the Reactor trip breakers do not have to be opened prior to securing the RCP. The second part is plausible since the 'C' RCP does not have spray capability and therefore the spray valves are not shut after stopping the 'C' RCP; however this is incorrect because the 'B' PRZ spray valve is shut after stopping the 'B' RCP. Additionally the driving flow for the PRZ Loop B has been significantly reduced as a result the candidate may have the misconception that the position of the PRZ Spray valve does not impact PRZ pressure and is therefore not required to be shut; however this is incorrect as well because the PRZ Spray valve on the stopped pump is shut to prevent the Master Pressure controller from attempting to control PRZ pressure with a spray valve that is not responsive.

015 Reactor Coolant Pump Malfunctions / APE

015 AK2.12; Knowledge of the relationship between Reactor Coolant Pump Malfunctions and the following systems or components: RCS pressure control valves

(CFR: 41.7 / 45.7)

Importance Rating:	3.5
Cognitive Level:	High
Technical Reference:	AOP-018, Section 4.3, Step 3, Pg 13, Rev. 51 AOP-018, Section 4.3, Step 8, Pg 14, Rev. 51
References to be provided:	None
Learning Objective:	AOP-LP-3.18, Obj. 4 Given a set of plant conditions, Determine the appropiate plant response and operator actions in accordance with AOP-018
Question Origin:	New
Comments:	None
Tier/Group:	T1/G1

5. 2024-2 NRC RO 005/NEW/FUNDAMENTAL//AOP-018-BD/NONE//022 AK3.04/ENHANCE

Given the following plant conditions:

- The unit is operating at 55% power when 'A' CSIP trips

Based on the conditions above, which ONE of the following completes the statements below?

The Letdown system __(1)__ be isolated per AOP-018, Reactor Coolant Pump Abnormal Conditions, prior to steps being directed by the CRS.

AND

One of the reasons for isolating Letdown is to __(2)__ .

A. (1) can NOT

(2) ensure proper RCS inventory control

B. (1) can NOT

(2) prevent lifting of the low pressure Letdown relief valve

C✔ (1) can

(2) ensure proper RCS inventory control

D. (1) can

(2) prevent lifting of the low pressure Letdown relief valve

Plausibility and Answer Analysis

Reason answer is correct: With 'A' CSIP tripped no charging pumps are running and in accordance with AOP-018 section 4.0 step 4 with no charging pumps running the RNO directs that the letdown system is isolated by shutting 1CS-7, 1CS-8, 1CS-9. In accordance with the AOP-018 basis document the reasons for this action is that this step ensures proper RCS inventory control when entering this procedure. Two handed operatioin is used to ensure un-cooled Letdown flow is isolated as soon as possible to minimize the potential for flashing in the Regenerative HX and water hammer when charging is reestablished.

A. Incorrect. *The first part is plausible since the ASI system is design to start following the loss of a CSIP the candidate may have the misconception that ASI flow is sufficient to allow letdown to delay the isolation of Letdown; however this is incorrect because ASI only supplies flow to the RCP seal until the 'B' CSIP is started. The second is correct.*

B. Incorrect. *The first part is plausible since the ASI system is design to start following the loss of a CSIP the candidate may have the misconception that ASI flow is sufficient to allow letdown to delay the isolation of Letdown; however this is incorrect because ASI only supplies flow to the RCP seal until the 'B' CSIP is started. The second part is plausible since isolating the Regenerative HX will prevent over pressurization of the LP letdown piping and lifting of 1CS-10, the system relief valve; however this is incorrect because this is an effect of the un-cooled letdown flow flashing in the Regenerative HX and raising the downstream system pressure which is the reason for performing this action.*

C. Correct.

D. Incorrect. *The first part is correct. The second part is plausible since isolating the Regenerative HX will prevent over pressurization of the LP letdown piping and lifting of 1CS-10, the system relief valve; however this is incorrect because this is an effect of the un-cooled letdown flow flashing in the Regenerative HX and raising the downstream system pressure which is the reason for performing this action.*

022 Loss Of Reactor Coolant Makeup / APE

022 AK3.04; Knowledge of the reasons for the following responses and/or actions as they apply to Loss of Reactor Coolant Makeup: Isolating letdown

(CFR: 41.5 / 41.10 / 45.6 / 45.13)

Importance Rating:	3.7
Cognitive Level:	Low
Technical Reference:	AOP-018, Section 4.0, Step 4, Pg 5, Rev. 51 AOP-018-BD, Section B, Pg 5, Rev 27
References to be provided:	None
Learning Objective:	AOP-LP-3.18, Obj 2 State/Identify the immediate operator actions from memory, including all sub-steps and response not obtained actions, for AOP-018
Question Origin:	New
Comments:	None
Tier/Group:	T1/G1

6. 2024-2 NRC RO 006/NEW/C/A//AOP-020/NONE//025 AK2.17/

Given the following plant conditions:

- The unit is in Mode 4 with a cooldown in progress
- RCS temperature is stable at 315°F
- RHR Train 'A' is in service for Shutdown Cooling Mode
- RHR Train 'B' is in ECCS Mode

Subsequently the following occurs:

- ALB-004-4-4, RHR Pump A Trip Or Close Ckt Trouble, alarms

Based on the conditions above, which ONE of the following completes the statements below?

In accordance with AOP-020, Loss of RCS Inventory or Heat Removal While Shutdown, establishing steam cooling using SGs and AFW ___(1)___ allowed AND the RHR 'A' Pump ___(2)___ required to be vented before it is returned to service.

A. (1) is

(2) is NOT

B. (1) is

(2) is

C. (1) is NOT

(2) is NOT

D. (1) is NOT

(2) is

Plausibility and Answer Analysis

Reason answer is correct: In accordance with AOP-020 RHR is the preferred method of cooling to be established if time permits. Alternate cooling means such as establishing steam cooling using SGs and AFW may be necessary based on plant conditions. The requirements to vent the is based on air binding or other signs of cavitation of the RHR pump. Because the 'A' RHR pump tripped on an electrical fault the pump does not have indications of either condition.

A. Correct.

B. Incorrect. The first part is correct. The second part is plausible since the RCS is above 212°F flashing of the RHR lines is possible which requires the system to be vented per OP-111; however this is incorrect because the requirements of AOP-020 are less restrictive and are specific to Mid Loop operations or since of pump cavitation or air binding.

C. Incorrect. The first part is plausible since an RHR is the preferred method of cooling; however this is incorrect because RCS temperature is above 212°F the SGs are required to be intact in Mode 4 therefore the secondary system is capable of providing the RCS a heat sink if necessary. The second part is correct.

D. Incorrect. The first part is plausible since an RHR is the preferred method of cooling; however this is incorrect because RCS temperature is above 212°F the SGs are required to be intact in Mode 4 therefore the secondary system is capable of providing the RCS a heat sink if necessary. The second part is plausible since the RCS is above 212°F flashing of the RHR lines is possible which requires the system to be vented per OP-111; however this is incorrect because the requirements of AOP-020 are less restrictive and are specific to Mid Loop operations or since of pump cavitation or air binding.

025 Loss Of Residual Heat Removal System / APE

025 AK2.17; Knowledge of the relationship between the Loss of the Residual Heat Removal System and the following systems or components: SGS

(CFR: 41.7 / 45.7)

Importance Rating:	3.2
Cognitive Level:	High
Technical Reference:	AOP-020, Sect 3.5, Note prior to step 5, Pg 60, Rev. 39 AOP-020, Sect 3.5, Step 6, Pg 60, Rev. 39
References to be provided:	None
Learning Objective:	AOP-LP-3.20, Obj. 2.b State the following for AOP-020: The criteria and methodology used to vent the RHR pumps following a loss of RCS inventory AOP-LP-3.20, Obj. 3 Given a set of plant conditions, Determine the appropriate plant response and operator actions in accordance with AOP-020
Question Origin:	New
Comments:	None
Tier/Group:	T1/G1

7. 2024-2 NRC RO 007/NEW/C/A//AOP-014/NONE//026 AG2.1.7/SAT

Given the following plant conditions:

- With the unit operating at 100%, a loss of Component Cooling Water has occurred
- NO CCW pumps are available
- The CRS has directed the Balance of Plant Operator to monitor RCP parameters in accordance with AOP-014, Loss of Component Cooling Water, Attachment 1
  - RCP A Motor Upper Thrust Bearing Temperature is 174°F and rising slowly
  - RCP A Motor Stator Winding Temperature is 269°F and rising slowly
  - RCP B Pump Radial Bearing Temperature is 232°F and rising slowly

Based on the conditions above, which ONE of the following identifies (1) the required follow up actions AND (2) the AOP-014, Attachment 1 limit(s) that is/are exceeded?

A. (1) Stop ALL RCPs

   (2) ONLY the Attachment 1 limit, Motor Stator Winding Temperature, is exceeded

B. ✔ (1) Stop ALL RCPs

   (2) ONLY the Attachment 1 limit, Pump Radial Bearing Temperature, is exceeded

C. (1) Stop ONLY RCPs ‘A’ and ‘B’

   (2) BOTH the Attachment 1 limits for Motor Stator Winding and Pump Radial Bearing Temperatures are exceeded

D. (1) Stop ONLY RCPs ‘A’ and ‘B’

   (2) BOTH the Attachment 1 limits for Upper Thrust Bearing and Pump Radial Bearing Temperatures are exceeded

Plausibility and Answer Analysis

Reason answer is correct: In accordance with AOP-014, the limit for Motor Stator Winding temperature is 300°F. This is NOT exceeded for RCP 'A'. The limit for Radial Bearing temperature is 230°F. This is exceeded for RCP 'B'. The limit for Upper Thrust Bearing temperature is 190°F. This is NOT exceeded for RCP 'A'. Based on these indications, AOP-014 will direct a reactor trip and ALL RCPs are stopped in anticapation of the other RCPs exceeding the limits of Attachment 1.

A. Incorrect. *The first part is correct. The second part is plausible since the candidate may have a misconception that the Motor Stator Winding Temperature was exceeded. The indication of 269°F is above the normal upper band temperature provided in OP-100, Reactor Coolant System, which is 265°F.*

B. *Correct.*

C. Incorrect. *The first part is plausible since stopping the B RCP is required based on exceeding the limit for Radial Bearing temperature (230°F). AOP-018 allows the stopping of individual RCPs if only one is affected, i.e. exceeding the limits of Attachment 1; however this is incorrect because ALL RCPs are affected by the loss of CCW and the guidance in AOP-014 does not wait for the other RCPs to exceed the limits of Attachment 1. The second part is plausible since the candidate may have a misconception that in addition to the B RCP exceeding Attachment 1 limits for the Radial Bearing Temperature, the Motor Stator Winding Temperature on A RCP was exceeded. The indication of 269°F is above the normal upper band temperature provided in OP-100, Reactor Coolant System, which is 265°F.*

D. Incorrect. *The first part is plausible since stopping the B RCP is required based on exceeding the limit for Radial Bearing temperature (230°F). AOP-018 allows the stopping of individual RCPs if only one is affected, i.e. exceeding the limits of Attachment 1; however this is incorrect because ALL RCPs are affected by the loss of CCW and the guidance in AOP-014 does not wait for the other RCPs to exceed the limits of Attachment 1. The second part is plausible since the candidate may have a misconception that in addition to the B RCP exceeding Attachment 1 limits for the Radial Bearing Temperature, the Upper Thrust Bearing temperature limit on the A RCP was exceeded (190°F). The indication of 174°F is above the normal upper band temperature provided in OP-100, Reactor Coolant System, which is 170°F.*

026 Loss of Component Cooling Water / APE

026 AG2.1.7; 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)

Importance Rating:	4.4
Cognitive Level:	High
Technical Reference:	AOP-014, Sect. 3.3, Step 2, Pg 37, Rev. 40 AOP-014, Attachment 1, Pg 43, Rev. 40
References to be provided:	None
Learning Objective:	AOP-LP-3.14, Obj. 2.e STATE/IDENTIFY the following for AOP-014: Conditions requiring a reactor trip and Conditions requiring RCP trip
Question Origin:	New
Comments:	None
Tier/Group:	T1/G1

8. 2024-2 NRC RO 008/NEW/C/A//AOP-019/NONE//027 AK3.03/

Given the following plant conditions:

- The unit is shutdown for a refueling outage
- The pressurizer is solid

Subsequently:

- A pressurizer Pressure Control System malfunction results in rising RCS pressure
- The crew has entered AOP-019, Malfunction of RCS Pressure Control

Based on the conditions above, which ONE of the following completes the statement below?

In accordance with AOP-019, a required operator action is to ___(1)___ the output on PK-145.1, 1CS-38, Letdown Pressure Control, to reduce RCS pressure to ___(2)___ .

A. (1) lower

(2) minimum

B. (1) lower

(2) its previous setpoint

C✔ (1) raise

(2) minimum

D. (1) raise

(2) its previous setpoint

Plausibility and Answer Analysis

Reason answer is correct: AOP-019, section 3.2, step 2 has the operating crew adjusting 1CS-38, PK-145.1 Letdown Pressure, to reduce RCS pressure to minimum. A note states how to operate this controller to accomplish this: depressing the RAISE output button will lower RCS Pressure.

A. Incorrect. The first part is plausible since there are some plant controllers where lowering the output will lower the controlled parameter. The second part is correct.

B. Incorrect. The first part is plausible since there are some plant controllers where lowering the output will lower the controlled parameter. The second part is plausible since some AOPs have direction to restore controllers to the previous setpoint as part of plant recovery.

C. Correct.

D. Incorrect. The first part is correct. The second part is plausible since some AOPs have direction to restore controllers to the previous setpoint as part of plant recovery.

027 Pressurizer Pressure Control System Malfunction / APE

027 AK3.03; Knowledge of the reasons for the following responses and/or actions as they apply to a Pressurizer Pressure Control System Malfunction: Actions contained in AOPs for a PZR PCS malfunction

(CFR: 41.5 / 41.10 / 45.6 / 45.13)

Importance Rating:	3.9
Cognitive Level:	High
Technical Reference:	AOP-019, Sect. 3.2, Note prior to Step 2, Pg 14, Rev. 26 AOP-019, Sect. 3.2, Step 2, Pg 14, Rev. 26
References to be provided:	None
Learning Objective:	AOP-LP-3.19, Obj. 2 STATE/IDENTIFY the immediate operator actions from memory, including all sub-steps and response not obtained actions, for AOP-019 AOP-LP-3.19, Obj. 3 STATE/IDENTIFY the bases for the overall mitigating strategies and the bases for all steps, notes and cautions, including all attachments, for AOP-019
Question Origin:	New
Comments:	None
Tier/Group:	T1/G1

9. 2024-2 NRC RO 009/NEW/C/A//EOP-FR-S.1/NONE//029 EK2.14/SAT

Given the following plant conditions:
- A unit startup is in progress
- Reactor power is 29%

Subsequently:
- A Reactor trip has occurred due to a loss of all Main Feedwater
- Several control rods did not insert on the trip
- The crew has entered EOP-FR-S.1, Response to Nuclear Power generation/ATWS
- NR Steam Generator levels are:
  - 'A' is 19% and slowly lowering
  - 'B' is 21% and slowly lowering
  - 'C' is 19% and slowly lowering

Based on the conditions above, which ONE of the following completes the statements below?

AMSAC ___(1)___ automatically start AFW pumps.

In accordance with EOP-FR-S.1, once AFW flow is established, the operating crew should maintain all NR SG levels between ___(2)___ .

A. (1) will

   (2) 25% and 50%

B. (1) will

   (2) 52% and 62%

C. ✔ (1) will NOT

   (2) 25% and 50%

D. (1) will NOT

   (2) 52% and 62%

Plausibility and Answer Analysis

Reason answer is correct: AMSAC is armed when the ATWS SG LVL ATWS PANEL BYPASS switch on the main control board is in NORMAL and both turbine first stage pressure transmitters [PT-446/447] reach >35% [C-20]. Since power was initially at 29%, it was not armed, the AFW pumps should NOT have started on AMSAC. EOP-FR-S.1, step 11 directs the crew to control feed flow to maintain all in-tact levels between 25% and 50% NR

A. Incorrect. The first part is plausible since it would be correct would be correct if the initial power level was above the 1st stage pressure [PT-446/447] which arms AMSAC (35%). The second part is correct.

B. Incorrect. The first part is plausible since it would be correct would be correct if the initial power level was above the 1st stage pressure [PT-446/447] which arms AMSAC (35%). The second part is plausible since this is the SG level band that is directed in AOP-010 if AFW is needed to be used for feedwater malfunctions.

C. Correct.

D. Incorrect. The first part is correct. The second part is plausible since this is the SG level band that is directed in AOP-010 if AFW is needed to be used for feedwater malfunctions.

029 Anticipated Transient Without Scram / EPE

029 EK2.14; Knowledge of the relationship between Anticipated Transient Without Scram and the following systems or components: AMSAC

(CFR: 41.7 / 45.7)

Importance Rating:	4.2
Cognitive Level:	High
Technical Reference:	APP-ALB-017, Window 1-1, Pg 3, Rev. 15 EOP-FR-S.1, Step 11, Pg 12, Rev. 7
References to be provided:	None
Learning Objective:	EOP=LP-3.15, Obj. 3 DESCRIBE the plant response to a loss-of-MFW initiated ATWS per FR-S Series background documents ILC-RPS, Obj. 7 STATE the interlocks, permissives, and automatic control functions of the RPS and AMSAC, and the basis for each
Question Origin:	New
Comments:	None
Tier/Group:	T1/G1

10. 2024-2 NRC RO 010/NEW/FUNDAMENTAL//EOP-ECA-2.1/NONE//WE12 EK1.06/SAT

Given the following plant conditions:

- A MSLB outside of CNMT has occurred
- The crew has entered EOP-ECA-2.1, Uncontrolled Depressurization of All Steam Generators

Subsequently SI has been terminated and Charging realigned to the VCT

Based on the conditions above, which ONE of the following completes the statement below?

Safety Injection Reinitiation Foldout will be required if PRZ level can NOT be maintained greater than a MINIMUM of ___(1)___ percent AND upon implementing the Safety Injection Reinitiation Foldout the CSIP suctions will ___(2)___ realign(ed) to the RWST.

A. (1) 10

   (2) automatically

B. ✔ (1) 10

   (2) be manually

C. (1) 30

   (2) automatically

D. (1) 30

   (2) be manually

Plausibility and Answer Analysis

Reason answer is correct: In accordance with EOP-ECA-2.1, SI Reinitiation Criteria if the following occurs: PRZ level can NOT be maintained greater the **10% non-adverse** or 30% adverse, then perform the following: if CSIP suction aligned to VCT, **then realign to RWST**

A. Incorrect. The first part is correct. The second part is plausible since the RWST suction valves 1CS-291 and 1CS-292, automatically realign when SI is actuated with SI reset; however this is incorrect because the SI flow will be manually aligned based on maintaining adequate subcooling or PRZ level.

B. Correct.

C. Incorrect. The first part is plausible since a steamline break inside CNMT of a large magnitude will raise CNMT pressure above the adverse value of 3 psig; however this is incorrect because the location of the fault in this stem is outside of CNMT. The second part is plausible since the RWST suction valves 1CS-291 and 1CS-292, automatically realign when SI is actuated with SI reset; however this is incorrect because the SI flow will be manually aligned based on maintaining adequate subcooling or PRZ level.

D. Incorrect. The first part is plausible since a steamline break inside CNMT of a large magnitude will raise CNMT pressure above the adverse value of 3 psig; however this is incorrect because the location of the fault in this stem is outside of CNMT. The second part is correct.

WE12 Uncontrolled Depressurization of All Steam Generators / EPE

WE12 EK1.06; Knowledge of the operational implications and/or cause and effect relationships of the following as they apply to Uncontrolled Depressurization of All Steam Generators: Effect on automatic transfer of high-head SI pump suction to RWST after SI reset

(CFR: 41.5 / 41.7 / 45.7 / 45.8)

Importance Rating:	3.5
Cognitive Level:	Low
Technical Reference:	EOP-ECA-2.1, SI Reinitiation Foldout, Pg 3, Rev. 3
References to be provided:	None
Learning Objective:	EOP-LP-3.09, Obj. 4 State/Identify the conditions to be monitored for foldout page items and given a set of plant conditions, Determine if the foldout page criteria are met and the required operator actions
Question Origin:	New
Comments:	None
Tier/Group:	T1/G1

11. 2024-2 NRC RO 011/BANK/FUNDAMENTAL//EOP-FR-H.1/NONE/2016 NRC RO 10/054 AK1.02/SAT

Given the following plant conditions:

- EOP-FR-H.1, Response to a Loss of Secondary Heat Sink, is being implemented
- RCS bleed and feed has been initiated

Subsequently the following conditions exist:

- All SGs are completely dry and depressurized
- Auxiliary Feedwater capability is restored

Based on the conditions above, which ONE of the following describes (1) the STRATEGY used to re-establish Feedwater AND (2) the reason why?

A. (1) Feed ONLY one (1) SG

(2) To ensure RCS cooldown rates are established within Technical Specification limits

B. ✔ (1) Feed ONLY one (1) SG

(2) To ensure a failure due to excessive thermal stresses is limited to one SG

C. (1) Feed ALL SGs

(2) To establish subcooled conditions in the RCS as soon as possible

D. (1) Feed ALL SGs

(2) To allow termination of RCS bleed and feed as soon as possible

Plausibility and Answer Analysis

Reason answer is correct: One SG is fed at minimal rate to minimize thermal shock and potential damage to the SG tubesheet when SGs are hot and dry. If a failure in an SG occurs due to excessive thermal stresses, the failure is isolated to one steam generator.

A. Incorrect. Plausible as operator is cautioned to control feedwater rates to prevent excessive cooldown for enhanced plant control, not to comply with tech spec requirements.

B. Correct.

C. Incorrect. Plausible as the operator is allowed to depressurize multiple steam generators to allow condensate flow to be used for recovery of heat sink .

D. Incorrect. Plausible as the operator is allowed to depressurize multiple steam generators to allow condensate flow to be used for recovery of heat sink and may be confused with actions to use max rate cooldown during SGTR events.

054 Loss of Main Feedwater / APE

054 AK1.02; Knowledge of the operational implications and/or cause and effect relationships of the following as they apply to Loss of Main Feedwater: Effects of feedwater introduction on a dry S/G

(CFR: 41.8 / 41.10 / 45.3)

Importance Rating:	4.0
Cognitive Level:	Low
Technical Reference:	EOP-FR-H.1, Attachment 1, Pg 70, Rev. 7 ERG-BKGRD-FR-H.1, Sect. 2.4, Pg 29, Rev. 3
References to be provided:	None
Learning Objective:	EOP-LP-3.11, Obj. 5.c Given a set of plant conditions, Determine the appropriate plant response and Explain the required operator actions, including the associated basis/intent for the following EOP steps, notes, and cautions: Feed Restoration
Question Origin:	Bank HNP 2016 NRC RO 10
Comments:	None
Tier/Group:	T1/G1

12. 2024-2 NRC RO 012/BANK/C/A//EOP-ECA-0.0/NONE/2018 NRC RO 09/056 AG2.1.20/SAT

Given the following plant conditions:

- A loss of Off-site power has occurred with the unit operating at 100%
- EDG 'A' fails to start
- EDG 'B' output breaker closes, but trips open
- EOP-ECA-0.0, Loss Of all AC Power, is being implemented
- ASI system is operating

Which ONE of the following completes the statement below?

In accordance with EOP-ECA-0.0, the RCS cooldown during natural circulation is limited to a MAXIMUM rate of ___(1)___ AND the cooldown is required to ___(2)___ .

A. (1) 100°F / Hr

(2) minimize RCP seal leakage

B. ✔ (1) 100°F / Hr

(2) control Pressurizer level

C. (1) 50°F / Hr

(2) minimize RCP seal leakage

D. (1) 50°F / Hr

(2) control Pressurizer level

Plausibility and Answer Analysis

Reason answer is correct: During a LOOSP the ASI system provides seal injection to the RCP seals. To prevent the RCS from going solid a cooldown must be initiated to offset the mass addition from the ASI system. The maximum cooldown rate to control PRZ level is 100°F / hr.

A. Incorrect. The first part is correct. The second part is plausible since this is the correct answer if the ASI system fails to operate, however this is incorrect because all other systems operate as designed.

B. Correct.

C. Incorrect. The first part is plausible since a rate of 50°F / hr maximum cooldown rate for inactive RCS loops during EOP-ES-0.2, Natural Circulation Cooldown, however this is incorrect because the cooldown rate during EOP-ECA-0.0 is limited to the normal rate. The second part is plausible since this is the correct answer if the ASI system fails to operate, however this is incorrect because all other systems operate as designed.

D. Incorrect. The first part is plausible since a rate of 50°F / hr maximum cooldown rate for inactive RCS loops during EOP-ES-0.2, Natural Circulation Cooldown, however this is incorrect because the cooldown rate during EOP-ECA-0.0 is limited to the normal rate. The second part is correct.

056 Loss of Offsite Power / APE

056 AG2.1.20; Ability to interpret and execute procedure steps

(CFR: 41.10 / 43.5 / 45.12)

Importance Rating:	4.6
Cognitive Level:	High
Technical Reference:	EOP-ECA-0.0, Step 34.a, Pg 61, Rev. 11
References to be provided:	None
Learning Objective:	EOP-LP-3.07 Obj. 6 Given a set of plant conditions, Determine the expected plant response and Explain the required operator actions, including the associated basis/intet for ECA-0.0, 0.1 &0.2 steps, notes and cautions
Question Origin:	Bank HNP 2018 NRC RO 09
Comments:	None
Tier/Group:	T1/G1

13. 2024-2 NRC RO 013/BANK/C/A//AOP-024-BD/NONE/2018 NRC RO 11/057 AK3.01/SAT

Given the following plant conditions:

- The unit is operating at 100% power
- PRZ Level Controller Switch is selected to the 459/460 position

Subsequently:

- Instrument Bus SII is lost
- The crew is implementing AOP-024, Loss of Uninterruptible Power Supply

Based on the conditions above, which ONE of the following completes the statements below?

Letdown flow will be isolated because ___(1)___ went SHUT.

In accordance with AOP-024, the OATC will control Charging in manual with FK-122.1, Charging Flow, to ___(2)___ with letdown isolated.

A. (1) 1CS-1, Letdown Isolation LCV-460

   (2) minimize the PRZ level rise

B. (1) 1CS-1, Letdown Isolation LCV-460

   (2) prevent gas binding of the CSIP

C. (1) 1CS-2, Letdown Isolation LCV-459

   (2) minimize the PRZ level rise

D. (1) 1CS-2, Letdown Isolation LCV-459

   (2) prevent gas binding of the CSIP

Plausibility and Answer Analysis

Reason answer is correct: Instrument Bus SII supplies Pressurizer Level channel 460 and the affected of losing power is the channel failing low, which causes the its associated letdown isolation valve 1CS-1 to shut. With letdown isolated to reduce charging flow to the minimum amount the FK-122 must be placed in manual. This is required to minimize the rise in PRZ level while selecting a valid channel since seal injection will continue into the RCS with no letdown to lower the level.

A. Correct.

B. Incorrect. Part 1 is plausible since 1CS-1 will shut due to LT-460 failing low after the loss of power to S-II

Part 2 is plausible if the candidate believes the VCT Level transmitters are effected with the lost of power to S-II, since with letdown isolated the VCT level will lower as the CSIP continues to take suction from it which expands the VCT vapor space and increases the potential for gas intrusion at the pump impeller

C. Incorrect. Part 1 is plausible since 1CS-2 shutting will isolate letdown flowit it is determined that LT-459 has loss power.

Part 2 is plausible since Charging flow will be controlled with FK-122.1, to minimize the rise in PRZ level while selecting a valid channel.

D. Incorrect. Part 1 is plausible since 1CS-2 shutting will isolate letdown flowif it is determined that LT-459 has loss power.

Part 2 is plausible if the candidate believes the VCT Level transmitters are effected with the lost of power to S-II, since with letdown isolated the VCT level will lower as the CSIP continues to take suction from it which expands the VCT vapor space and increases the potential for gas intrusion at the pump impeller.

057 Loss of Vital AC Electrical Instrument Bus / APE

057 AK3.01; Knowledge of the reasons for the following responses and/or actions as they apply to Loss of Vital AC Electrical Instrument Bus: Actions contained in AOPs for the loss of a vital AC electrical instrument bus

(CFR: 41.5 / 41.10 / 45.6 / 45.13)

Importance Rating:	4.1
Cognitive Level:	High
Technical Reference:	AOP-024-BD, Section 1.0, Pg 5, Rev. 25 AOP-024-BD, Section 2.0, Step 3, Pg 7, Rev. 25
References to be provided:	None
Learning Objective:	AOP-LP-3.24, Obj. 4 Given a set of plant conditions, Determine the plant response and appropriate operator actions in accordance with AOP-025
Question Origin:	Bank HNP 2018 NRC RO 11
Comments:	None
Tier/Group:	T1/G1

14. 2024-2 NRC RO 014/BANK/C/A//APP-ALB-015/NONE/2013 NRC RO 12/058 AA2.01/SAT

Given the following plant conditions:
- The unit is operating at 100% power
- ALB-015-4-5, Channel III UPS Trouble has just alarmed
- Feed flows to all SG's have not changed

Subsequently:
- An AO reports the Bypass Source Supplying Load light is lit

Based on the conditions above, which ONE of the following completes the statements below?

The 7.5 kVA Instrument Bus III Inverter input has lost ___(1)___ AND Instrument Bus IDP-S III is currently powered from ___(2)___ .

A. (1) DC power ONLY

   (2) the 7.5 kVA Instrument Bus III Inverter

B. (1) DC power ONLY

   (2) 1A21

C. (1) AC and DC power

   (2) 1D21

D. ✓ (1) AC and DC power

   (2) 1A21

Plausibility and Answer Analysis

Reason answer is correct: Annunciator ALB-015-4-5 has multiple causes including Low DC voltage (Loss of DC Power). A loss of Instrument Bus III automatic function is loss of power to Channel III SG level instruments and will cause all Feed Regulating valves to fail open. IF both AC and DC power supplies were affected the static switch would align to the bypass power supply. IF the normal (AC), backup (DC) or bypass (AC) power supplies remain available then there will be no affect on SG level control. For the Channel I and Channel III UPSs, a bypass power source is provided from 480v MCCs 1A31-SB and 1A21-SB respectively, through a step down transformer to 120v.

A. Incorrect. The first part is plausible since this one of the potential causes for the annunciator to alarm. The second part is plausible since this is the where the Instrument Bus would normally be powered from.

B.Incorrect. The first part is plausible since this one of the potential causes for the annunciator to alarm. The second part is correct.

C. Incorrect. The first part is correct. The second part is plausible since the Channel II and Channel IV UPSs, a bypass power source is provided from 480v MCCs 1B31-SB and 1B21-SB respectively, through a step down transformer to 120v.

D. Correct.

058 Loss of DC Power / APE

058 AA2.01; Ability to determine and/or interpret the following as they apply to Loss of DC Power: Verification that alternate power sources have come on line

(CFR: 43.5 / 45.13)

Importance Rating:	3.4
Cognitive Level:	High
Technical Reference:	APP-ALB-015, Window 4-5, Pg 25, Rev. 31
References to be provided:	None
Learning Objective:	AOP-LP-3.25 Obj. 6 State/Identify the bases for the overall mitigating strategies and the bases for all steps, notes, and cautions, including all attachments, for AOP-025
Question Origin:	Bank HNP 2013 NRC RO 12 (Modified for current plant design)
Comments:	None
Tier/Group:	T1/G1

15. 2024-2 NRC RO 015/NEW/C/A//AOP-017/NONE//065 AK1.02/ENHANCE

Given the following plant conditions

- The unit is at 100% power
- The running Air Compressor Air Dryer is being placed in service in accordance with OP-151.01, Compressed Air

Which ONE of the following completes the statements below?

Instrument Air Dryers are normally operated to reduce moisture causing buildup of corrosion products from ___(1)___ corrosion in the air lines.

AND

In accordance with AOP-017, Loss Of Instrument Air, the malfunctioning Air Dryer bypass valves ___(2)___ allowed to be opened.

A. (1) general

   (2) are

B. (1) general

   (2) are NOT

C. (1) galvanic

   (2) are

D. (1) galvanic

   (2) are NOT

Plausibility and Answer Analysis

Reason answer is correct: Air Dryers remove moisture that occurs naturally in the intake air used by the compressors to supply the instrument air system. General (i.e. Uniform or Pitting) corrosion due to moisture exposure in the IA sensing or control lines is reduced by the air dryers. This reduction of corrosion products reduces the potential for component failure a potential event precursor. In accordance with AOP-017 the air dryers and filters are checked to ensure proper operation and if not then the malfunctioning air dryer is bypassed. This action is performed in an attempt to preserve IA header pressure and minimize impact on the plant during the transient.

A. Correct.

B. Incorrect. The first part is correct. The second part is plausible since bypassing the Air Dryers allows the introduction of moisture and/or particulate matter which increases the possibility of component failures; however this is incorrect because restoring IA pressure is the priority in order to stabilize the operation of the plant.

C. Incorrect. The first part is plausible since galvanic corrosion is a type of possible corrosion that occurs in the main condenser tubes; however this is incorrect because galvanic corrosion is a result of contact between two dissimilar metals vice uniform corrosion from moisture exposure. The second part is correct.

D. Incorrect. The first part is plausible since galvanic corrosion is a type of possible corrosion that occurs in the main condenser tubes; however this is incorrect because galvanic corrosion is a result of contact between two dissimilar metals vice uniform corrosion from moisture exposure. The second part is plausible since bypassing the Air Dryers allows the introduction of moisture and/or particulate matter which increases the possibility of component failures; however this is incorrect because restoring IA pressure is the priority in order to stabilize the operation of the plant.

065 Loss of Instrument Air / APE

065 AK1.02; Knowledge of the operational implications and/or cause and effect relationships of the following as they apply to Loss of Instrument Air: Effects of water and/or particulate matter in instrument air lines (operating experience)

(CFR: 41.8 / 41.10 / 45.3)

Importance Rating:	3.1
Cognitive Level:	Low
Technical Reference:	AOP-017, Sect. 4.0, Step 3.c, Pg 5, Rev. 42
References to be provided:	None
Learning Objective:	ILC-ISA, Obj. 4.b Describe the ISA normal operation, including the operation of: Air Dryers AOP-LP-3.17, Obj. 5 State/Identify the bases fr the overall mitigating strategies and the bases for all steps, notes and cautions, including all attachments, for AOP-017
Question Origin:	New
Comments:	None
Tier/Group:	T1/G1

16. 2024-2 NRC RO 016/NEW/C/A//AOP-028/NONE//077 AA1.02/ENHANCE

Given the following plant conditions:

- The unit is operating at 20% Reactor power
- Grid frequency is fluctuating between 60.8 Hz and 58.6 Hz over the last three (3) minutes
- The crew enters AOP-028, Grid Instability
  - Main Generator indications:
    - Turbine speed is 1776 RPM

Based on the conditions above, which ONE of the following completes the statement below?

In accordance with AOP-028, current plant conditions ___(1)___ require a MANUAL Reactor trip.

IF RCP bus frequency continues to degrade with NO operator actions, an automatic Reactor trip ___(2)___ actuate.

A. (1) do NOT

   (2) will NOT

B. ✔ (1) do NOT

   (2) will

C. (1) do

   (2) will NOT

D. (1) do

   (2) will

Plausibility and Answer Analysis

Reason answer is correct: Per step 2 of AOP-028, a Reactor trip will be required if any of the following conditions exist: (1) Generator frequency less than 59 Hz for greater that or equal to 5 minutes; (2) Generator frequency less than 58.4 Hz; or (3) Turbine speed less than or equal to 1752 RPM. None of these conditions currently exist therefore a Reactor trip is NOT REQUIRED. As noted in AOP-028 prior to step 2 states that if frequency decreases to 57.5 Hz with power greater than P-7 (10%), a Reactor trip will occur. With power at 20%, P-7 is instated and the RCP Bus Underfrequency will actuate when the setpoint of less than 57.5 Hz is reached

A. Incorrect. The first part is correct. The second part is plausible since changing the stem conditions such that power is less than P-7 (10%), then this would be correct.

B. Correct.

C. Incorrect. The first part is plausible since changing the stem conditions such that frequency lowered to less than 58.4 Hz OR if the fluctuations observed were for 5 minutes vice 3, then this would be correct. The second part is plausible since changing the stem conditions such that power is less than P-7 (10%), then this would be correct.

D. Incorrect. The first part is plausible since changing the stem conditions such that frequency lowered to less than 58.4 Hz OR if the fluctuations observed were for 5 minutes vice 3, then this would be correct. The second part is correct.

077 Generator Voltage and Electric Grid Disturbances / APE

077 AA1.02; Ability to operate and/or monitor the following as they apply to Generator Voltage and Electric Grid Disturbances: Turbine/generator controls

(CFR: 41.5 / 41.10 / 45.5 / 45.7 / 45.8)

Importance Rating:	3.6
Cognitive Level:	High
Technical Reference:	AOP-028, Sect. 3.0, Note prior to step 2, Pg 4, Rev. 39 AOP-028, Sect. 3.0, Step 2, Pg 4, Rev. 39
References to be provided:	None
Learning Objective:	AOP-LP-3.28, Obj. 2.a STATE/IDENTIFY the following for AOP-028: Conditions requiring a reactor/turbine trip AOP-LP-3.28, Obj. 3 Given a set of plant conditions, DETERMINE the appropriate plant response and operator actions in accordance with AOP-028
Question Origin:	New
Comments:	None
Tier/Group:	T1/G1

17. 2024-2 NRC RO 017/NEW/C/A//EOP-ECA-1.1/NONE//WE11 EA2.03/ENHANCE

Given the following plant conditions:
- A LOCA is in progress
- RWST level is 20% and stable

Subsequently the following conditions exist:
- RHR Pump B has tripped
- RHR Pump A operating parameters are abnormal
- The crew has transitioned from EOP-ES-1.3, Transfer To Cold Leg Recirculation to EOP-ECA-1.1, Loss of Emergency Coolant Recirculation

Based on the conditions above, which ONE of the following completes the statement below?

In accordance with EOP-ECA-1.1, indications evaluated to determine degraded recirculation sump performance are RHR Pump current ___(1)___ AND RHR Pump Discharge pressure ___(2)___ .

A. (1) LOW

(2) HIGH

B✔ (1) LOW

(2) LOW

C. (1) HIGH

(2) HIGH

D. (1) HIGH

(2) LOW

Plausibility and Answer Analysis

Reason answer is correct: EOP-ECA-1.1 Attachment 2 provides the indications of degraded recirculation sump performance. RHR pump amps, flow discharge pressure, d/p and vibrations are listed as the parameters to monitor. PI-600A is listed as the indication of RHR A pump discharge pressure and EI-610A1 is the indication of RHR A Pump Amps. Low and/or oscillations of this parameter is the indicator response symptomatic of degraded sump performance.

A. Incorrect. The first part is correct. The second part is plausible since oscillations are represented by the indications pegging low and rising back on scale potentially high; however this is incorrect because the symptom is amps or discharge pressure remaining low not high.

B. Correct.

C. Incorrect. The first part is plausible since oscillations are represented by the indications pegging low and rising back on scale potentially high; however this is incorrect because the symptom is amps or discharge pressure remaining low not high. The second part is plausible since oscillations are represented by the indications pegging low and rising back on scale potentially high; however this is incorrect because the symptom is amps or discharge pressure remaining low not high.

D. Incorrect. The first part is plausible since oscillations are represented by the indications pegging low and rising back on scale potentially high; however this is incorrect because the symptom is amps or discharge pressure remaining low not high. The second part is correct.

W E11 Loss of Emergency Coolant Recirculation / EPE

WE11 EA2.03; Ability to determine and/or interpret the following as they apply to Loss of Emergency Coolant Recirculation: Indications of sump blockage

(CFR: 41.10 / 43.5 / 45.13)

Importance Rating:	3.0
Cognitive Level:	High
Technical Reference:	EOP-ECA-1.1, Attachment 2, Pg 67, Rev. 4
References to be provided:	None
Learning Objective:	EOP-LP-3.3, OBJ. 5.j Given a set of plant conditions, Determine the expected plant response and Explain the required operator actions, including the associated basis/intent for the following EOP steps, notes and cautions: Monitoring for Containment Recirculation Sump Performance in ES-1.3 and ECA-1.1
Question Origin:	New
Comments:	Phonecon 4/22/2024: HNP discussed topic WE04 EA2.03 was examined on the 2024-1 exam and is too close to topic/K/A from original exam. Additionally the topic procedure guidance for evaluation of RCS pressure is limited, so Chief Examiner randomly selected a new K/A. New K/A WE11EA2.03: Ability to determine and/or interpret the following as they apply to Loss of Emergency Coolant Recirculation: Indications of sump blockage.
Tier/Group:	T1/G1

18. 2024-2 NRC RO 018/BANK/C/A//EOP-FR-H.1/NONE//WE05 EG2.1.19/ENHANCE

Given the following plant conditions:
- The unit is operating at 100%
- The TDAFW pump is under clearance

Subsequently the following occurs:
- The crew manually trips the Reactor due to a loss of the 'B' CBP
- The 'B' SUT Lockout actuates during the fast bus transfer
- ALB-025-3-3, Diesel Generator B Start Failure, alarms
- ALB-017-5-4, Aux Feedwater Pump A Trip Or Close Ckt Trouble, alarms

Current conditions are as follows:
- The crew is implementing EOP-FR-H.1, Response to Loss of Secondary Heat Sink
- Containment pressure is 3.2 psig and slowly lowering
- SG Levels are lowering, current levels are as follows:

	A	B	C
NR	0%	0%	0%
WR	14%	29%	38%

Which ONE of the following completes the statements below?

Based on the conditions above, in accordance with EOP-FR-H.1, RCS Bleed and Feed Initiation foldout ___(1)___ required.

IF implementing RCS Bleed and Feed in accordance with EOP-FR-H.1, the ___(2)___ path is established first.

A. (1) is NOT

(2) feed

B. (1) is NOT

(2) bleed

C. ✓ (1) is

(2) feed

D. (1) is

(2) bleed

Plausibility and Answer Analysis

Reason answer is correct: EOP-FR-H.1 requires the RCS Bleed and Feed Initiation critieria to be implemented when two WR SG level indications are below 15% with containment not adverse and below **(30%)** with containment adverse. RCS Bleed and Feed is established by performing steps 20 through 30. Step 20 will have the operator actuate Safety Injection and step 21 will ensure an RCS Feed Path.

A. Incorrect. The first part is plausible since two of the three SG WR levels are above 15% which is the NORMAL Containment level that the SG's have to drop to less than prior to meeting RCS bleed and feed initiation criteria. The second part is correct.

B. Incorrect. The first part is plausible since two of the three SG WR levels are above 15% which is the NORMAL Containment level that the SG's have to drop to less than prior to meeting RCS bleed and feed initiation criteria. The second part is plausible since the foldout is to establish Bleed and Feed for the RCS; however this is incorrect because the first action is to actuate Safety Injection and ensure RCS Feed Path.

C. Correct.

D. Incorrect. The first part is correct. The second part is plausible since the foldout is to establish Bleed and Feed for the RCS; however this is incorrect because the first action is to actuate Safety Injection and ensure RCS Feed Path.

W E05 Loss of Secondary Heat Sink / EPE

WE05 EG2.1.19; Ability to use available indications to evaluate system or component status

(CFR: 41.10 / 45.12)

Importance Rating:	3.9
Cognitive Level:	High
Technical Reference:	EOP-FR-H.1, Foldout, Rev 7, Page 5 EOP-FR-H.1, Step 21, Rev 7, Page 40
References to be provided:	None
Learning Objective:	EOP-LP-3.11, Objectives 4 and 5.c
Question Origin:	Bank
Comments:	None
Tier/Group:	T1/G1

19. 2024-2 NRC RO 019/NEW/C/A//TS 3.2.1, AOP-001/NONE//001 AK2.13/ENHANCE

Given the following plant conditions:

- A unit startup is in progress in accordance with GP-005, Power Operation (Mode 2 to Mode 1)

Subsequently the following occurs:

- A failed T_{ref} channel results in continuous spurious control bank motion outward
- AOP-001, Malfunction of Rod Control and Indication System, was entered
- The control rods stopped withdrawing when placed in MANUAL
- Axial Flux Difference (AFD) rose in reponse to the continuous rod withdrawal
- Current power level is 45%

Based on the conditions above, which ONE of the following completes the statements below?

The Limiting Condition for Operation (LCO) for Technical Specification 3.2.1, Axial Flux Difference, ___(1)___ apply for the current power level.

AND

In accordance with AOP-001, ___(2)___ is directed to restore equilibrium power and temperature conditions.

A. (1) does NOT

   (2) reduction of Turbine load

B. ✔ (1) does NOT

   (2) manual operation of control rods

C. (1) does

   (2) reduction of Turbine load

D. (1) 30

   (2) manual operation of control rods

Plausibility and Answer Analysis

Reason answer is correct: Applicability for Technical Specification 3.2.1, Axial Flux Difference, is Mode 1 above 50% Rated Thermal Power. AOP-001, Section 3.2, step 2 directs the crew to manually OPERATE affected control bank to restore the following:

- Equilibrium power and temperature conditions
- Rods above the insertion limits of Tech Spec 3.1.3.6 and the COLR

A. Incorrect. The first part is correct. The second part is plausible since section 3.3 directs adjusting turbine load or boron concentration to equalize Tavg with Tref if the affected bank will not move; however this is incorrect because the control rod were spuriously moving out and can be manually moved.

B. Correct.

C. Incorrect. The first part is plausible since AFD is one of the paramenter monitored per the Reactivity Plan during the startup; however this is incorrect since the applicability for Technical Specification 3.2.1 is Mode 1 above 50% of Rated Thermal Power. The second part is plausible since section 3.3 directs adjusting turbine load or boron concentration to equalize Tavg with Tref if the affected bank will not move; however this is incorrect because the control rod were spuriously moving out and can be manually moved.

D. Incorrect. The first part is plausible since AFD is one of the paramenter monitored per the Reactivity Plan during the startup; however this is incorrect since the applicability for Technical Specification 3.2.1 is Mode 1 above 50% of Rated Thermal Power. The second part is correct.

001 Continuous Rod Withdrawal / APE

001 AK2.13; Knowledge of the relationship between Continuous Rod Withdrawal and the following systems or components: NIS
(CFR: 41.7 / 45.7)

Importance Rating:	3.8
Cognitive Level:	High
Technical Reference:	Technical Specification 3.2.1, Pg 3/4 2-1, Rev. 13 AOP-001, Sect. 3.2, Step 2, Pg 18, Rev. 58
References to be provided:	None
Learning Objective:	ILC-NIS, Obj. 10.b Given a set of plant conditions indicating a NIS component is clearly inoperable, or parameter outside its LCO limits, determine which of the following Tech Spec LCOs or TRM requirments are applicable: 3.2.1 AFD AOP-LP-3.01, Obj. 4 Given a set of plant conditions, determine the plant response and appropriate operator actions in accordance with AOP-001
Question Origin:	New
Comments:	None
Tier/Group:	T1/G2

20. 2024-2 NRC RO 020/NEW/FUNDAMENTAL//AOP-001/NONE//005 AG2.4.20/SAT

Given the following plant conditions:
- The unit is at 100% power

Subsequently while lowering the unit output to 85% power the following occurs:
- ALB-013-7-1, Rod Control Urgent Failure, alarms
- Control Bank 'D' Group Counters are at 180 steps
- Control Bank 'D' rod H-2, indicates 198 steps on DRPI
- All other Control Bank 'D' rods indicate 180 steps on DRPI
- The crew enters AOP-001, Malfunction Of Rod Control And Indication System

Based on the conditions above, which ONE of the following completes the statements below?

AOP-001 cautions that if ALB-013-7-1 is alarming due to a __(1)__ error resetting the alarm before correcting the cause could result in dropping rods supplied from the affected __(2)__ cabinet.

A. (1) logic

(2) power

B. (1) logic

(2) logic

C. (1) power

(2) power

D. (1) power

(2) logic

Plausibility and Answer Analysis

Reason answer is correct: In accordance with AOP-001, section 3.4 cautions if ALB-13/7-1, ROD CONTROL URGENT ALARM, is alarming due to a logic error, resetting the alarm before correcting the cause could result in dropping rods supplied from the affected power cabinet.

A. Correct.

B. Incorrect. The first part is correct. The second part is plausible since the logic cabinet provides inputs to the Rod Control Urgent alarm; however only resetting the alarm with logic error in the power cabinet may drop rods.

C. Incorrect. The first part is plausible since the logic error is an error specific to the power cabinet the candidate may have the misconception that the caution applies to the power cabinet errors vice only the logic error. The second part is correct.

D. Incorrect. The first part is plausible since the logic error is an error specific to the power cabinet the candidate may have the misconception that the caution applies to the power cabinet errors vice only the logic error. The second part is plausible since the logic cabinet provides inputs to the Rod Control Urgent alarm; however only resetting the alarm with logic error in the power cabinet may drop rods.

005 Inoperable/Stuck Control Rod / APE

005 AG2.4.20; Knowledge of the operational implications of emergency and abnormal operating procedures warnings, cautions, and notes

(CFR: 41.10 / 43.5 / 45.13)

Importance Rating:	3.8
Cognitive Level:	Low
Technical Reference:	AOP-001, Sect 3.4, Note prior to step 6, Pg 25, Rev. 58
References to be provided:	None
Learning Objective:	AOP-LP-3.01, Obj. 6 State/Identify the bases for the overall mtigating strategy and for all steps, notes and cautions, including all attachments, for AOP-001
Question Origin:	New
Comments:	None
Tier/Group:	T1/G2

21. 2024-2 NRC RO 021/BANK/C/A//AOP-002/NONE/2016 NRC RO 30/024 AG2.2.2/SAT

Given the following plant conditions:

- 'A' Boric Acid Pump is under clearance
- An Emergency Boration per AOP-002, Emergency Boration must be performed
- 'B' Boric Acid Pump fails to start
- VCT level is 19% and slowly lowering

In accordance with AOP-002, which ONE of the following identifies (1) the valve alignment that would be attempted AND (2) the MINIMUM charging flowrate required for this flowpath?

Valve Noun Name:
1CS-283, Boric Acid to Boric Acid Blender FCV-113A
1CS-155, Make Up to VCT FCV-114A
1CS-165, VCT Oulet LCV-115C
1CS-166, VCT Oulet LCV-115E
1CS-291, Suction from RWST LCV-115B
1CS-292, Suction from RWST LCV-115D

A. (1) OPEN 1CS-283 and 1CS-155

   (2) 30 gpm

B. (1) OPEN 1CS-283 and 1CS-155

   (2) 90 gpm

C. (1) OPEN 1CS-291 and 1CS-292 THEN SHUT 1CS-165 and 1CS-166

   (2) 30 gpm

D. ✔ (1) OPEN 1CS-291 and 1CS-292 THEN SHUT 1CS-165 and 1CS-166

   (2) 90 gpm

Plausibility and Answer Analysis

Reason answer is correct: AOP-002 directs the candidate to first start a boric acid pump in order to establish a Boration flow path. If a boric acid pump is not available the operator is directed to open 1CS-291(LCV-115B) and 1CS-292(LCV-115D) RWST supply to the CSIPs, then shut 1CS-165(LCV-115C) and 1CS-166(LCV-115E) to provide a Boration flow path from the RWST to the CSIP suction.

A. Incorrect. The first part is plausible since AOP-002 Section 3.0 step 7 identifies this as part of the actions required to align the alternate boric acid flow path; however this is incorrect because no boric acid pump is running. The second part is plausible since VCT level is at the value which an auto make up will occur and this action will raise VCT level to eliminate the potential for gas binding due to low VCT level; however this is incorrect because gas binding is not a concern until the VCT level is below 5%.

B. Incorrect. The first part is plausible since AOP-002 Section 3.0 step 7 identifies this as part of the actions required to align the alternate boric acid flow path; however this is incorrect because no boric acid pump is running. The second part is correct.

C. Incorrect. The first part is correct. The second part is plausible since VCT level is at the value which an auto make up will occur and this action will raise VCT level to eliminate the potential for gas binding due to low VCT level; however this is incorrect because gas binding is not a concern until the VCT level is below 5%

D. Correct.

024 Emergency Boration / APE

024 AG2.2.2; Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels

(CFR: 41.6 / 41.7 / 45.2)

Importance Rating:	4.6
Cognitive Level:	High
Technical Reference:	AOP-002, Step 6, Rev. 26, Page 5
References to be provided:	None
Learning Objective:	AOP-LP-3.02 Obj. 2.a State/Identify the following for AOP-002: Emergency boration flowpaths and flow rates, including order of priority
Question Origin:	Bank HNP 2016 NRC RO 30
Comments:	Phonecon 4/22/2024: HNP discussed topic 024 AG2.2.7, Emergency Boration does not enter in the IPTE process, so Chief Examiner randomly selected a new generic K/A, keeping APE topic 024, Emergency Boration. New K/A 024 AG2.2.2: Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels
Tier/Group:	T1/G2

22. 2024-2 NRC RO 022/NEW/FUNDAMENTAL//APP-ALB-009/NONE//028 AK1.02/SAT

With the Pressurizer level controller selector switch in the 460/461 position, which ONE of the following completes the statement below?

The FIRST plant response that will occur after LT-460, Pressurizer Level transmitter, develops a reference leg leak is _____ .

A. LCV-459 (1CS-2), Letdown isolation valve, shuts

B. ✔ ALB-009-4-1, Pressurizer High Level, actuates

C. FCV-121.1 (1CS-231), Charging Flow control valve, shuts

D. FCV-121.1 (1CS-231), Charging Flow control valve, opens

Plausibility and Answer Analysis

Reason answer is correct: A reference line leak from LT-460 will lower the d/p across transmitter resulting in level rising on LT-460. In accordance with APP-ALB-009, window 4-1 the Pressurizer High level alarm actuates when LS-01RC-460CW exceeds 70% which will occur when LT-460 fails high.

A. Incorrect. Plausible since PRZ level channels provide input for the Master Level controller and a high level on the controlling channel will result in actual level lowering. If PRZ level lowers below 17% LCV-459 will shut to isolate Letdown; however this will not occur since PRZ level is being controlled by LT-461.

B. Correct.

C. Incorrect. Plausible since PRZ level channels provide input for the Master Level controller and a high level on the controlling channel will result in actual level lowering. The candidate may have the misconception that the FCV-121.1 (1CS-231) will shut in response the rising level; however this is incorrect because LT-460 is the non-controlling channel which will not reposition FCV-121.1 (1CS-231).

D. Incorrect. Plausible since PRZ level channels provide input for the Master Level controller the candidate may have the misconception that a leak from the reference line of LT-460 will result in actual PRZ level lower which will cause FCV-121.1 (1CS-231) to open in response the lowering level; however this is incorrect because LT-460 is the non-controlling channel which will not reposition FCV-121.1 (1CS-231).

028 Pressurizer Level Control Malfunction / APE

028 AK1.02; Knowledge of the operational implications and/or cause and effect relationships of the following as they apply to a Pressurizer Level Control Malfunction: Cause for PZR level deviation alarm: controller malfunction or other instrumentation malfunction

(CFR: 41.7 / 41.8 / 41.10 / 45.3)

Importance Rating:	3.6
Cognitive Level:	Low
Technical Reference:	APP-ALB-009, Window 4-1, Pg 15, Rev. 18
References to be provided:	None
Learning Objective:	ILC-PRZLC, Obj. 7.e Given a set of plant conditions, Predict the response of the pressurizer level control system and the effect on overall plant conditions with regard to automatic control functions, signals, and interlocks, including: Pressurizer high-level alarm
Question Origin:	Bank
Comments:	None
Tier/Group:	T1/G2

23. 2024-2 NRC RO 023/NEW/FUNDAMENTAL//DBD-106, EOP-E-1/NONE//WE14 EK3.06/

Given the following conditions:

- A Large Break Loss of Coolant Accident (LOCA) in Containment has occurred resulting in the automatic actuation of Containment Spray
- The operating crew has entered EOP-E-1, Loss of Reactor or Secondary Coolant

Subsequently CNMT Pressure is 30 psig and rising

Which ONE of the following completes the statements regarding the operation of the Containment Spray System?

In addition to removing heat, an added purpose of the Containment Spray System is to reduce post-accident ___(1)___ in the Containment atmosphere during a LOCA.

Based on the conditions above, in accordance with EOP-E-1, a MINIMUM of ___(2)___ train(s) of Containment Spray are required to be in service.

A. (1) iodine

(2) 2

B. (1) iodine

(2) 1

C. (1) hydrogen

(2) 2

D. (1) hydrogen

(2) 1

Plausibility and Answer Analysis

Reason answer is correct: From DBD-106, one of the design bases of the Containment Spray System to provide adequate capability for the fission product scrubbing of the containment atmosphere (that is, removal of iodine in the elemental form, in the form of organic compounds, and in particulate form) following a LOCA. With CNMT pressure at 30 psig and rising the CNMT 2 CNMT Spray pumps are required to be in operation regardless of the number of CNMT Fan Coolers running.

A. Correct

B. Incorrect. The first part is correct. The second part is plausible since the candidate may have the misconception that conditions allow changes in the required CNMT Spray pumps if more 2 or more CNMT Fan Coolers are in service; however this is incorrect because this pressure requirement is less than 20 psig vice less than 30 psig.

C. Incorrect. The first part is plausible since plausible since Hydrogen is produced during a LOCA; however, the Containment Spray system is not designed to remove hydrogen form the Containment atmosphere. This is the function of the Containment Ventilation and Cooling HVAC System. The second part is correct.

D. Incorrect. The first part is plausible since plausible since Hydrogen is produced during a LOCA; however, the Containment Spray system is not designed to remove hydrogen form the Containment atmosphere. This is the function of the Containment Ventilation and Cooling HVAC System. The second part is plausible since the candidate may have the misconception that conditions allow changes in the required CNMT Spray pumps if more 2 or more CNMT Fan Coolers are in service; however this is incorrect because this pressure requirment is less than 20 psig vice less than 30 psig.

W E14 High Containment Pressure / EPE

WE14 EK3.06; Knowledge of the reasons for the following responses and/or actions as they apply to High Containment Pressure: Establishing containment spray
(CFR: 41.5 / 41.10 / 45.6 / 45.13)

Importance Rating:	4.1
Cognitive Level:	Low
Technical Reference:	DBD-106, Sect. 2.0, Step 2.1.3, Pg 3, Rev. 18 EOP-E-0, Step 6, Pg 8, Rev. 6
References to be provided:	None
Learning Objective:	ILC-CSS, Obj. 1 STATE the purpose and design function of the Containment Spray System (CSS) EOP-LP-3.01, Obj. 5.a GIVEN a set of plant conditions, EXPLAIN the required operator actions, including the associated basis/intent for the following EOP steps and notes: Criteria for securing of CNMT spray
Question Origin:	New
Comments:	None
Tier/Group:	T1/G2

24. 2024-2 NRC RO 024/NEW/C/A//AOP-016, EOP-E-0/NONE//078 AA2.09/SAT

Given the following plant conditions:

- The unit is operating at 100% power
- The crew is performing AOP-016, Excessive Primary Plant Leakage
- Letdown is isolated
- Charging flow is 120 gpm and rising
- PRZ pressure is 2080 psig and lowering
- Pressurizer level is 26% and lowering
- VCT level is 10% and lowering

Based on the conditions above, which ONE of the following completes the statement below?

The Reactor will automatically trip when PRZ pressure FIRST reaches ___(1)___ psig AND in accordance with AOP-016, a manual trip of the Reactor is required when VCT ___(2)___ .

A. (1) 2000

(2) level can NOT be maintained greater than 5%

B. (1) 2000

(2) makeup capability is less than RCS leakage

C. (1) 1960

(2) level can NOT be maintained greater than 5%

D. ✔ (1) 1960

(2) makeup capability is less than RCS leakage

Plausibility and Answer Analysis

Reason answer is correct: In accordance with EOP-E-0, Attachment 10, the a reactor trip signal will be generated by RPS Pressurizer pressure lowers below the setpoint for Pressurizer Low Pressure of 1960 psig. AOP-016 continuous actions check to see if RCS leakage is within VCT makeup capability and it will direct the crew to trip the reactor when the RCS leak is in excess of VCT makeup capability.

A. Incorrect. The first part is plausible since 2000 psig is the below the AD-OP-HNP-1001 manual reactor trip limit of 2050 psig, additionally 200 psig is the setpoint for P-11 which will generate a shut signal for the PRZ PORVs when open in Automatic; however this is incorrect because the RPS setpoint for PRZ low pressure is 1960 psig. The second part is plausible since AOP-016 has a continuous action in step 5 to maintain VCT level greater than 5%; however this is incorrect because the action for VCT level less than 5% is to ensure the CSIP suctions swap from the VCT to the RWST.

B. Incorrect. The first part is plausible since 2000 psig is the below the AD-OP-HNP-1001 manual reactor trip limit of 2050 psig, additionally 200 psig is the setpoint for P-11 which will generate a shut signal for the PRZ PORVs when open in Automatic; however this is incorrect because the RPS setpoint for PRZ low pressure is 1960 psig. The second part of is correct.

C. Incorrect. The first part is correct. The second part is plausible since AOP-016 has a continuous action in step 5 to maintain VCT level greater than 5%; however this is incorrect because the action for VCT level less than 5% is to ensure the CSIP suctions swap from the VCT to the RWST.

D. Correct.

078 Reactor Coolant System Leak / APE

078 AA2.09; Ability to determine and/or interpret the following as they apply to a Reactor Coolant System Leak: Reactor Trip Setpoints
(CFR: 43.5 / 45.13)

Importance Rating:	4.8
Cognitive Level:	High
Technical Reference:	EOP-E-0, Attachment 10, Pg 79, Rev. 15 AOP-016, Sect. 3.0, Step 4, Pg 4, Rev. 61
References to be provided:	None
Learning Objective:	AOP-LP-3.16, Obj 5 State/Identify the bases for the overall mitigating strategies and the bases for all steps, notes and cautions, including all attachments, for AOP-016
Question Origin:	New
Comments:	Phonecon 4/30/2024: HNP discussed topic 078 AA2.04, Component Cooling Water does not have an isolation valve on the systems surge tank, so Chief Examiner randomly selected a new K/A, keeping Abnormal topic 078, Reactor Coolant System Leak. New K/A 078 AA2.09: Ability to determine and/or interpret the following as they apply to a Reactor Coolant System Leak: Reactor Trip Setpoints.
Tier/Group:	T1/G2

25. 2024-2 NRC RO 025/NEW/FUNDAMENTAL//EOP-ES-1.1/NONE//WE02 EA1.11/SAT

Given the following plant conditions:

- The plant is operating at 100% power, when RCS leakage develops

Subsuquently:

- The crew performed a manual Reactor Trip and Safety Injection
- The crew has transitioned to EOP-ES-1.1, SI Termination, and have secured one CSIP and realigned the CSIP discharge from the BIT to the normal Charging line
- RCPs remain in service

Concerning PRZ level control during these conditions, which ONE of the following completes the statements below?

In accordance with EOP-ES-1.1, RCS temperature __(1)__ stablilized to allow evaluation of PRZ level trend.

AND

IF used to dump steam, EOP-ES-1.1 directs the condenser steam dumps to be in the __(2)__ mode.

A. (1) must be

(2) steam pressure

B. (1) must be

(2) T_{avg}

C. (1) is NOT required to be

(2) steam pressure

D. (1) is NOT required to be

(2) T_{avg}

Plausibility and Answer Analysis

Reason answer is correct: RCS temperature must be stabilized to allow evaluation of PRZ level trend. To accomplish this the condenser steam dumps are transferred to steam pressure mode if the condenser is available.

A. Correct.

B. Incorrect. The first part is correct. The second part is plausible since the reactor coolant pumps are in service which requires Tavg to be used when monitoring RCS temperature the candidate may have the misconception that the condenser steam dump controller is required to be in Tavg mode with the RCPs operating.

C. Incorrect. The first part is plausible since procedures in the EOP network such as EOP-E-3 monitor PRZ level without RCS stabilized the candidate may have the misconception that this also applies to EOP-ES-1.1. The second part is correct.

D. Incorrect. The first part is plausible since procedures in the EOP network such as EOP-E-3 monitor PRZ level without RCS stabilized the candidate may have the misconception that this also applies to EOP-ES-1.1. The second part is plausible since the reactor coolant pumps are in service which requires Tavg to be used when monitoring RCS temperature the candidate may have the misconception that the condenser steam dump controller is required to be in Tavg mode with the RCPs operating.

W E02 SI Termination / EPE

WE02 EA1.11; Ability to operate and/or monitor the following as they apply to SI Termination: SDS

(CFR: 41.5 to 41.8 / 45.5 to 45.8)

Importance Rating:	2.9
Cognitive Level:	Low
Technical Reference:	EOP-ES-1.1, Step 15, Pg 20, Rev. 3 EOP-ES-1.1, Note prior to Step 16, Pg 20, Rev. 3
References to be provided:	None
Learning Objective:	EOP-LP-3.01, Obj. 5.g Give a set of plant conditions, Explain the required operator actions, including the associated basis/intent for the following EOP steps and notes: SI termination sequence
Question Origin:	New
Comments:	None
Tier/Group:	T1/G2

26. 2024-2 NRC RO 026/NEW/C/A//EOP-CSFST-5, EOP-FR-/NONE//WE16 EK1.01/SAT

Given the following plant conditions:

- A Loss of Coolant Accident occurred
- The crew has entered the EOP network

Based on the conditions above, which ONE of the following completes the statements below?

The LOWEST priority color on the CSFST for Containment which satisfies entry into EOP-FR-Z.3, Response to High Containment Radiation Level, is ___(1)___ .

High Range Post LOCA Containment Radiation monitors ___(2)___ be susceptible to inaccurate readings due to high Containment temperatures.

A. (1) yellow

(2) may

B. (1) yellow

(2) will NOT

C. (1) orange

(2) may

D. (1) orange

(2) will NOT

Plausibility and Answer Analysis

Reason answer is correct: Entry condition for EOP-FR-Z.3, Response to High Containment Radiation Level, is CSF-5, CONTAINMENT Critical Safety Function Status Tree on a YELLOW condition. The yellow condition occurs when the High Range Post LOCA Radiation monitors rise = the alarm setpoint.

A. Correct.

B. Incorrect. The first part is correct. The second part is plausible since instrumentation that's subject to high temperatures and pressures is designed more robust. While this is true, a note in EOP-FR-Z.3 states that indications may be unreliable for up to 30 minutes due to thermally induced currents.

C. Incorrect. The first part is plausible since there is an orange priority CSFST *condition on containment level (same CSFST branch) for entry condition into EOP-FR-Z.2 however this is incorrect because the minimum color for entry into Z.3 is yellow. The second part is correct.*

D. Incorrect. The first part is plausible since there is an orange priority CSFST *condition on containment level (same CSFST branch) for entry condition into EOP-FR-Z.2 however this is incorrect because the minimum color for entry into Z.3 is yellow. The second part is plausible since instrumentation that's subject to high temperatures and pressures is designed more robust. While this is true, a note in EOP-FR-Z.3 states that indications may be unreliable for up to 30 minutes due to thermally induced currents.*

W E16 High Containment Radiation / EPE

WE16 EK1.01; Knowledge of the operational implications and/or cause and effect relationships of the following as they apply to High Containment Radiation: Value(s) of high radiation and/or associated radiation monitors that require entry into the FRZ EOP for high radiation

(CFR: 41.5 / 41.7 / 45.7 / 45.8)

Importance Rating:	3.4
Cognitive Level:	Low
Technical Reference:	EOP-CSFST-5, Pg 3, Rev. 14 EOP-FR-Z.3, Note prior to step 1, Pg 3, Rev. 2
References to be provided:	None
Learning Objective:	EOP-LP-3.13, Obj. 3.a Given a set of plant conditions requiring FR implementation, Determine the following: Entry requirements
Question Origin:	New
Comments:	None
Tier/Group:	T1/G2

27. 2024-2 NRC RO 027/NEW/FUNDAMENTAL//GP-007/NONE//003 191007 K1.11/SAT
Which one of the following completes the statements below?

In accordance with GP-007, Normal Plant Cooldown (Mode 3 To Mode 5), maintaining ___(1)___ RCP(s) running until cleanup (CRUD Burst) is complete will improve the cleanup evolution AND the cleanup (CRUD Burst) is removed by ___(2)___ in the letdown demineralizers.

A. (1) ALL

(2) filtration

B. (1) ALL

(2) ion exchange

C. (1) ONLY 'A'

(2) filtration

D. (1) ONLY 'A'

(2) ion exchange

Plausibility and Answer Analysis

Reason answer is correct: In accordance with GP-007, maintaining as many RCPs running as possible until cleanup is complete will improve the cleanup evolution. The suspended solids and insoluble particles associated with a crud burst are mechanically filtered out and deposited on the resin bed. The deposits increase head loss across the demineralizer, resulting an increase in the differential pressure across the demineralizer and a large pressure drop across the demineralizer

A. Correct.

B. Incorrect. The first part is correct. The second part is plausible since one of the principle operations of a demineralizer is the improve water quality via the ion exchange process; however in the event of a crud burst the suspended solids are mechanically filtered out by the resin bed.

C. Incorrect. The first part is plausible since the letdown systems taps off RCS Loop 'A' the candidate may have the misconception that continued operation of only the RCP 'A' during a crud burst evolution will improve cleanup; however force circulation through any loop will improve cleanup. The second part is correct.

D. Incorrect. The first part is plausible since the letdown systems taps off RCS Loop 'A' the candidate may have the misconception that continued operation of only the RCP 'A' during a crud burst evolution will improve cleanup; however force circulation through any loop will improve cleanup. The second part is plausible since one of the principle operations of a demineralizer is the improve water quality via the ion exchange process; however in the event of a crud burst the suspended solids are mechanically filtered out by the resin bed.

003 Reactor Coolant Pump System / SF4P RCP

003 191007 K1.11; Plant evolutions that can cause crud bursts and the effect on demineralizers

(CFR: 41.3)

Importance Rating:	2.8
Cognitive Level:	Low
Technical Reference:	GP-007, Sect. 6.0, Note prior to step 48, Pg 60, Rev. 77 LP-1007, Slide 38, Rev. 4
References to be provided:	None
Learning Objective:	GP-LP-3.07, Given a scenario, Recognize the criteria and Apply the actions required by any GP-007 precaution and limitation LP-1007, Obj. 1.7 Describe plant evolutions that could affect demineralizer operation
Question Origin:	New
Comments:	None
Tier/Group:	T2/G1

28. 2024-2 NRC RO 028/BANK/C/A//AOP-003, ALB-007/NONE/2013 NRC RO 30/004 K5.26/

Given the following plant conditions:
- The unit is operating at 100% power

Subsequently the following occurs:
- ALB-007-4-3, VCT High-Low Level, alarms
- VCT level transmitter LI-115 has failed high
- VCT level transmitter LI-112 reads 14% and lowering

Based on the conditions above, which ONE of the following completes the statements below?

In accordance with AOP-003, Malfunction Of Reactor Makeup Control, the VCT level below which gas binding of the running CSIP is a concern is ___(1)___ .

Given these conditions, RWST suction valves AND VCT Outlet valves will ___(2)___ .

Valve Noun Name:
1CS-291, Suction from RWST LCV-115B
1CS-292, Suction from RWST LCV-115D
1CS-165, VCT Outlet LCV-115C
1CS-166, VCT Outlet LCV-115E

A. (1) 5%

(2) automatically realign

B. ✔ (1) 5%

(2) require manual realignment

C. (1) 10%

(2) automatically realign

D. (1) 10%

(2) require manual realignment

Plausibility and Answer Analysis

Reason answer is correct: VCT level should be maintained on scale to prevent gas intrusion to the CSIP's, because the automatic fucntion is defeated with LI-115 failed high the student must manually algin the RWST as a suction source and isolate the VCT to ensure level is maintained on scale.

A. Incorrect. The first part is correct. The second part is plausible since the RWST suction valves will automatically open when VCT level is <5% on 2 of 2 VCT level channels. In this case LT-115 has failed high and an automatic swap over will not occur until after Maintenance lifts and taps the cables associated with the failing instrument. Lifting leads causes a simulated low-low level signal from the failed instrument. This allows a valid low-low level signal from the good instrument ot initiate emergency makeup from the RWST.

B. Correct.

C. Incorrect. The first part is plausible since 15% is the VCT High-Low level alarm setpoint. The second part is plausible since the RWST suction valves will automatically open when VCT level is <5% on 2 of 2 VCT level channels. In this case LT-115 has failed high and an automatic swap over will not occur until after Maintenance lifts and taps the cables associated with the failing instrument. Lifting leads causes a simulated low-low level signal from the failed instrument. This allows a valid low-low level signal from the good instrument ot initiate emergency makeup from the RWST.

D. Incorrect. The first part is plausible since 15% is the VCT High-Low level alarm setpoint. The second part is correct.

004 Chemical and Volume Control System / SF1; SF2 CVCS

004 K5.26; Knowledge of the operational implications or cause and effect relationships of the following concepts as they apply to the Chemical and Volume Control System: Relationship between VCT pressure and NPSH for charging pumps

(CFR: 41.5 / 45.7)

Importance Rating:	3.5
Cognitive Level:	High
Technical Reference:	AOP-003, Sect. 3.1, step 15, Pg 8, Rev. 30 APP-ALB-007, Window 4-3, Pg 18, Rev. 17
References to be provided:	None
Learning Objective:	ILC-CVCS Obj. 3.c Discuss potential modes of the CVCS component failures and relevant industry Operating Experience (OE): VCT Level control failures that contribute to gas intrusion into the CSIPs
Question Origin:	Bank HNP 2013 NRC RO 30
Comments:	None
Tier/Group:	T2/G1

29. 2024-2 NRC RO 029/BANK/C/A//AOP-017/NONE/MNS 2010 NRC RO 04/005 K3.01/

Given the following plant conditions:

- The unit is in Mode 5
- RHR Train 'A' is in service
- 1RH-20, RHR Heat Exchanger A Bypass Valve, is in AUTO
- RCS temperature is being maintained at 140°F

Based on the above conditions, which ONE of the following completes the statement below?

1RH-20 position ___(1)___ when adjusting RCS temperature AND if instrument air is lost to 1RH-20, RCS temperature will ___(2)___ .

A. (1) is held constant

(2) rise

B. (1) is held constant

(2) lower

C. (1) varies

(2) rise

D. ✔ (1) varies

(2) lower

Plausibility and Answer Analysis

Reason answer is correct: 1RH-20 is operated in Automatic and will open or shut to maintain total system flow as required when 1RH-30, RHR Heat Exchanger 'A' Outlet Flow, is adjusted to maintain RCS temperature. When the instrument air is loss to 1RH-20, it will shut, resulting in more flow through the heat exchanger which will result in a lower outlet temperature.

A. *Incorrect.* *The first part is plausible since 1RH-30 is manually adjusted to maintain RCS temperature the candidate may have the misconception that 1RH-20, RHR heat exchanger 'A' bypass, is maintained constant and 1RH-30 is setpoint is adjusted to maintain the desired RCS temperature. The second part is plausible since Total RHR flow will rise with the bypass valve open resulting in less flow through the RHR heat exchanger the candidate may have a misconception that total heat transfer is reduced which will result in a higher bulk RCS temperature.*

B: *Incorrect.* *The first part is plausible since 1RH-30 is manually adjusted to maintain RCS temperature the candidate may have the misconception that 1RH-20, RHR heat exchanger 'A' bypass, is maintained constant and 1RH-30 is setpoint is adjusted to maintain the desired RCS temperature The second part is correct.*

C. *Incorrect.* *The first part is correct. The second part is plausible since Total RHR flow will be lower the candidate may have the misconception that total heat transfer is reduce which will result in a higher bulk RCS temperature.*

D. *Correct.*

005 Residual Heat Removal System / SF4P RHR

005 K3.01; Knowledge of the effect that a loss or malfunction of the Residual Heat Removal System will have on the following systems or system parameters: RCS (CFR: 41.7 / 45.6)

Importance Rating:	4.5
Cognitive Level:	Low
Technical Reference:	AOP-017, Attachment 1, Pg 41, Rev.42
References to be provided:	None
Learning Objective:	ILC-RHR, Obj. 4 Discuss potential modes of RHRS component failures, including the term Active and Passive Failures, and state how industry OE has been implemented at HNP
Question Origin:	Bank MNS 2010 NRC RO 04
Comments:	None
Tier/Group:	T2/G1

30. 2024-2 NRC RO 030/NEW/FUNDAMENTAL//EOP-E-1, DBD-105/NONE//006 K1.11/

Given the following plant conditions

- A Loss of Coolant Accident has occurred
- The operating crew has entered EOP-E-1, Loss of Reactor or Secondary Coolant
- The RO was directed to establish cooling water flow to the RHR Heat Exchangers

Based on the conditions above to establish this flow, which ONE of the following completes the statement below?

The DIRECT heat sink water source to the RHR Heat Exchangers is ___(1)___ , AND the RHR Heat Exchangers are located on the ___(2)___ elevation of the RAB.

A. (1) Component Cooling Water

(2) 190

B. ✔ (1) Component Cooling Water

(2) 236

C. (1) Emergency Service Water

(2) 190

D. (1) Emergency Service Water

(2) 236

Plausibility and Answer Analysis

Reason answer is correct: Component Cooling Water serves to cool the RHR Heat Exchangers while RHR is in Safety Injection mode by transferring heat from the RHR tube side to the CCW shell side. RHR RHR Heat Exchangers are located on the 236' elevation of th RAB.

A. Incorrect. The first part is correct. The second part is plausible since this is the location of the RHR pumps.

B. Correct.

C. Incorrect. The first part is plausible since ESW serves as the heat sink water source for the CCW Heat Exchangers. The second part is plausible since this is the location of the RHR pumps.

D. Incorrect. The first part is plausible since ESW serves as the heat sink water source for the CCW Heat Exchangers. The second part is correct.

006 Emergency Core Cooling System / SF2 ECCS

006 K1.11; Knowledge of the physical connections and/or cause and effect relationships between the Emergency Core Cooling System and the following systems: CCWS

(CFR: 41.2 to 41.8 / 45.3 / 45.7 / 45.8)

Importance Rating:	3.7
Cognitive Level:	Low
Technical Reference:	EOP-E-1, Step 12, Pg 16, Rev. 6 DBD-105, Sect. 1.3, Step 1.3.1.3, Pg 6, Rev. 14
References to be provided:	None
Learning Objective:	ILC-CCW, Obj. 4.a DESCRIBE the modes of operations and major flowpaths of the CCWS in accordance with plant operating procedures: Essential Loop
Question Origin:	New
Comments:	None
Tier/Group:	T2/G1

31. 2024-2 NRC RO 031/NEW/FUNDAMENTAL//OP-100/NONE//007 A4.01/SAT

With regard to Pressurizer Relief Tank (PRT) fill operations, which ONE of the following completes the statements below?

The source of water to refill the PRT is Reactor ___(1)___ .

1RC-167, Water source to PRT, is operated from the ___(2)___ should PRT makeup operations be required.

A. ✔ (1) Makeup water

(2) MCB

B. (1) Makeup water

(2) RCWR

C. (1) Coolant

(2) MCB

D. (1) Coolant

(2) RWCR

Plausibility and Answer Analysis

Reason answer is correct: The source of water to fill the PRT is from Reactor Makeup Water, (OP-100). 1RC-161, RMW to PRT, isolation valve can be operated from the MCB or ACP. This valve is operated during PRT makeup operations: OP-100, section 8.1, step 2.

A. Correct.

B. Incorrect. The first part is correct. The second part is plausible since RWCR is contacted to coordinate draining of the PRT to the RCDT the candidate may have the misconception that the fill operation is coordinated in the same manner.

C. Incorrect. The first part is plausible since the PRT accepts borated water from the RCS the candidate may have the misconception that the water in PRT is maintained at the same boron concentration as the RCS; however this is incorrect as the PRT is primarily concerned with quench volume vice reactvity control. The second part is correct.

D. Incorrect. The first part is plausible since the PRT accepts borated water from the RCS the candidate may have the misconception that the water in PRT is maintained at the same boron concentration as the RCS; however this is incorrect as the PRT is primarily concerned with quench volume vice reactvity control. The second part is plausible since RWCR is contacted to coordinate draining of the PRT to the RCDT the candidate may have the misconception that the fill operation is coordinated in the same manner.

007 Presurizer Relief Tank/Quench Tank System / SF5 PRTS

007 A4.01; Ability to manually operate and/or monitor in the control room: PRT/quench tank makeup valve

(CFR: 41.5 / 41.7 / 45.5 / 45.7 / 45.8)

Importance Rating:	2.8
Cognitive Level:	Low
Technical Reference:	OP-100, Sect. 8.1, Step 2, Pg 17, Rev. 49
References to be provided:	None
Learning Objective:	ILC-PRZ, Obj. 5.a DESCRIBE the modes of operations and major flowpaths of the Pressurizer in accordance with plant operating procedure: Filling the PRT ILC-PRZ, Obj. 7 IDENTIFY associated remote and local instrumentation, indications, alarms, and controls for the Pressurizer
Question Origin:	New
Comments:	K/A is matched since applicant must demonstrate the
Tier/Group:	T2/G1

32. 2024-2 NRC RO 032/NEW/FUNDAMENTAL//DBD-100, OP-100/NONE//007 K4.06/

With regard to Pressurizer Relief Tank (PRT) pressure control, which ONE of the following completes the statements below?

Overpressure protection for the PRT is provided by ___(1)___ .

A vent path option for relieving PRT pressure is to ___(2)___ .

A. (1) Pressure Relief Valves

   (2) In-service Waste Gas Decay Tank B

B. (1) Pressure Relief Valves

   (2) Relief Waste Gas Decay Tank F

C✔ (1) Rupture Discs

   (2) In-service Waste Gas Decay Tank B

D. (1) Rupture Discs

   (2) Relief Waste Gas Decay Tank F

Plausibility and Answer Analysis

Reason answer is correct: Excessive pressure and/or continuous steam flow to the PRT will result in failure of the rupture discs on the tank when tank pressure reaches 85-100 psig. OP-100, section 8.2 is for venting the PRT. One of the initial conditions for this operation is that Waste Gas Decay Tanks E and F are not in service. Therefore, Waste Gas Decay Tank A is an option for the vent path. Waste Gas Decay Tanks A, B, C, D, G, H, I, and J are the normal tanks, E is the shutdown tank and F is the relief tank. Normally, one tank is in operation at a time in high pressure mode.

A. Incorrect. The first part is plausible since there are relief valves in the Pressurizer system, but these are for the Pressurizer only. The PRT has 2 rupture discs that relieve Pressurizer pressure via the relief valves. The second part is correct.

B. Incorrect. The first part is plausible since there are relief valves in the Pressurizer system, but these are for the Pressurizer only. The PRT has 2 rupture discs that relieve Pressurizer pressure via the relief valves. The second part is plausible since F is one of ten Waste Gas Decay Tanks in the System. F however, is the relief Waste Gas Decay Tank not to be used for PRT venting operations.

C. Correct.

D. Incorrect. The first part is correct. The second part is plausible since F is one of ten Waste Gas Decay Tanks in the System. F however, is the relief Waste Gas Decay Tank not to be used for PRT venting operations.

007 Presurizer Relief Tank/Quench Tank System / SF5 PRTS

007 K4.06; Knowledge of Pressurizer Relief Tank/Quench Tank System design features and/or interlocks that provide for the following: Venting PRT/quench tank

(CFR: 41.7)

Importance Rating:	2.6
Cognitive Level:	Low
Technical Reference:	DBD-100, Sect. 2.1, Step 5, Pg 5, Rev. 20 OP-100, Sect. 8.2, Step 5, Pg 19, Rev. 49
References to be provided:	None
Learning Objective:	ILC-PRZ, Obj. 2.e STATE the function of the following major components: Waste Decay tanks ILC-PRZ, Obj. 4.b DESCRIBE the normal operation of the pressurizer, including operation sequence and normal parameters, and expected system response including: How the PRT dissipates the energy from a safety or relief valve discharge.
Question Origin:	New
Comments:	K/A is matched since applicant must demonstrate knowledge of the
Tier/Group:	T2/G1

33. 2024-2 NRC RO 033/NEW/C/A//APP-ALB-005/NONE//008 G2.4.31/

Given the following plant conditions:

- The unit is operating at 100% power
- 'A' Train equipment is in service

Subsequently:

- ALB-005-7-4, CCW Pumps A Trip Or Close Ckt Trouble, alarms

Based on the alarm status above, which ONE of the following completes the statements below?

In accordance with APP-ALB-005, a possible cause for this alarm is a(an) ___(1)___ trip of the pump .

AND

The CCW Pump B will automatically start due to ___(2)___ .

A. (1) ground fault

(2) the breaker trip

B. (1) ground fault

(2) low pressure

C. (1) overcurrent

(2) the breaker trip

D✓ (1) overcurrent

(2) low pressure

Plausibility and Answer Analysis

Reason answer is correct: With window 7-4 in alarm, Possible causes for this alarm are: (1) Overcurrent trip (2) Closing circuit malfunction (3) alarm circuit or instrument malfunction. The CCW system is normally cross-tie via the non-essential header, because of this the automatic action that will occur is that CCW Pump 1B-SB automatically starts at 52 psig discharge pressure.

A. Incorrect. The first part is plausible since window 7-3, CCW Pumps A Trouble, will alarm due to a ground fault in addition to an overcurrent trip; however this is incorrect because a ground condition will not trip the running pump. The second part is plausible since other system (i.e. Normal Service Water)have pumps that automatically start due to electrical trips of a running pump; however this is incorrect because the CCW system pumps auto start based on low system pressure.

B. Incorrect. The first part is plausible since window 7-3, CCW Pumps A Trouble, will alarm due to a ground fault in addition to an overcurrent trip; however this is incorrect because a ground condition will not trip the running pump. The second part is correct

C. Incorrect. The first part is correct. The second part is plausible since other system (i.e. Normal Service Water)have pumps that automatically start due to electrical trips of a running pump; however this is incorrect because the CCW system pumps auto start based on low system pressure.

D. Correct.

008 Component Cooling Water System / SF8 CCW

008 G2.4.31; Knowledge of annunciator alarms, indications, or response procedures

(CFR: 41.10 / 45.3)

Importance Rating:	4.2
Cognitive Level:	High
Technical Reference:	APP-ALB-005, window 7-4, Pg 47, Rev. 25 APP-ALB-005, window 8-2, Pg 51, Rev. 25
References to be provided:	None
Learning Objective:	ILC-CCW, 7.a Given a set of plant conditions, PREDICT the response of the CCWS and the effect on overall plant conditions with regard to the following automatic control functions, signals, and interlocks: Low discharge pressure on operating CCW pump
Question Origin:	New
Comments:	None
Tier/Group:	T2/G1

34. 2024-2 NRC RO 034/NEW/FUNDAMENTAL//OP-145/NONE//008 K2.02/SAT

Which ONE identifies the possible bus power supply lineup(s) to the “A” Component Cooling Water Pump?

A. ✔ 1A-SA ONLY

B. 1A-SA or 1B-SB

C. Aux Bus 1A ONLY

D. Aux Bus 1A or Aux Bus 1B

Plausibility and Answer Analysis

Reason answer is correct: In accordance with OP-145, the power supply lineup to the “A” CCW pump is from emergency bus 1A-SA, OP-145, Attachment 1.

A. Correct.

B. Incorrect. Plausible since this is the possible power supply configuration for the “C” CCW pump which is the same system and component type.

C. Incorrect. Plausible since Aux Bus 1A is a power supply to another “A” 6.9 KV pump (“A” Main Feedwater Pump).

D. Incorrect. Plausible since the Component Cooling Water System, like the Circulating Water System has three pumps (A, B, C) which are powered off their system 6.9KV A/B busses. In this case, the A pumps is off Aux Bus 1A and the B and C buses are off Aux Bus 1B. The candidate may have the misconception this configuration applies to the Component Cooling Water System.

008 Component Cooling Water System / SF8 CCW

008 K2.02; Knowledge of electrical power supplies to the following: CCW pumps

(CFR: 41.7)

Importance Rating:	3.9
Cognitive Level:	Low
Technical Reference:	OP-145, Attachment 1, Pg 130, Rev. 83
References to be provided:	None
Learning Objective:	ILC-CCW, Obj. 2.a STATE the function and power supplies (if applicable) of the following CCWS major components: CCW Pumps
Question Origin:	New
Comments:	None
Tier/Group:	T2/G1

35. 2024-2 NRC RO 035/BANK/C/A//AOP-019/NONE/2013 NRC RO 37/010 A1.07/SAT

Given the following plant conditions:

- The unit is at 100% power
- The PRZ pressure master controller, PK-444A, is in AUTOMATIC
- A PRZ pressure master controller malfunction causes the SETPOINT to slowly drift to 61% over 10 minutes

Based on the conditions above, which ONE of the following is the expected plant response to the drifting of the setpoint?

(Assume NO Operator Actions)

A. One PRZ PORV will cycle

B. ✔ Both spray valves will open

C. Pressure will stabilize at 2280 psig

D. The control heaters will be at maximum output

Plausibility and Answer Analysis

Reason answer is correct: The Master Pressure Controller (MPC) operates in Automatic to control RCS pressure to a setpoint determined by the Operator and set on the left-hand scale on the MPC. Since the MPC setpoint control range is from 1700 psig to 2500 psig (800 psig band), the setpoint may need to be changed to reflect the desired RCS pressure. For instance, if the Operator desires to control RCS pressure at 2200 psig, the MPC setpoint would be set to a value calculated by the following: (Desired pressure - 1700 psig) / 800 psig or 62.5%. The nominal setpoint at power is 67% to control the RCS pressure at 2235 psig.

(2235 - 1700 / 800 = 0.66875 x 100 = approximately 67%)

NOTE: the values provided in the answer analysis are based on the controller setpoint of 61%.

Controller setpoint of 61% achieves a normal pressure of 2188 psig. Normal at power pressure is 2235 psig. Spray valves should generally open approximately 25 psig above normal setpoint (2213 psig). This is just outside normal operating pressure enough that there should be no question that at least the spray valves should open, but not be drastic enough to challenge the PORVS openning. The word "slowly" is in the stem to preclude the PORVs opening from quick operation of the controller.

The control switch for the group C heaters controls the power supply breaker. The control heaters output is controlled by the PRZ master pressure controller output signal. They will be full on when the error signal output of the PRZ master pressure controller corresponds to a difference between actual pressure and reference pressure (2235 psig) of -15 psi, or for this question 2173 psig. Conversely, the control heaters will be

full off when the error signal is +15 psi, or for this question 2203 psig. Between the high and low error from reference pressure, the heater output varies linearly.

Control switches for the backup heaters (groups A, B, and D) have three positions (OFF, AUTO, ON). In AUTO, the backup heaters are controlled via the PRZ master pressure controller. The heaters will be full on when the error signal output of the PRZ master pressure controller corresponds to -25 psig below normal setpoint (2163 psig) and decreasing, and full off at -17 psi (2171 psig) and increasing. Since pressure is currently 2235 psig prior to the controller adjustment the control group heaters should be full off with the new setpoint.

A. Incorrect. Plausible if controller fails quickly to this new setpoint one PORV (1RC-114, PCV-444B) could get a signal to open.

B. Correct.

C. Incorrect. Plausible if the drifting of the controller made the actual pressure increase instead of decrease this would be possible for controllers.

D. Incorrect. Plausible if the drifting of the controller made the actual pressure increase instead of decrease.

010 Pressurizer Pressure Control System / SF3 PZR PCS

010 A1.07; Ability to predict and/or monitor changes in parameters associated with operation of the Pressurizer Pressure Control System, including: RCS or PZR pressure (CFR: 41.5 / 45.5)

Importance Rating:	3.9
Cognitive Level:	High
Technical Reference:	AOP-019, Attachement 2, Pg 22, Rev. 26
References to be provided:	None
Learning Objective:	ILC-PRZPC, Obj 4.b Describe the PRZPC normal operation, including: How pressurizer pressure control setpoint is both determined and adjusted for a desired RCS pressure
Question Origin:	Bank HNP 2013 NRC RO 37
Comments:	None
Tier/Group:	T2/G1

36. 2024-2 NRC RO 036/NEW/C/A//AOP-024/NONE//012 A2.02/

Given the following plant conditions:
- The unit is operating at 100% power

Subsequently the following occurs:
- Instrument Bus, IDP-SI, is lost
- The crew is implementing AOP-024, Loss of Uninterruptible Power Supply

Based on the conditions above, which ONE of the following completes the statements below?

In accordance with AOP-024, the crew will be required to place the PRZ Level Controller Selector Switch to CHAN ___(1)___ /461 position.

If subsequently PT-456, PRZ Pressure Channel II Transmitter, were to fail high a Reactor trip ___(2)___ occur.

A. (1) 459

(2) will NOT

B. (1) 459

(2) will

C. (1) 460

(2) will NOT

D. ✔ (1) 460

(2) will

Plausibility and Answer Analysis

Reason answer is correct: With Instrument Bus SI de-energized, AOP-024, step 4.1.3 directs manually controlling pressurizer master pressure controller. Step 4.1.5a then has the crew place the PRZ Level Controller Selector Switch to CHAN 460/461. Also, with Instrument Bus SI de-energized, Pressurizer Pressure transmitter PT-455 is in a tripped condition. With the added PT-456 pressure transmitter failing high, this meets the 2/3 logic needed for an automatic trip to occur, regardless of what initial Pressurizer Pressure is (P-11 no impact on high trip). Therefore EOP-E-0 would be entered.

A. Incorrect. The first part is plausible since step 4.1.6.a would direct the crew to place PRZ Level Controller Selector Switch to CHAN 459/461 is it was Instrument Bus SII that were lost. The second part is plausible since there are some RPS instrumentation that require 2/4 logic to actuate [NIs]. However, this is not the case for this RPS instrumentation that is on a 2/3 logic to trip. Also, if the question was replaced with Instrument Bus SIV being lost which has no impact on Pressurizer pressure instruments, then a subsequent failure of PT-456 would not result in a Reactor trip.

B. Incorrect. The first part is plausible since step 4.1.6.a would direct the crew to place PRZ Level Controller Selector Switch to CHAN 459/461 is it was Instrument Bus SII that were lost. The second part is correct.

C. Incorrect. The first part is correct. The second part is plausible since there are some RPS instrumentation that require 2/4 logic to actuate [NIs]. However, this is not the case for this RPS instrumentation that is on a 2/3 logic to trip. Also, if the question was replaced with Instrument Bus SIV being lost which has no impact on Pressurizer pressure instruments, then a subsequent failure of PT-456 would not result in a Reactor trip.

D. Correct.

012 Reactor Protection System / SF7 RPS

012 A2.02; Ability to (a) predict the impacts of the following on the Reactor Protection System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations: Loss of instrument power

(CFR: 41.5 / 43.5 / 45.3 / 45.5)

Importance Rating:	3.9
Cognitive Level:	High
Technical Reference:	AOP-024, Sect. 3.1, Step 5, Pg 8, Rev. 63 AOP-024, Attachment 1, Pg 32, Rev. 63 AOP-024, Attachment 2, Pg 35, Rev. 63 AOP-024, Attachment 3, Pg 40, Rev. 63
References to be provided:	None
Learning Objective:	ILC-RPS, Obj. 8 GIVEN a set of plant conditions, PREDICT the response of the RPS and AMSAC including the effect on overall plant conditions with regard to automatic control functions, signals, and interlocks ILC-120VUPS, Obj. 11 Given a set of plant conditions, PREDICT the response of the 480/120V UPS and the effects on overall plant operations for major component failures/ malfunctions AOP-LP-3.24, Obj. 4 Given a set of plant conditions, DETERMINE the appropriate plant response and operator actions in accordance with AOP-024
Question Origin:	New
Comments:	None
Tier/Group:	T2/G1

37. 2024-2 NRC RO 037/BANK/C/A//EOP-E-0, AOP-025/NONE/2014 NRC RO 39/012 K6.06/SAT

Given the following plant conditions:

- The unit is operating at 7% Reactor power

Based on the condition above, which ONE of the following coincident with a loss of IDP-SI, Instrument Bus S-I, will result in a Reactor trip signal being generated by the Reactor Protection system?

A. LT-461, PRZ Level Channel III, fails high

B. ✔ LT-496, 'C' SG Level Channel III, fails low

C. PT-951, Containment Pressure Channel II, fails high

D. Breaker 107, Aux Bus A supply, fails open

Plausibility and Answer Analysis

Reason answer is correct: The SG low-low water level circuit trips the reactor if two out of three level indicators of any one SG indicate below the low-low trip setpoint of 25% NR SG level. 2/3 'C' Levels are < 25% (Ch. I and III) which would result in a RPS generating a reactor trip signal.

A. Incorrect. Plausible since one channel for Pressurizer High Level (87%) would be acutated due to the failure of Instrument Bus S-I and the second failure would actuate a Reactor trip signal but since Reactor power and Turbine power are <10% the Hi PRZ level Reactor trip is blocked by P-7. Reactor Trip logic for PRZ High Level - two of the three water level signals from LS-459A, LS-460A, or LS-461A above the trip setpoint (87% of span) will initiate a reactor trip. The trip function is automatically blocked below P-7.

B. Correct.

C. Incorrect. Plausible since a Reactor trip is actuated any time a Safety Injection signal is actuates. Since Instrument Bus S-I is de-energized the candidate could assume that one channel for Containment Hi Pressure (HI-1 3 psig) is tripped. Since there has been a second failure a Safety Injection signal could have been actuated but the Hi-1 singal actuates off channels II, III, IV. The given conditions would result in channels I and II only and therefore not actuate a SI and Reactor trip.

D. Incorrect. Plausible since this would cause 2 RCPs to lose power and a Reactor trip signal for loss of Reactor Coolant Flow (2 of 3 channels on one loop < 90.5%) would be generated, but because the Reactor power and Turbine power are <10% this trip is blocked by P-7.

012 Reactor Protection System / SF7 RPS

012 K6.06; Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the Reactor Protection System: Sensors and detectors

(CFR: 41.7 / 45.7)

Importance Rating:	3.7
Cognitive Level:	High
Technical Reference:	EOP-E-0, Attachment 10, Pg 79, Rev. 15 AOP-024, Attachment 1, Pg 32, Rev. 63 EMDRAC 1364-000870, SG Low-Low level trip, Rev. 6
References to be provided:	None
Learning Objective:	ILC-RPS, Obj. 8 Given a set of plant conditions, predit the response of the RPS and AMSAC, including the effect on overall plant conditions with regard to automatic control functions, signal, and interlocks
Question Origin:	Bank HNP 2014 NRC RO 39
Comments:	None
Tier/Group:	T2/G1

38. 2024-2 NRC RO 038/BANK/FUNDAMENTAL//AOP-024/NONE/2018 NRC RO 39/013 K2.01/
Which ONE of the following completes the statement below?

Instrument Buses ___(1)___ AND ___(2)___ provide power to the ESFAS Slave Relays.

A. (1) SI

(2) SII

B. (1) SII

(2) SIII

C✔ (1) SI

(2) SIV

D. (1) SIII

(2) SIV

Plausibility and Answer Analysis

Reason answer is correct: *Train ESFAS slave relays are powered from Instrument Bus SI (SIV). A loss of SI or SIV will result in a loss of ESFAS functions driven by slave relays for that train.*

A. Incorrect *Plausible since the ESFAS relays are powered from the safety instrument buses. If SI or SIII is lost, the MCB controller for MDAFW pump flow control valves will not be operable; flow control valves will not shut on an AFW isolation signal and will not open on an auto open signal. Train ESFAS slave relays are powered from Instrument Bus SI (SIV). A loss of SI or SIV will result in a loss of ESFAS functions driven by slave relays for that train. A loss of SI will cause a loss of 'A' Train ONLY the question is asking for BOTH 'A' and 'B' Train.*

B.Incorrect *Plausible since the ESFAS relays are powered from the safety instrument buses. If power is lost to Instrument Bus SII (B Train and TDAFW) or SIII (A Train) the associated AFW pump suction pressure instrument will read low. If the AFW pump is running, it will not trip on Lo-Lo suction pressure nor will it be prevented from being started. Additionally, if power is lost to Instrument Bus SII (B Train) or SIII (A Train), the associated CNMT Spray Additive Tank level indicators will read empty but their associated CNMT Spray Chemical Addition Valve will not automatically shut. If necessary, the valve(s) may be manually operated*.

C.Correct

D. Incorrect *Plausible since the ESFAS slave relays are powered from Instrument Bus SI (SIV). To answer this question it would take BOTH SI and SIV and only one of the two (SIV) are listed. If power is lost to Instrument Bus SII (B Train and TDAFW) or SIII (A Train) the associated AFW pump suction pressure instrument will read low. If the AFW pump is running, it will not trip on Lo-Lo suction pressure nor will it be prevented from being started. Train ESFAS slave relays are powered from Instrument Bus SI (SIV). A loss of SI or SIV will result in a loss of ESFAS functions driven by slave relays for that train.*

013 Engineered Safety Features Actuation System / SF2 ESFAS

013 K2.01; Knowledge of electrical power supplies to the following: ESFAS/Safeguards train power supplies

(CFR: 41.7)

Importance Rating:	4.0
Cognitive Level:	Low
Technical Reference:	AOP-024-BD, Sect. 1.0, Step 5, Pg 2, Rev. 25
References to be provided:	None
Learning Objective:	ILC-ESFAS, Obj. 2.a STATE the function, design bases, and power supplies of the following ESFAS major components: Solid State Protection System (SSPS) Cabinets
Question Origin:	Bank HNP 2018 NRC RO 39
Comments:	None
Tier/Group:	T2/G1

39. 2024-2 NRC RO 039/BANK/C/A//OMM-004/NONE/2012 NRC RO 41/022 K4.02/SAT

Given the following plant conditions:

- The unit was operating at 100% power
- A Small Break LOCA has occurred
- Containment pressure is 3.8 psig and rising
- Containment temperature is 137°F and rising

Based on the conditions above, which ONE of the following completes the statement below?

Containment Fan Coolers will be running in ___(1)___ speed with the post-accident dampers ___(2)___ .

(Assume NO Operator actions)

A. (1) HIGH

(2) OPEN

B. (1) HIGH

(2) SHUT

C✔ (1) SLOW

(2) OPEN

D. (1) SLOW

(2) SHUT

Plausibility and Answer Analysis

Reason answer is correct: As containment pressure rises above 3.0 psig a SI signal will be generated. Upon receipt of a SI signal each containment fan cooler will start in slow speed and the post accident damper will automatically open if either of the associated fans are running in slow speed

A. Incorrect. The first part is plausible since fans normally run in high speed. The second part is correct.

B. Incorrect. The first part is plausible since fans normally run in high speed.. The second part is plausible since some ventilation dampers will shut during a SBLOCA (i.e. CNMT Cooling Coil Units).

C. Correct.

D. Incorrect. The first part is correct. The second part is plausible since some ventilation dampers will shut during a SBLOCA (i.e. CNMT Cooling Coil Units).

022 Containment Cooling System / SF5 CCS

022 K4.02; Knowledge of Containment Cooling System design features and/or interlocks that provide for the following: Correlation of fan speed and flowpath changes with containment pressure

(CFR: 41.7)

Importance Rating:	3.4
Cognitive Level:	High
Technical Reference:	OMM-004, Attachment 3, Pg 34, Rev. 44 OP-169, Sect 8.4, Step 3, Pg 27, Rev. 28 OP-169, Sect 8.9, Note prior to step 1, Pg 40, Rev. 28
References to be provided:	None
Learning Objective:	ILC-CCS Obj. 4.h Decribe the modes of operations and major flowpaths of the CCS in accordance with plant operating procedures: Operation of all CCS subsystems during LOSP and SI conditions.
Question Origin:	Bank 2012 NRC RO 41
Comments:	None
Tier/Group:	T2/G1

40. 2024-2 NRC RO 040/MODIFIED/C/A//OMM-004, OST-1118/NONE/2008 NRC RO 37/026 A3.01/SAT

Given the following plant conditions:

- Surveillance testing is in progress on Train 'A' Containment Spray
- Containment Spray 'A' Pump is running
- 1CT-24-SA, Containment Spray Eductor Test Valve, is open for testing

Subsequently the following occurs:

- A LOCA occurs in containment
- RCS pressure lowers to 1600 psig
- Containment Pressure rises to 7.5 psig and is stable

Based on the conditions above, which ONE of the following correctly identifies the position of the Containment Spray Eductor Test Valve and the status of the Containment Spray 'A' Pump?

	1CT-24-SA	Containment Spray 'A' Pump
A.	OPEN	RUNNING
B.	OPEN	OFF
C.	SHUT	RUNNING
D. ✔	SHUT	OFF

Plausibility and Answer Analysis

Reason answer is correct: 1CT-24 will close on Phase A (HIGH-2) if it is open and the Containment Spray pump 1A-SA will trip off. Current pressure is above HIGH-2 (3 psig), but below HIGH-3 (10 psig).

A. Incorrect. The first part is plausible since eductor valve is initially open before the LOCA occurs. The second part is plausible since containment spray pump 1A-SA was initially running for testing be fore the LOCA occurs.

B. Incorrect. The first part is plausible since eductor valve is initially open before the LOCA occurs. The second part is correct.

C. Incorrect. The first part is correct. The second part is plausible since containment spray pump 1A-SA was initially running for testing be fore the LOCA occurs. e.

D. Correct.

026 Containment Spray System / SF5 CCS

026 A3.01; Ability to monitor automatic features of the Containment Spray System, including: Pump starts and correct valve positioning

(CFR: 41.7 / 45.5)

Importance Rating:	4.1
Cognitive Level:	High
Technical Reference:	OMM-004, Attachment 4, Pg 44, Rev. 44 OST-1118, Sect 4.0, P&L 1, Pg 10, Rev. 58
References to be provided:	None
Learning Objective:	ILC-CSS, Obj. 6 Given a set of plant conditions, predit the response of the CSS and the effect on the overall plant conditions with regard to the following automatic control functions, signal, and interlock: Phase A Isolation
Question Origin:	Bank HNP 2008 NRC 37 (modified)
Comments:	Phonecon 4/22/2024: HNP discussed topic 026 A3.02, Containment Spray does not have any system heat exchangers, so Chief Examiner randomly selected a new K/A, keeping System topic 026, Containment Spray System. New K/A 026 A3.01: Ability to monitor automatic features of the Containment Spray System, including: Pump starts and correct valve positioning
Tier/Group:	T2/G1

41. 2024-2 NRC RO 041/NEW/FUNDAMENTAL//OP-112, ALB-004/NONE//026 K2.02/SAT

With regard to the Containment Spray System, which ONE of the following completes the statements below?

1CT-26, RWST to Containment Spray Pump 1A-SA, is powered from MCC ___(1)___ .

With Containment Spray Pump 1A-SA running, 1CT-26 will receive an automatic shut signal when RWST level lowers to ___(2)___ .

A. (1) 1A36-SA

(2) 23.4%

B. (1) 1A36-SA

(2) 3%

C✔ (1) 1A31-SA

(2) 23.4%

D. (1) 1A31-SA

(2) 3%

Plausibility and Answer Analysis

Reason answer is correct: 1CT-26 is powered from 1A31 per OP-112, Attachment 1. While in injection mode (CS pump running), 1CT-26 will automatically shut when RWST level lowers to the low-low level setpoint of 23,4% on 2/4 level indicators per APP-ALB-004, window 2-4.

A. Incorrect. The first part is plausible since 1A36-SA is the power supply to emergency related components the candidate may have the misconception that the components are CNMT Spray valves; however this is incorrect because 1A36-SA is the power supply to ventilation system valves. The second part is correct.

B. Incorrect. he first part is plausible since 1A36-SA is the power supply to emergency related components the candidate may have the misconception that the components are CNMT Spray valves; however this is incorrect because 1A36-SA is the power supply to ventilation system valves. The second part is plausible since 3% is the setpoint for the RWST empty annunciator on the Main Control Board.

C. Correct.

D. Incorrect. The first part is correct. The second part is plausible since 3% is the setpoint for the RWST empty annunciator on the Main Control Board.

026 Containment Spray System / SF5 CCS

026 K2.02; Knowledge of electrical power supplies to the following: Motor-operated valves

(CFR: 41.7)

Importance Rating:	3.6
Cognitive Level:	Low
Technical Reference:	OP-112, Attachment 1, Pg 40, Rev. 47 APP-ALB-004, Window 2-4, Pg 9, Rev. 18
References to be provided:	None
Learning Objective:	ILC-CSS, Obj. 6.d Given a set of plant conditions, PREDICT the response of the CSS and the effect on overall plant conditions with regard to the following automatic control functions, signals, and interlocks: Refueling Water Storage Tank Low-Low Level
Question Origin:	New
Comments:	None
Tier/Group:	T2/G1

42. 2024-2 NRC RO 042/PREVIOUS/FUNDAMENTAL//AOP-051/NONE/2020 NRC RO 16/039 A3.02/SAT

Given the following plant conditions:

- The unit is operating at 100% power
- A Main Steam line rupture in the Turbine Building has occurred
- The crew has manually tripped the Reactor

Which ONE of the following completes the statement below?

The Turbine Ventilating valves (1GS-97, 1GS-98) are expected to __(1)__ AND the MSR Non-Return valves (1HD-2, 1HD-3, 1HD-302, 1HD-303) are expected to __(2)__.

Valve Noun Name:

Turbine Ventilating valves
1GS-97, HP Turbine Vent to Cond (FCV-01TA-0415B)
1GS-98, HP Turbine Vent to Cond (FCV-01TA-0415A)

MSR Non-Return valves
1HD-2, MSR 1A-NNS Outlet to MSDT 1A-NNS
1HD-3, MSRDT 1A-NNS Outlet to 5-1A-NNS
1HD-302, MSR 1B-NNS Outlet to MSDT 1B-NNS
1HD-303, MSRDT 1B-NNS Outlet to 5-1B-NNS

A. (1) SHUT

(2) SHUT

B. (1) SHUT

(2) OPEN

C. ✓ (1) OPEN

(2) SHUT

D. (1) OPEN

(2) OPEN

Plausibility and Answer Analysis

Reason answer is correct: Any Reactor Trip generates a Turbine Trip signal. Since a Turbine Trip signal is present all of the Turbine Throttle valves would be shut and the Auto Stop Trip header would be depressurized causing the Turbine Ventilating valves to OPEN and MSR Non-Return valves to SHUT. 1GS-97 and 1GS-98 automatically open while 1HD-2, 1HD-3, 1HD-302 and 1HD-303 shut automatically based on the status of the Turbine Throttle valves or the Auto Stop Trip header pressure which are used to determine if the Turbine is tripped or latched.

A. Incorrect. The first part is plausible since with the Turbine tripped, 1st stage pressure is reduced to the pressure of the Main Condenser which is less than the 5 psig. The Gland Sealing Steam Spillover Regulator to the condenser modulates open if header pressure is > 5 psig and therefore the valve would be shut on a turbine trip; however, the ventilating valves open to provide a flowpath to the condenser for the steam trapped in the HP turbine. The second part is correct.

B. Incorrect. The first part is plausible since with the Turbine tripped, 1st stage pressure is reduced to the pressure of the Main Condenser which is less than the 5 psig. The Gland Sealing Steam Spillover Regulator to the condenser modulates open if header pressure is > 5 psig and therefore the valve would be shut on a turbine trip; however, the ventilating valves open to provide a flowpath to the condenser for the steam trapped in the HP turbine. The second part is plausible since the turbine drain valves automatically open following a turbine trip to provide a drain path for the residual steam trapped in the turbine as this steam begins to condense.

C. Correct.

D. Incorrect. The first part is correct. The second part is plausible since the turbine drain valves automatically open following a turbine trip to provide a drain path for the residual steam trapped in the turbine as this steam begins to condense.

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039 Main and Reheat Steam System / SF4S MRSS

039 A3.02; Ability to monitor automatic operation of the Main and Reheat Steam System, including: Isolation of the MRSS

(CFR: 41.5 / 45.5)

Importance Rating:	3.3
Cognitive Level:	Low
Technical Reference:	AOP-051, Sect 3.0, Step 8 and 9, Pg 5, Rev. 0
References to be provided:	None
Learning Objective:	ILC-MT, Obj. 9 Given a set of plant conditions, PREDICT the response of the main turbine and the effect on the overall plant conditions regarding automatic control functions, signals, and interlocks ILC-MSR, Obj. 7 Given a set of plant conditions, PREDICT the response of the MSR and the effect on the overall plant operation/conditions for major component failures/malfunctions, automatic control functions, and interlocks
Question Origin:	Previous HNP 2020 NRC RO 16
Comments:	None
Tier/Group:	T2/G1

43. 2024-2 NRC RO 043/NEW/C/A//AOP-010/NONE//059 K3.03/SAT

Given the following plant conditions:

- A unit startup is in progress in accordance with GP-005, (Operation Mode 2 to Mode 1).
- Reactor power is 57% power

Subsequently the 'A' Main Feedwater Pump trips:

Based on the conditions above, which ONE of the following completes the statement below?

In accordance with AOP-010, Feedwater Malfunctions, one of the required actions that the operating crew should take is to _____ .

A. start the “B” Main Feedwater Pump

B. check that a turbine runback occurs

C. ✔ maintain ALL Steam Generator levels greater than 30%

D. trip the Reactor and go to EOP-E-0, Reactor Trip or Safety Injection

Plausibility and Answer Analysis

Reason answer is correct: Given the initial conditions, with the plant operating at 57%, a 2nd Feedwater Pump was started at ~45-55% turbine load in accordance with GP-005, Power Operation Mode 2 to Mode 1, Section 6.0, step 140. With one feedwater pump tripped, the AOP-010, Section 3.0, Step 6 actions are to: (1) Maintain at least one Main Feedwater Pump running (running based on initial conditions) (2) Maintain feedwater flow to ALL SGs (done with one Feedwater pump running per initial conditions) (3) Maintain ALL SG levels greater than 30%.

A. Incorrect. Plausible since this would be a correct answer if initial Reactor power was less than 45% turbine load and the 2nd Main Feedwater Pump (“B”) had not yet been started IAW GP-005.

B. Incorrect. Plausible since this would be a correct answer if initial Reactor power was greater than 60%, but it’s not. It’s at 57%.

C. Correct.

D. Incorrect. Plausible since this would be a correct answer if Reactor Power was initially greater than 90%, but it’s not. It’s at 57%.

059 Main Feedwater System / SF4S MFW

059 K3.03; Knowledge of the effect that a loss or malfunction of the Main Feedwater System will have on the following systems or system parameters: S/Gs

(CFR: 41.7 / 45.6)

Importance Rating:	3.8
Cognitive Level:	High
Technical Reference:	AOP-010, Sect. 3.0, Step 6, Pg 5, Rev. 42
References to be provided:	None
Learning Objective:	AOP-LP-3.10, Obj. 4 Given plant conditions, DETERMINE the appropriate mitigating strategies and operator actions for Loss of Running Condensate/Feedwater Pumps in accordance with AOP-010
Question Origin:	New
Comments:	None
Tier/Group:	T2/G1

44. 2024-2 NRC RO 044/BANK/C/A//EOP-ECA-0.0/NONE/2013 NRC RO 46/061 A1.01/SAT

Given the following plant conditions:

- The unit was operating at 100% Reactor power when a station black out occured
- The crew is implementing ECA-0.0, Loss of All AC Power
- The TDAFW pump has been running in automatic with the controller setpoint at 31% for several minutes
- NO operator actions have been taken on the AFW system
- All SG NR levels are approximately 9% and lowering
- AFW flow is currently 160 kpph

Which ONE of the following identifies the action(s) required to be taken for these conditions?

A. Depress the RAISE pushbutton(s) on the TDAFW FCV(s).

B. Transition to FR-H.1, Response to Loss of Secondary Heat Sink.

C. Open 1 SG PORV (on the SG with the highest level) to lower SG pressure.

D. ✔ Place Aux FW Turbine SPD PDK-2180.1 in MAN and depress the output RAISE pushbutton.

Plausibility and Answer Analysis

Reason answer is correct: *ECA-0.0 step 4 RNO directions for AFW flow < 200 kpph are to ensure the TDAFW pump is running and adjust TDAFW pump speed controller as necessary to raise flow.*

A. Incorrect. *Plausible since the TDAFW speed controller is set to maintain approximately 31 psid. This setting is not normally changed during AFW feeding with the TDAFW pump. The setpoint of 31 psid is used to prevent SG overfill during a SG Tube Rupture event. However the TDAFW flow controllers are normally at 100% to maintain full flow on the start of the pump because unlike the MDAFW pumps the TDAFW pump FCVs do NOT auto open when given a start signal. Therefore in order to raise flow directions are provided in ECA-0.0 to increase TDAFW pump speed when flow is < 200 kpph to obtain adequate flow rates to overcome possible high SG pressures to raise SG level and control SG levels between 25% to 50%.*

B. Incorrect. *Plausible since NR level in all SGs are < 25% and total AFW flow is < 200 kpph which is a RED path condition requiring entry into FR-H.1 but a note prior to step 1 of ECA-0.0 states: CRF Status Trees should be monitored for information only. FR procedures should NOT be implemented unless directed by this procedure. In this case an operator can adjust the TDAFW speed control to raise flow to > 200 kpph and there is NO direction in ECA-0.0 to transistion to FR-H.1.*

C. Incorrect. *Plausible since decreasing SG pressures is directed during the performance of FR-H.1 to allow SG pressure to be reduced below the discharge pressure of the Condensate Booster pumps, however this is not correct because the transition to FR-H.1 is NOT implemented unless directed by ECA-0.0. There is NO direction in ECA-0.0 to transistion to FR-H.1.*

D. Correct.

061 Auxiliary/Emergency Feedwater System / SF4S AFW

061 A1.01; Ability to predict and/or monitor changes in parameters associated with operation of the Auxiliary/Emergency Feedwater System, including: S/G Level

(CFR: 41.5 / 45.5)

Importance Rating:	4.2
Cognitive Level:	Low
Technical Reference:	EOP-ECA-0.0, Step 4, Pg 5, Rev. 11
References to be provided:	None
Learning Objective:	EOP-LP-3.07, Obj. 6 Given a set of plant conditions, DETERMINE the expected plant response and EXPLAIN the required operator actions, including the associated basis/intent for ECA-0.0, 0.1 & 0.2 steps, notes and cautions
Question Origin:	Bank HNP 2013 NRC RO 46
Comments:	None
Tier/Group:	T2/G1

45. 2024-2 NRC RO 045/BANK/C/A//1364-870, ALB-014/NONE/2016 NRC RO 45/061 A3.01/

Given the following plant conditions:

- A Reactor Trip and Safety Injection have actuated
- A MSLI has actuated
- Steam Generator parameters have lowered to the following values:

SG	NR Level	Pressure
A	32%	870 psig
B	12%	420 psig
C	34%	830 psig

Based on the conditions above, which ONE of the following completes the statements below?

The expected position of 1AF-143, STM TURB AUX FW B Isolation, is ___(1)___ .

AND

The expected position of 1MS-70, B SG to AFW Turbine, is ___(2)___ .

(Assume NO operator actions have been taken)

A. (1) OPEN

   (2) OPEN

B. (1) OPEN

   (2) CLOSED

C. (1) CLOSED

   (2) CLOSED

D. (1) CLOSED

   (2) OPEN

Plausibility and Answer Analysis

Reason answer is correct: FCV-2071B(1AF-130) and 1AF-143 have received an AFW isolation signal due to the Main Steam Isolation signal coincident with high differential steam pressure. No automatic start signal has been generated for the TDAFW pump (only 1 SG low-low level has occurred) so the steam supply valves, 1MS-70 and 1MS-72, should be closed.

A. Incorrect. The first part is plausible since the valve controller is set at 100% per OP-137, and a MDAFWP start signal has been generated which would open the FCVs from the MDAFW pumps (not TDAFW), however it received an AFW isolation signal due to the Main Steam Isolation signal coincident with high differential steam pressure. The second part is plausible since this valve would open on low-low level in 2 SGs.

B. Incorrect. The first part is plausible since the valve controller is set at 100% per OP-137, and a MDAFWP start signal has been generated which would open the FCVs from the MDAFW pumps (not TDAFW), however it received an AFW isolation signal due to the Main Steam Isolation signal coincident with high differential steam pressure. The second part is correct since no automatic start signal has been generated for the TDAFW pump (only 1 SG low-low level has occurred) so the steam supply valves should be closed

C. Correct.

D. Incorrect. The first part is correct since the FCV received an AFW isolation signal due to the Main Steam Isolation signal coincident with high differential steam pressure. The second part is plausible since this valve would open on low-low level in 2 SGs.

061 Auxiliary/Emergency Feedwater System / SF4S AFW

061 A3.01; Ability to monitor automatic features of the Auxiliary/Emergency Feedwater System, including: AFW system automatic start

(CFR: 41.7 / 45.7)

Importance Rating:	4.2
Cognitive Level:	High
Technical Reference:	ALB-014, Window 2-1A, Rev 30, Page 9 EMDRAC 1364-0870, AFW Isolation logic, Rev. 6
References to be provided:	None
Learning Objective:	ILC-AFW, Obj. 8.a State the AFW controls and interlocks (and the basis for each) associated with the following: 1MS-70 and 1MS-72, TD AFW pump steam admission valves ILC-AFW, Obj. 8.d State the AFW controls and interlocks (and the basis for each) associated with the following: 1FK-2071-A1, B1, and C1, TD AFW pump flow controllers
Question Origin:	Bank HNP 2016 NRC RO 45
Comments:	None
Tier/Group:	T2/G1

46. 2024-2 NRC RO 046/NEW/FUNDAMENTAL//OP-156.02/NONE//062 K1.10/SAT

Which ONE of the following completes the statements below in accordance with OP-156.02, AC Electrical Distribution?

When checking the status of the ATS for MCC 1D23 the normal power supply is 480 bus ___(1)___ AND if on the emergency power supply, MCC 1D23 will automatically transfer to the normal power supply ___(2)___ after the normal power supply is restored.

A. (1) 1E2

   (2) 10 seconds

B. (1) 1E2

   (2) 30 minutes

C. (1) 1D2

   (2) 10 seconds

D. ✔ (1) 1D2

   (2) 30 minutes

Plausibility and Answer Analysis

Reason answer is correct: Due to the TDEN timer function of the Auto Transfer Switch, the re-transfer to Source 1 supplying the MCC 1D23 will occur 30 minutes following closure of Aux Bus Breaker 1D2-7B.

A. Incorrect. The first part is plausible since the normal power supply to the ABT for MCC 1D14 is 1E1 the candidate may have the misconception that MCC 1D23 is normally power in the same manner; however this is incorrect because MCC 1D23 is normally powered from 1D2. The second part is plausible since ATS incorporates a 10 second delay before transferring MCC 1D23 to the DSDG; however this is incorrect because the delay is 30 minutes following the restoration of the normal power supply.

B. Incorrect. The first part is plausible since the normal power supply to the ABT for MCC 1D14 is 1E1 the candidate may have the misconception that MCC 1D23 is normally power in the same manner; however this is incorrect because MCC 1D23 is normally powered from 1D2. The second part is correct.

C. Incorrect. The first part is correct. The second part is plausible since ATS incorporates a 10 second delay before transferring MCC 1D23 to the DSDG; however this is incorrect because the delay is 30 minutes following the restoration of the normal power supply.

D. Correct.

062 AC Electrical Distribution System / SF6 ED AC

062 K1.10; Knowledge of the physical connections and/or cause and effect relationships between the AC Electrical Distribution System and the following systems: Non-Class 1E AC distribution system

(CFR: 41.4 to 41.8)

Importance Rating:	3.1
Cognitive Level:	Low
Technical Reference:	OP-156.02, Sect. 8.35, Step 4, Pg 328, Rev. 181 OP-156.02, Sect. 8.35, Note prior to step 2, Pg 328, Rev. 181
References to be provided:	None
Learning Objective:	ILC-DCP, Obj. 4.c DESCRIBE the modes of operations and major flowpaths of the DCP System in accordance with plant operating procedures including: Battery Chargers (including local indications and controls)
Question Origin:	Bank
Comments:	None
Tier/Group:	T2/G1

47. 2024-2 NRC RO 047/NEW/FUNDAMENTAL//EOP-ECA-0.0/NONE//063 A4.02/ENHANCE

Given the following plant conditions:

- The unit is operating at 100% power, when a Loss of All AC occurs
- The operating crew entered EOP-ECA-0.0, Loss of All AC Power

Subsequently:

- Main turbine speed is 0 RPM and the turbine shaft rotation has been locally verified to stop

Based on the conditions above, which ONE of the following completes the statements below regarding the strategy for conserving DC electrical power?

EOP-ECA-0.0 has a Time Sensitive Action to stop the DC Emergency Bearing Oil Pump within a MAXIMUM of ___(1)___ minutes following a loss of all AC power.

After securing the DC Emergency Bearing Oil Pump, EOP-ECA-0.0 directs ___(2)___ .

A. (1) 30

(2) placing the MCB control switch in “Pull-To-Lock”

B. (1) 30

(2) opening the breaker on panel DP-1A-SA

C✔ (1) 60

(2) placing the MCB control switch in “Pull-To-Lock”

D. (1) 60

(2) opening the breaker on panel DP-1A-SA

Plausibility and Answer Analysis

Reason answer is correct: EOP-ECA-0.0 has a time sensitive action to stop the DC Emergency Bearing Oil Pump within 60 minutes as part of the Station Blackout Coping Analysis. This is done per step 24 which has the operator place the DC Emergency Bearing Pump Control Switch in Pull-To-Lock.

A. Incorrect. The first part is plausible since there is a time critical action to open inverter and MCB inverter doors within 30 minutes as part of SBO Coping Analysis. The second part is correct.

B. Incorrect. The first part is plausible since there is a time critical action to open inverter and MCB inverter doors within 30 minutes as part of SBO Coping Analysis. The second part is plausible since the load shedding per ECA-0.0,Attachment 3 is done by locally opening DC breakers in the field in the TB and RAB. An example of breakers opening on a DC panel in the TB is DP-1A11 on TB 286' elevation.

C. Correct.

D. Incorrect. The first part is correct. The second part is plausible since the load shedding per ECA-0.0, Attachment 3 is done by locally opening DC breakers in the field in the TB and RAB. An example of breakers opening on a DC panel in the TB is DP-1A11 on TB 286' elevation.

063 DC Electrical Distribution System / SF6 ED DC

063 A4.02; Ability to manually operate and/or monitor in the control room: Load shedding

(CFR: 41.7 / 45.5 to 45.8)

Importance Rating:	3.6
Cognitive Level:	Low
Technical Reference:	EOP-ECA-0.0, Time Sensitive Actions, Pg 2, Rev. 11 EOP-ECA-0.0, Note prior to Step 24, Pg 43, Rev. 11 EOP-ECA-0.0, Attachment 9, Step 24, Pg 130, Rev. 11
References to be provided:	None
Learning Objective:	EOP-LP-3.07, Obj. 6 Given a set of plant conditions, DETERMINE the expected plant response and EXPLAIN the required operator actions, including the associated basis/intent for ECA-0.0, 0.1 & 0.2 steps, notes, and cautions.
Question Origin:	New
Comments:	None
Tier/Group:	T2/G1

48. 2024-2 NRC RO 048/BANK/C/A//OP-155, AOP-025-BD/NONE/2018 NRC RO 50/064 K6.11/SAT

Given the following plant conditions:

- The unit is at 100% power
- A loss of DC Bus 1A-SA occurs

Based on the conditions above, which ONE of the following choices regarding the 'A' EDG correctly completes the statement below?

The Governor and Generator Excitation circuits will be __(1)__ and the EDG Output breaker __(2)__ be closed from the MCB.

A. (1) de-energized

   (2) can

B. ✔ (1) de-energized

   (2) can NOT

C. (1) energized

   (2) can

D. (1) energized

   (2) can NOT

Plausibility and Answer Analysis

Reason answer is correct: Part 1: OP-155, Diesel Generator Emergency Power System, has a section to restore the Governor after DC power is lost. Additionally, notes are in the procedure for loss of DC power to the EDG. The unavailability of 125 VDC will prevent the generator to flash and electronic speed control is NOT available if there is a loss of 125 VDC control power. AOP-025 Basis document section 3.3 step 2 also provides indication that the governor will lose power with a loss of DC. Part 2: The EDG Output breaker is a 6.9 KV breaker that is remotely operated via 125 VDC power. The effects of losing 125 VDC to a 6.9 KV breaker are as follows:

No power to closing coil (can't shut breaker remotely)
No power to trip coil (can't open breaker remotely)
No power to charge the closing spring (depending on the status of the breaker before the loss of 125 VDC, may only get 1 close and 1 open cycle out of breaker before manually changing closing spring

A. Incorrect. Plausible since the Governor and Excitation circuits will de-energize, however to operate the EDG Output breaker from the MCB requires DC Control Power.

B. Correct

C. Incorrect. Plausible if the candidate has a misconception that the Governor, Excitation, and Control power circuits are supplied with power from the AC Electrical Distribution System similar to the Main Generator.

D. Incorrect. Plausible if the candidate has a misconception that the Governor and Excitation circuits are supplied by the AC Electrical Distribution System similar to the Main Generator.

064 Emergency Diesel Generators / SF6 EDG

064 K6.11; Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the Emergency Diesel Generators: DC distribution system

(CFR: 41.7 / 45.7)

Importance Rating:	3.9
Cognitive Level:	High
Technical Reference:	OP-155, Sect. 8.14, Note prior to step 10.e.5.d, Pg 90, Rev. 93 AOP-025-BD, Section 2.0, Pg 64, Rev. 23
References to be provided:	None
Learning Objective:	AOP-LP-3.25, Obj. 5.d Given a set of plant conditions, Determine the following for AOP-025: Effects of a loss of a DC bus on equipment operability (e.g. EDG)
Question Origin:	Bank HNP 2018 NRC RO 50
Comments:	None
Tier/Group:	T2/G1

49. 2024-2 NRC RO 049/NEW/FUNDAMENTAL//AOP-005/NONE//073 K4.01/SAT

Which ONE of the following identifies a system radiation monitor that will automatically isolate the process flowpath to terminate a potential release during a high radiation condition?

A. REM-01CC-3501ASA, CCW Train A

B. ✔ REM-21WL-3541, Waste Monitor Tank Discharge

C. REM-01BD-3527, Steam Generator Blowdown Monitor

D. REM-01SW-3500B, RAB from Cont Turb Bldg to CW Monitor

Plausibility and Answer Analysis

Reason answer is correct: REM-3541 detects high radiation on discharge piping of WST Monitor Tanks. When this radiation monitor goes into a high alarm condition, it will shut normally open 3FD-421, FD Wst Mon Tks Disch Isol Valve.

A. Incorrect. Plausible since this system does have a radiation monitor in its process flowpath; however the monitor has no automatic isolations that would terminate a release.

B. Correct

C. Incorrect. Plausible since this system does have a radiation monitor in its process flowpath however, the monitor has no automatic isolations that would terminate a release.

D. Incorrect. Plausible since this system does have a radiation monitor in its process flowpath however, the monitor has no automatic isolations that would terminate a release

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073 Process Radiation Monitoring System / SF7 PRM

073 K4.01; Knowledge of Process Radiation Monitoring System design features and/or interlocks that provide for the following: Release termination

(CFR: 41.7)

Importance Rating:	3.9
Cognitive Level:	Low
Technical Reference:	AOP-005, Attachment 9, Pg 27, Rev. 31
References to be provided:	None
Learning Objective:	ILC-RMS, Obj. 6.a Given a set of plant conditions, PREDICT the response of the RMS with regard to automatic control functions, signals, and interlocks: High Radiation Level
Question Origin:	New
Comments:	None
Tier/Group:	T2/G1

50. 2024-2 NRC RO 050/BANK/FUNDAMENTAL///NONE/2012 NRC RO 52/076 A2.08/SAT

Given the following plant conditions:
- The plant is operating at 100% power
- An overcurrent fault causes 1B35-SB to be deenergized

Subsequently ALB-002-7-1, Serv Wtr Supply Hdr B Low Press, alarms
- ESW pump 'B' automatically starts

Based on the conditions above, which ONE of the following completes the statements below?

Following the automatic start of the ESW pump 'B' ___(1)___ shut.

AND

Entry into AOP-022, Loss of Service Water, ___(2)___ required.

Valve noun name:
1SW-40, Normal SW Supply to Header B
1SW-274, Header B Return to Normal Header

A. (1) Neither 1SW-40 OR 1SW-274 will

   (2) is NOT

B. ✔ (1) Neither 1SW-40 OR 1SW-274 will

   (2) is

C. (1) 1SW-40 will shut but 1SW-274 will NOT

   (2) is NOT

D. (1) 1SW-40 will shut but 1SW-274 will NOT

   (2) is

Plausibility and Answer Analysis

Reason answer is correct: Both 1SW-40 and 1SW-274 are powered from 480V MCC 1B35-SB, with power lost to both valves they will not realign automatically and remain in the open position. AOP-022 entry conditions for loss of header include ESW Header pressure low as indicated by PI-9101B less than 53 psig or ALB-002 window 7-1 in alarm.

A. Incorrect. The first part is correct. The second part is plausible since the service water system is designed with isolation valves powered from the opposite safety train to ensure isolation capabilty from the NSW system is preserved following the loss of one train. As a result of the system design entry in to AOP-022 is delay to allow the system to re-align and entry is evaluated based on the system response; however ALB-002 window 7-1 combined with the start of the ESW Pump 'B' is an indication that the ESW header is losing pressure and entry conditions for AOP-022 are met.

B. Correct.

C. Incorrect. The first part is plausible because the service water system is designed with isolation valves powered from the opposite safety train to ensure isolation capabilty from the NSW system is preserved following the loss of one train. Candidate must know the power supply for each valve to correctly answer the question. The second part is plausible since the service water system is designed with isolation valves powered from the opposite safety train to ensure isolation capabilty from the NSW system is preserved following the loss of one train. As a result of the system design entry in to AOP-022 is delay to allow the system to re-align and entry is evaluated based on the system response; however ALB-002 window 7-1 combined with the start of the ESW Pump 'B' is an indication that the ESW header is losing pressure and entry conditions for AOP-022 are met.

D. Incorrect. The first part is plausible because the service water system is designed with isolation valves powered from the opposite safety train to ensure isolation capabilty from the NSW system is preserved following the loss of one train. Candidate must know the power supply for each valve to correctly answer the question. The second part is correct.

076 Service Water System / SF4S SW

076 A2.08; Ability to (a) predict the impacts of the following on the Service Water System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations: Malfunction of breakers, relays, and disconnects

(CFR: 41.5 / 41.1 / 43.5 / 45.3 / 45.6 / 45.13)

Importance Rating:	3.5
Cognitive Level:	High
Technical Reference:	OP-139, Attachment 1, Page 192, Rev 147 AOP-022, Sect 2.0, Pg 4, Rev 46
References to be provided:	None
Learning Objective:	Service Water System Obj. 4 Given a set of plant conditions, Predict the response of the Service Water system and the effects on overall plant operations
Question Origin:	Bank 2012 NRC RO question 52: (modified for procedure use)
Comments:	None
Tier/Group:	T2/G1

51. 2024-2 NRC RO 051/NEW/C/A//AOP-017, ALB-002/NONE//078 A4.03/SAT

Given the following Main Control Board indications:

Which of the following correctly completes the statements below regarding operation of the Instrument and Service Air System?

The Main Control Room indication for 1SA-506, Service Air Isolation, is a ___(1)___ .

For the indications, the Reactor Operator would expect this valve to be ___(2)___ .

A. (1) valve position indicating light on control switch

   (2) open

B. (1) valve position indicating light on control switch

   (2) shut

C. (1) light on Status Light Box 3

   (2) open

D✔ (1) light on Status Light Box 3

   (2) shut

Plausibility and Answer Analysis

Reason answer is correct: In accordance with AOP-017 and APP-ALB-002, window 8-1, when instrument air pressure lowers <90 psig, 1SA-506 will automatically shut. PI-9850 shows pressure is <90 psig so this valve will be shut. The operator will be able to verify this by observing the light indication on Status Light Box 3.

A. Incorrect. The first part is plausible since there are some valves that do have a position indication in the Main Control Room by the control switch or controller when instrument air pressure is lost (examples: FRVs, Charging flow control); however this incorrect because this valve is not operated from the Main Control Room but does have light indication on Status Light Box 3. The second part is plausible since the trainee may have the misconception that the automatic action for the valve to be shut does not occur until the alarm setpoint is reached at 75 psig; however this is incorrect because when ALB-002, 8-1 comes in, the actions are to verify that 1SA-506 has already automatically shut at 90 psig.

B. Incorrect. The first part is plausible since there are some valves that do have a position indication in the Main Control Room by the control switch or controller when instrument air pressure is lost (examples: FRVs, Charging flow control); however this incorrect because this valve is not operated from the Main Control Room but does have light indication on Status Light Box 3. The second part is correct.

C. Incorrect. The first part is correct. The second part is plausible since the trainee may have the misconception that the automatic action for the valve to be shut does not occur until the alarm setpoint is reached at 75 psig; however this is incorrect because when ALB-002, 8-1 comes in, the actions are to verify that 1SA-506 has already automatically shut at 90 psig.

D. Correct.

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078 Instrument Air System / SF8 IAS

078 A4.03; Ability to manually operate and/or monitor in the control room: Isolation/restoration of instrument air to isolated components/systems (CFR: 41.7 / 45.5 to 45.8)

Importance Rating:	3.2
Cognitive Level:	High
Technical Reference:	AOP-017, Sect. 4.0, Step 4, Pg 5, Rev. 42
References to be provided:	None
Learning Objective:	AOP-LP-017, Obj. 3 Given a set of plant conditions, DETERMINE the appropriate plant response and operator actions in accordance with AOP-017
Question Origin:	New
Comments:	None
Tier/Group:	T2/G1

52. 2024-2 NRC RO 052/NEW/FUNDAMENTAL//EOP-E-0, ATT 7/NONE//078 G2.2.2/

Given the following conditions:

- With the unit operating at 100%, a plant transient has resulted in a Loss of Offsite Power
- EOP-ES-0.1, Reactor Trip Response, has been entered
- The CRS has directed the performance of Attachment 1, Response To Loss Of Offsite Power to AC Emergency Buses, which refers to EOP-E-0, Attachment 7, Operation Of Air Compressors in Local Control Mode

Based on the conditions above, which one of the following completes the statements below?

Attachment 7 is used to establish Local Control Mode for ___(1)___ .

The actions of Attachment 7 are completed locally in the Turbine Building at ___(2)___ .

Procedure Title:
EOP-E-0, Reactor Trip Or Safety Injection

A. (1) ALL three Air Compressors

   (2) the CAS control panel

B. (1) ALL three Air Compressors

   (2) each Air Compressor

C. (1) ONLY the 1A and 1B Air Compressors

   (2) the CAS control panel

D. ✔ (1) ONLY the 1A and 1B Air Compressors

   (2) each Air Compressor

Plausibility and Answer Analysis

Reason answer is correct: After 480V emergency buses 1A1 and 1B1 have been re-energized, E-0, Attachment 7 places air compressors 1A and 1B in the correct switch alignment for Local Control mode by placing the individual air compressor key on the compressor control panel in position 2. The start pushbutton on the control panel is depressed to start the compressor. The last step of the attachment is to depress the reset pushbutton and clear the power failure alarm.

A. Incorrect. The first part is plausible since the station has three air compressors all which go to local control mode on a loss of power to CAS however in this case air compressor 1A and 1B internal circuitry shifts to "local" mode as a result of the sequencers stripping buses 1A1 and 1B1. The second part is plausible since the candidate may have the misconception that actions to isolate the Air Compressor from the CAS controller are performed by E-0, Attachment 7 since isolating the compressor from the CAS controller transfers the control of the associated Air Compressor to the compressors local transducer which is the same control sensor used by the compressor when the key is in position 2 on its control panel.

B. Incorrect. The first part is plausible since the station has three air compressors all which go to local control mode on a loss of power to CAS however in this case air compressor 1A and 1B internal circuitry shifts to "local" mode as a result of the sequencers stripping buses 1A1 and 1B1. The second part is correct.

C. Incorrect. The first part is correct. The second part is plausible since the candidate may have the misconception that actions to isolate the Air Compressor from the CAS controller are performed by E-0, Attachment 7 since isolating the compressor from the CAS controller transfers the control of the associated Air Compressor to the compressors local transducer which is the same control sensor used by the compressor when the key is in position 2 on its control panel.

D. Correct.

078 Instrument Air System / SF8 IAS

078 G2.2.2; Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels

(CFR: 41.6 / 41.7 / 45.2)

Importance Rating:	4.6
Cognitive Level:	Low
Technical Reference:	EOP-E-0, Attachment 7, Pg 69, Rev. 7
References to be provided:	None
Learning Objective:	ILC-ISA, Obj. 5.c DESCRIBE the following modes of operations and major flowpaths of the ISA in accordance with plant operating procedures: CAS Controller (and sequences) and ILC-ISA, Obj. 9.b Given a set of plant conditions, PREDICT the response of the ISA and the effect on overall plant conditions with regard to the following signals or conditions: Loss of Off-site Power (LOOP)
Question Origin:	New
Comments:	None
Tier/Group:	T2/G1

53. 2024-2 NRC RO 053/NEW/FUNDAMENTAL//EOP-E-0, OMM-004/NONE//103 A2.06/SAT
A plant transient results in Containment pressure rising to 3.9 psig

Based on the condition above, which ONE of the following completes the statement below with regard to an action the operating crew will take with Containment Isolation?

The operating crew will verify that ___(1)___ is shut in accordance with OMM-004, Post Trip / Safeguards Actuation Review, Attachment ___(2)___ .

A. (1) 1CC-207, CCW to RCPs

(2) 4, Containment Isolation Phase A Verification

B. (1) 1CC-207, CCW to RCPs

(2) 9, Containment Isolation Phase B Verification

C. ✔ (1) 1IA-819, Containment Instrument Air

(2) 4, Containment Isolation Phase A Verification

D. (1) 1IA-819, Containment Instrument Air

(2) 9, Containment Isolation Phase B Verification

Plausibility and Answer Analysis

Reason answer is correct: Phase A Containment Isolation occurs at 3.0 psig which isolated non-essential loads to containment. Phase B Containment Isolation occurs at 10.0 psig. 1IA-819 will shut on a Phase ‘A’ Containment Isolation Signal. EOP-E-0, step 20 states: Ensure Alignment Of Components From Actuation Of ESFAS Signals Using Attachment 3, "Safeguards Actuation Verification" which directs the use of OMM-004 per step 6: Ensure CNMT Phase A Isolation Valves – SHUT (Refer to OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 4.)

A. Incorrect. The first part is plausible since this is a Containment Isolation Valve, however it shuts on a Phase B Isolation signal at 10 psig. The second part is correct.

B. Incorrect. The first part is plausible since this is a Containment Isolation Valve, however it shuts on a Phase B Isolation signal at 10 psig. The second part is plausible since 1CC-207 does match up with the phase B isolation signal; however this is incorrect because phase B occurs at 10 psig.

C. Correct.

D. Incorrect. The first part is correct. The second part is plausible since attachment 9 is used for Phase B however, the stem only gave conditions for Phase A. In addition, 1IA-819 is not a phase B valve.

103 Containment System / SF5 CNT

103 A2.06; Ability to (a) predict the impacts of the following on the Containment System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations: High containment pressure

(CFR: 41.5 / 43.5 / 45.3 / 45.13)

Importance Rating:	4.5
Cognitive Level:	Low
Technical Reference:	EOP-E-0, Attachment 10, Pg 79, Rev. 15 OMM-004, Attachment 1, Pg 18, Rev. 44 OMM-004, Attachment 4, Pg 44, Rev. 44
References to be provided:	None
Learning Objective:	ILC-ESFAS, Obj. 7 STATE the interlocks, permissives, and automatic control functions of the ESFAS, and the basis for each ILC-ESFAS, Obj. 8.c Given a set of plant conditions, PREDICT the response of the ESFAS and the effect on overall plant conditions with regard to the following automatic control functions, signals, and interlocks: Phase A (T)
Question Origin:	New
Comments:	None
Tier/Group:	T2/G1

54. 2024-2 NRC RO 054/BANK/FUNDAMENTAL//FSAR, OMM-004/NONE//103 K5.01/

Given the following plant conditions:

- The Containment Isolation System (CIS), Phase A has actuated as a result of Loss of Coolant Accident
- CNMT pressure has risen to 3.4 psig

Based on the condition above, which ONE of the following completes the statement below?

Actuation of CIS in this condition will prevent the ___(1)___ while allowing for continued ___(2)___ .

A. ✔ (1) release of radioactive material

(2) operation of reactor coolant pumps

B. (1) release of radioactive material

(2) operation of steam dumps

C. (1) failure of any fission product barrier

(2) operation of reactor coolant pumps

D. (1) failure of any fission product barrier

(2) operation of steam dumps

Plausibility and Answer Analysis

Reason answer is correct: The purpose of the containment isolation system is to prevent the release of radioactivity through containment mechanical penetrations after postulated accidents (i.e. LOCAs, MSLBs, etc.). This action is designed to occur in two stages and does not interfere with ESF functions. Phase A occurs based on the actuation of SI at 3 psig in containment, PRZ pressure lowering to 1850 psig or main steam header pressure lowering to 601 psig. Phase A will isolate non ESF mechanical penetrations with the exception of CCW to the Reactor Coolant Pumps which will be isolated by Phase B when containment pressure exceeds 10 psig.

A. Correct

B. Incorrect. The first part is correct. The second part is plausible since S/G Steam dumps are used for max rate cooldown during the implementation of the EOP network when a Steam Generator Tube rupture is in progress the candidate may have the misconception the this is one of the ESF systems designed to remain in operation during a LOCA; however this is incorrect because Phase A isolate mechanical penetrations inside containment and the S/G Steam dumps are not and ESF system.

C. Incorrect. The first part is plausible since containment is the last of the 3 fission product barrier to prevent the release of fission products to the public and Phase A isolates the mechanical penetrations exiting containment; however this is incorrect because phase A while helps to ensure the containment fission barrier is intact its purpose is to prevent the release of radioactive material. The second part is correct.

D. Incorrect. The first part is plausible since containment is the last of the 3 fission product barrier to prevent the release of fission products to the public and Phase A isolates the mechanical penetrations exiting containment; however this is incorrect because phase A while helps to ensure the containment fission barrier is intact its purpose is to prevent the release of radioactive material. The second part is plausible since S/G Steam dumps are used for max rate cooldown during the implementation of the EOP network when a Steam Generator Tube rupture is in progress the candidate may have the misconception the this is one of the ESF systems designed to remain in operation during a LOCA; however this is incorrect because Phase A isolate mechanical penetrations inside containment and the S/G Steam dumps are not and ESF system.

103 Containment System / SF5 CNT

103 K5.01; Knowledge of the operational implications or cause and effect relationships of the following concepts as they apply to the Containment System: Containment isolation/containment integrity

(CFR: 41.5 / 45.7)

Importance Rating:	4.1
Cognitive Level:	Low
Technical Reference:	UFSAR, Chapter 6.2.4, Step 6.2.4.1, Pg 58, Amend 65 OMM-004, Attachment 4, Pg 43 - 45, Rev. 44
References to be provided:	None
Learning Objective:	ILC-CIS, Obj 1 State the purpose and design function of the containment isolation system ILC-CIS, Obj 3.a Describe the operation of the containment isolation system: Containment isolation Phase A
Question Origin:	Bank
Comments:	None
Tier/Group:	T2/G1

55. 2024-2 NRC RO 055/BANK/C/A//ILC-RODCS/NONE//001 K6.06/ENHANCE

Given the following plant conditions:

- The unit is operating at 100% power

Subsequently the 1A Rod Drive MG set trips

Which ONE of the following will be the plant response to losing the 1A Rod Drive MG set?

(Assume NO Operator action)

A. The Movable and Lift coils will lose power.

B. ✔ Rod control will continue to operate as normal.

C. 1B Rod Drive MG set will autostart to provide power.

D. The unit will trip due to loss of power to the Stationary coils.

Plausibility and Answer Analysis

Reason answer is correct: At 100% power both the 1A and 1B rod drive MG sets are in service operating in parallel to provide a redundant power supply to the rod control system. As a result if the 1A rod drive MG set were to be de-energized power would be maintained to the rod control system by the 1B rod drive MG set and rod control would continue to operate normally.

A. Incorrect. Plausible since movable and lift coils are energized as part of the sequence to move rods in or out and they are powered by the output of the rod drive MG sets ; however this is incorrect because the loss of power to 1A rod drive MG set does not result in a loss of power to the coil assemblies due to the 1B rod drive MG set running in parallel.

B. Correct.

C. Incorrect. Plausible since multiple plant systems have standby components that automatically start when the in service component fails (i.e. NSW Pumps, Cond Vac Pumps, CCW Pumps). Additionally multiple systems have dual power supplies that automatically swap sources to an alternate power supply (i.e. ABTs or static transfer switches); however this is incorrect because the loss of power to 1A rod drive MG set does not result in an auto start of the 1B rod drive MG set due to the 1B rod drive MG set running in parallel.

D. Incorrect. Plausible since stationary coils are energized while holding the rods in the current position and they are powered by the output of the rod drive MG sets ; however this is incorrect because the loss of power to 1A rod drive MG set does not result in a loss of power to the coil assemblies due to the 1B rod drive MG set running in parallel.

001 Control Rod Drive System / SF1 CRDS

001 K6.06; Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the Control Rod Drive System: Rod drive M/G set(s)

(CFR: 41.1 / 41.2 / 41.5 / 41.6 / 45.7)

Importance Rating:	3.8
Cognitive Level:	Low
Technical Reference:	VM-PRO-V01, Sect. 1.2.2, Step 1.2.2.1, Pg 30, Rev. 7
References to be provided:	None
Learning Objective:	ILC-RODCS, Obj. 4.b DESCRIBE RODCS normal operation, including operation sequence, normal parameters, and expected system response, including: How the Rod Drive MGs, Reactor Trip Breaker, CRDMs, Logic Cabinet & Power Cabinet interface to allow rod motion
Question Origin:	Bank
Comments:	None
Tier/Group:	T2/G2

56. 2024-2 NRC RO 056/NEW/C/A//AOP-019/NONE//011 A1.07/ENHANCE

Given the following plant conditions:
- The unit is operating stable at 100% power

Subsequently an RCS leak results in the following:
- PRZ pressure is stable at 2225 psig
- PRZ level is 58.2%

Based on the conditions above, which ONE of the following completes the statements below?

The Pressurizer Level Control system output signal for FK-122.1 (1CS-231), Charging flow valve, will ___(1)___ .

AND

The Pressurizer ___(2)___ .

(Assume NO operator actions)

A. (1) rise

(2) Group 'C' heaters will be full OFF

B. ✔ (1) rise

(2) spray valves will be shut

C. (1) lower

(2) Group 'C' heaters will be full OFF

D. (1) lower

(2) spray valves will be shut

Plausibility and Answer Analysis

Reason answer is correct: *Pressurizer programmed level input signal varies as a function of the median loop Tavg signal. The program changes reference PRZ level from 25% to 60% as Tavg varies from 557°F to 588.8°F. With PRZ level control in Automatic and actual PRZ level less than program level, FCV-122 demand signal will rise opening the valve to raise flow to the RCS and thus restore level to program. At power PRZ pressure is maintained at 2235 psig in Auto control with PK-444A1, PRZ Master Pressure Controller by controlling cycling of PRZ heaters and normal spray valves. PRZ spray valves begin to throttle open at 2260 psig and are full open at 2310 psig. With PRZ pressure at 2222 psig the Group C heaters would be partial open and the spray valves would be closed.*

B. Incorrect. The first part is correct. The second part is plausible since the PRZ backup heater are off when PRZ pressure is above 2218 the candidate may have the misconception that Group C Heater operate in the same fashion; however this is incorrect because the Group C heater are full off above 2250 psig.

B. Correct.

C. Incorrect. The first part is plausible since controllers such as the Master Pressure controller have a setpoint adjustment that will lower to raise the controller output the candidate may have the misconception that Charging flow control valve operates in this inverse manner and determine that the output will lower; however this is incorrect because charging flow control valve setpoint is determined by median Tavg and the output signal will rise to provide more charging flow and restore PRZ level back to setpoint. The second part is plausible since the PRZ backup heater are off when PRZ pressure is above 2218 the candidate may have the misconception that Group C Heater operate in the same fashion; however this is incorrect because the Group C heater are full off above 2250 psig.

D. Incorrect. The first part is plausible since controllers such as the Master Pressure controller have a setpoint adjustment that will lower to raise the controller output the candidate may have the misconception that Charging flow control valve operates in this inverse manner and determine that the output will lower; however this is incorrect because charging flow control valve setpoint is determined by median Tavg and the output signal will rise to provide more charging flow and restore PRZ level back to setpoint. The second part is correct.

011 Pressurizer Level Control System / SF2 PZR LCS

011 A1.07; Ability to predict and/or monitor changes in parameters associated with operation of the Pressurizer Level Control System, including: RCS leak rate

(CFR: 41.5 / 45.5)

Importance Rating:	3.9
Cognitive Level:	High
Technical Reference:	AOP-019, Attachment 1, Pg 21, Rev. 26
References to be provided:	None
Learning Objective:	ILC-PRZLC, Obj. 7.f Given a set of plant conditions, Predict the response of the pressurizer level control system and the effects on overall plant conditions with regard to automatic control functions, signals, and interlocks, including: Actual pressurizer level ILC-PRZPC, Obj 5.a Describe the modes of operations of the PRZPC in accord ance with plant operating procedures, including: Master Pressure Controller (Manual and Automatic)
Question Origin:	New
Comments:	None
Tier/Group:	T2/G2

57. 2024-2 NRC RO 057/BANK/C/A//TS 3.1.3.2, VM-PKP/NONE//014 K5.01/

Given the following plant conditions:

- The General Warning LED is lit for control bank 'D' rod H-14
- All 3 Data 'B' Failure LEDs are lit on the RPI display panel
- Both control bank 'D' step counters indicate 212 steps
- Rod H-14 indicates 216 steps on RPI, all other control bank 'D' rods indicate 210 steps

Based on the conditions above, which ONE of the following describes the status of rod H-14?

A. Inoperable due to mis-alignment from its group step counter position

B. Inoperable due to inability to accurately determine rod position by DRPI

C. Remains operable with actual rod position within +10, -4 steps of DRPI indication

D. ✔ Remains operable with actual rod position within +4, -10 steps of DRPI indication

Plausibility and Answer Analysis

Reason answer is correct: With the general warning LED lit above rod H-14 and all 3 Data 'B' Failure lit the Data 'B' information is no longer being processed for the rod. The accuracy with only Data 'A' information available is +4 above or -10 below the other rods in the group. Because all other rod in the group are at 210 steps the rod remains operable.

A. Incorrect. Plausible since rod H-14 at 216 steps is greater than +4 step above the indicated control bank 'D' group step counter value of 208 steps; hower this is incorrect because the requirement for the group step counter is +/- 12 step from the DRPI value and the current difference is +8 steps above the group step counter.

B. Incorrect. Plausible since rod H-14 has a general warning alarm the candidate may have the misconception that the rod position is considered indeterminate; however this incorrect because the DRPI is considered indeterminate if greater then 12 steps difference is detected between the A and B train for that rod.

C. Incorrect. Plausible since the rod is operable and is within +10 steps above the affected group; however this is incorrect because the accuracy of the DRPI system with Data 'A' information only is +4 above or -10 below the other rods in the group.

D. Correct.

014 Rod Position Indication System / SF1 RPI

014 K5.01; Knowledge of the operational implications or cause and effect relationships of the following concepts as they apply to the Rod Position Indication System: Reasons for differences between RPIS and demand position

(CFR: 41.6 / 41.7 / 45.7)

Importance Rating:	3.4
Cognitive Level:	Low
Technical Reference:	Technical Specifcation 3.1.3.2, Pg 3/4 1-17, Rev. 13 VM-PKP, Sect. 1.2, Step1.2.3, Pg 1-8, Rev. 11
References to be provided:	None
Learning Objective:	ILC-RPI, Obj. 3.c DESCRIBE the normal operation of the following: Accuracy of indicated position for any mode of operation and indication of full and half accuracy ILC-RPI, Obj. 5 Given a set of plant conditions, PREDICT the response of the RPI and the effect on overall plant operations for major component failures/malfunctions
Question Origin:	Bank
Comments:	Phonecon 4/22/2024: HNP discussed topic 014 K5.04, HNP discussed being unable to create a discriminatory system question for the topic of magnetic flux and permeability of steel housing, so Chief Examiner randomly selected a new K/A, keeping System topic 014, Rod Position Indication System. New K/A 014 K5.01: Knowledge of the operational implications or cause and effect relationships of the following concepts as they apply to the Rod Position Indication System: Reasons for differences between RPIS and demand position
Tier/Group:	T2/G2

58. 2024-2 NRC RO 058/NEW/C/A//VM-PKO-01/NONE//015 K3.02/SAT

Given the following plant conditions:

- The unit is operating at 30% power

Subsequently NI-41, Power Range Nuclear Instrument, fails high

Based on the conditions above, which ONE of the following completes the statement below?

Control rods will initially step in at ___(1)___ steps per minute due to the ___(2)___ mismatch circuit.

A. (1) 8

(2) power rate

B. (1) 8

(2) temperature

C. ✔ (1) 72

(2) power rate

D. (1) 72

(2) temperature

Plausibility and Answer Analysis

Reason answer is correct: At 30% power T_{avg} and T_{ref} will be matched at 566.54°F and the Temperature input to the rod control summing circuit will be balanced. When NI-41 fails high the power input to the summing circuit will be larger than the reference temperature provided by the turbine. As a result the Power Rate portion of the summing circuit will have a mismatch greater than 5°F which will initially send a signal for the speed-direction program to insert rods at the maximum rate of 72 step per minute in an attempt to reduce NI power to the reference temperature provided by the turbine.

A. Incorrect. *The first part is plausible since 8 steps per minute is the rod speed initially requested by the speed - direction program when the total error exceeds 3°F; however this is incorrect because the mismatch is greater than 5°F due to the power rate mismatch and the speed - direction program will insert rods at 72 steps per minute. The second part is correct.*

B. Incorrect. *The first part is plausible since 8 steps per minute is the rod speed initially requested by the speed - direction program when the total error exceeds 3°F; however this is incorrect because the mismatch is greater than 5°F due to the power rate mismatch and the speed - direction program will insert rods at 72 steps per minute. The second part is plausible since the speed - direction program total error is T_{ref} - T_{avg} the candidate may have the misconception that the temperature circuit determines the rod speed and direction; however this is incorrect because the T_{ref} has two inputs one from the turbine impulse chamber pressure and an input from the highest Power Range NI.*

C. *Correct.*

D. Incorrect. *The first part is correct. The second part is plausible since the speed - direction program total error is T_{ref} - T_{avg} the candidate may have the misconception that the temperature circuit determines the rod speed and direction; however this is incorrect because the T_{ref} has two inputs one from the turbine impulse chamber pressure and an input from the highest Power Range NI.*

015 Nuclear Instrumentation System / SF7 NI

015 K3.02; Knowledge of the effect that a loss or malfunction of the Nuclear Instrumentation System will have on the following systems or system parameters: CRDS

(CFR: 41.7 / 45.6)

Importance Rating:	3.7
Cognitive Level:	High
Technical Reference:	VM-PRO-V01, Sect. 1.2.1, Step 1.2.1.2, Pg 25, Rev. 7 EMDRAC 1364-000872, Rev. 10
References to be provided:	None
Learning Objective:	ILC-RODCS, Obj. 11.c Given a set of plant conditions, PREDICT the response of the RODCS and the effect on overall plant operations for major component failures/malfunctions, including: Power range NI channel failure
Question Origin:	New
Comments:	None
Tier/Group:	T2/G2

59. 2024-2 NRC RO 059/BANK/C/A//EOP-CSFST, USERS GUI/NONE/2013 NRC SRO 16(91)/017 A2.02/

Given the following plant conditions:

- The crew is implementing E-1, Loss Of Reactor Or Secondary Coolant
- Plant conditions are as follows:
  - CNMT pressure - 12.6 psig
  - RCS hot leg temperature - 650°F
  - The five hottest core exit thermocouples are:
    A08 - 1109°F
    B05 - 1100°F
    G02 - 857°F
    H15 - 753°F
    L14 - 734°F
  - RCS pressure - 200 psig
  - RVLIS full range level - 45%
  - The SPTOP and CSFST displays are NOT available on ERFIS

Based on the conditions above, which ONE of the following completes the statements below?

With SPTOP unavailable, core exit thermocouples ___(1)___ .

AND

The status of the Core Cooling Critical Safety Function Status Tree is ___(2)___ .

A. (1) must be read locally in PIC Room C-17

   (2) Red

B. (1) can still be read remotely in the MCR

   (2) Orange

C. (1) must be read locally in PIC Room C-17

   (2) Red

D. ✔ (1) can still be read remotely in the MCR

   (2) Orange

Reason answer is correct:

Even with SPTOP unavailable (primary indicator of core exit temperature), core exit thermcouples can still be read on the RVLIS plasma displays located in the MCR.

Since the SPTOP display and CSFSTs are unavailable the candidate must determine the status of the Core Cooling tree manually. EOP-USERS-GUIDE states, "The TC value should be considered 'greater than' if five functioning TCs are greater than the setpoint." Therefore, with the conjunction of 5 valid TC reading being greater than 730°F and RVLIS full range level being greater than 39%, CSFST Core Cooling-RED entry conditions are NOT met therefore FR-C.1 is not required to be implemented at this time.

A. Incorrect. The first part is plausible since core exit thermocouples can be read locally in PIC Room C-17 via the micropressor cabinet (as directed by AOP-004, Remote Shutdown), but in addition to SPTOP, core exit thermocouples can also be monitored in the MCR using the RVLIS plasma displays. The second part is plausible since multiple CSFSTs implement the same procedure in the event of a Red or an Orange path (FR-Z.1 for example), The candidate may determine that FR-C.1 implements the same strategy for both the Red and Orange paths.

B. Incorrect. The first part is plausible since core exit thermocouples can be read locally in PIC Room C-17 via the microprocessor cabinet (as directed by AOP-004, Remote Shutdown), but in addition to SPTOP, core exit thermocouples can also be monitored in the MCR using the RVLIS plasma displays. The second part is correct.

C. Incorrect. The first part is correct. The second part is plausible since multiple CSFSTs implement the same procedure in the event of a Red or an Orange path (FR-Z.1 for example). The candidate may determine that FR-C.1 implements the same strategy for both the Red and Orange paths.

D. Correct.

017 ITM In-Core Temperature Monitor System / SF7 ITM

017 A2.02; Ability to (a) predict the impacts of the following on the In-Core Temperature Monitor System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations: Elevated in-core temperatures that can cause or have caused core damage

(CFR: 41.5 / 43.5 / 45.3 / 45.5)

Importance Rating:	4.1
Cognitive Level:	High
Technical Reference:	EOP-Users Guide, Sect 6.21, Pg 49, Rev. 51
References to be provided:	None
Learning Objective:	EOP-LP-3.00, Obj. 5.c Identify associated remote and local instrumentation, indications, alarms, and controls for the ICCM, including: Available ICCM plasma unit display pages and how an operator accesses the individual pages EOP-LP-3.00, Obj. 7 State/Identify the four status conditions of any CSFST, including the color by which each is identified
Question Origin:	Bank HNP 2013 NRC SRO 16 modified
Comments:	None
Tier/Group:	T2/G2

60. 2024-2 NRC RO 060/BANK/FUNDAMENTAL//ILC-CVS/NONE/2012 NRC RO 61/029 191003 K1.10/SAT
With CNMT pressure at its normal value, which ONE of the following completes the statement below?

The setpoint at which 1CB-6, Vacuum Relief SB CIV, FIRST receives an open signal is ___(1)___ INWG AND will fail ___(2)___ on a loss of air.

A. (1) -1.50

(2) open

B. (1) -1.50

(2) shut

C. (1) -2.25

(2) open

D✔ (1) -2.25

(2) shut

Plausibility and Answer Analysis

Reason answer is correct: The vacuum relief valves open to relieve containment vacuum when the actuation setpoint of -2.25 inches w.g. is reached. The Air operated valve is designed to shut on a loss of air to ensure containment isolation is preserved.

A. Incorrect. The first part is plausible since this is the pressure at which check valve in the CNMT vacuum breaker lines shut; however this is incorrect because 1CB-6 will open at -2.25 inches wg. The second part is plausible since the systems has air operated dampers that fail open on a loss of air so that the spring loaded check valve in the system will be able to perform its safety function of relieving negative CNMT pressure; however this is incorrect because 1CB-6 will fail shut on loss of air. .

B. Incorrect. The first part is plausible since this is the pressure at which check valve in the CNMT vacuum breaker lines shut; however this is incorrect because 1CB-6 will open at -2.25 inches wg. The second part is correct

C. Incorrect. The first part is correct. The second part is plausible since the systems has air operated dampers that fail open on a loss of air so that the spring loaded check valve in the system will be able to perform its safety function of relieving negative CNMT pressure; however this is incorrect because 1CB-6 will fail shut on loss of air.

D. Correct.

029 Containment Purge System / SF8 CPS

029 191003 K1.10; Function and characteristics of air-operated valves, including failure modes

(CFR: 41.7)

Importance Rating:	2.8
Cognitive Level:	Low
Technical Reference:	APP-ALB-028, Window 5-1, Pg 17, Rev. 18 CPL-2165 S-1017, Rev. 7
References to be provided:	None
Learning Objective:	ILC-CVS, Obj. 5.i Identify the controls and explain the interlocks for the following: Containment vacuum reliefs
Question Origin:	Bank HNP 2012 NRC RO 61
Comments:	Phonecon 4/22/2024: HNP discussed topic 027 191003 K1.10, HNP does not have a Containment Iodine Removal System. Iodine removal is accomplished through Containment Spray scrubbing effect and NaOH addition. In addition, the Containment Spray system valves are not air operated, so Chief Examiner randomly selected a new K/A, keeping Generic Fundamental topic 191003, Controllers and Positioners. New K/A 029 191003 K1.10: Function and characteristics of air-operated valves, including failure modes
Tier/Group:	T2/G2

61. 2024-2 NRC RO 061/NEW/FUNDAMENTAL//TS 3.7.14, OP-116.01/NONE//033 K4.05/

Given the following plant conditions:

- The unit is in MODE 6 (REFUELING)
- ALB-023-4-18, SFP C HI/LO Level, has been recieved
- The WPB AO reports that Spent Fuel Pool Level has lowered approximately 5 inches in the last hour

Based on the conditions above, which ONE of the following completes the statements below?

The Spent Fuel Pool design requires a minimum boron concentration of ___(1)___ ppm in accordance with Technical Specification 3.7.14, Plant Systems - Fuel Storage Pool Boron Concentration,

AND

In accordance with OP-116.01, Fuel Pool Purification System, Chemistry ___(2)___ required to perform a boron sample/calculation following makeup to restore Spent Fuel Level to clear the alarm.

A. (1) 4000

   (2) is

B. (1) 4000

   (2) is NOT

C. ✔ (1) 2000

   (2) is

D. (1) 2000

   (2) is NOT

Plausibility and Answer Analysis

Reason answer is correct: In accordance with Technical Specification 3.7.14, the boron concentration of spent fuel pools shall be = 2000 ppm. Normal restoration of SFP level is accomplished by adding demin or purification water to the pools. Precaution and limitation 18 states "Any addition of dilution water to the refueling cavity or Spent Fuel Pools in Mode 6 that causes a measurable change in level should be followed up with a Chemistry sample to ensure boron concentration is within the acceptable limits". Additional the section for making up to the SFP C section 8.4 requires Chemistry to perform a boron sample/calculation if the addition results in a measurable change.

A. Incorrect. The first part is plausible since 4000 ppm is the boron concentration required for the ASI Tank which is one of the borated sources of water required to be maintained above a minimum value; however this is incorrect because 2000 ppm is the minimum required by tech spes in the SFPs. The second part is correct.

B. Incorrect. The first part is plausible since 4000 ppm is the boron concentration required for the ASI Tank which is one of the borated sources of water required to be maintained above a minimum value; however this is incorrect because 2000 ppm is the minimum required by tech spes in the SFPs. The second part is plausible since during 100% power operations sampling is not required due to evaporative losses; however this is incorrect because the unit is in Mode 6 which requires boron sampling to be performed when a measurable change in level has occurred.

C. Correct.

D. Incorrect. The first part is correct. The second part is plausible since during 100% power operations sampling is not required due to evaporative losses; however this is incorrect because the unit is in Mode 6 which requires boron sampling to be performed when a measurable change in level has occurred.

033 Spent Fuel Pool Cooling System / SF8 SFPCS

033 K4.05; Knowledge of Spent Fuel Pool Cooling System design features and/or interlocks that provide for the following: Adedquate SDM

(CFR: 41.7)

Importance Rating:	3.6
Cognitive Level:	Low
Technical Reference:	Techincal Specification 3.7.14, Pg 3/4 7-31, Rev. 13 OP-116.01, Sect 8.4.2, Step 8, Pg 25, Rev. 37 OP-116.01, Sect 4.0, P&L # 18, Pg 8, Rev. 37
References to be provided:	None
Learning Objective:	ILC-FHS, Obj. 7.a Given a set of plant conditions indicatinga FHS component is clearly inoperable, or parameter outside of its LCO limits, Determine which of the following Tech Spec LCOs or TRM requirements are applicable: 3.7.14, Fuel Storage Pool Boron Concentration ILC-FPC, Obj. 5 State the major precautions, limitations, and safety considerations associated with the FPC and describe their bases, suchas for: Minimum Fuel Pool/Refueling Cavity Water Level
Question Origin:	New
Comments:	Phonecon 4/22/2024: HNP discussed topic 033 K4.06, HNP discussed being unable to create a discriminatory system question for the topic of K-eff, so Chief Examiner randomly selected a new K/A, keeping System topic 033, Spent Fuel Pool Cooling System. New K/A 033 K4.05: Knowledge of Spent Fuel Pool Cooling System design features and/or interlocks that provide for the following: Adedquate SDM K/A is matched since the applicant must demonstrate knowledge of
Tier/Group:	T2/G2

62. 2024-2 NRC RO 062/NEW/FUNDAMENTAL//OP-116, AOP-041/NONE//034 K6.05/

Given the following plant conditions:

- The unit is in Mode 6 with refueling is in progress

Subsequently the following occurs:

- ALB-023-4-19, Spent FP In Low Flow, alarms
- ALB-023-4-14, Fuel Pool PNL F-P7 Trbl, alarms
- Fuel Pool Cooling Pump 1&4A has tripped

Based on the conditions above, which ONE of the following completes the statements below?

ALB-023-4-16, Spent FP Hi Temp, will alarm when the Spent fuel Pool FIRST reaches a water temperature of ___(1)___ °F.

AND

In accordance with AOP-041, Spent Fuel Pool Events, rising Spent Fuel Temperature ___(2)___ a criteria used to suspend movement of fuel as a result of the requirement to evacuate the Fuel Handling Building.

A. (1) 135

(2) is

B. (1) 135

(2) is NOT

C. (1) 105

(2) is

D. ✔ (1) 105

(2) is NOT

Plausibility and Answer Analysis

Reason answer is correct: The Spent Fuel Pools High water temperature alarm is received at 105°F. AOP-041 prioritizes Spent Fuel Pool Level over SFP temperature and if ALL fuel assemblies are not safely positioned the lowering SFP level section of AOP-041 will direct placing fuel in safe storage and suspending further fuel movements.

A. Incorrect. The first part is plausible since it is the limit at which the SFP Demineralizer must be removed from service to prevent resin damage; however this is incorrect because the water temperature at which the SFP alarm is received is 105°F. The second part is plausible since the FHB environment will become very humid making it difficult to operate the Fuel Handling Bridge equipment it would be more conservative to suspend movement of fuel; however this is incorrect because in AOP-041 Spent Fuel temperature is a long term concern and does not suspend fuel movement or evacuate the FHB based on SFP temperature. In addition, AOP-041 has requirments to the evacuate the FHB; however one of those conditions is not based on reising SFP temperature.

B. Incorrect. The first part is plausible since it is the limit at which the SFP Demineralizer must be removed from service to prevent resin damage; however this is incorrect because the water temperature at which the SFP alarm is received is 105°F. The second part is correct.

C. Incorrect. The first part is correct. The second part is plausible since the FHB environment will become very humid making it difficult to operate the Fuel Handling Bridge equipment it would be more conservative to suspend movement of fuel; however this is incorrect because in AOP-041 Spent Fuel temperature is a long term concern and does not suspend fuel movement or evacuate the FHB based on SFP temperature. In addition, AOP-041 has requirments to the evacuate the FHB; however one of those conditions is not based on reising SFP temperature.

D. Correct.

034 Fuel Handling Equipment System / SF8 FHS

034 K6.05; Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the Fuel Handling Equipment System: SFPCS

(CFR: 41.6 / 41.7 / 43.5 / 45 .7)

Importance Rating:	3.3
Cognitive Level:	Low
Technical Reference:	APP-ALB-023, Window 4-16, Pg 125, Rev. 52 AOP-041, Attachment 3, Pg 26, Rev. 8
References to be provided:	None
Learning Objective:	ILC-FPC, Obj. 5.a State the major precautions, limitations, and safety considerations associated with the FPC and describe their bases, such as for: Max Fuel Pool Temperature AOP-LP-3.41, Obj. 3 Given a set of plant conditions, Determine the plant response and appropriate operator actions in accordance with AOP-041
Question Origin:	New
Comments:	None
Tier/Group:	T2/G2

63. 2024-2 NRC RO 063/NEW/FUNDAMENTAL//OP-173, ALB-030/NONE//050 K1.01/SAT

Which of the following identifies ALL of the Radiation Monitoring System conditions that will cause a Control Room (Area HVAC) Isolation Signal (CRIS)?

1. High Radiation signal at the Normal Outside Air Intake (OAI)
2. High Radiation signal at EITHER Post-Accident Outside Air Intakes (OAI)
3. Power Failure to Radiation Monitor

(NOTE consider each cause independent of each other)

A. 1 and 2 ONLY

B. 2 and 3 ONLY

C. 1 and 3 ONLY

D. ✓ 1, 2, and 3

Plausibility and Answer Analysis

Reason answer is correct: Regarding the RMS, the following will cause a Control Room Area HVAC Isolation Signal: (1) Power Failure to Radiation Monitor (2) High Radiation Level at Normal OAI at either Post Accident OAI (3) Smoke Detection Signal from Zone 1-150 on the Main Return Ventilation Duct (4) SI Signal. Based on this, the questions lists all three conditions therefore, making all three correct.

A. Incorrect. Plausible since # 1 and 2 are not the ONLY causes. #3 is also a cause.

B. Incorrect. Plausible since # 2 and 3 are not the ONLY causes. #1 is also a cause.

C. Incorrect. Plausible since # 1 and 3 are not the ONLY causes. #2 is also a cause.

D. Correct.

050 Control Room Ventilation System / SF9 CRV

050 K1.01; Knowledge of the physical connections and/or cause and effect relationships between the Control Room Ventilation and the following systems: RMS

(CFR: 41.2 to 41.9 / 45.7 / 45.8)

Importance Rating:	3.5
Cognitive Level:	Low
Technical Reference:	APP-ALB-030, Window 1-1, Pg 3, Rev. 46 OP-173, Sect. 8.1, Note prior to Step 1, Pg 11, Rev. 40
References to be provided:	None
Learning Objective:	ILC-CRAV, Obj. 4 LIST the signals that will actuate Control Room Area Ventilation System isolation
Question Origin:	New
Comments:	None
Tier/Group:	T2/G2

64. 2024-2 NRC RO 064/NEW/FUNDAMENTAL//AD-OP-ALL-0108/NONE//G2.1.3/SAT

In accordance with AD-OP-ALL-0108, Turnover and Shift Brief Process, which ONE of the following completes the statements below?

As part of turnover, the oncoming Reactor Operator is required to perform a control board walk down ___(1)___ the off-going Operator.

After turnover is complete and the shift position is ready to be assumed, ___(2)___ Operator(s) is (are) required to annotate the turnover in eSOMS using the 'RED' hand feature.

A. (1) independent of

   (2) BOTH the oncoming and off-going

B. (1) independent of

   (2) ONLY the on-coming

C. (1) with

   (2) BOTH the oncoming and off-going

D. ✔ (1) with

   (2) ONLY the on-coming

Plausibility and Answer Analysis

Reason answer is correct: In accordance with AD-OP-ALL-0108, section 5.1.12, the Oncoming ROs are to conduct control board walk downs with an off-going Operator. In accordance with section 5.1.17 and the eSOMS User Guide, the 'RED' hand feature is to be used to assume a shift position. This will sign off the person you are relieving at the same time it signs you in.

A. Incorrect. The first part is plausible since there are other activities amongst paired ROs that are done independently [e.g., clearances, IVs]. The second part is plausible since there are some administrative tasks where both ROs are required to sign off [e.g., a surveillance which is turned over from one shift to another before being completed].

B. Incorrect. The first part is plausible since there are other activities amongst paired ROs that are done independently [e.g., clearances, IVs]. The second part is correct.

C. Incorrect. The first part is correct. The second part is plausible since there are some administrative tasks where both ROs are required to sign off [e.g., a surveillance which is turned over from one shift to another before being completed].

D. Correct

Generic Knowledge and Abilities / Conduct of Operations

G2.1.3; Knowledge of shift or short-term relief turnover practices

(CFR: 41.10 / 45.13)

Importance Rating:	3.7
Cognitive Level:	Low
Technical Reference:	AD-OP-ALL-0108, Sect. 5.1, Step 12, Pg 8, Rev. 2 AD-OP-ALL-0108, Sect. 5.1, Step 17, Pg 9, Rev. 2 eSOMs User Guide, Assuming a Shift Position, Pg 2, Rev. 1
References to be provided:	None
Learning Objective:	No objective tie to AD-OP-ALL-0108. This is included as part of OJO on-shift time [520 hours].
Question Origin:	New
Comments:	None
Tier/Group:	T3

65. 2024-2 NRC RO 065/NEW/FUNDAMENTAL//AD-OP-ALL-1000, AD-H/NONE//G2.1.38/SAT

Which ONE of the following completes the statements with regard to conduct of operations?

In accordance with AD-OP-ALL-1000, Conduct of Operations, during steady state operations a peer check for a Control Room Surveillance Area equipment manipulation done in accordance with a system Operating Procedure ___(1)___ be waived by the Control Room Supervisor or Shift Manager.

In accordance with AD-HU-ALL-0005, Human Performance Tools, while performing manipulations on plant components requiring peer checks, ___(2)___ is (are) required to verbalize the correct component identifier and intended action.

A. (1) can

(2) ONLY the performer

B. ✔ (1) can

(2) BOTH the performer and the peer checker

C. (1) cannot

(2) ONLY the performer

D. (1) cannot

(2) BOTH the performer and the peer checker

Plausibility and Answer Analysis

Reason answer is correct: In accordance with AD-OP-ALL-1000, section 5.5.11.1.b.(1)(a), the CRS or SM may waive this requirement in the Control Room if unforeseen circumstances warrant it being impractical or resources are not reasonably available. In accordance with AD-HU-ALL-0005, attachment 10, the PERFORMER verbalizes the correct component, intended action, and expected outcome to the PEER. The PEER repeats the correct component identifier, intended action, and expected outcome.

A. Incorrect. The first part is correct. The second part is plausible since once could believe that the peer checker is only required to verbalize the correct component and and NOT be required to also verbalize the intended action as well as the expected outcome.

B. Correct.

C. Incorrect. The first part is plausible since there are many operational evolutions that do not have a caveat for waiving procedural requirments. Waiving items that are routinely considered normal have special circumstances. In the case of a peer check during steady state operations, it can be perceived as an item where the peer check standards cannot be deviated from. The second part is plausible since once could believe that the peer checker is only required to verbalize the correct component and and NOT be required to also verbalize the intended action as well as the expected outcome.

D. Incorrect. The first part is plausible since there are many operational evolutions that do not have a caveat for waiving procedural requirments. Waiving items that are routinely considered normal have special circumstances. In the case of a peer check during steady state operations, it can be perceived as an item where the peer check standards cannot be deviated from. The second part is correct.

Generic Knowledge and Abilities / Conduct of Operations

G2.1.38; Knowledge of the station's requirements for verbal communications when implementing procedures

(CFR: 41.10 / 45.13)

Importance Rating:	3.7
Cognitive Level:	Low
Technical Reference:	AOP-OP-ALL-1000, Sect. 5.5.11, Step 1.b(1)(a), Pg 40 and 41 Rev. 22 AOP-HU-ALL-0005, Attachment 10, Pg 31, Rev. 6
References to be provided:	None
Learning Objective:	PP-LP-3.00, Obj. 8.h DESCRIBE the procedural requirements concerning the following (located in AD-OP-ALL-1000 unless otherwise noted): Peer Checks
Question Origin:	New
Comments:	None
Tier/Group:	T3

66. 2024-2 NRC RO 066/NEW/FUNDAMENTAL//AD-OP-ALL-0204, 1000/NONE//G2.2.2/SAT

An equipment lineup change requires the manipulation of a component on the Main Control Board

Which ONE of the following correctly completes the statements below regarding this manipulation?

In accordance with AD-OP-ALL-0204, Plant Status Control, in addition to approved technical procedures, approved ___(1)___ may be used to manipulate a component.

In accordance with AD-OP-ALL-1000, Conduct of Operations, an operator with an active license not on the operating crew ___(2)___ be the one responsible for the physical manipulation.

A. (1) work requests

   (2) can

B. (1) work requests

   (2) cannot

C. ✔ (1) clearances

   (2) can

D. (1) clearances

   (2) cannot

Plausibility and Answer Analysis

Reason answer is correct: In accordance with AD-OP-ALL-0204, section 5.2.2, there are three mechanisms which allow component manipulation: technical procedures, approved work orders, and approved clearances. In accordance with AD-OP-ALL-1000, section 5.5.10, an active licensed operator who is not the STA, SM, or CRS can manipulate components on the MCB.

A. *Incorrect. The first part is plausible since Work Requests are part of the Work Control process however, the WR needs to become a Work Order before actual manipulation can occur by this process. The second part is correct.*

B. *Incorrect. The first part is plausible since Work Requests are part of the Work Control process however, the WR needs to become a Work Order before actual manipulation can occur by this process. The second part is plausible since there are some licensed operator positions which cannot operate the Main Control Boards [STA/SM/CRS]. If the stem were replaced with CRS, then the answer would be "cannot".*

C. *Correct.*

D. *Incorrect. The first part is correct. The second part is plausible since there are some licensed operator positions which cannot operate the Main Control Boards [STA/SM/CRS]. If the stem were replaced with CRS, then the answer would be "cannot".*

Generic Knowledge and Abilities / Equipment Control

G2.2.2; Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels

(CFR: 41.6 / 41.7 / 45.2)

Importance Rating:	4.6
Cognitive Level:	High
Technical Reference:	AD-OP-ALL-0204, Sect 5.3.1, Step 3.a, Pg 18, Rev. 7 AD-OP-ALL-1000, Sect 5.5.10, Step 2, Pg 40 Rev. 22
References to be provided:	None
Learning Objective:	PP-LP-3.00, Obj. 8.a DESCRIBE the procedural requirements concerning the following (located in AD-OP-ALL-1000 unless otherwise noted): Who can perform manipulations of reactor plant controls
Question Origin:	New
Comments:	None
Tier/Group:	T3

67. 2024-2 NRC RO 067/PREVIOUS/FUNDAMENTAL//TECH SPEC TABLE 1.2/NONE/2022 NRC RO 66/G2.2.35/SAT

Which ONE of the following completes the statement below regarding Technical Specification Operational Modes?

Mode 3 is defined as HOT ___(1)___ with an average coolant temperature of ___(2)___ .

A. (1) STANDBY

   (2) > 350°F

B. (1) STANDBY

   (2) < 350°F, > 200°F

C. (1) SHUTDOWN

   (2) > 350°F

D. (1) SHUTDOWN

   (2) < 350°F, > 200°F

Plausibility and Answer Analysis

Reason answer is correct: Mode 3 (HOT STANDBY) per Tech Spec Table 1.2 is a plant condition where the Reactivity Condition (Keff) is < 0.99 and the average coolant temperature is > 350°F (T_{avg}).

A. Correct.

B. Incorrect. The first part is correct. The second part is plausible since this is the average coolant temperature requirement for Mode 4.

C. Incorrect. The first part is plausible since Mode 4 is defined as HOT SHUTDOWN The second part is correct.

D. Incorrect. Plausible since this choice would be correct for Mode 4.

Generic Knowledge and Abilities / Equipment Control

G2.2.35; Ability to determine TS for mode of operation

(CFR: 41.7 / 41.10 / 43.2 / 45.13)

Importance Rating:	3.6
Cognitive Level:	Low
Technical Reference:	Technical Specifications, Table 1.2, Pg. 1-9, Rev. 13
References to be provided:	None
Learning Objective:	TS-LP-3.0, Obj. 4.a IDENTIFY which section of the Technical Specifications contains the following information: Operational mode descriptions
Question Origin:	Previous HNP 2022 NRC RO 66
Comments:	Phonecon 4/22/2024: HNP discussed topic G2.2.20, Not a discriminatory RO job responsibility, management of the troubleshooting process, so Chief Examiner randomly selected a new generic K/A. New K/A G2.2.35: Ability to determine TS for mode of operation
Tier/Group:	T3

68. 2024-2 NRC RO 068/NEW/FUNDAMENTAL//OWP-RM-09, OP-118/NONE//G2.3.5/SAT

Given the following:

- OWP-RM-09, Radiation, Effluent, and Explosive Gas Monitoring, has been implemented for Main Steam Line radiation monitoring

Which ONE of the following completes the statements below?

There is (are) ___(1)___ radiation monitor(s) in the Main Steam System.

IF a channel HIGH signal is received on the affected radiation monitor(s) RM-23 it is indicated by the ___(2)___ LED indicator illuminating.

A. (1) 1

(2) red

B. (1) 1

(2) yellow

C. (1) 3

(2) red

D. (1) 3

(2) yellow

Plausibility and Answer Analysis

Reason answer is correct: There are three Main Steam Line radiation monitors- one per steam line [A, B, and C]. If a channel high or alert signal is received, the appropriate HIGH (red) or ALERT (yellow) indicator goes on and the corresponding backlighted channel display/control key BLINKS

A. *Incorrect. The first part is plausible since systems such as SGBD and CVPETS have only one radiation monitor even though there may be parallel flow paths. The trainee may have the misconception the main steam system is one with a common radiation monitor for the entire system. The second part is correct.*

B. *Incorrect. The first part is plausible since systems such as SGBD and CVPETS have only one radiation monitor even though there may be parallel flow paths. The trainee may have the misconception the main steam system is one with a common radiation monitor for the entire system. The second part is plausible since the radiation monitor has three indicating lights to (red, yellow, and green) to communicate the status; however the high alarm is indicated by a red LED.*

C. *Correct.*

D. *Incorrect. The first part is correct. The second part is plausible since the radiation monitor has three indicating lights to (red, yellow, and green) to communicate the status; however the high alarm is indicated by a red LED.*

Generic Knowledge and Abilities / Radiation Control

G2.3.5; Ability to use RMSs, such as fixed radiation monitors and alarms or personnel monitoring equipment

(CFR: 41.11 / 41.12 / 43.4 / 45.9)

Importance Rating:	2.9
Cognitive Level:	Low
Technical Reference:	OWP-RM-09, Sheet 1 of 3, Pg 40, Rev. 50 OP-118, Sect. 6.1, Note prior to step 1, Pg 17, Rev. 42 OP-118, Attachment 10, Pg 116, Rev. 42
References to be provided:	None
Learning Objective:	ILC-RMS, Obj. 8.b Given a set of plant conditions indicating an RMS component is clearly inoperable, DETERMINE which of the following Tech Spec LCOs are applicable: 3.3.3.1, Radiation Monitoring for Plant Operations Instrumentation ILC-RMS, Obj. 8.c Given a set of plant conditions indicating an RMS component is clearly inoperable, DETERMINE which of the following Tech Spec LCOs are applicable: 3.3.3.6, Accident Monitoring Instrumentation
Question Origin:	New
Comments:	None
Tier/Group:	T3

69. 2024-2 NRC RO 069/NEW/FUNDAMENTAL//AD-OP-ALL-1001/NONE//G2.4.14/SAT

Given plant conditions exist which warrant entry into a station Abnormal Operating Procedure (AOP) that has Immediate Actions

Which one of the following correctly completes the statements below in accordance with AD-OP-ALL-1001, Conduct of Abnormal Operations?

A Reactor Operator ___(1)___ permitted to perform immediate actions even though the Control Room Supervisor has not formally entered the AOP and provided direction to take actions.

If degrading plant conditions were to warrant entry into another AOP, it ___(2)___ generally acceptable to be in both procedures concurrently.

A. (1) is

   (2) is

B. (1) is

   (2) is NOT

C. (1) is NOT

   (2) is

D. (1) is NOT

   (2) is NOT

Plausibility and Answer Analysis

Reason answer is correct: In accordance with AD-OP-ALL-1001, Conduct of Abnormal Operations, section 5.6.3, the Reactor operator should perform Immediate Actions without direction upon entry into a procedure that contains Immediate Actions. Additionally, these Immediate Actions should not be delayed Immediate while waiting on formal entry into the Event Procedure. Section 5.7.1, alludes to the possibility that AOPs may be in effect at the same time and the CRS would delegate actions to be performed from each. It's the use of AOPs in parallel with EOPs that should be avoided.

A. Correct.

B. Incorrect. The first part is correct. The second part is plausible since the use of AOPs concurrently with EOPs should be avoided (exceptions in the EOP Users Guide are permitted such as AOP-025 concurrently with EOP-ECA-0.0 but the EOP has the priority). If the stem were revised to replace AOP with EOP, then this would be a correct answer.

C. Incorrect. The first part is plausible since all other actions outside of the Immediate Actions should wait until direction is received. If the stem was revised to replace immediate actions with follow-up actions, this would be a correct answer. The second part is correct.

D. Incorrect. The first part is plausible since all other actions outside of the Immediate Actions should wait until direction is received. If the stem were replaced with follow-up actions, this would be a correct answer. The second part is plausible since

Generic Knowledge and Abilities / Emergency Procedures/Plan

G2.4.14; Knowledge of general guidelines for emergency and abnormal operating procedures usage

(CFR: 41.10 / 43.1 / 45.13)

Importance Rating:	3.8
Cognitive Level:	Low
Technical Reference:	AD-OP-ALL-1001, Sect 5.6, Step 3.a, Pg 22, Rev. 6 AD-OP-ALL-1001, Sect 5.7.1, Step 3.d, Pg 23, Rev. 6
References to be provided:	None
Learning Objective:	AOP-LP-3.00, Obj. 8.a DESCRIBE the guidance of AD-OP-ALL-1001 for the following: Resource management during event procedures
Question Origin:	New
Comments:	None
Tier/Group:	T3

70. 2024-2 NRC RO 070/BANK/FUNDAMENTAL//GP-004, GFES-LP-2006/FORM 4.3-1//192006 K1.01/SAT

Given the following conditions:

- A reactor startup is in progress in accordance with GP-004, Reactor Startup (Mode 3 To Mode 2) following a 2-day forced outage
- Criticality has been achieved and control rods are being withdrawn to approach the Point of Adding Heat

Which ONE of the following completes the statements below?

Xenon is considered a major fission product poison during the startup because it has a large ___(1)___ cross section.

In accordance with AD-OP-ALL-0203, Reactivity Management, at the present time, the simultaneous addition of positive reactivity by more than one method other than xenon decay (i.e., control rod withdrawal and dilution) is ___(2)___ .

A. (1) fission

(2) permitted

B. (1) fission

(2) prohibited

C. (1) absorption

(2) permitted

D. ✓ (1) absorption

(2) prohibited

Plausibility and Answer Analysis

Reason answer is correct: In order to be considered a fission fragment poison, it must satisfy two criteria: (1) exist in sufficient quantity and (2) have a relatively large, microscopic cross section for absorption. The fission yield curve supports the sufficiency quantity. Because of its quantity it is continuously produced by fission and is considered a permanent poison. In the reactor, xenon-135 has about a 2.6×10^6 barns absorption cross section. GP-004 cautions When the reactor is subcritical, simultaneous addition of positive reactivity by more than one method other than xenon decay is prohibited. Additionally, AD-OP-ALL-0203, Reactivity Management, states "two positive reactivity additions shall not be made simultaneously. This does not include testing or other activities which have the potential to cause small changes in RCS temperature or RCS boron concentration where the resultant positive reactivity change would be small in relation to the shutdown margin."

A. Inorrect. The first part is plausible since it is another type of reactor kinetics cross section type and characteristic of thermal nuclear reactors (in addition to elastic and inelastic scattering). The second part is plausible since there may be a misconception that the caution in GP-004 no longer applies. While that is true, AD-OP-ALL-0203 states that regardless of criticality status during a startup, two positive reactivity additions shall not be made simultaneously. Additionally, there is a caveat on -0203 that states "small changes in relation to shutdown margin".

B*. Incorrect. The first part is plausible since it is another type of reactor kinetics cross section type and characteristic of thermal nuclear reactors (in addition to elastic and inelastic scattering). The second part is correct.*

C. Incorrect. The first part is correct. The second part is plausible since there may be a misconception that the caution in GP-004 no longer applies. While that is true, AD-OP-ALL-0203 states that regardless of criticality status during a startup, two positive reactivity additions shall not be made simultaneously. Additionally, there is a caveat on -0203 that states "small changes in relation to shutdown margin".

D. Correct.

Fission Product Poisons / Reactor Theory

192006 K1.01; Define fission product poison

(CFR: 41.1)

Importance Rating:	2.6
Cognitive Level:	Low
Technical Reference:	GFES-LP-2006, Slide 6, Rev. 4 GP-004, Sect 6.0, Caution prior to step 17, Pg 18, Rev. 69 AD-OP-ALL-0203, Sect 5.4, Step 5.4.5.3, Pg 38, Rev. 16
References to be provided:	Nureg 1021 Form 4.3-1, Generic Fundamental Equations and Conversion Sheet
Learning Objective:	LP-2006, Obj 1.1 Describe fission product poisons and how fission product poisons affect the neutron life cycle GP-LP-3.04, Obj 6 Given a scenario, recognize and apply the criteria of actions required by any GP-004 precaution and limitation GP-LP-3.04, Obj 7 Given a set of plant conditions, recognize and apply the criteria of the responsibilities of the reactor operator as listed in AD-OP-ALL-0203, Reactivity Management and .
Question Origin:	Modified (NRC Generic Fundamentals P658)
Comments:	None
Tier/Group:	T4

71. 2024-2 NRC RO 071/PREVIOUS/FUNDAMENTAL//HNP CYCLE 24 RELOAD/CYCLE 24 FIG 5 2/2022 NRC RO 71/192007 K1.04/SAT

Refer to the graph provided of critical boron concentration versus core burnup for the reactor following a refueling outage.

Which ONE of the following is PRIMARILY responsible for the shape of the curve from the middle of core life to the end of core life?

(Reference provided)

A. ✔ Fuel depletion

B. Fission product buildup

C. Burnable poison burnout

D. Conversion of U-238 to Pu-239

Plausibility and Answer Analysis

Reason answer is correct: From middle to end of core life, fuel depletion is primarily responsible for the shape of the curve.

A. Correct.

B. Incorrect. Plausible since fission product buildup adds negative reactivity over core life, but is not primarily responsible for the shape of the curve.

C. Incorrect. Plausible since burnable poison burnout affects core reactivity, but this is a positive reactivity effect which would support a rise in critical boron concentration.

D. Incorrect. Plausible since conversion of U-238 to Pu-239 adds negative reactivity over core life, but is not primarily responsible for the shape of the curve.

Fuel Depletion and Burnable Poisons / Reactor Theory

192007 K1.04; Describe how and why boron concentration changes over core life

(CFR: 41.1)

Importance Rating:	3.4
Cognitive Level:	Low
Technical Reference:	Harris Cycle 24 Reload Change Document, Pg 8
References to be provided:	HNP Cycle 24 Figure 5.2
Learning Objective:	LP-2007, Obj. 1.5 Explain the change in value of excess reactivity over core life
Question Origin:	Previous HNP 2022 NRC RO 71
Comments:	Exact K/A match in GFES bank. HNP Applicability: Replaced generic curve with HNP Cycle 24 Figure 5.2, HFP Critical Boron Concentration vs. Burnup.
Tier/Group:	T4

72. 2024-2 NRC RO 072/NEW/C/A//GP-004, FORM4.3-1/FORM 4.3-1/GFES/192008 K1.20/

Given the following plant conditions:

- A reactor startup is in progress in accordance with GP-004, Reactor Startup (Mode 3 to Mode 2)
- The Operator at the Controls has just achieved criticality and has been given direction to withdraw control rods to stabilize power at 10^{-8} amps

Current Reactor power is steady at $2x10^{-8}$ amps

Based on the conditions above, which of the following completes the statements below?

Assuming a steady 0.1 DPM Startup Rate (SUR) during control rod withdraw, it will take ___(1)___ minutes to raise power to $7x10^{-8}$ amps.

In accordance with GP-004, power is then stabilized just above the Point of Adding Heat which is between 1% and ___(2)___ .

(Reference provided)

A. ✔ (1) 5.4

(2) 3%

B. (1) 5.4

(2) 5%

C. (1) 12.5

(2) 3%

D. (1) 12.5

(2) 5%

Plausibility and Answer Analysis

Reason answer is correct: Using the equation reference sheet provided, the equation $P = P_O\ 10^{SUR\ (t)}$ is used.

Solving for time: $t = \log (P/P_O) / SUR = \log (7x10^{-8}$ amps/$2x10^{-8}$ amps) / 0.1 DPM = 5.4 minutes. In accordance with GP-004, step the Point of Adding Heat is stabilized at 1-3%.

A. Correct.

B. Incorrect. The first part is correct. The second part is plausible since GP-004 has a 5% for threshold for tripping the Reactor is a stem leak develops.

C. Incorrect. The first part is plausible since candidate may misapply the equation in the following way while solving for time: $t = ln (P/P_O) / SUR = ln (7x10^{-8}$ amps/$2x10^{-8}$ amps) / 0.1 DPM = 12.5 minutes. The second part is correct.

D. Incorrect. The first part is plausible since candidate may misapply the equation in the following way while solving for time: $t = ln (P/P_O) / SUR = ln (7x10^{-8}$ amps/$2x10^{-8}$ amps) / 0.1 DPM = 12.5 minutes. The second part is plausible since GP-004 has a 5% for threshold for tripping the Reactor is a stem leak develops.

Reactor Operational Physics / Reactor Theory

192008 K1.20; Explain the effects of control rod motion or boration/dilution on reactor power

(CFR: 41.1)

Importance Rating:	3.9
Cognitive Level:	High
Technical Reference:	GP-004, Sect. 6.0, Step 43, Pg 25, Rev. 69
References to be provided:	Nureg 1021 Form 4.3-1, Generic Fundamental Equations and Conversion Sheet
Learning Objective:	SU-SIM-3.23, Obj. 2 PERFORM a reactor start-up in accordance with GP-004 to the POAH
Question Origin:	Modified (NRC Generic Fundamentals P271)
Comments:	None
Tier/Group:	T4

73. 2024-2 NRC RO 073/BANK/C/A//STM TABLE, MOLLIER/STM TABLE, MOLLIER/GFES/193003 K1.16/

Given following plant conditions:

- A unit shutdown is in progress in accordance with GP-006, Normal Plant Shutdown from Power Operation to Hot Standby (Mode 1 to Mode 3)
- Main Condenser pressure is 1 psia

Based on the conditions above, which ONE of the following completes the statement below?

During the condenser cooling process the temperature lowers to 100°F which at this time is a _____ .

A. ✔ subcooled liquid

B. saturated liquid

C. saturated vapor

D. superheated vapor

Plausibility and Answer Analysis

Reason answer is correct: Using the Mollier Diagram or the steam tables, the saturation temperature for 1 psia is 101.69°F. Since 100°F is less than this, then the state of the Low-Pressure Turbine Exhaust is a subcooled liquid.

A. Correct.

B. Incorrect. Plausible since this is an area that can be identified on the Mollier Diagram [on the saturated vapor line separated from saturated vapor line at the critical point]

C. Incorrect. Plausible since this is an area that can be identified on the Mollier Diagram [on the saturated liquid line separated from saturated liquid line at the critical point]

D. Incorrect. Plausible since this is an area that can be identified on the Mollier Diagram [above the saturation line]

Steam / Thermodynamics Theory

193003 K1.16; Define the following terms: subcooled and compressed liquids

(CFR: 41.14)

Importance Rating:	2.7
Cognitive Level:	High
Technical Reference:	Steam Table and Mollier Diagram
References to be provided:	Steam Table and Mollier Diagram Nureg 1021 Form 4.3-1, Generic Fundamental Equations and Conversion Sheet
Learning Objective:	GFES-LP-3003, Obj. 2.1.b Use Mollier diagram and steam tables to determine properties of a fluid: Subcooled liquid
Question Origin:	Bank
Comments:	Exact K/A match in GFES bank.
Tier/Group:	T4

74. 2024-2 NRC RO 074/NEW/FUNDAMENTAL//LP-3004/NONE/GFES/193004 K1.11/
Which ONE of the following completes the statements below?

A positive effect of having condensate depression is ___(1)___ .

AND

Raising circulating water flow to the main condenser by starting an additional Circulating Water Pump would result in ___(2)___condensate depression.

(Assume NO change in condenser vacuum)

A. (1) improved secondary plant efficiency

(2) more

B. (1) improved secondary plant efficiency

(2) less

C✔ (1) sufficient NPSH to the condensate pumps

(2) more

D. (1) sufficient NPSH to the condensate pumps

(2) less

Plausibility and Answer Analysis

Reason answer is correct:

Condensate Depression is necessary to prevent cavitation of the condensate pumps at the expense of reducing secondary plant efficiency.

Condensate Depression (CD) = Tsat – Tactual

If circulating water flow to the main condenser is raised, Tactual would lower and Tsat would remain the same due to no change in condenser vacuum resulting in MORE condensate depression.

A. Incorrect. The first part is plausible since condensate depression affects secondary plant effiency; however this is incorrect since more condensate depression results in a lower secondary plant efficiency due to additional heat that will need to be added to the condensate and feedwater to reach saturation conditions in the steam generator (make steam). The second part of the distractor is correct.

B. Incorrect. The first part is plausible since condensate depression affects secondary plant effiency; however this is incorrect since more condensate depression results in a lower secondary plant efficiency due to additional heat that will need to be added to the condensate and feedwater to reach saturation conditions in the steam generator (make steam). The second part is plausible since the candidate would conclude less condensate depression based on incorrect appiclation of the condensate depression formula. i.e. (CD) = Tactual - Tsat.

C. Correct.

D. Incorrect. The first part is correct. The second part is plausible since the candidate would conclude less condensate depression based on incorrect application of the condensate depression formula. i.e. (CD) = Tactual - Tsat.

Thermodynamic Processes / Thermodynamics Theory

193004 K1.11; Describe the process of condensate depression (subcooling) and its effect on plant operation

(CFR: 41.14)

Importance Rating:	2.5
Cognitive Level:	Low
Technical Reference:	LP-3004, Slides 88 - 93, Rev. 4
References to be provided:	Nureg 1021 Form 4.3-1, Generic Fundamental Equations and Conversion Sheet
Learning Objective:	LP-3004 Obj. 2.2 Describe the condensing process to include vacuum formation and condensate depression
Question Origin:	New
Comments:	New question developed using multiple concepts tested in the GFES bank.
Tier/Group:	T4

75. 2024-2 NRC RO 075/NEW/FUNDAMENTAL//OST-1039, TS 3.2.4/NONE/GFES/193009 K1.10/ENHANCE

Given the following plant conditions:

- A unit startup is in progress in accordance with GP-005, Power Operation (Mode 2 to Mode 1)
- Reactor power is 53%
- The CRS has directed the OATC to perform OST-1039, Calculation Of Quadrant Power Tilt Ratio, Weekly Interval (with Alarm Operable).

Based on the conditions above, which ONE of the following completes the statement below regarding the calculation of the QPTR?

QPTR is calculated using ___(1)___ to ensure the Technical Specification LCO 3.2.4 limit and OST-1039 acceptance criteria of ____(2)____ is met with power >50%.

Technical Specification Title:
3.2.4, Power Distrubition Limits - Quadrant Power Tilt Ratio

A. (1) Movable Incore Detectors

(2) 1.02

B. (1) Movable Incore Detectors

(2) 1.09

C✔ (1) Excore Nuclear Instrumentation

(2) 1.02

D. (1) Excore Nuclear Instrumentation

(2) 1.09

Plausibility and Answer Analysis

Reason answer is correct: OST-1039 purpose: The Power Range Detector Currents will be recorded and compared with calculated full power normalized currents to determine the upper and lower quadrant power tilt ratios. Also, Technical Specifications definition of QPTR (K/A tie): QUADRANT POWER TILT RATIO shall be the ratio of the maximum upper excore detector calibrated output to the average of the upper excore detector calibrated outputs, or the ratio of the maximum lower excore detector calibrated output to the average of the lower excore detector calibrated outputs, whichever is greater. OST-1039 will be completed satisfactorily if the Quadrant Power Tilt Ratio when measured at greater than 50% Rated Thermal Power is less than or equal to 1.02.

A. Incorrect. The first part is plausible since MIDS is an instrumentation system that measures neutron flux distribution at any core height at select locations (could be perceived as "quadrants") within the reactor core however, it is PRNI upper and lower currents that are used for QPTR calculations. The second part is correct.

B. Incorrect. The first part is plausible since MIDS is an instrumentation system that measures neutron flux distribution at any core height at select locations (could be perceived as "quadrants") within the reactor core however, it is PRNI upper and lower currents that are used for QPTR calculations. The second part is plausible since 1.09 is the Technical Specification 3.2.4 action a. upper limit which QPTR must not exceed while QPTR is calculated hourly until QPTR is reduced to within its limit or power is reduced to less than 50%.

C. Correct.

D. Incorrect. The first part is correct. The second part is plausible since 1.09 is the Technical Specification 3.2.4 action a. upper limit which QPTR must not exceed while QPTR is calculated hourly until QPTR is reduced to within its limit or power is reduced to less than 50%.

Core Thermal Limits / Thermodynamics Theory

193009 K1.10; Define and calculate quadrant tilt (symmetric offset) ratio

(CFR: 41.14)

Importance Rating:	3.3
Cognitive Level:	Low
Technical Reference:	OST-1039, Sect. 9.5, Procedure # 7, Pg 14, Rev. 20 Technical Specification 3.2.4, Pg 3/4 2-11, Rev. 13
References to be provided:	None
Learning Objective:	ILC-NI, Obj. 6.c IDENTIFY associated remote and local instrumentation, indications, alarms, and controls associated with the following: PR upper detector high flux deviation or automatic defeat ILC-NI, Obj. 6.d IDENTIFY associated remote and local instrumentation, indications, alarms, and controls associated with the following: PR lower detector high flux deviation or automatic defeat ILC-NI, Obj. 10.f Given a set of plant conditions indicating a NIS component is clearly inoperable, or parameter outside its LCO limits, DETERMINE which of the following Tech Spec LCOs or TRM requirements are applicable: 3.2.4 QPTR
Question Origin:	New
Comments:	None
Tier/Group:	T4

You have completed the test!